

Household waste and the circular economy in Bangkok

SEI policy report
December 2022

Chloe Pottinger-Glass
Fedra Vanhuyse
Raja Asvanon
Diane Archer





Stockholm Environment Institute
Linnégatan 87D 115 23 Stockholm, Sweden
Tel: +46 8 30 80 44 www.sei.org

Author contact: Chloe Pottinger-Glass
chloe.pottingerglass@sei.org
Layout: Richard Clay
Graphics: Mia Shu
Cover photo: Collecting recyclables, Bangkok © Diane Archer / SEI

This publication may be reproduced in whole or in part and in any form for educational or non-profit purposes, without special permission from the copyright holder(s) provided acknowledgement of the source is made. No use of this publication may be made for resale or other commercial purpose, without the written permission of the copyright holder(s).

Copyright © December 2022 by Stockholm Environment Institute

DOI: <https://doi.org/10.51414/sei2022.051>

Stockholm Environment Institute is an international non-profit research and policy organization that tackles environment and development challenges.
We connect science and decision-making to develop solutions for a sustainable future for all.
Our approach is highly collaborative: stakeholder involvement is at the heart of our efforts to build capacity, strengthen institutions, and equip partners for the long term.
Our work spans climate, water, air, and land-use issues, and integrates evidence and perspectives on governance, the economy, gender and human health.
Across our eight centres in Europe, Asia, Africa and the Americas, we engage with policy processes, development action and business practice throughout the world.

Contents

Introduction	4
Project background and methodology	4
Findings	5
Policy recommendations	9
Conclusion	11
References	12

Key findings

- Looking at two Bangkok neighbourhoods, our study finds major gaps in household waste separation, recycling and reuse practices with approximately 75% of all types of household waste thrown out as trash.
 - Organic waste is the most significant waste type, making up 83% of total waste generated and 90% of total waste thrown out as trash. Households face difficulties in composting due to lack of knowledge, appropriate storage facilities and financial incentive.
 - A value-action gap can be observed between attitudes and practices with 72% of households saying that they separate waste “every time” or “mostly”, and 92% agreeing with the statement that “household waste sorting should be done by everyone”. This does not correlate to the large amount of waste in the sample that is thrown away as trash.
 - The most important motivating factors of household behaviour were found to be economic motivation, with many households earning supplementary income from selling waste to informal collectors, and the feeling of collective action when various stakeholders work together towards common goals.
-

Introduction

While formal collection of waste is relatively high in Asia, averaging 77% of municipal waste (Archer & Nguyen, 2019), mismanagement is common, with overflowing landfills and leakages into the environment resulting in pollution, decreased urban liveability and negative impacts on human health. As governments and communities take strides towards more sustainable cities, the circular economy (CE) is held as a model for future development. Instead of a “take-make-waste” pattern of production and consumption, CE has been defined as an economy that is “restorative or regenerative by intention and design” (The Ellen MacArthur Foundation, 2017).

Thailand’s Roadmap on Plastic Waste Management sets out the ambitious target of recycling 100% of plastic waste through CE principles by 2030 (Pollution Control Department, 2021). However, progress has been slow. Plans to ban four types of single-use plastics (thin plastic bags, Styrofoam food containers, thin plastic glasses and plastic straws) were supposed to come into force by the end of 2022, but use of these materials remains widespread. Studies have shown that during the COVID-19 pandemic, both food and plastic waste generated by households in Bangkok increased due to rising patterns of food delivery and the association of plastic with hygienic preparation and non-contamination (Liu, Bunditsakulchai & Zhuo, 2021).

In 2020, the Bangkok Metropolitan Authority (BMA) launched a 3R (reduce, reuse, recycle) programme in 50 districts to promote waste reduction and separation at source. However, critics argue that similar campaigns have been unsuccessful in the past due to low levels of household awareness (Nguyen & Nitivattananon, 2019).

Households play a critical role in the waste system both as consumers and generators of waste and as the potential driving force for change. Developing a better understanding of household attitudes and behaviour can inform more effective and targeted interventions to support sustainable practices.

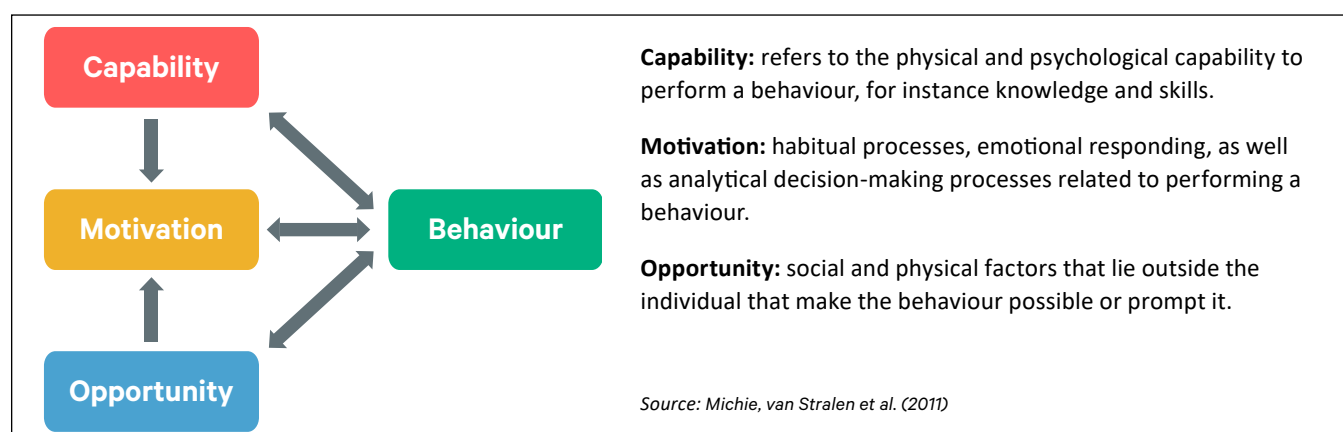
Project background and methodology

The project *Toward inclusive waste systems: integrating informal waste workers for a circular economy* set out to gain insights into Bangkok’s urban waste system through looking at material flows, actors in the system and the drivers of their behaviour, while exploring barriers and opportunities for inclusive circularity.

Questionnaires, focus group discussions and “walk along” interviews were carried out between July and November 2020, with informal waste workers (IWW), junk shops and households in two Bangkok neighbourhoods of Khlong Toei and Bang Kapi. In total, 213 households, 34 IWW and 17 junk shops were surveyed. Households ranged from low income (52% informal settlements) to lower middle and middle class (36% private house/condominium, 8% public housing and 4% shophouse). This policy brief focuses on the findings from households and the implications of household waste practices for circular transitions in Bangkok.

To analyse findings, material flow analysis (MFA) was combined with the COM-B framework of behaviour change. MFA was applied to examine origin, destination and size of flows of main waste types and to draw out gaps in the system. The COM-B system was used to better understand household behaviour by breaking it down into three essential conditions that drive behaviour: capability, opportunity and motivation (Michie, van Stralen & West, 2011). The importance of behaviour change frameworks such as COM-B and other well-tested approaches such as the theory of planned behaviour in improving outcomes have been well established in the field of health (see e.g. Michie, Abraham et al., 2011). Recent literature has been making the case for the utility of such frameworks for sustainability-related behaviours. For instance, the COM-B model has been applied to water conservation (Addo et al., 2018), sustainable packaging (Allison et al., 2021) and energy (Perros et al., 2022). We argue there remains a need for more theoretically driven work on behaviour change for sustainability-related behaviours to build the evidence base for what works.

Figure 1: The COM-B system of behaviour change



Findings

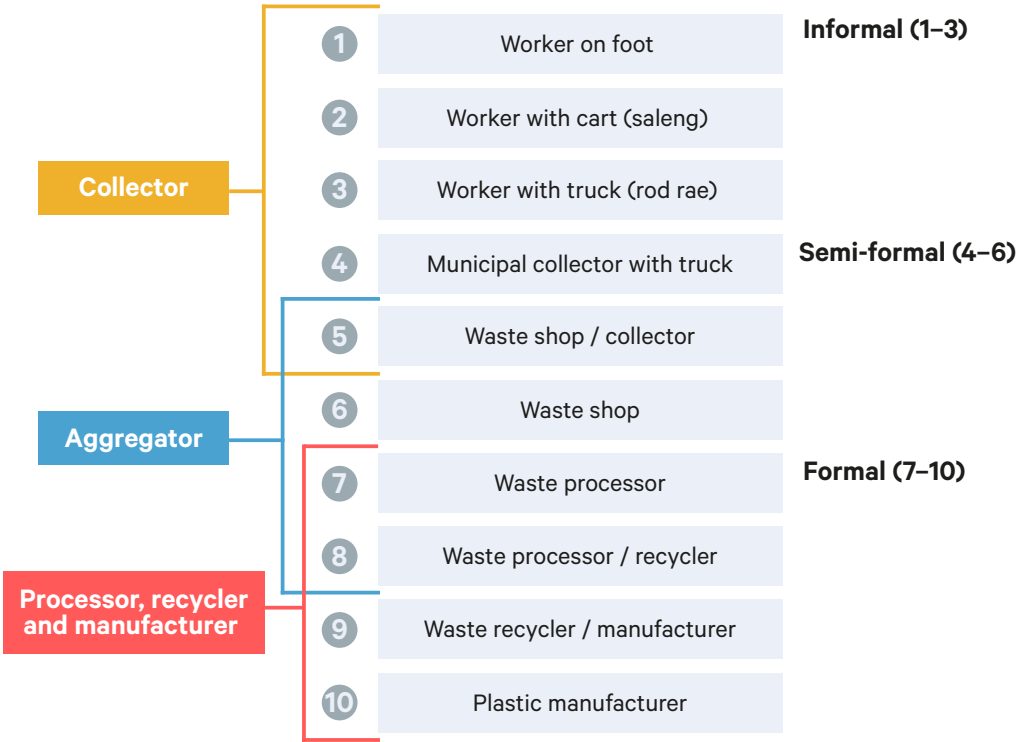
Understanding Bangkok’s waste system

Bangkok’s informal waste economy consists of many interlinked informal, semi-formal and formal actors (Figure 2).

The relationship between these actors can be symbiotic or can lead to conflict. For example, municipal garbage collectors sometimes hire informal workers to help them separate waste, which is then directly sold to junkshops for supplementary income (Hongsthavij, 2017). Access to waste transfer stations can be contentious with some facilities choosing to source their own informal workers to sort materials. Informal workers often have a personal relationship with the households they buy recyclables from, which enables more effective waste collection and greater wage stability.

Due to the hidden nature of informal waste work, it is difficult to estimate the extent of the sector’s contribution to waste management and recycling efforts. Social enterprise Trash Lucky

Figure 2: Actors involved in Bangkok’s recycling system

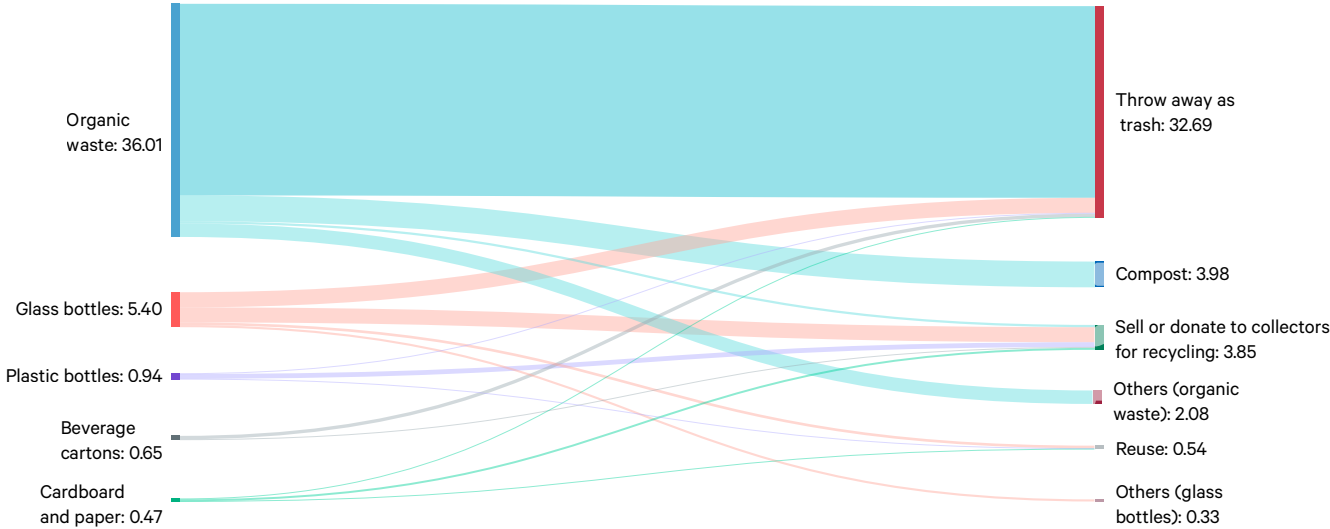


estimates there are around 1.5 million IWW in Thailand, who are responsible for around 75% of recycling in the country (Atichartakarn, 2022).

Household behaviour and material flows

Figure 3 shows the average amount of waste generated in kilograms per household per month according to type in the sample households. We can see a strong potential to recycle or reuse more waste, with approximately 75% of all waste thrown out as trash.

Figure 3: Average household waste generated (kg/month) and its end source



Source: Pottinger-Glass et al., (in preparation).

Organic waste in particular has the highest unrealized potential, making up 83% of total waste generated by weight and 90% of total waste thrown out as trash. Households face difficulties in composting due to lack of knowledge and appropriate storage facilities and lack of economic incentive. Plastic bottles account for the smallest proportion of total waste thrown away as trash as they can be easily reused and have higher resell value. Despite this, there remain serious problems with widespread use of single-use plastics in Bangkok.

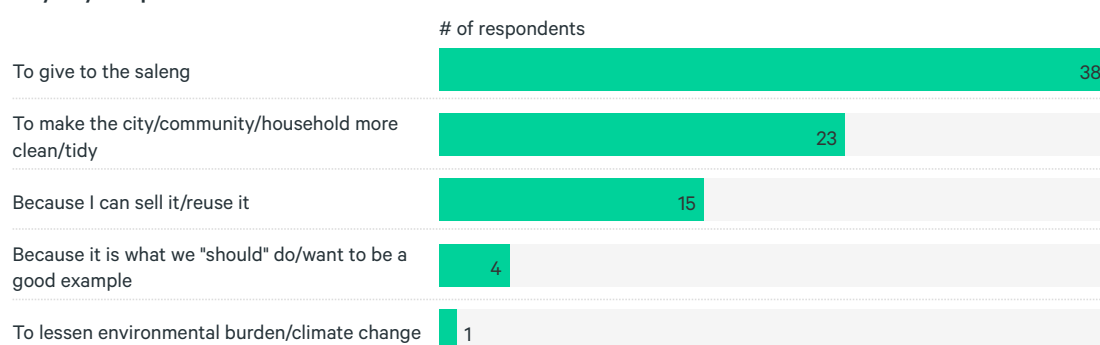
A key finding looking at the behaviour and attitudes of households was a “value-action gap” between what households believe they should do and what they actually do, with 72% of households saying that they separate waste “every time” or mostly”, and 92% of respondents agreeing with the statement that “household waste sorting should be done by everyone”. This does not correlate to the large amount of waste in the sample thrown away as trash.

IWW and junkshop respondents emphasized the critical importance of household waste separation at source as it makes the job of IWW more efficient, dignified and safe when they do not have to rummage through mixed waste and spend time cleaning materials.

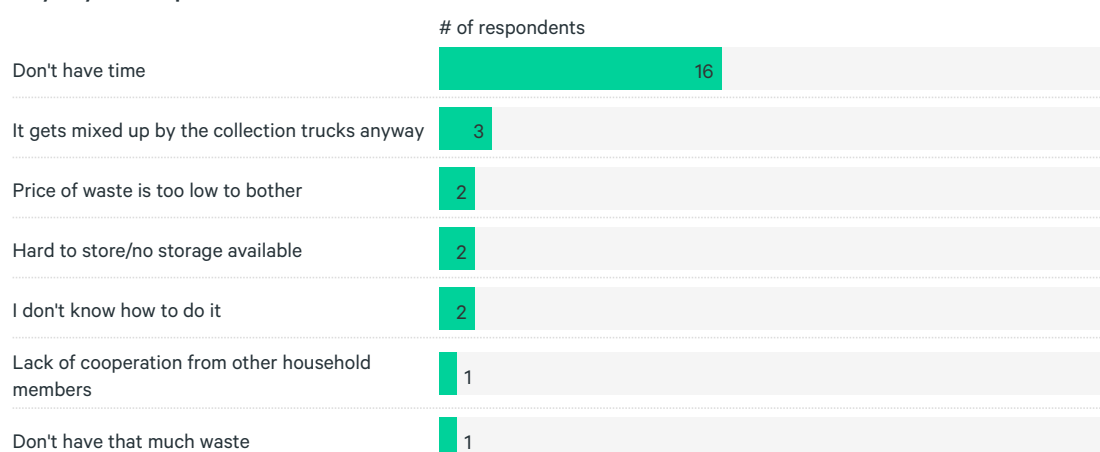
Drilling down into the drivers of household behaviour, Figure 4 shows respondents’ reasons for why they separate or do not separate waste. “To give to the *saleng*” emerged as a key response. *Saleng* usually buy separated waste from households, meaning that together with the response “because I can sell/reuse it” we can see economic motivation as a key factor for household waste separation.¹

Figure 4: Reasons for household waste separation

Why do you separate waste



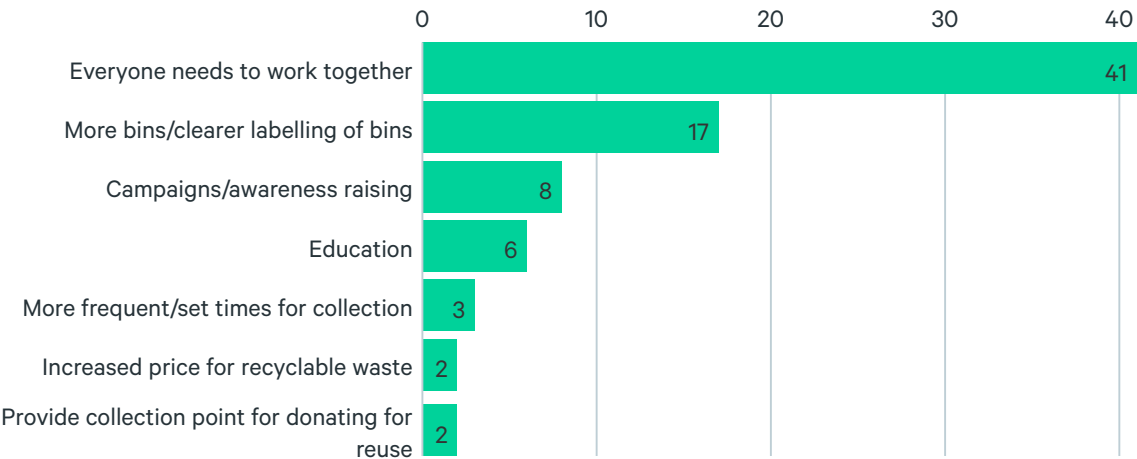
Why do you not separate waste



¹ A chi square test was run to test the association of household type and waste separation. Weak evidence ($p=0.08$) was found supporting the association. An assumption can therefore be made that lower-income household types (e.g. slum/informal settlement) are more likely to separate waste due to the potential for supplementing their income by selling recyclables to collectors.

Only one person in the sample mentioned environment and climate change as a driver for waste separation. This implies that for lower and middle socioeconomic groups in Bangkok, these issues are not relevant to their day-to-day lives and may be an ineffectual driver of behaviour. For reasons not to separate waste, the response of “don’t have time” was the strongest factor, which suggests a lack of positive motivation to bother.

Figure 5: Household suggestions for how to improve waste systems in Bangkok



When asked about how waste circularity could be improved, the most important finding was the importance of collective action, with different stakeholders being seen to do their part.

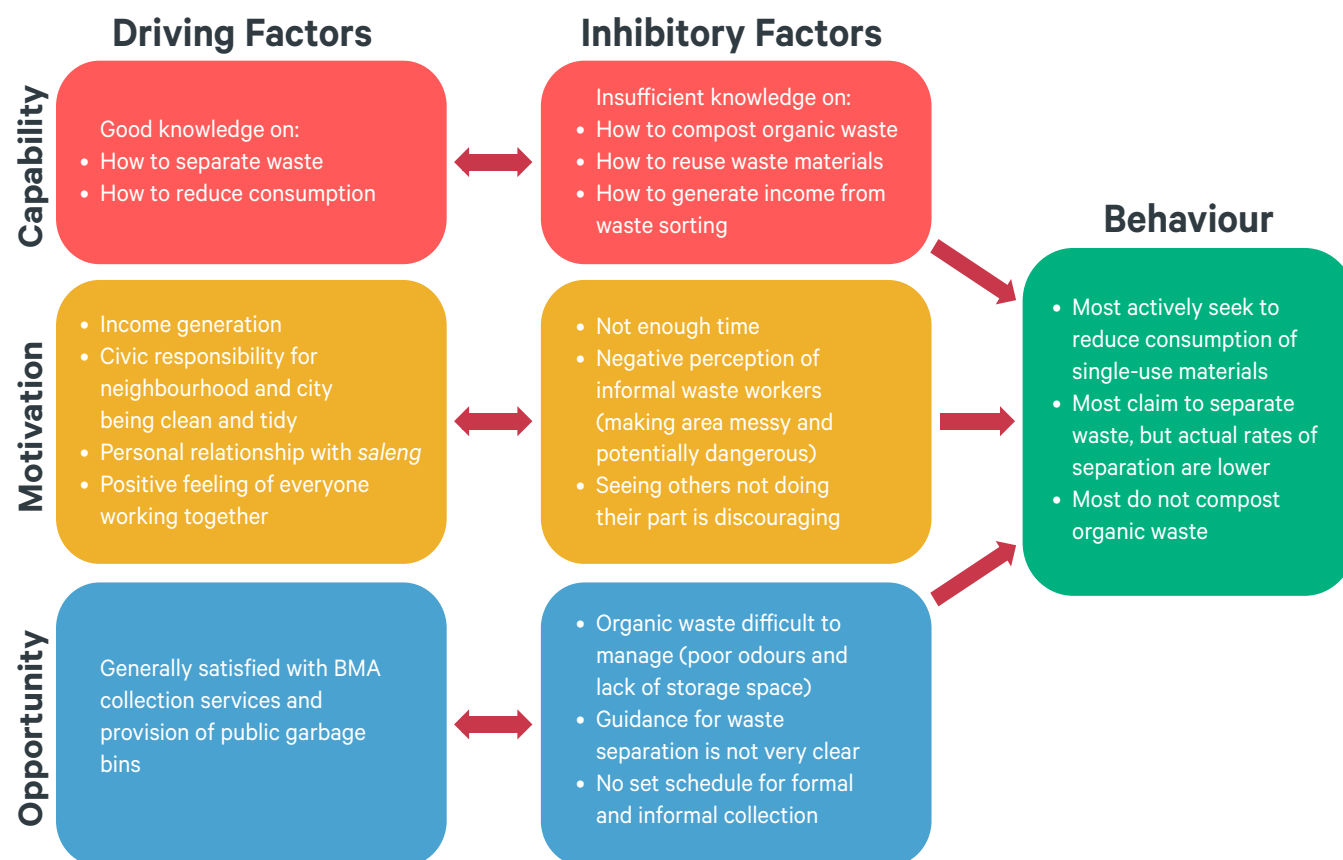
I don't have any problem changing my behaviours and practices to help tackle the waste problem in my community. I'm willing to put in the effort, but there must be action from the waste authorities. Otherwise, acting at the individual level feels discouraging. – Household respondent

Collective action emerges as both a negative and a positive driver of behaviour. For instance, a common complaint that emerged was the feeling of futility when households see municipal garbage collectors mix up the waste that has been separated. However, garbage collectors will often segregate the sorted recyclables after collection in the truck, or at the transfer facility, meaning that the negative perception does not necessarily relate to reality.

In terms of waste reduction and recycling knowledge (capability), 60% of respondents noted that they already had good knowledge, or only needed a bit more knowledge about how to separate and reduce waste. Less than half of respondents said the same for “how to reuse waste materials” (49%) or “how to make compost from organic waste” (43%). This indicates an opportunity for increased delivery of educational programmes and awareness campaigns to address these knowledge gaps

Figure 6 summarizes the driving and inhibitory factors in terms of capability, motivation and opportunity and how they contribute to observed behaviour.

Figure 6: Household behaviour viewed through the COM-B framework



Policy recommendations

Based on our findings, we propose the following recommendations.

Tackle organic waste as a priority

Targeting organic waste as a priority would have a significant impact on circular transitions in Bangkok. Campaigns for household food waste reduction could be implemented alongside pilots for household or community composting schemes. However, initiatives must be locally appropriate. A recent Bangkok study found that composting workshops were impractical as they focused on using bottomless bins, despite the areas in the target communities being paved (Rado, 2022). The lack of financial incentive for households to compost presents another barrier. Schemes could focus on composting for home gardens and urban agriculture as incentives. Alternatively, organic waste could be centrally managed by the municipality via community bins and regular collection.

Capitalize upon the power of collective action to drive household behaviour change

In addition to economic motivation, the feeling of collective action was a significant finding as a positive and negative motivating factor for household behaviour. Campaigns and schemes from the municipality or civil society could therefore focus on bringing Bangkok's interlinked waste actors together towards common goals of waste reduction, separation, recycling and reuse and showing everyone to be "doing their part". Aligning with this recommendation, greater visibility of community-driven initiatives and municipal schemes is likely to be impactful in sparking broader societal uptake.

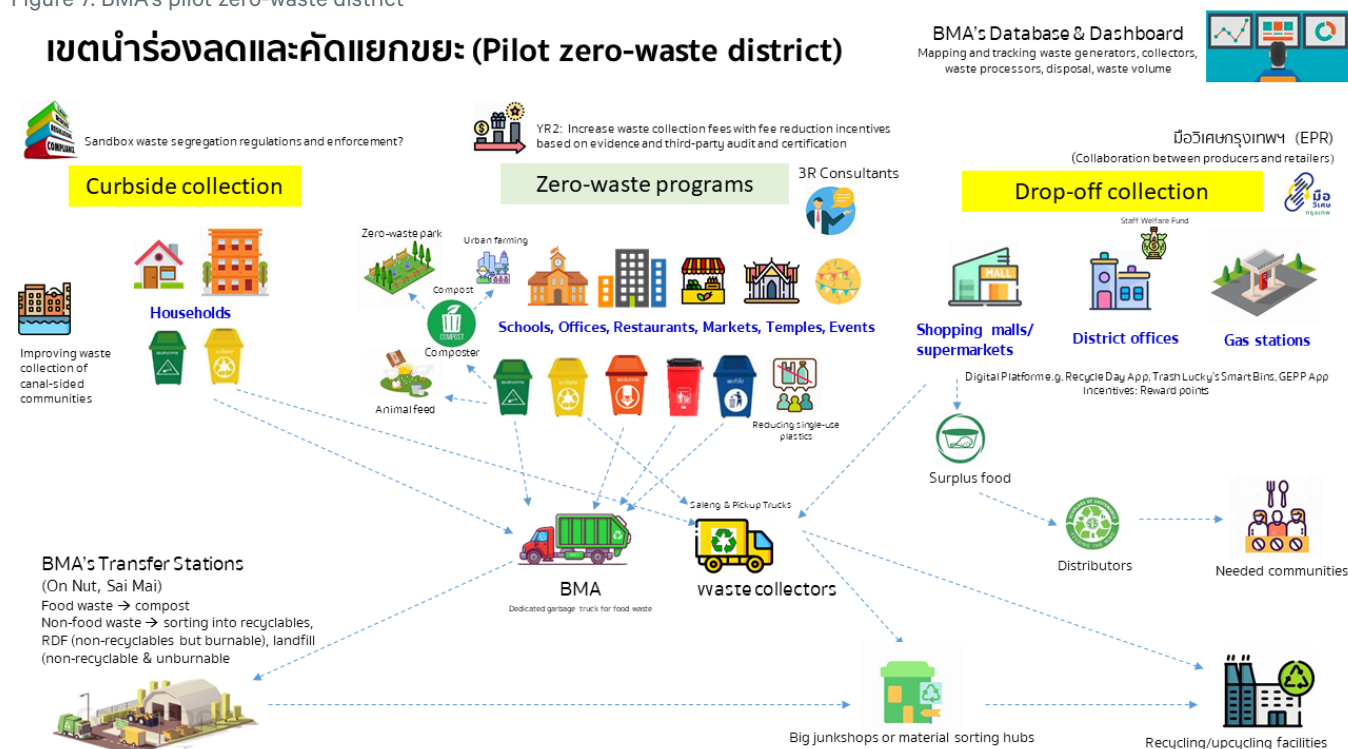
Pilot holistic models for waste management that recognize and include the informal sector

Holistic models for waste management should be piloted by the municipality. Systems should include clear guidance for separation, such as colour-coding of public bins and set schedules for collection to make the process simpler and less time-consuming for households. Within this model, informal workers need to be recognized for the critical role they play and included in waste management decision-making – for instance, through collaboration with worker associations like Thailand's Saleng and Recycle Trader Association (Brenes Salazar et al., 2022).

BMA PILOTING THREE ZERO-WASTE DISTRICTS

The BMA is planning three pilot zero-waste districts (Figure 7) in Bangkok with the campaign tagline “mix no more”. Bins will be provided to households, schools, offices, restaurants, markets and temples for separating recyclables and organic waste. BMA will be responsible for collecting organic waste, which will be composted, and saleng will be responsible for collecting recyclables. Enhanced technology will support BMA to map and track waste flows and volumes.

Figure 7: BMA's pilot zero-waste district



Source: Bangkok Metropolitan Authority

PHITSANULOK LEADING THE WAY:

Showing the power of holistic systems, the city of Phitsanulok in northern Thailand has successfully diverted almost 95% of its waste from landfill by promoting the 3R approach, household separation and community composting. Recyclable waste is largely managed by the informal sector, which receives some technical support from the government (UN ESCAP, 2019).

Address institutional and economic barriers to circular waste systems

While it is important to support sustainable household practices, these actions are only part of the story. For some materials, the amount of energy needed to recycle them outweighs their market value, which means they will inevitably end up in landfill. For instance, coloured plastics cannot be melted down and reused like clear plastics can. Similarly, many food packages such as beverage cartons are made of composite materials, which are difficult to recycle.

In line with Target 1 of *Thailand's Roadmap on Plastic Waste Management*, it will be essential to implement incentives, taxes and fines to galvanize the recycling industry and limit production of single-use and difficult-to-recycle materials. Extended producer responsibility (EPR) is a promising modality that is currently being explored in Thailand, which holds producers responsible for environmental impacts of products throughout their lifecycle. Inclusive implementation of EPR under the umbrella of “green jobs” could also provide informal workers with livelihood opportunities (Vassanadumrongdee & Manomaivibool, 2022).

BAN ON USE OF RECYCLED PET FOR FOOD PACKAGING LIFTED

A major policy breakthrough was reached in June 2022 with the overturning of a limitation on the use of recycled materials such as recycled PET (r-PET) for food packaging in Thailand, which previously constituted a major disincentive for buyers of recycled plastic.

Conclusion

This study has underscored the importance of waste as a resource that supports the livelihoods of many urban stakeholders in Bangkok. Examining drivers of household behaviour provides important insights into how to promote more sustainable behaviour. However, possibilities for individual behaviour change are constrained by factors including societal norms, lack of easy opportunities and lack of incentives. Policymakers have a leading role to play in piloting more efficient and circular waste structures, regulating industry and creating an enabling environment for sustainable behaviour, while ensuring that no one is left behind.

ACKNOWLEDGEMENT

This work was undertaken by SEI in collaboration with Thammasat University, Bangkok, as part of the research project Toward inclusive waste systems: integrating informal waste workers for a circular economy (grant number 2019-02244) funded by FORMAS – the Swedish Research Council for Sustainable Development.

References

- Addo, I. B., Thoms, M. C., & Parsons, M. (2018). Barriers and drivers of household water-conservation behavior: A profiling approach. *Water*, 10(12), Article 12. <https://doi.org/10.3390/w10121794>
- Allison, A. L., Lorencatto, F., Michie, S., & Miodownik, M. (2021). Barriers and enablers to buying biodegradable and compostable plastic packaging. *Sustainability*, 13(3), 1463. <https://doi.org/10.3390/su13031463>
- Archer, D., & Nguyen, T. T. (2019). *Closing the loop: Innovative partnerships with informal workers to recover plastic waste in an inclusive circular economy approach. Regional policy guide*. United Nations Economic and Social Commission for Asia and the Pacific (ESCAP).
- Atichartakarn, N. (2022, July). *Waste Hero Alliance* [Policy workshop]. Social Fiction Thinkathon. Yunus Thailand.
- Brenes Salazar, J., Carraway, B., MacKenzie, C., Ongvasith, P., Sethi, P., Pottinger-Glass, C., & Chandra Pal, B. (2022). *A Waste Hero Alliance: Youth visions for the inclusion and empowerment of informal waste workers in Asian circular cities*. Yunus Thailand. <https://yunus-thailand.org/projects/circular-economy-policy/>
- Hongsathavij, V. (2017). *Who governs the wasteland? Bangkok's informal recycling sector in urban waste management* [Doctoral dissertation, Chulalongkorn University].
- Liu, C., Bunditsakulchai, P., & Zhuo, Q. (2021). Impact of COVID-19 on food and plastic waste generated by consumers in Bangkok. *Sustainability*, 13(16), Article 16. <https://doi.org/10.3390/su13168988>
- Michie, S., Abraham, C., Eccles, M. P., Francis, J. J., Hardeman, W., & Johnston, M. (2011). Strengthening evaluation and implementation by specifying components of behaviour change interventions: A study protocol. *Implementation Science*, 6, 10. <https://doi.org/10.1186/1748-5908-6-10>
- Michie, S., van Stralen, M. M., & West, R. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science*, 6(1), 42. <https://doi.org/10.1186/1748-5908-6-42>
- Nguyen, T. T., & Nitivattananon, V. (2019). *Roles and integration of informal waste sector in municipal solid waste management: The case of transfer facilities in Bangkok, Thailand*. 14th Asian Urbanization Conference. Sustainable Development Goals in Asia. King Mongkut's Institute of Technology Ladkrabang (KMITL), Bangkok, Thailand, January 2018. 11.
- Perros, T., Allison, A. L., Tomei, J., & Parikh, P. (2022). Behavioural factors that drive stacking with traditional cooking fuels using the COM-B model. *Nature Energy*, 7(9), Article 9. <https://doi.org/10.1038/s41560-022-01074-x>
- Pollution Control Department. (2021). *Thailand's roadmap on plastic waste management 2018–2030*. Ministry of Natural Resources and Environment. https://www.pcd.go.th/wp-content/uploads/2021/10/pcdnew-2021-10-19_08-59-54_995414.pdf
- Pottinger-Glass, C., Vanhuyse, F., Asvanon, R., & Archer, D. (In preparation). Bangkok's waste metabolism: Barriers and opportunities for inclusive circularity.
- Rado, I. (2022). Getting to the bottom of food waste: Identifying obstacles to effective circular economy practices in a Thai semi-urban context. *Journal of Material Cycles and Waste Management*, 24, 824–834. <https://doi.org/10.1007/s10163-021-01347-9>
- The Ellen MacArthur Foundation. (2017). *The circular economy in detail*. <https://archive.ellenmacarthurfoundation.org/explore/the-circular-economy-in-detail>
- UN ESCAP. (2019). *Closing the loop: Sai Mai District, Bangkok case study*. <https://repository.unescap.org/handle/20.500.12870/231>
- Vassanadumrongdee, S., & Manomaivibool, P. (2022). *Policy brief. Developing a policy framework for extended producer responsibility (EPR) for packaging waste in Thailand*. Pollution Control Department, Thailand. https://www.pcd.go.th/wp-content/uploads/2022/02/pcdnew-2022-02-18_03-24-24_729536.pdf

Visit us

SEI Headquarters

Linnégatan 87D
Box 24218
104 51 Stockholm Sweden
Tel: +46 8 30 80 44
info@sei.org

Måns Nilsson
Executive Director

SEI Africa

World Agroforestry Centre
United Nations Avenue Gigiri
P.O. Box 30677 Nairobi 00100 Kenya
Tel: +254 20 722 4886
info-Africa@sei.org

Philip Osano
Centre Director

SEI Asia

Chulalongkorn University
Henri Dunant Road Pathumwan
Bangkok 10330 Thailand
Tel: +66 2 251 4415
info-Asia@sei.org

Niall O'Connor
Centre Director

SEI Latin America

Calle 71 # 11-10
Oficina 801
Bogotá Colombia
Tel: +57 1 6355319
info-LatinAmerica@sei.org

David Purkey
Centre Director

SEI Oxford

Oxford Eco Centre
Roger House Osney Mead
Oxford OX2 0ES UK
Tel: +44 1865 42 6316
info-Oxford@sei.org

Ruth Butterfield
Centre Director

SEI Tallinn

Arsenal Centre
Erika 14
10416 Tallinn Estonia
Tel: +372 6276 100
info-Tallinn@sei.org

Lauri Tammiste
Centre Director

SEI York

University of York
Heslington
York YO10 5NG UK
Tel: +44 1904 32 2897
info-York@sei.org

Sarah West
Centre Director

SEI US Main Office

11 Curtis Avenue
Somerville MA 02144-1224 USA
Tel: +1 617 627 3786
info-US@sei.org

Michael Lazarus
Centre Director

SEI US Davis Office

501 Second Street
Davis CA 95616 USA
Tel: +1 530 753 3035

SEI US Seattle Office

1402 Third Avenue Suite 925
Seattle WA 98101 USA
Tel: +1 206 547 4000
