

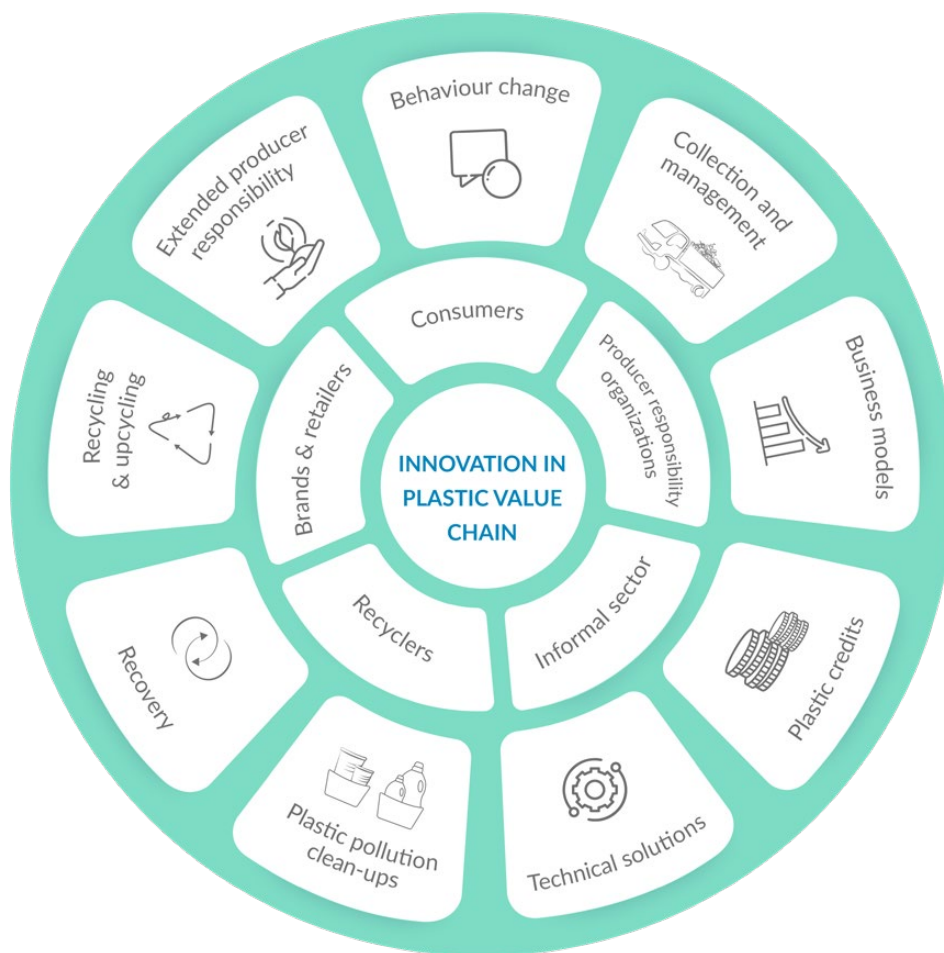
Circular solutions for plastic pollution

Innovative local strategies for effective
plastic waste management models

About the case study

This good practice case study is part of a series of knowledge products developed by the SEA circular project to showcase exemplary market-based solutions that bring about transformational changes in the way plastic is managed in the value chain. This series captures circular economy approaches, ranging from innovative business models to behaviour change initiatives, to address plastic pollution. These approaches form part of the SEA circular project's "circularity framework for the plastic value chain".

Circularity framework – plastic value chain



Introduction

In many developing nations, large populations and rapid urbanization overwhelm local waste management infrastructure. Robust consumption, low waste collection rates and high levels of littering produce substantial pollution in the surrounding land and marine environments. For smaller communities in peri-urban areas, solid waste management can be an even more complex and multidimensional challenge, mainly because of their geographies, limited resources and economic activities. For one such community in Thailand, that challenge was addressed through a combination of practical interventions, community involvement, sustainable systems and relevant partnerships. This case study demonstrates exemplary approaches to the way that plastic is managed within the community, which led to an increase in recycling and a reduction in single-use plastic packaging while improving people's health and well-being.

Improved plastic management

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The challenge

Wangwa is located in the Klaeng district of the industrial province of Rayong, on the eastern coast of the Gulf of Thailand, about 220 km from Bangkok. The province is part of the country's Eastern Economic Corridor (EEC), where the focus of both the Thai Government and the private sector is on developing the eastern seaboard area into a vibrant economic hub for the Mekong region.

The community is situated in an agricultural part of the province with coastal access. About 8.1 ha in size, the new Wangwa community was established in 2011 and has a population of 522 households (2,100 people), with many of the population working in factories in the city of Rayong, about 50 km away.

There was no waste management system in place in the community's early days. Families lived among piles of trash and filth and were at risk of catching diseases caused by the pollution that surrounded them. The local government had limited resources allocated to the community, with small garbage trucks doing once-weekly rounds to collect garbage from households. The services were clearly insufficient for keeping pace with the population, which was rapidly growing as people moved to the area to live closer to jobs in nearby Rayong.

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Interventions

It took some time before any clear and concerted action was established to address the critical waste issue. The efforts of some concerned residents led to door-to-door visits in 2013 to solicit community members' support in addressing the mounting pollution crisis they themselves had created.

The Wangwa waste management model was established in 2013. Local environmental advocate Sayan Rungreaung led community committee members on a programme to work with each household to segregate their organic waste. Through that effort, at least 18 tons of organic waste were collected monthly, which were used to feed animals or as fertilizer. A recycling bank and a community-led organic waste management system were fully implemented in 2015.

Soon after, the municipal government and some businesses with a local presence also joined the effort, helping to provide the facilities, equipment and roads required for launching the community's recycling initiative. In 2018, the community engaged with the Private Partnership for Sustainable Plastics and Waste Management (PPP Plastics)¹ to further improve on the model that had, by then, become integrated into the Wangwa community's way of life.

The established community of practice in Wangwa allowed PPP Plastics to fast-track the development of a more effective local waste management system. In fact, the high degree of community involvement and commitment provided the foundation for a system that was culturally appropriate, inclusive, sustainable and transparent.

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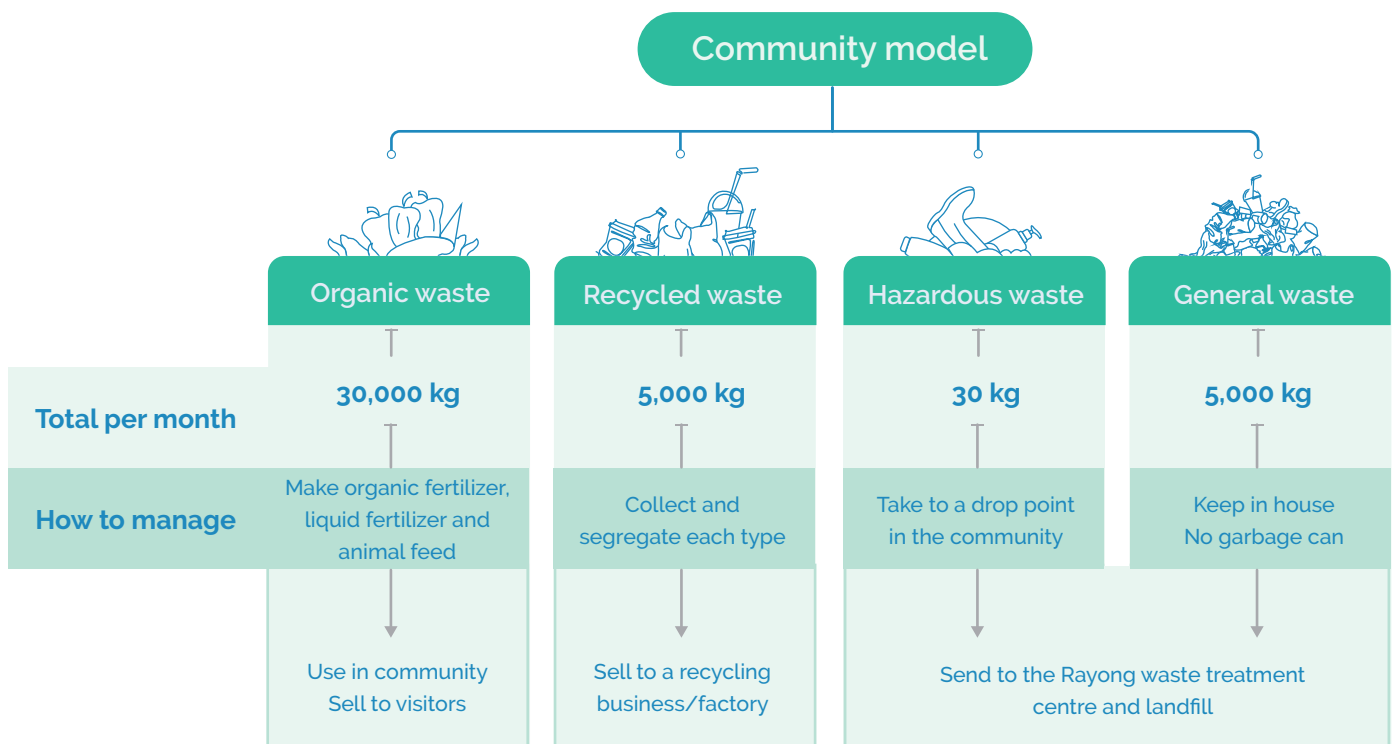
1. PPP Plastics was launched in 2018 and is composed of more than 20 public and private organizations and civil society organizations committed to sustainably addressing plastic waste. Dow, SCG and PTT Global Chemical lead the PPP Plastics plastic waste management initiative in Wangwa, which highlights the circular economy concept and undertakes to educate the general public on waste segregation, with the goal of achieving 100 per cent recycling and halving ocean waste in Thailand by 2027.



The community model

The Wangwa community model, as illustrated in Figure 1, makes households responsible for segregating their waste into four streams: organic waste, recyclable waste, hazardous waste and general waste.

Figure 1. The Wangwa community model



Source: PPP Plastics (2020)

Monthly waste collection represents about 40,000 kg in total, 75 per cent of which is organic waste, with the rest comprising recyclable and general waste. Plastics constitute most of the non-organic waste (2,000 kg per month). Working closely with the municipality and PPP Plastics, the community manages data collection, with processes in place to measure waste volumes.

- Organic waste is collected daily by youth volunteers from each household and brought to the organic waste management facility located in the community, where it is processed to make organic fertilizer, liquid fertilizer and animal feed.



- The monthly average of about 30,000 kg of organic waste can be processed into 12,000 kg of biological fertilizer and 3,000 kg of animal feed from food waste, 500 kg of organic fertilizer, 150 kg of fertilizer from earthworms and 250 litres of liquid fertilizer. The products are used by the community or sold to visitors.
- Recyclable waste is collected by households and sold to the recycling storage area every month. Elderly volunteers sort the items and segregate and clean about 5,000 kg of plastic and plastic bottles, aluminium and paper every month. Those post-consumer items are either sold to recycling businesses and factories that require recycled materials or upcycled within the community into products for sale to businesses and consumers.
- General and hazardous wastes (batteries, lighting, aerosol cans, etc.) are collected from households every Tuesday by local waste services or can be dropped off at designated points in the community. They are segregated and then brought to the provincial waste treatment centre located in Rayong.

The Wangwa model for managing waste is supported by infrastructure located in 800 m² of common public space, with the land provided by the local government. Seed money from various partners and from PPP Plastics was made available to add or upgrade the following: facilities for processing the organic waste into animal feed and fertilizer; a storage facility for plastic and recyclable materials; and a learning centre for the community (Figure 2). A team of community members, supported by volunteers, runs and manages the entire set-up.

Figure 2. Wangwa waste management facility



Source: PPP Plastics (2020)



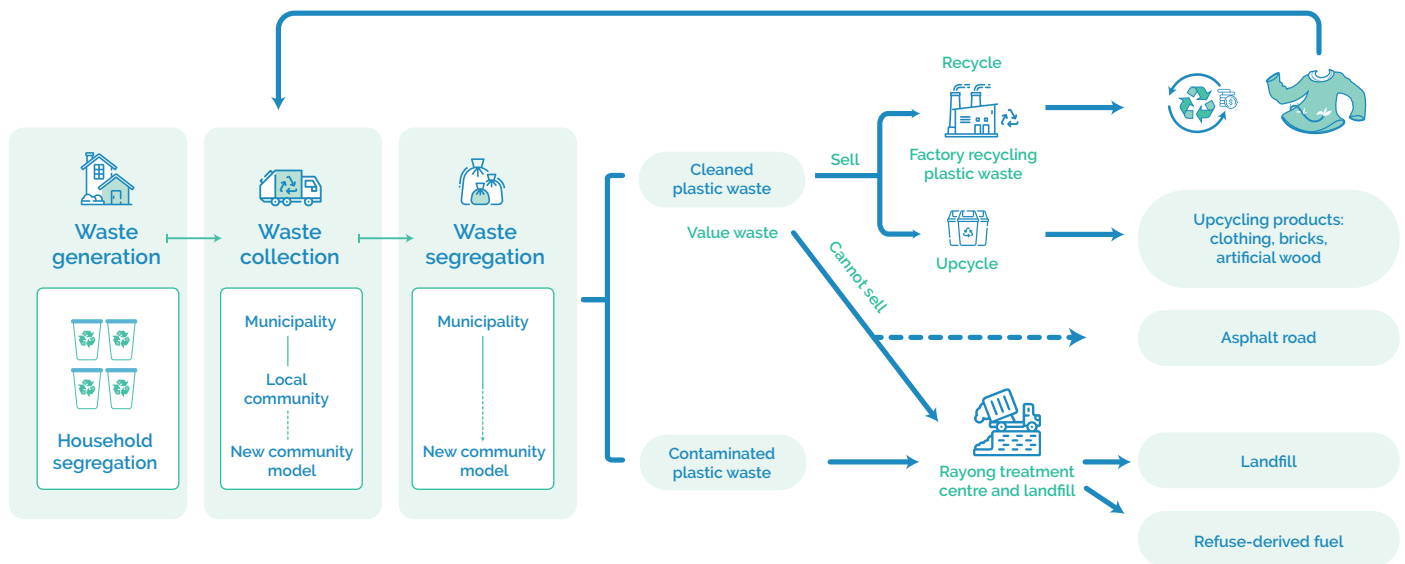
- A team of 13 people manages the different fertilizer stations and another team of 10 manages the recycled materials. These individuals are locals who have been trained through years of experience and continuous learning with experts and community volunteers who are paid or given incentives for their work.
- The learning centre in Wangwa is a venue for holding workshops and training on organic waste management, fertilizer production and recycling, and processing of plastic into new products. It has also become a tourist attraction and a learning centre for the province. In 2019, for example, almost 15,000 visitors from nearby communities and even from northern and southern Thailand attended workshops there.
- Elderly community volunteers sort the recyclable materials and are provided with monetary incentives for their participation.
- Incentives are derived from the income generated from the whole project: from fertilizer sales, sales of recyclable materials to recycling businesses, and workshop and visitor sales. Such income also supports a community fund for Wangwa's senior residents (e.g. to cover hospital-related logistics costs), scholarships for children, free Wi-Fi for the community's 500 households and neighbourhood security.
- Waste sold in Wangwa that cannot be recycled or converted into fertilizer is sent to the Rayong waste treatment centre and landfill, an integrated system that has the capacity to handle 1,000 tons of waste a day. The provincial waste treatment centre services Rayong's 68 municipalities and 600 communities, in addition to a few other neighbouring provinces.



The Wangwa model

Self-sustaining circular system. The model for sustainable waste management in Wangwa promotes material reuse, recycling and transformation into new products, creating a circular economy that limits waste from entering the environment (Figure 3). It is driven by a community that is involved, understands the need to sort waste at source and possesses the right knowledge.

Figure 3. The Wangwa community model



Source: PPP Plastics (2020)

Sorting the organic waste and segregating in situ has also allowed Wangwa to send higher-quality waste to the Rayong waste treatment centre and landfill. This supports Rayong's provincial targets for better management of landfill, given the limited land area and breakdowns in waste processing equipment due to unsorted, contaminated waste. A working model such as Wangwa's can be adopted and scaled, especially in communities where no segregation is taking place, not only to optimize investments in infrastructure (thus minimizing machine breakdowns), but also to prolong landfill life with reduced waste volumes.



Appropriate technology and local capacity. The waste management system should be affordable, simple and something a community can handle. Easy and accessible innovation and technology can be sustained over longer periods of time. With support and seed money, communities can start with basic organic waste treatment stations and proceed step by step. The main investment from local governments would be common space allocation for collecting organic waste. Good management and efficient technology that matches local capacity further enables the system.

Community commitment and partnerships. Big investment is not the key success factor. It is more crucial to have a committed community leadership supported by its members, with a successful network of local authorities and related businesses united to collaborate on improving waste management and reducing plastic waste. Partnership with PPP Plastics in Wangwa has provided the community with considerable support and leads to further opportunities for scaling up and transferring learning and experiences to other communities in Rayong and the rest of Thailand.

Enhanced community knowledge. Continuous efforts to educate and raise awareness about managing and sorting waste, including plastics, among constituents and especially the younger generation are entrenched in the community of practice. Responsible consumption patterns are promoted among community members, encouraging them to segregate waste at home.

Income for the community. Recycling plastics and processing organic waste have brought economic benefits to the community. Thirty thousand kilograms of organic waste per month are processed into fertilizer, which is sold to visitors and used for community tree planting and gardening activities. This translates into a monthly income of about THB 21,600 (approximately US\$650). The proceeds are reinvested into the community and used to provide scholarships and free public Wi-Fi. The income from sorting and selling recyclables ranges from THB 12,000 to THB 15,000 (approximately US\$360–460) per month.

Community behaviour that is predisposed towards managing waste at source resulted from first-hand experience of living with garbage and filth in the streets. Such behaviour was further encouraged by a system that empowered the community to act and enjoy the direct benefits of their efforts.

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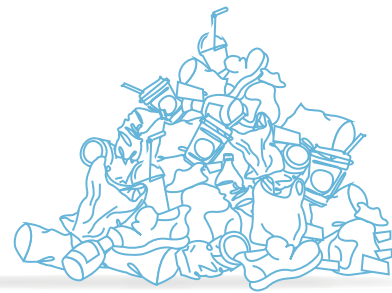
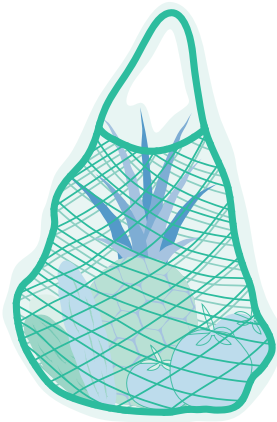
Measurable impacts

Higher-quality recyclables. Segregating organic waste from the other waste streams minimizes contamination and improves the quality of recyclable items such as plastic bottles and aluminium cans. The Wangwa waste management system has resulted in an increase in the community's recycling rate from zero since the community was established.

Reduced waste volumes to landfills. A reduction in waste volumes from 60,000 kg of contaminated waste a month in 2015 (before starting the project) to 5,000 kg in 2019 has resulted from the community's high take-up of waste management procedures. The amount of plastic waste sent to landfill had fallen by 20 per cent by 2019 and the community is aiming for zero waste by 2022.

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We thank Wangwa for sharing details of their exemplary innovations in the SEA circular project's series on the plastic value chain.



The SEA circular project Reducing marine litter by addressing the management of the plastic value chain in Southeast Asia is implemented by the UNEP Regional Office for Asia and the Pacific and the Coordinating Body on the Seas of East Asia (COBSEA), with funding support from the Government of Sweden. SEA circular aims to reduce and prevent plastic pollution and its impact by working with governments, businesses, civil society, academia and international partners. The initiative promotes market-based solutions and enabling policies to transform plastic value-chain management, strengthens the science base for informed decision making, creates outreach and raises awareness. The project leverages COBSEA's regional mechanism to tackle the transboundary challenge of marine litter in a harmonized manner.

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