URBAN OCEAN

PROJECT STATEMENT

Can Tho

Enhancing Can Tho's River Waste Management and Recycling Facilities

Contents

01. INTRODUCTION 3

02. CONTEXT 5

2.1. The City and its River 5

2.2 The City's Waste Management System 6

03. PROJECT JUSTIFICATION 7

3.1. Challenges 8

3.2. Opportunities 9

3.3. Translating the Opportunities into a Project 10

3.4. Goal 10

04. PROJECT DESCRIPTION 11

4.1. Study 12

4.2. Campaign 14

4.3. Waste Collection Fee 16

4.4. Governance - Setting Up an Appropriate Governance Model to Manage Waste Collection 17

4.5. Pilot Waste Separation and Recycling Facility 18

4.6. Further Understanding the Resilience Value 24

05. ROADMAP FOR IMPLEMENTATION 25

5.1. Institutional Arrangements 25

5.2. Implementation Timeline 27

06. ANNEX 29

07. FURTHER READING 30

ENDNOTES 30

Team members

OCEAN CONSERVANCY

Keri Browder, Chever Voltmer

R-CITIES

Katrin Bruebach, Luciana Cardoso, Saurabh Gaidhani, Nini Purwajati, Alvaro Soldevilla

THE CIRCULATE INITIATIVE

Ellen Martin

TEAM CAN THO

Luu Tan Tai, La So Sen, Duog Thanh Van, Dinh Diep Anh Tuan

Introduction

● URBAN OCEAN MENTOR CITIES

● URBAN OCEAN LEARNING CITIES

* Chennai was welcomed as an additional city to the first cohort in August 2021 and it is working through an accelerated program order

Overview of the Urban Ocean Challenge

Cities are home to over half of the global population and account for nearly three-quarters of global greenhouse gas (GHG) emissions[1]. The Covid-19 pandemic could push between 71 and 100 million people into extreme poverty, of which 30 percent will reside in urban centers[2]. No climate nor social target will be met without a deep transformation of urban centers towards a more inclusive, sustainable and, ultimately, resilient path. Approaching urban waste management systems through a resilience lens reveals the complex, interrelated ramifications for social, economic, and environmental indicators. It is estimated that the waste management sector alone has the potential to create 45 million jobs globally and reduce GHG emissions by 15 to 20 percent[3]. At the same time, the circular economy offers a $4.5 trillion economic opportunity by reducing waste, stimulating innovation, and creating employment by 2030[4]. Adding a layer of complexity by including the marine plastic debris challenge can push cities towards rethinking their relationship with the ocean. So, a huge opportunity exists for city governments to implement policies and projects that promote a more resilient and circular waste sector in their cities. Now is the time to set out the path towards a more resilient urban-ocean relationship.

Program Objective

The Urban Ocean program aims to work with city leaders to bring new ideas, partners, and resources together to solve interrelated resilience challenges related to waste management, to reduce plastic leakage and to protect water bodies and the ocean. Urban Ocean provides the platform for ocean advocates and city leaders to join forces with other allies to develop comprehensive solutions that meet the needs and priorities of governments, cities, communities and other actors to create real and lasting impact. The program demonstrates how actions to improve waste management and recycling can provide resilient and sustainable solutions that reduce ocean plastic pollution and address key city priorities, such as improving public health, supporting economic development, and reducing greenhouse gas emissions. Furthermore, Urban Ocean provides cities with the opportunity to showcase leadership and share knowledge and experience across the Resilient Cities Network (R-Cities) community and beyond.

Project Statement

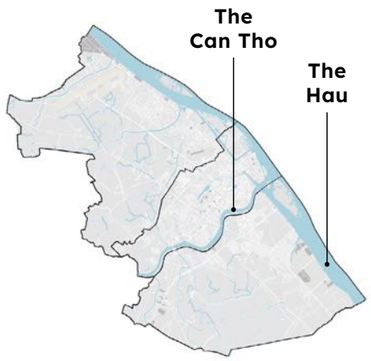
This Project Statement is the result of two years of work and dedication of Can Tho and trusted partners to develop specific actions the city wants to advance solutions to address plastic waste challenges. It is based on a rigorous gap assessment process and several capacity-building sessions that helped the city to pinpoint the best opportunities for impact and formulate data-driven, multipronged approaches to implement locally. It outlines the context and the needs of the city on which the project builds. It provides the vision and an outline of the impact the city is trying to achieve.

Context

The City and its rivers

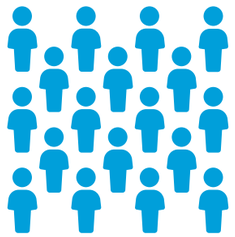
The city has a dense network of river channels and canals, connecting

2 major rivers



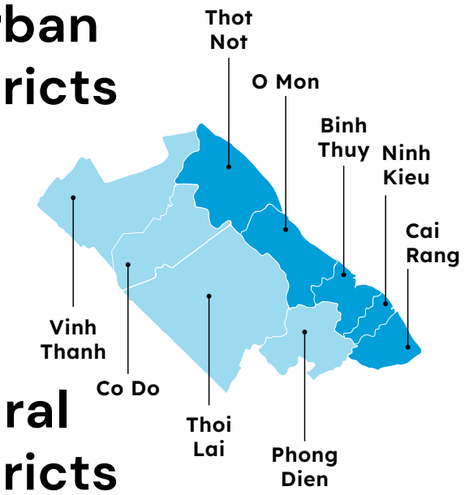
1.23 million

population in 2019



5 urban districts

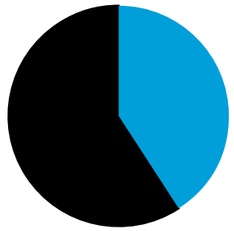
4 rural districts



The total amount of water flowing into the sea is about

200 billion m³/year

Accounting for about



41%

of the total water of the whole Mekong system[5]

A record tidal peak (in the range 2.2–2.25 m) in 2018 inundated

62 out of 63 streets

in Ninh Kieu District, with a flood depth in many streets reaching

0.6 m.

Can Tho is the largest city in the flat Vietnamese Mekong Delta region, situated on the left bank of the Hau Giang River and 145 km southwest of Ho Chi Minh City. The city is famous for its waters and rice. But today, it faces enormous challenges due to economic modernization and industrialization, urban growth, and climate change. Its once-productive agricultural sites currently struggle with anthropogenic changes, flooding, contamination, and displacement of farmers. To address these challenges, the city has been combining high-tech solutions for agricultural practices, becoming a hub for agricultural innovation in the region.

The section of the Hau River in Can Tho City is about 60 km long and up to 1,500 m wide. The river system in Can Tho mainly facilitates commercial activities and is an important route for transporting goods such as food and aquatic products. The Mekong River is the longest river in Southeast Asia and crosses several international borders. The Mekong Delta is a development priority for Viet Nam because of its high density and food potential. So, key planning and coordination instruments have been developed, including a 1994 master plan with the support of the United Nations, and a River Basin Organization established in 2005 with the support of the World Bank and the Vietnamese Ministry of Agriculture and Rural Development. Although these instruments include some decentralization efforts, the role of local authorities in river management is limited.

The Hau River's water regime is divided into two seasons: the dry and flood seasons. On average, the Hau River's water flow in Can Tho being 14,800 m³/s, but it varies significantly between seasons. The flood season is from July to December, peaking in September and October when the flow reaches its maximum of 40,000 m³/s. The dry season is from January to June, with the lowest flow rate in March and April at only 2,000 m³/s, the river's level in Can Tho being only 48 cm higher than sea level at that point . According to a study by Hiroshi Takagi and colleagues , ocean tides from the East Sea predominantly determine water elevation in Can Tho City, even though Can Tho is situated about 80 km inland from the rivermouth at Dinh An. Three tidal components of semidiurnal, diurnal, and annual cycles were found to be the dominant factors in the water surface variations of the Hau River. The river flow causes tidal damping and effectively reduces the energy of the incoming tides. This tidal damping is especially pronounced during the flood season.

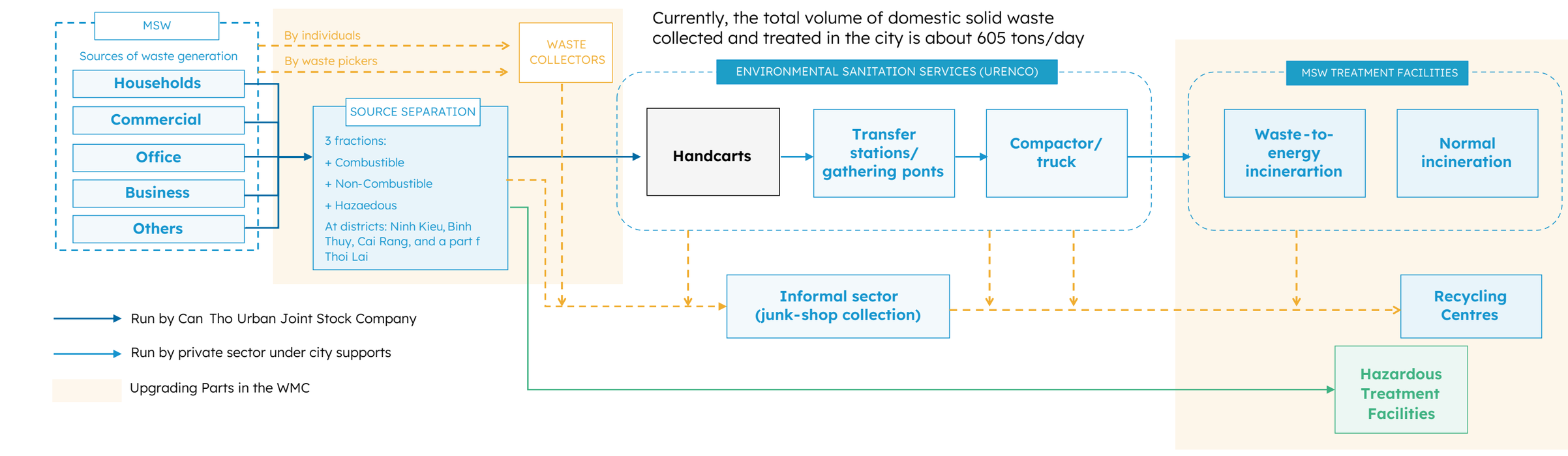
This hydrological ecosystem, combined with rapid climate change, puts the city at risk of flooding. In general, the population has historically adapted to the regular patterns of seasonal flooding, but as such events become less predictable and more damaging, new challenges arise. The urban poor are disproportionately exposed to flooding, storms, and other natural hazards, generating greater risks to low-income households on canals and riverbeds, particularly in terms of safety and health. In addition, the urban poor tend to depend on rice and fish for sustenance and employment, but the shift towards high-tech agriculture may also have negative consequences for this population. Finally, rapid, uncontrolled urbanization, coupled with insufficient, aging sanitation infrastructure, presents challenges in terms of the city's economic attractiveness and adverse health impacts.

The City´s Waste Management System

During the period 2015-2020, it was estimated that the total volume of domestic solid waste generated was 930 tons/day, while the amount being collected and treated in the city was about 630 tons/day . Still, qualitative research indicates that it is difficult to access waste collection services in rural areas or far from residential areas. The city's solid waste is collected and transported to a waste-to-energy (WtE) plant located in Thoi Lai District or the treatment zones in O Mon District, Co Do District, Thot Not District, and Vinh Thanh district. Currently, most of the municipal solid waste in the city is mainly treated by the WtE plant, which was awarded to Everbright International Co. Ltd (China) following a bidding process in a build-operate-own model. The WtE plant, which started in 2018, can process about 400 tons of waste per day and generate 60 million kWh of electricity per year, being expected to process about 70 percent of domestic waste in Can Tho. Growing urbanization, economic development, and improved living standards and lifestyles have caused a sharp growth in municipal solid waste (MSW), especially in Can Tho's urban districts. The city envisions that by 2030, 100 percent of municipal solid waste will be collected and treated, and 90 percent of waste will be recycled, reused, and recovered to produce energy or organic fertilizer to ensure environmental safety. Also, the Can Tho city vision states that in rural areas, 90 percent of waste generated in rural residential areas and 100 percent of waste generated in craft villages should be collected and treated to create a pollution-free and improved environment. Still, achieving the city's vision may be difficult, because waste generation is increasing and will likely exceed the treatment capacity of the existing plant and landfills in the coming years.

The recycling sector in Can Tho is completely informal and is considered an important component of waste collection and management in the city. Plastics account for a relatively small proportion (estimated at 6-9 percent) of the entire household solid waste stream in Can Tho City. Most of the domestic waste is organic, biodegradable food waste (estimated 75-85 percent). Even though certain rural households compost, the activity's potential to support food security and livelihoods is limited by the lack of a marketplace for selling organic fertilizers in Can Tho. Surveys and interviews show that farmers tend to use chemical fertilizers, leading to environmental and health risks.

CAN THO'S WASTE FLOW CHART



Project Justification

In January 2022, the revised Law on Environmental Protection (LEP) 2020 came into effect in Viet Nam. The law highlights the responsibilities of ministries and local governments to integrate the circular economy in planning strategies, development plans, waste management, and waste recycling. More specifically, it requires localities to ensure (1) that 100 percent of waste is classified at source according to the types specified; (2) the development of a plan to collect and treat solid waste according to volume. In addition, conscious of growing marine litter pollution, Viet Nam has also launched a national action plan for the management of marine plastic litter, aiming to reduce Viet Nam's marine plastic debris by 75 percent by 2030. By then, the country will seek to have eliminated single-use plastics and non-biodegradable plastic bags from all coastal tourism areas. In parallel, protected marine areas should become free of plastic litter. The government also demonstrated a strong dedication to sustainable development and tackling climate change at the 2021 United Nations Climate Change Conference ("COP26") with its commitment to achieve net-zero carbon emissions by 2050. However, building a circular economy requires more than just facilitating recycling and reuse practices: it needs a hierarchical transformation in distribution and consumption at all levels – production, businesses, consumers, eco-industrial parks, cities, regions, and the country.

Cities have to play a major role for the government to achieve its targets, and Can Tho is committed to moving forward with increased efforts in improving and facilitating waste management and recycling. The new legal framework can establish a broader classification of waste, increase the demand for new solutions and create an enabling environment for the recycling industry to grow in the city. To guide this growth and guarantee that it will yield multiple benefits, including sustainable economic development, the municipality is looking for integrated solutions that reduce waste leakage into rivers and enhance the collection and treatment of river waste. To properly steer this work, the municipality relies on strong commitment and capacity:

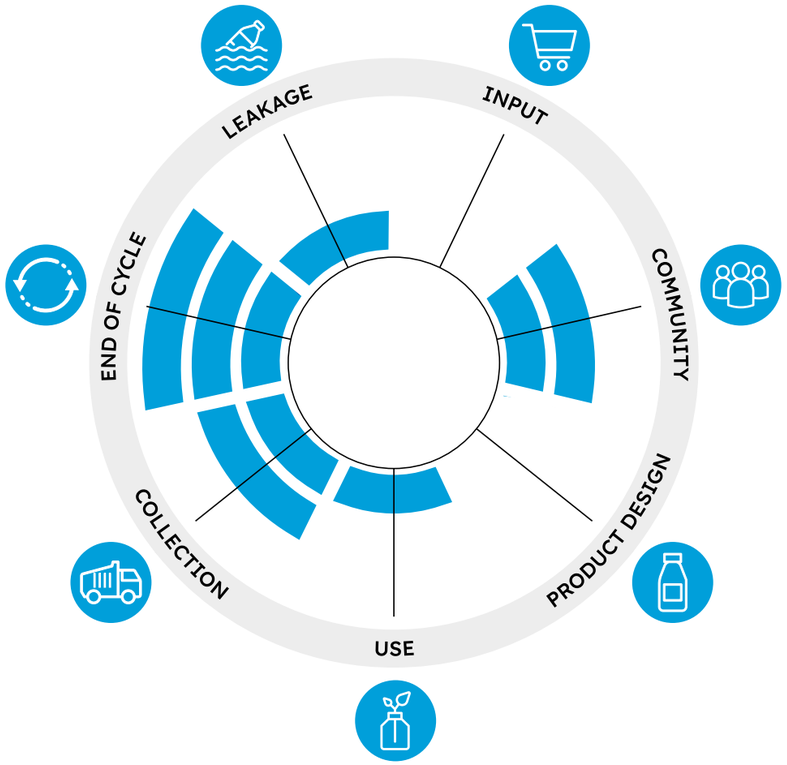
- The new Law on Environmental Protection sets out obligations for the city; therefore, the city needs to upgrade its waste categorization in council regulations.
- Can Tho has a track record of successful partnerships to pilot garbage collection devices and for the development of waste management infrastructure, particularly the WtE plant
- As an innovation hub and rapidly modernizing economy, the city is well-positioned to create an enabling environment for recycling businesses to thrive, generating employment and improving the city's tourism and cleanness.

So, through the Urban Ocean gap assessment, the city has been able to identify its main challenges and prioritize them to come up with opportunities that may yield multiple benefits. These opportunities have been structured as initiatives with different areas of intervention. The following sections document this process by highlighting the challenges and opportunities identified, and how they have been translated into a project with agreed-upon goals.

Challenges

The Circularity Assessment Protocol (CAP) tool captured weaknesses and strengths in Can Tho's waste management, which were discussed in Opportunity Assessment Tool (OAT) sessions. The key points highlighted and prioritized during OAT sessions by local stakeholders and officials were:

- The city council is carrying out pilot projects to test waste collection devices in the river. However, there is a technical gap for developing and deploying solutions to segregate, clean and treat the floating waste collected from the river
- The waste collection devices in the two rivers in Can Tho are restricted to only a few locations because the initiative has no scale-up plan that integrates the financial sustainability of the devices.
- Leakage of waste into rivers in Can Tho originates mostly from illegal dumping practices in the city rather than littering.
- The city's waste transfer stations/points are running out of storage space for waste, particularly the transfer stations/ points in the inner-city area, which could potentially create environmental and health risks to the city.
- The city's municipal waste is classified as "burnable", "non-burnable", and "hazardous", not only limiting the possibility of recycling or reusing waste sources, but not aligning with the LEP. This classification has been useful for the WtE plant, but it limits the potential for strengthening the recycling industry in the city.
- The recycling sector in Can Tho is completely informal and largely unregulated.



Opportunities

During the Urban Ocean gap assessment phase, the city led participatory workshops to identify the main opportunities for improving its waste management sector and building resilient societies and economies.

1. Clean rivers: waste collection schemes in rivers

The city has identified a governance gap in the city's river waste management issue. The city lacks an entity or institution within the council that has a clear mandate to manage solid waste in rivers. Meanwhile, the issue has received more public attention and the city council has started implementing solutions, such as trash-trap devices, which could potentially be scaled up. The city is actively looking for solutions to improve its river management and decrease pollution.

- The opportunity has the potential to strengthen the tourism sector in the city, as the city's attractiveness is partially due to the canals.
- The city is exploring how to attract more private participation in collecting and sorting the waste from rivers.

2. Waste collection systems (improved collection vehicles and transfer stations)

The city agrees that the current waste collection infrastructure is inadequate – mainly the collection vehicles and transfer stations. There are opportunities for improvement by using technology to improve operational and environmental efficiency. The city would also like to explore how this infrastructure could be better suited to the local urban fabric, particularly in the inner city, where alleys are narrower. In addition, as the collection is decentralized by district, there is an opportunity to standardize the requirements for infrastructure and so modernize it.

3. Sustainable consumption Recycling, reuse and treatment facility.

There is an urgent need to improve separation at source, so the collected waste can be used as input for different sectors, such as alternative materials for packaging. It is agreed that the first step to improving waste separation at source is to change waste classification in the city. Successful pilots to enhance separation at source have been carried out, and many businesses in Can Tho are already creating more sustainable products, so there is an opportunity to work with the private sector.

- The city's recycling sector is much smaller than the demand for recycled products, and it is estimated that the recycling industry could potentially grow to twice its current size. In particular, there is great potential for rethinking the disposal of organic waste, since products such as organic fertilizer have not been explored and could find a market in the city.
- The city prioritizes strengthening the recycling industry and it recognizes the need to create an enabling innovation environment that can support local businesses and small/medium enterprises in the recycling sector.

Translating the Opportunities into a Project

The project below has been designed not only to address the challenges identified but also to use the friendly national regulatory environment for improving environmental concerns within the waste management system. Following the National Strategy issued on 7 May 2018, which sets integrated waste management targets for Viet Nam, Can Tho has adopted the ambitious goal of having 100 percent of municipal solid waste collected and treated by 2030 . The city council is already exploring solutions to address the challenges raised, such as:

- Plans to upgrade waste collection infrastructure, particularly the transfer stations/points and transport vehicles.
- Calculations for waste collection fees according to waste volumes and types. Not only will this support the financial sustainability of the system, but it will generate data that will allow the city to better monitor and upgrade the waste collection system.

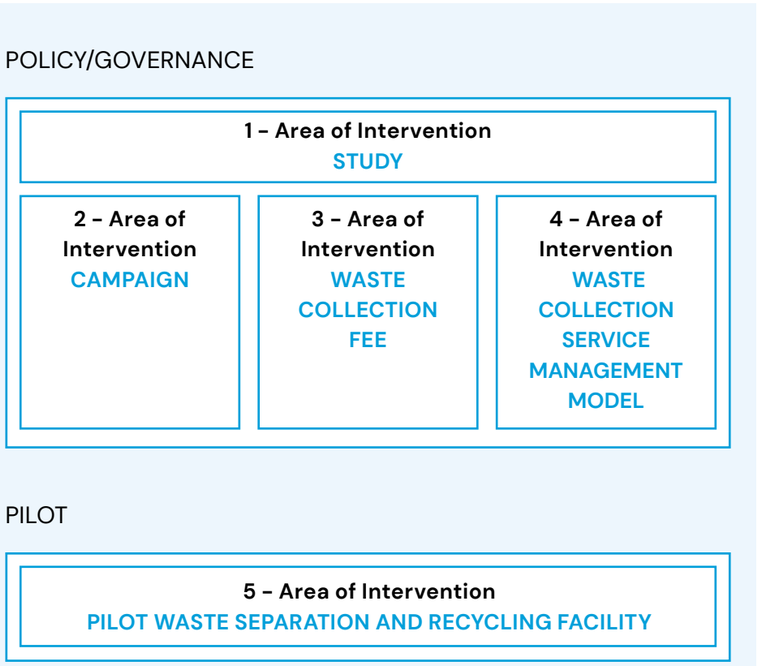
This project takes one step further towards finding integrated solutions that will help the city achieve its goals while building its overall resilience. So, in the context of the Law on Environmental Protection, the city also needs to take this opportunity to address the limitation of its waste classification. Apart from the “burnable”, “non-burnable”, and “hazardous” categories, the city needs to include other materials such as plastics, paper, organic, etc. so it can increase waste separation at source and allow for recycling businesses to be created.

The project is built on the city’s extensive experience in building partnerships, investing in new technology, and supporting pilots to increase community awareness. For the past few years, the city has been testing trash traps in Song Hong, including in collaboration with Ocean Conservancy and partners, and along the river and its tributaries in Nam Dinh Province. To strengthen this existing collection system, the city aims to develop an appropriate institutional structure and business concept to support waste segregation and collection, particularly focusing on infrastructure to separate and clean materials.

Goal

This project’s goal is to create an enabling environment for recycling businesses to prosper that will demonstrate how a well-managed waste cycle in urban areas can enhance tourism, economic activity, and equity, while also supporting the cleaning of the city’s rivers.

Project Description



The Can Tho Urban Ocean initiative is changing the relationship between the city and the waste it produces. It envisions to strengthening of the recycling industry from a resilience and circularity perspective and incorporates activities to add value to materials, reduce the amount of waste being produced, decrease health and environmental risks associated with inadequate waste disposal, and allow for the economic and social benefits of enlarging the recycling industry.

A resilient city promotes sustainable development, wellbeing, and inclusive growth in areas of governance, economy, society, and the environment. The city would like to improve the classification process more thoroughly according to the provisions of the new Law on Environmental Protection (2020). This requires solutions to upgrade waste categorization and include waste separation, manage waste floating in and leaking into the rivers, and upgrade transfer stations, particularly in the inner-city area. These solutions are related to the two opportunity areas which provide some resilience co-benefits:

To achieve the city's goal, the project Enhancing Can Tho's River Waste Management and Recycling Facilities will include several parts, ranging from study to pilot case implementations. The city will:

1. Develop a study to understand waste separation according to the new Law on Environmental Protection and evaluate the value chain of recyclable waste types.
2. Create a campaign to raise awareness and increase citizen participation in waste separation.
3. Define a sustainable waste collection fee in close consultation with citizens and businesses.
4. Identify and test multiple service management models for waste collection (including private-public partnerships and community models) to define the appropriate structure.
5. Develop and implement a pilot project on a waste separation and treatment facility.

1 - Study

Study to Understand Waste Separation According to the New Law on Environmental Protection and Evaluate the Value Chain of Recyclable Waste Types

Can Tho waste-to-power plant

OVERVIEW

In accordance with the new Law on Environmental Protection, the study will evaluate regulations for enhancing waste collection and improving separation at source, particularly addressing the current waste classification. In addition, the study will evaluate the value chain of recyclable waste in Can Tho City, covering design, production, use, and end-of-life. The study serves as the baseline assessment to support the design of the other areas of intervention, particularly the definition of the waste collection fee in the city. The study will be conducted considering three geographic scopes: the Mekong Delta region, Can Tho Province, and Can Tho City. This is important because Can Tho is considered a hub in the region, being an important logistics center, so it could possibly extend the project to other cities.

ENABLING ENVIRONMENT & LOCAL RESOURCES

- "Study on Sustainable River Waste Treatment in Can Tho: A practical and sustainable business model for the management of waste collected by the Interceptor." This business model was developed together with the Netherlands and Kim Delta T&C.
- "A study project on Equipment Design for Floating garbage collection" – by Can Tho's Department of Science and Technology
- The Japan International Cooperation Agency (JICA)project "Data collection survey on waste reduction and waste-to-energy in Viet Nam."
- An initial experiment by the Can Tho's Department of Natural Resources and Environment (DONRE) on implementing the new Law on Environmental Protection (2020).

In addition, Can Tho University has a strong background in scientific research and is based in the city. This is an advantage for this study's development.

EXPECTED IMPACT

Inform the revision of waste classification in the city.

Provide a general view to investors in recyclable waste opportunities.

SDG

Decent Work and Economic Growth
Target 8.4
Improve progressively, through 2030, global resource efficiency in consumption and production and endeavor to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programs on sustainable consumption and production, with developed countries taking the lead.

RESILIENCE VALUE

- Improve capacity to collect and use data to inform public policy, and to monitor the implementation of programs related to waste management.
- Improve waste segregation at source through the waste classification update.
- Enable the generation of new businesses through the waste classification update.

IMPLEMENTATION ACTIVITIES

Study/mapping of current community habits and barriers to waste segregation.

Measurement and modeling the volumes of recyclables generated, considering:

- New consumption habits and materials given the Covid-19 pandemic.
- Volumes per district.
- Proportion of waste generated by tourism.

Identification and definition of typologies of recyclable waste and its production/ consumption.

Evaluation of the potential markets for recycled material in the city.

Study of current governance and management structures for recyclable waste (in urban, peri-urban, and rural setting) in the city.

Assessment of citizen willingness to pay for waste collection at household and private businesses/industries.

Assessment of the existing waste collection infrastructure and opportunity to upgrade.

2 - Campaign

Campaign to Raise Awareness and Increase Citizen Participation in Waste Separation

https://baotainguyenmoitruong.vn/

OVERVIEW

Based on the findings from the study above, a communication campaign to raise awareness will be created. This will include local community groups through training and dissemination of information to increase citizen participation in waste separation. As the value chain of recyclables will have been assessed, the community work will primarily focus on high-value recyclable waste to guarantee community engagement. The campaign will be co-created with community groups in the area selected for the pilot infrastructure. In addition, the city council will collaborate with the community via support from an NGO, to de determined, who will lead in the delivery of this campaign.

ENABLING ENVIRONMENT & LOCAL RESOURCES

- The Can Tho DONRE have experience in organizing campaigns related to recycling and managing waste.
- Can Tho University is a prestigious university in the Mekong Delta. The university has hosted many train-the-trainer courses in several subject areas. So, the university can act as a bridge from academic knowledge to practical, applicable experience.

The government budget for environmental protection can be allocated for some activities to raise awareness among local communities about the benefits of waste segregation and reuse.

EXPECTED IMPACT

Reduce waste generation.

Increase waste separation at source.

SDG

Climate Action
Target 13.3
Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

RESILIENCE VALUE

- To achieve the goal of a cleaner river, the causes of informal waste dumping must be understood and tackled. According to the results of the CAP, the main reasons include socio-economic inequalities and a lack of awareness.. Working with communities can support awareness raising while addressing deep-rooted challenges such as inequalities.
  - For instance, the role of women in waste management can be key to improving communication and awareness with lower-income communities, supporting both livelihoods and gender equality.
- Cleaner rivers and cities can potentially attract more tourists and increase the health of fish stocks. These activities related to tourism and fishing in the region can generate economic development all while supporting healthier cities.

IMPLEMENTATION ACTIVITIES

Organize a pilot to test free distribution of waste sorting bags to raise awareness about waste segregation and reuse benefits. The pilot should test behavior changes in the short term and assess the possibility to inform a public policy.

Train-the-trainer courses: a training series on waste classification and reuse solutions for government staff, People's Committee organizations, and communities.

Create a communication campaign to raise awareness of waste challenges.

3 - Waste Collection Fee

Define a Sustainable Waste Collection Fee in Close Consultation with Citizens and Businesses

OVERVIEW

The city has an opportunity to design waste collection fees based on waste typology and the overall volume generated by respective users. There is an opportunity to take advantage of the new Law on Environmental Protection in Viet Nam, which facilitates waste separation at source and recycling waste. Currently, there is an initiative where the Asian Development Bank (ADB) has carried out an initial assessment of recyclable and reusable waste in the urban waste streams, and the pilot project seeks to improve Ninh Kieu District's waste separation at source. The definition of the waste collection fee will include the participation of the private sector. Together with these stakeholder, the city will assess the possibility of developing new financing instruments that can support the strengthening of waste collection. The new Law on Environmental Protection specifies that the waste collection fee must be regulated by local authorities. So, there is a clear opportunity and need to define the waste collection fee.

ENABLING ENVIRONMENT & LOCAL RESOURCES

- Ongoing initiative with the ADB pilot project.
- The city has already started calculating the waste collection fee.

EXPECTED IMPACT

Enhance waste collection, leading to the reduction of waste leaked into rivers.

SDG

Sustainable Cities and Communities
Target 11.3
By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated, and sustainable human settlements planning and management in all countries

RESILIENCE VALUE

- Improved municipal finances.
- Reduction of the financial burden on the most vulnerable population.

IMPLEMENTATION ACTIVITIES

Review the study outputs from the study (first area of intervention).

Design a waste collection fee in the city (the initial formula could be: fee charged = waste collection fee - income from returning/selling recyclable waste).

4 - Governance - Setting Up an Appropriate Governance Model to Manage Waste Collection

Identify and Test Multiple Service Management Models for Waste Collection (Including Private-Public Partnerships and Community Models) to Define the Appropriate Structure

OVERVIEW

The city lacks private-sector investment and involvement in waste management and recycling infrastructure. As part of this area of intervention, the city team will design and test appropriate mechanisms which may increase private-public partnerships (PPPs) in Can Tho's waste management cycle, in addition to including communities. The city is planning to pilot the waste separation plant for items that are collected via river waste collectors and to attract specialized treatment for these sorted waste items through a PPP scheme. The city government will collaborate with local NGOs, the private sector, communities, and Can Tho University to develop appropriate service management models to guarantee the efficiency and resilience of PPP projects andfuture scale-up.

ENABLING ENVIRONMENT & LOCAL RESOURCES

- There are some private companies conducting municipal waste collection in the city.
- There is some informal business around recyable waste.

EXPECTED IMPACT

Reduced number of illegal dumpsites, leading to reduced waste leakage into rivers.

SDG

Sustainable Cities and Communities
Target 11.3
By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated, and sustainable human settlements planning and management in all countries

RESILIENCE VALUE

- Illegal dumping of waste has many negative consequences for public health, including an increased risk of flooding and pollution. Reducing the number of illegal dumpsites will have benefits in all these aspects.
- A transparent and coordinated governance scheme to support the deployment of technology, maintenance, and scaling-up of benefits can strengthen municipal capacity and mobilize more resources towards the waste management system.
- A well-managed collections service can generate green jobs.

IMPLEMENTATION ACTIVITIES

Establish a project management board with the participation of various stakeholders, such as the city's People's Committee, departments relevant to waste management, associations, etc.

Financial and governance assessment for waste collection service delivery:

1. Explore PPP business models to manage river waste collection and recycling facilities in the city.
2. Define business models to manage recyclables collection

Organize annual/quarterly/regular meetings with local NGOs, the private sector, and communities to select a balanced PPP business model.

5 - Pilot Waste Separation and Recycling Facility

Pilot Implementation of Waste Separation Facilities Interlinked with Ongoing River Waste Collection Project in The City

OVERVIEW

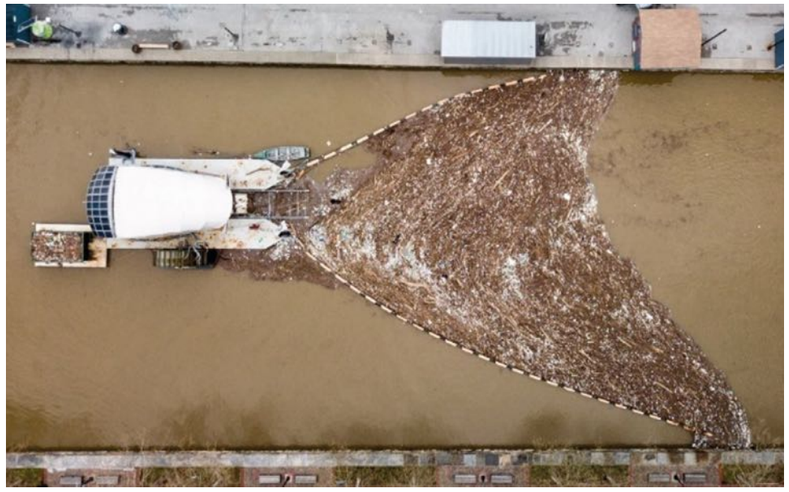
The city is seeking investments to make the most of the expected improvements in waste separation at source, targeted at the other areas of intervention that will improve the recycling infrastructure. In addition to the expected improvement in waste separation at source, the city will take advantage of the existing river waste collection project. Currently, river materials are collected but not treated. This is a common challenge for local governments since there is an important gap between the collection and treatment of marine debris. So, the city would like to create a pilot project to design and construct a waste separation facility that connects to the river waste collection devices.

The city will select one or two pilot locations to design an implementation plan for separating waste collected in the rivers. The treatment facility should target recyclable waste at the city scale to secure viable volumes of materials. If the pilot project is successful, the city will expand the assessment and conduct further studies to scale the project in two directions: 1) expand the sorting facilities to include recyclable treatment infrastructure; 2) design and construct additional sorting facilities at other locations. This first pilot will be implemented at the city level and, based on its evaluation; the project will be further scaled up to the provincial level. The city will only scale up the project if the pilot is successfully implemented and positive impacts can be measured.

ENABLING ENVIRONMENT & LOCAL RESOURCES

The city has implemented pilot projects to design waste collection devices to collect floating waste. Currently, there are two waste collection technologies operating in the city.

- The first is called the Interceptor™ (003) river cleanup solution in Can Tho River. The Interceptor (003) river clean-up solution is an automatic waste collection system floating on the river like a small ferry. It is 8.1 m wide, 24.7 m long and about 4.4 m high. It can store up to 50 m3 of waste. (Trinh, 2021; Vietnamnews.vn, 2022). The city added a temporary dump close to the Interceptor (003) to support the waste collection.



- The second is the trash traps to collect plastic waste in the smaller rivers/canals. The traps passively collect plastic waste 24/7, operating as a function of the rivers' rates of flow (Trinh, 2019). These trash traps are part of the "Can Tho vision: A circular solution for plastic and other waste (Clear Rivers)" project in collaboration with the Recycled Island Foundation from the Netherlands; the HZ University of applied sciences, Can Tho University, recycling companies, the Can Tho Climate Change Coordination Office and Resilience Office, and URENCO group. The city has placed two plastic catchers that passively collect plastic litter from the water and so help clean the river. In addition, the city plans to implement a "circular park" to improve the recycling of the materials and their upcycling into valuable materials.

In addition, in 2021 the city developed a pilot project on the waste separation at source model (the ADB pilot project). The project objectives are as follows.

- Waste segregation at source will help improve performance of the solid waste-to-energy targeting to reduce ash generation and increase the calorific value of the input waste.
- Propose for a demonstration model for waste separation in the city and other provinces in the Mekong Delta.

This pilot already integrates the classification of recyclable waste. The project pilots the waste separation at source model in certain neighborhoods in Ninh Kieu District. The waste is separated into recyclable waste, burnable, unburnable and hazardous waste. The pilots were carried out in 2021 and there are some expanded versions being proposed.

EXPECTED IMPACT

Expand treatment opportunities for waste.

Enhance the recycling industry in the city.

Close the gap between collection and treatment of marine debris.

SDG

Life Below Water
Target 14.1
By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.

RESILIENCE VALUE

- Transfer stations are essential to the waste collection system, needing adequate equipment and personnel to operate efficiently. The city is looking to test business models that promote financial sustainability, which would support the municipal finances, while promoting multiple co-benefits to the population, such as employment, social cohesion, efficiency in building design, etc.
- Transfer stations include considerations on the city landscape and consumption habits.
- When coupled with awareness-raising activities, transfer stations can potentially incentivize circular activities such as segregation at source, composting, reduced waste generation, use of alternative materials/products, etc.
- When coupled with activities to upskill and guarantee the safety of waste workers, transfer stations can strengthen coordination within communities. Ideally, a strong transfer station can support social cohesion and livelihoods in the community.
- Transfer stations that are embedded in an innovation and circular environment can support multiple activities for green economic development and generate jobs.
- Adequate infrastructure can strengthen the municipal role in waste collection while attracting new partnerships.
- Transfer stations can be designed and/or upgraded as green infrastructure (renewable energy, rainfall as a water supply, etc.).
- An improved waste management system can generate environmental, economic, and social benefits by decreasing the risk of flooding. As highlighted in the Context section above, flooding is extremely costly to the city and has resulted in fatalities. This project would potentially reduce the flood risk by decreasing the leakage of waste into the storm drain system.
- This project aims to contribute to decreasing pollution and air contamination.

IMPLEMENTATION ACTIVITIES

Pilot

Evaluate public-private alliances and synergies to find investors and technical partners who are interested in expanding the recycling industry.

Financial and governance assessment, including the possibility of a concession model for the design, construction, and operation of facilities for sorting, cleaning, and treating recyclables.

Select one or two pilot locations to design an implementation plan for separating waste collected in rivers and treating the sorted waste.

Conduct a feasibility study for the necessary facility, which will include the necessary technical considerations; evaluate river waste characteristics, potential shocks, and stresses; asses environmental and social risk assessment; analyze legal documentation; evaluate fiscal benefits, etc.

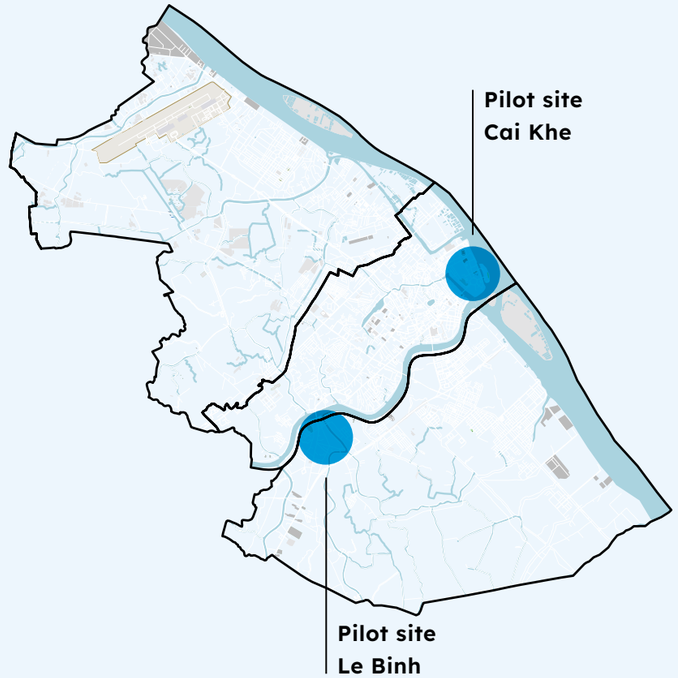
Analyze the feasibility of new technology available for sorting, cleaning, and treating recyclables, including the procurement requirements.

Analyze the possibilities for building efficiency (the use of renewable energy, water efficiency, etc.).

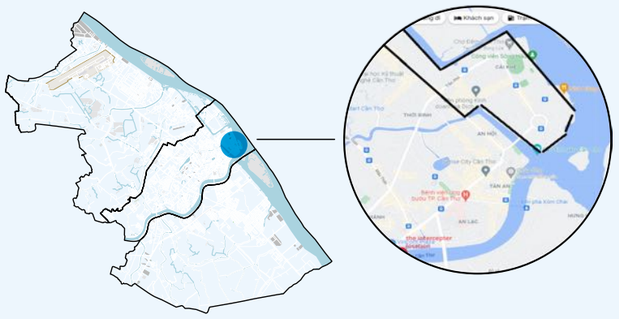
Guarantee the implementation of the pilot connected to the ongoing river waste collection devices.

Potential pilot project locations identified by the city

There are two neighborhoods proposed to be case studies for the project. These locations have been chosen to improve the resilience value of the project because these are touristic locations. Their cleaning and rehabilitation could increase tourism activities, generating economic development for local communities.



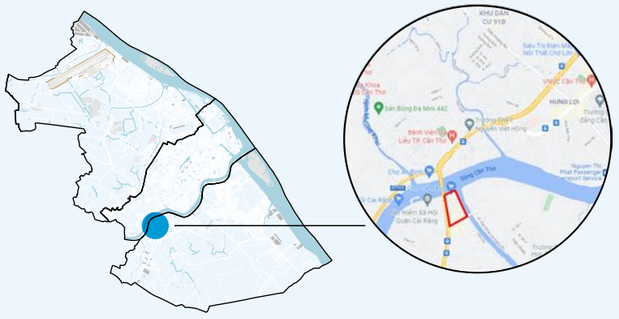
PILOT NEIGHBORHOOD 1: CAI KHE WARD, NINH KIEU, CAN THO



Proposed location for the pilot project within Ninh Kieu District, Can Tho City.

This neighborhood is around 1.67 km2 in area, with a population of about 8,400 people (2018). There are two riverways surrounding the neighborhood, namely the Cai Khe canal and Khai Luong River. The area is known for the various riverside activities beside the households living along the rivers, including its open markets, riverside restaurants, stadiums, hotels, and commercial centers. Even though the important rate of commercial activity and tourism in the area is crucial for local economic development, it carries with it the environmental cost of increased waste generation. Its location between rivers also facilitates the leakage of this waste into waterbodies. So, this location has been chosen for its high impact in terms of pollution prevention, cleaning an important area of the city for businesses, and enhancing the city's attractiveness. A trash trap is also strategically located close to this area. The pilot location is presented in the figures on this page.

PILOT NEIGHBORHOOD 2: LE BINH WARD, CAI RANG, CAN THO



Proposed location for the pilot project in Cai Rang, Can Tho.

This neighborhood spreads over about 48,000 m2 with a population of approximately 800 people (2018). The area is located at the corner of Can Tho and Cai Rang Rivers. There are various riverside activities within the neighborhood, such as a floating market, pagoda, and a factory. In particular, the Cai Rang floating market is well-known in the city, being visited by national and international tourists. This location also generates a large amount of waste, so it has been selected because of its correspondingly high potential for pollution prevention, cleaning an important area of the city for businesses, and enhancing the city's attractiveness. A trash trap is also strategically located close to this area. The pilot location is presented in the figures on page.

Further Understanding
the Resilience Value

This project has been designed for resilience. Not only it will make the recycling industry in Can Tho more robust, innovative, and adaptable to the needs of the city, but it will also develop more interconnected systems, so Can Tho City can be better prepared to overcome the shocks and stresses it faces and even thrive beyond them. Conceptually, this means thinking about this project from three perspectives:

- How the project itself demonstrates qualities of resilience, such that it can better handle external shocks and stresses;
- How the project contributes to the resilience of the city, considering its direct and indirect impacts.
- How the operation of the project is (positively or negatively). influenced by the resilience of the city environment overall.

Beyond the immediate objectives to be achieved, the transformation sought will include and maximize all the "co-benefits" generated by the project that contribute to the structural, community, and/or individual resilience of the citizens of Can Tho. The link between the recycling industry and the city, the province, the region, and even the nation will be considered, including the interdependencies between the existing social, environmental, economic, and institutional systems.

The "City Resilience Framework" identifies seven qualities of resilience that any urban system must incorporate so that it can resist, respond, and adapt more quickly to the shocks and stresses it faces. So, this initiative – understood as a system integrated into the city – is designed considering the following qualities of resilience.

REFLECTIVE	Systems that have mechanisms to continuously evolve and will modify standards or norms based on emerging evidence, learning from past experiences.	A significant part of this project relates to its anchoring within the municipality. The project will create the tools to increase the city's capacity to monitor, track, and evaluate results from all its components. This will contribute to an institutional memory that will benefit the creation of new programs related to waste management and river cleanliness.
ROBUST	Systems that include well-conceived, constructed, and managed physical assets so they can withstand the impacts of shocks and stresses.	The design of the sorting and treatment facility will investigate the possibility of designing for building efficiency (including renewable energy, water efficiency, etc.), in addition to including social programs, such workforce training.
REDUNDANT	Systems that create spare capacity purposely to accommodate disruption, extreme pressure, and surges in demand.	The project is designed to strengthen the recycling sector in the city; so, more recycling businesses will be created. The idea is that alternative materials can be used to design products.
FLEXIBLE	Systems that can change, evolve, and adapt in response to changing circumstances.	The project is built incrementally. It will start with one or two pilots in the city, depending on the feasibility studies, and it can potentially scale to other places. It allows for the city to improve its design and operations when it scales up.
RESOURCEFUL	Systems that can rapidly find different ways to achieve their goals or meet their needs during a shock or under stress.	The project is anchored on an in-depth analysis of the context, searching for different solutions to the same problem.
INCLUSIVE	Systems that emphasize the need for a broad consultation and engagement of communities.	The project has a multistakeholder approach, working with the private sector, the national government, communities, the university and NGOs.
INTEGRATED	Systems that promote consistency in decision-making and ensure that all investments are mutually supportive to a common objective.	• The project is completely connected, as all components mutually support each other. • The project has the potential to improve various urban systems, improving tourism, the environment, public health, and local economic development.

Roadmap for Implementation

Institutional Arrangements

The Can Tho DONRE has been assigned full responsibility for waste management by the Can Tho City People's Committee. Apart from the DONRE, the Can Tho Department of Construction oversees the planning for the construction of waste management infrastructure, including transfer stations, connection points and waste treatment plants. Finally, the Department of Planning and Investment manages administrative procedures related to investment projects in the city.

ACTIONS	LEAD/ COORDINATION	SUPPORTING ORGANIZATIONS	POTENTIALLY INTERESTED AGENCIES	POTENTIAL FUNDING
Study	Can Tho DONRE	• Can Tho's Department of Science and Technology, Can Tho People's Committee. • Can Tho Institute of Socio-Economics • Can Tho University	• Research Institute for Climate change, Can Tho University • College of Environment and Natural Resources, Can Tho University • College of Technology, Can Tho University • College of Economy, Can Tho Univerity • Waste Aid • Kim Delta T&C • Green Hub	• The Ocean Conservancy • Recycled Island Foundation(the Netherlands) • The Ocean Cleanup • Private sector: the Coca-Cola Company • International agencies: JICA, USAID, AusAID, funds for scientific study from the Netherlands, or other funds • The city's budget for environmental expenses or scientific technology development
Campaign	Can Tho DONRE	• Viet Nam Fatherland Front, Can Tho City. • Women's Union, Can Tho City • Youth Union, Can Tho City • Farmer Union, Can Tho City • People's Committee at district level • Can Tho University	• WWF Viet Nam • Waste Aid • Kim Delta T&C • Green Hub	• The Ocean Conservancy • Recycled Island Foundation (the Netherlands) • The Ocean Cleanup • International agencies: JICA, USAID, AusAID or other funds • The city's budget for environmental expenses
Waste Collection Fee	Can Tho DONRE	• Can Tho Department of Finance • People's Committee at district level • Can Tho Institute of Socio-Economics • Can Tho University	• Can Tho Urban Joint Stock Company • Minh Thong Trading Service co., ltd • Joint Venture Do Duy Construction Company Limited • Production Service Trading Joint Stock Company 69 • Minh Tam Environment Company	• International agencies: JICA, USAID, AusAID or other funds • Environmental expenses funds from national and/or city goverments
Waste Collection Service Management Model	Can Tho City People's Committee/ Can Tho DONRE and People's Committees at district level	• Can Tho's Department of Justice • Can Tho's Department of Planning and Investment • Can Tho Institute of Socio-Economics • Can Tho Univesity	• URENCO • Minh Thong Trading Service co., ltd • Joint venture: Do Duy construction co., ltd. • Production Service Trading Joint Stock Company 69 • Minh Tam Environment Company	• International agencies: JICA, USAID, AusAID or other funds • Environmental expenses funds from national and city governments
Pilot	Can Tho DONRE/ Ninh Kieu People's Committee	• Ninh Kieu and Cai Rang People's Committees • Can Tho Institute of Socio-Economics • Can Tho University	• URENCO • Green Hub • Other interested international/national agencies	• Recycled Island Foundation (the Netherlands). • The Ocean Cleanup. • The Ocean Conservancy • International agencies: JICA, USAID, AusAID or other funds

Implementation Timeline

AREAS OF INTERVENTION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Study to understand waste separation according to the new Law on Environmental Protection (LEP) and evaluate the value chain of recyclable waste types					
Support needed to implement					
Technical assistance to review current waste generation practices in light of LEP, including community habits, typologies of waste, willingness to pay					
Technical assistance to map stakeholders in the waste sector					
Technical assistance to review current waste infrastructure					
Internal milestones					
Baseline assessment of waste generation practices conducted					
Baseline assessment of waste infrastructure in the city conducted					
Campaign to raise awareness and increase citizen participation in waste separation					
Support needed to implement					
Technical assistance to evaluate past community awareness campaigns and educational programs					
Technical assistance to conduct a feasibility study for the pilot on waste segregation bags (define location, metrics for measuring success, etc.)					
Internal milestones					
Implementation of the pilot on waste segregation bags					
Evaluation of the pilot and possibility of scaling up					
Structuring of train-the-trainer courses together with academia					
Delivery of train-the-trainer courses for city staff					

AREAS OF INTERVENTION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Define a sustainable waste collection fee in close consultation with citizens and businesses					
Support needed to implement					
Technical assistance to define an equitable waste collection fee based on the baseline assessment from the study					
Internal milestones					
Legal and political process to review and implement new tariff					
Identify and test multiple service management models for waste collection (including PPPs and community models) to define the appropriate structure					
Support needed to implement					
Technical assistance for financial and governance assessment for waste collection service delivery					
Internal milestones					
Establish a project management board with participation of various stakeholders, such as the city's People's Committee, departments relevant to waste management, associations, etc.					
Organize annual/quarterly/regular meetings with local NGOs, the private sector, and communities to select a balanced PPP business model.					
Legal and political process to review and implement new management model, including consultation period at ministerial level.					
Pilot implementation of waste separation and recycling facilities interlinked with ongoing river waste collection project in the city					
Support needed to implement					
Technical assistance for implementation plan for the pilot					
Technical assistance to conduct a feasibility study for the sorting and treatment facility that guarantees the resilience value of the infrastructure					
Internal milestones					
Review of the baseline assessments and selection of the pilot location					
Evaluate public-private alliances and synergies to find investors and technical partners who are interested in expanding the recycling industry					
Legal and political process to review and kick-start the construction of the facility (including permits, necessary approvals and guarantee of financial sustainability), including consultation period at ministerial level					
Design and construction of sorting and treatment facility connected to river waste collection device					
Monitoring and evaluation of the pilot and definition of a scale-up plan					

Annex

National- and provincial-level regulations and documents related to the project are listed in the following table. Important considerations for the implementation of each action are also listed.

ACTIONS	REGULATIONS
Study Understanding waste separation according to the new environmental protection law and evaluating the value chain of recyclable waste types.	• Law on Environmental Protection No. 55/2014/QH13 passed by the 13th National Assembly of the Socialist Republic of Viet Nam. • Government Decree 38/2015/ND-CP dated 24 April 2015 on refuse and waste management. • Decision No. 280/QD-UBND dated 19 January 2015 by the People's Committee of Can Tho City approving the plan on solid waste treatment in Can Tho City up to 2030 with a vision to 2050. • Plan No. 106/KH-UBND dated 25 June 2018 by the People's Committee of Can Tho City on the collection, transportation, and treatment of hazardous medical waste. • Plan No. 66/KH-UBND dated 3 April 2019 by the People's Committee of Can Tho City on implementing the National Strategy on Integrated Solid Waste Management up to 2025 with avision to 2050 in Can Tho City. • Decision No. 3020/QD-UBND dated 20 October 2014 by the People's Committee of Can Tho City on the assignment of solid waste management tasks. • Plan No. 113/KH-UBND dated 21 June 2018 of the People's Committee of Can Tho City on the implementation of Directive No. 28-CT/TU dated 10 April 2019 of the Standing Committee of the Party Committee of Can Tho City on strengthening the management of, solid waste treatment in the city.
Campaign Raising awareness of waste separation and leveraging the high value of recyclable waste	• Law on Environmental Protection No. 55/2014/QH13 passed by the 13th National Assembly of the Socialist Republic of Viet Nam. • Government Decree 38/2015/ND-CP dated 24 April 2015 on refuse and waste management. • Plan No. 66/KH-UBND dated 3 April 2019 by the People's Committee of Can Tho City on implementing the National Strategy on Integrated Solid Waste Management up to 2025 with a vision to 2050 in Can Tho City (Act IV.1). • Plan No. 113/KH-UBND dated 21 June 2018 of the City People's Committee on the implementation of Directive No. 28-CT/TU dated 10 April 2019 by the Standing Committee of the Party of Can Tho City on strengthening the management of solid waste treatment in the city.
Waste collection fee	• Law on Environmental Protection No. 55/2014/QH13 passed by the 13th National Assembly of the Socialist Republic of Viet Nam (Articles 79 and 75). • Government Decree 38/2015/ND-CP dated 24 April 2015 on refuse and waste management. • Decision No. 280/QD-UBND dated 19 January 2015 by the People's Committee of Can Tho City approving the plan on solid waste treatment in Can Tho City up to 2030 with a vision to 2050.
Governance Setting up an appropriate governance body/model to manage waste collection and its interrelated fee from city to district levels	• Law on Environmental Protection No. 55/2014/QH13 passed by the 13th National Assembly of the Socialist Republic of Viet Nam. • Government Decree 38/2015/ND-CP dated 24 April 2015 on refuse and waste management. • Plan No. 113/KH-UBND dated 21 June 2018 of the City People's Committee on the implementation of Directive No. 28-CT/TU dated 10 April 2019 of the Standing Committee of the Party Committee of Can Tho City on strengthening the management of solid waste treatment in the city. • Decision No. 3020/QD-UBND dated 20 October 2014 by the People's Committee of Can Tho City on the assignment of solid waste management tasks. • Plan No. 66/KH-UBND dated 3 April 2019 by the People's Committee of Can Tho City on implementing the National Strategy on Integrated Solid Waste Management up to 2025 with a vision to 2050 in Can Tho City (Act V).
Project Pilot project on waste separation and recycling facilities interlinked with ongoing river waste collection project in the city	• Law on Environmental Protection No. 55/2014/QH13 passed by the 13th National Assembly of the Socialist Republic of Viet Nam. • Government Decree 38/2015/ND-CP dated 24 April 2015 on refuse and waste management. • Decision No. 280/QD-UBND dated 19 January 2015 by the People's Committee of Can Tho City approving the plan on solid waste treatment in Can Tho City up to 2030 with a vision to 2050. • Plan No. 66/KH-UBND dated 03 April 2019 by the People's Committee of Can Tho City on implementing the National Strategy on Integrated Solid Waste Management up to 2025 with a vision to 2050 in Can Tho City.

Further Reading

1. Frouws, E., Frölke, R., Maarse, N., van den Heuvel, O., & Meijer, B. (2019). Polder system Can Tho City: Impact of the urban polder on Can Tho City.
2. People's Committee of Can Tho City(2019). Letter No. 3343/UBND-XDĐT on the feasibility study of passive garbage traps in small rivers.
3. Recycled Island Foundation(2019). Can Tho Vision Report: A circular solution for plastic waste and other wastes.
4. Recycled Island Foundation and HZ University of Application (2019). Garbage Trap Project in Can Tho Viet Nam.
5. Trinh (2019). Towards a river without plastic waste. http://baocantho.com.vn/huong-den-dong-song-khong-rac-thai-nhua-a115436.html.
6. Trinh (2021). Automatic collection of garbage floating in the river. http://baocantho.com.vn/thu-gom-tu-dong-rac-noi-tren-song-a134740.html.

Endnotes

[1] Intergovernmental Panel on Climate Change (2021). Climate Change 2021: the Physical Science Basis. www.ipcc.ch/report/sixth-assessment-report-working-group-i

[2] World Bank (2020). The new poor are different: Who they are and why it matters. https://blogs.worldbank.org/developmenttalk/new-poor-are-different-who-they-are-and-why-it-matters

[3] International Labour Organization (2018). World Employment Social Outlook. www.ilo.org/global/research/global-reports/weso/2018/lang--en/index.htm; Eunomia (2015). The potentialContribution of Waste Management to a Low Carbon Economy. www.eunomia.co.uk/reports-tools/the-potential-contribution-of-waste-management-to-a-low-carbon-economy

[4] World Resources Institute (2021). 5 Opportunities of a Circular Economy www.wri.org/insights/5-opportunities-circular-economy

[5] Linh Do, Thuy (2020). Urban landscape planning adapting to flood in Can Tho city, Viet Nam. https://iopscience.iop.org/article/10.1088/1757-899X/869/2/022019/pdf

[6] ibid.

[7] Takagi, H., Ty, T.V., Thao, N.D. & Esteban, M. (2015). Ocean tides and the influence of sea-level rise on floods in urban areas of the Mekong Delta. http://dx.doi.org/10.1111/jfr3.12094

[8] People's Committee of Can Tho City (2021). Official Letter No. 97: Report for 2020 Environmental Protection in Can Tho City.

[9] People's Committee of Can Tho City (2015). Decision No. 280/QD-UBND dated 19 January 2015 by the People's Committee of Can Tho City approving the plan on solid waste treatment in Can Tho City up to 2030 with a vision to 2050.

URBAN
OCEAN