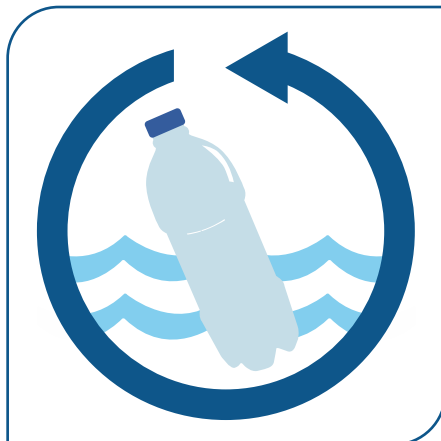


CLOSING THE LOOP

Innovative partnerships with informal workers to recover plastic waste, in an inclusive circular economy approach



SAI MAI DISTRICT, BANGKOK CASE STUDY



Acknowledgements

This case study was produced under the United Nations Economic and Social Commission for Asia and the Pacific's Closing the Loop initiative, aimed at gathering evidence in cities in Asia to find opportunities to return plastic resources into the production cycle by linking informal and formal waste processes. The case studies in Pune, India and Bangkok, Thailand were produced in partnership with the Stockholm Environment Institute (SEI) Asia Centre and Kashtakari Panchayat – the local partner of Women in Informal Employment: Globalizing and Organizing (WIEGO) in Pune.

Lead authors: Oliver Johnson (SEI) and Nguyen Trang (AIT)

Contributing authors and editors: Solene le Doze, Natalie Harms, Omar Siddique and Alexander Vougioukas (ESCAP) and Diane Archer (SEI)

External reviewer: Taylor Cass Talbot (WIEGO)

Copy editor: Karen Emmons

Design and layout: Jeff Williams

Infographics: Mallory Bellairs

Photos: Nguyen Trang

All \$ references are US dollars.

Contents

Acknowledgements	2
Abbreviations	3
1. Introduction	4
2. Policy context	6
3. Municipal solid waste management in Bangkok	8
4. Plastic waste value chain	10
4.1 Collecting and sorting plastic waste	11
4.2 Trade and pre-processing	13
4.3 Recycling	16
5. Environmental impacts of informal plastic waste management	20
5.1 Impacts of recycling	20
5.2 Leakages	21
6. Socioeconomic impacts of plastic waste management	23
6.1 Financial savings from informal recycling	23
6.2 Social impacts on informal workers	24
7. Conclusions and entry points for action	26
Endnotes	29

Abbreviations

BMA	Bangkok Metropolitan Administration
CO₂	carbon dioxide
HDPE	high-density polyethylene
LDPE	low-density polyethylene
PET	polyethylene terephthalate
PP	polypropylene
PS	polystyrene

1. Introduction

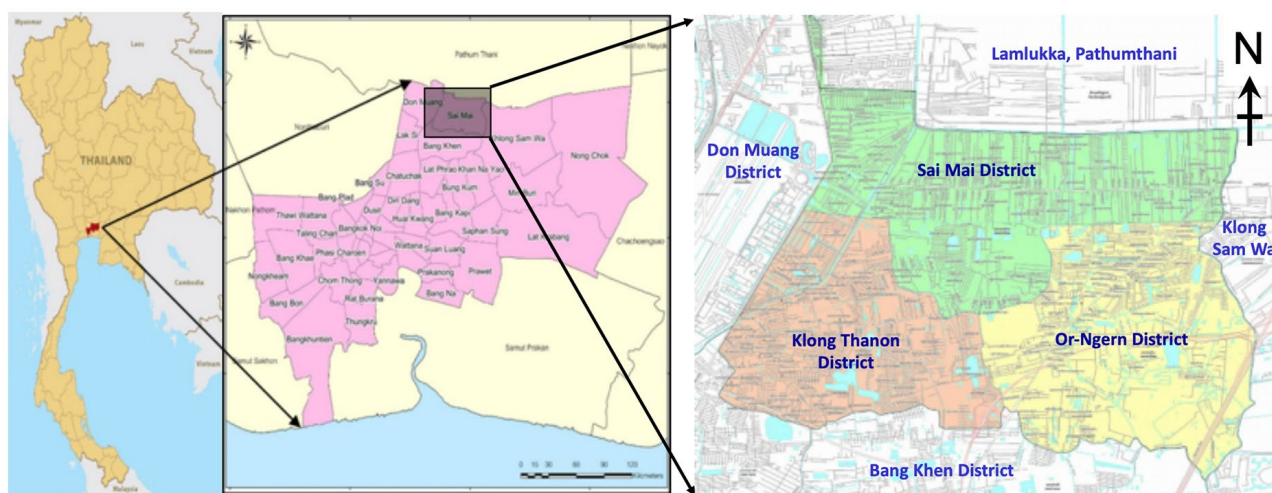
Thailand is one of the five countries globally contributing the most plastic waste pollution into the oceans.¹ Thailand has critical problems with improper waste management infrastructure, poor waste management practices and low public awareness of how or why individuals should be responsible waste generators. In the country's large and growing capital, Bangkok, the situation is becoming increasingly acute.

This case study explores the plastic waste value chain in Bangkok to better understand the contributions of – and links between – formal and informal actors in plastic waste management. The insights from this study hopefully will help determine a range of policy measures that work to enhance the contributions of all level of waste collectors and thus the environmental and economic benefits of an integrated plastic waste management system.

The study centred on plastic waste management in the Bangkok metropolitan area, and specifically in Sai Mai District for more in-depth research. Sai Mai District is one of three waste collection and transportation systems run by the Bangkok Metropolitan Administration (BMA), with waste composition and waste stream flows comparable to many of the city's 50 other districts.

Sai Mai District's population of 203,000 people are located within an area of 44,615 sq km and divided into three districts: Saimai, Or-Ngern and Klong Thanon (see figure 1). The data used for this study were collected by the Stockholm Environment Institute during August and September 2018 and were presented and validated at a city-level workshop in Bangkok (October 2018). Because this case study focuses on one part of the value chain, at the Sai Mai transfer station, and uses limited data due to access issues, it is only a glimpse of the issues of informal waste management in Bangkok. Where presented, the quantitative analysis contains limitations due to the reliance on rough estimates based on secondary data. Deeper research is required to better understand the scale of operations of informal waste workers across the whole of Bangkok and accurately quantify plastic waste flows within the city.

Figure 1: Sai Mai District



Source: Remote Sensing and Geographic Information System, AIT 2016; Sai Mai District Office, 2018.

KEY MESSAGES

- Along with the formal waste management system provided by the Bangkok Metropolitan Administration, the informal sector in Bangkok also has an important role in plastic waste collection and recycling.
- Conservative estimates calculated using secondary data on the number of informal waste actors in Bangkok indicate that they are helping to ensure that large quantities of plastic waste are recycled rather than incinerated or going to landfill. The estimated total amount of plastic waste collected from all sources in Sai Mai District (including the sorting within the Sai Mai transfer station) amounts to around 39.6 tonnes per day, or 14,454 tonnes per year. This activity contributes to significant reductions in greenhouse gas emissions, with more than 21,681 tonnes of CO₂ equivalent avoided in Sai Mai District.
- Conservative estimates indicate that the informal collection, processing and recycling of plastic waste in Sai Mai District enables the Bangkok Metropolitan Administration to avoid an estimated 10 million baht (\$316,000) per year in waste management costs. Across Bangkok's 50 districts, this could amount to 500 million baht (\$15.8 million) per year, which is greater than the average of 437 million baht per year spent for waste collection between 2011 and 2013.
- Informal actors work in unhealthy conditions without any protective gear, are socially marginalized and their contributions are under-recognized by local government.
- To better recognize the positive role of informal actors and better link them with the formal waste management system, local authorities should formally recognize waste picking as a legitimate activity and support the establishment of cooperatives or associations for informal actors, through which they can access training and health and safety equipment and negotiate contracts with formal actors.
- To improve the separation of waste at source, which could significantly improve recycling rates, local authorities should undertake public awareness campaigns to educate and encourage citizens to contribute to recycling efforts.
- Better data on the contribution of informal actors to plastic waste management in Bangkok are still required and are vital to enable evidence-based decision-making and to support the recognition of their contributions and thus scale up plastic recycling in the city.

2. Policy context

Bangkok at a glance²

- Bangkok is situated within the Chao Phraya river delta in the Gulf of Thailand.
- The city has a population of 9.4 million inhabitants and a population density of approximately 3,626 people per kilometre.
- The city's climate is tropical, with a mean annual rainfall of 1,498 mm, with September typically the wettest month (220 mm) of the year.
- Due to the city's proximity to the sea, the river and network of manmade canals that criss-cross the city are critical in draining the city during heavy and intense downpours.
- Management and disposal of municipal solid waste in Bangkok's 50 districts is the responsibility of the Bangkok Metropolitan Administration.
- There are approximately 1,774 informal settlements in Bangkok, housing around 1.8 million people.
- Literacy rates of men and women in Thailand in 2015 were approximately 95 per cent for men and 91 per cent for women.
- Per capita income in Thailand in 2017 was the equivalent of \$6,593.
- In 2016, 11,269 tonnes of municipal solid waste were generated daily.

Solid waste management in Thailand is formally governed by policies, regulations and standards set by the central Government and implemented by local authorities, such as the BMA. At the central level, the Ministry of Natural Resources and Environment has major responsibilities: Its Pollution Control Department provides recommendations on the technical preparation of solid waste management policy and develops relevant guidance, guidelines and processes; its Department of Environmental Quality Promotion disseminates information pertaining to municipal solid waste management; and its Office of Natural Resources and Environmental Policy and Planning prepares policies and prospective plans and administers the Government's Environmental Fund.

In addition, the Ministry of Interior's Department of Local Administration administers the finances of Local Government Organizations and provides support for the preparation of local development plans. The Thai Ministry of Industry's Department of Industrial Works manages waste landfill sites around the country.

These government institutions carry out their activities under the auspices of several national regulations governing municipal solid waste management in Thailand, including the 1992 Public Health Act, the 1992 Enhancement and Conservation of National Environmental Quality Act and the 1999 Decentralization to Local Administrative Organizations Act. In addition, the Government has promoted a National Policy on Waste Management as well as a 3Rs strategy to reduce, reuse and recycle waste.

Within the BMA, the overall environmental management and improvement in the performance of solid waste management is the responsibility of the Department of Environment and the Environment and Sanitation section within each of the 50 BMA district offices. This responsibility includes promoting waste reduction strategies, collecting and sorting waste and applying appropriate technologies that increase the efficiency of solid waste management processes (DOE, 2015).³ The Department of Environment has several units whose work directly relates to solid waste management in Bangkok:

- **Policy and Planning Division**, which is responsible for preparing master plans and occasional plans, solid waste statistics, planning and promoting campaigns on waste separation and minimization and research into waste collection and disposal improvement.
- **Solid Waste, Hazardous Waste and Night Soil Management**, which is responsible for solid waste, hazardous waste, night soil collection, receiving problems from operational unit-collection, handling solid waste, hazardous waste and night soil collection in the event of an emergency, setting up drinking water and garbage containers for special occasions, cleaning roads with machines and coordination with the district offices.
- **Solid Waste Disposal Division**, which is responsible for the management and supervision of solid waste disposal as well as contracting out the activities to ensure highest efficiency and least impact to the environment.
- **Public Park Office**, which is responsible for making Bangkok a “metropolis of the environment” by increasing public parks and miniature parks.

The BMA Department of Public Cleansing, together with the 50 districts, is responsible for cleaning the city and reporting the amount of waste collected from all districts.

In addition to the formal governance arrangement between the central Government and local authorities, there is also significant informal activity around solid waste management, which is often overlooked and under-recognized. This study contributes to making the important contribution of informal actors to solid waste management in Bangkok more visible.

3. Municipal solid waste management in Bangkok

Population growth, economic development and lifestyle changes are the major causes of the increasing waste generation in Bangkok. According to the Pollution Control Department (2017),⁴ around 4.2 million tonnes (or 11,534 tonnes per day) of solid waste was generated in Bangkok in 2016. But only 10,130 tonnes per day was collected.⁵ In comparison, the generation of municipal solid waste in Jakarta and Manila in 2017 was around 3.2 million and 3.17 million tonnes per year, respectively.⁶

The BMA Department of Environment has primary responsibility for the city's waste management and works closely with its 50 district offices. There are about 1,894 waste collection trucks, ranging in size for waste collection services.⁷ Waste is collected directly from accessible households, institutions and businesses by municipal garbage collection crews. Currently, the BMA employs 2,587 collection drivers, 7,591 collection staff and 9,042 street sweepers.⁸ After it is collected, municipal solid waste is transported to three large disposal centres in Bangkok: Sai Mai, On Nut and Nong Khaem (see table 1).

Table 1. Waste transfer stations in Bangkok

Transfer centre	Sai Mai	On Nut	Nong Khaem
Sources	18 districts 14 organizations (government agencies, universities, military)	25 districts 35 organizations	25 districts
Waste transfer contractor	Wasaduphan Thurakit Ltd (private)	Phairot Sompong Phanit Co. Ltd (private)	Klum 79 Ltd (private)
Solid waste transferred (tonnes/day)	2,000–2,300	2,600	3,600
Landfill site location	Kamphaeng Saen District, Nakhon Pathom Province	Phanom Sarakham District, Chachoengsao Province (sanitary landfill)	Kamphaeng Saen District, Nakhon Pathom Province
Other waste disposal measures		Euro West Engineering Ltd. Contracted by BMA to renovate On Nut transfer station and establish a waste composting processor to compost 1,200 tonnes/day	BMA contracted a private company to build and operate an incinerator at Nong Khaem, incinerating 300 tonnes/day and generating 5 MW of electricity.
Principal districts covered	Bangkheng, Bangsue,	Nong Chok, Min Buri, Lat	Thawi Wattana, Bang Khae,

预览已结束，完整报告链接和二维码如下：

https://www.yunbaogao.cn/report/index/report?reportId=5_1047

