

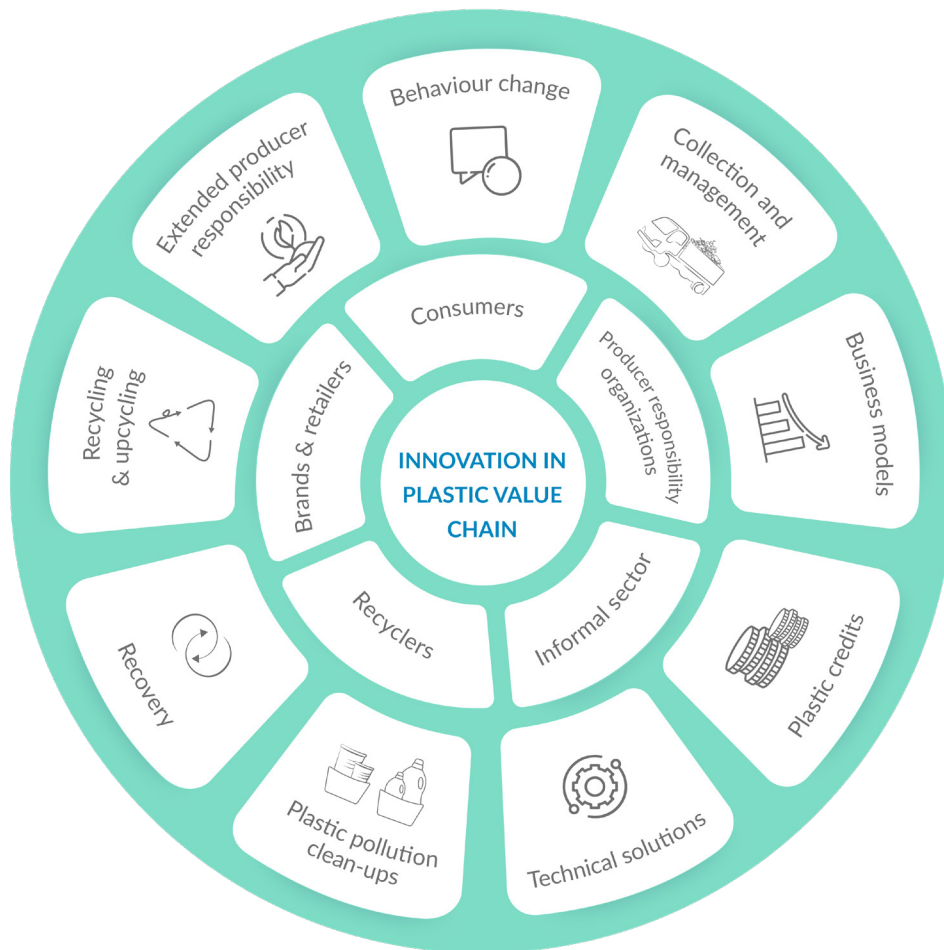
Circular solutions for plastic pollution

An ecosystem business
model for small communities and
a renewed sense of value towards plastic

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

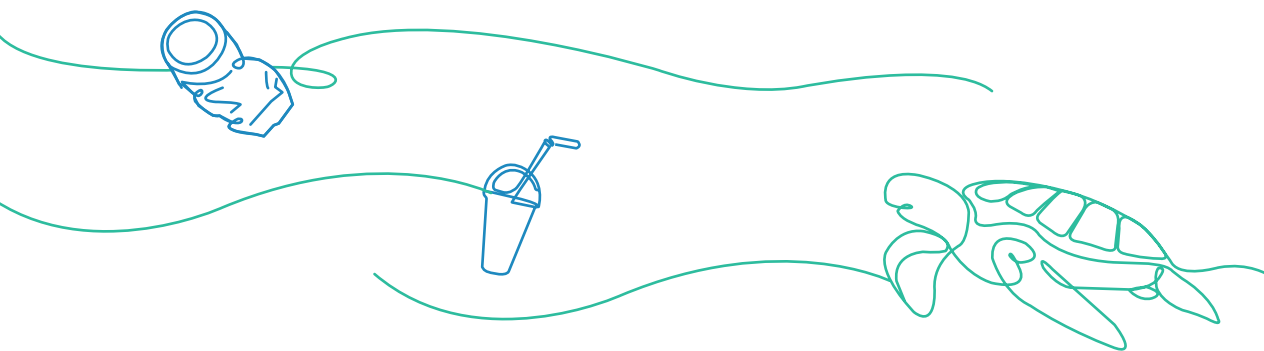


Background

Plastic Collective was established in 2016 when Louise Hardman decided to launch a start-up that would stop plastic pollution. Spurred to action by a turtle that was found to have ingested 30 different types of plastic (the turtle died three days after being found), Louise decided to work towards turning these same plastic wastes into resources with economic value.

Louise started out designing a machine that could process and recycle plastic waste into usable material, and then worked with engineers to build it. Thanks to her clear vision, the first prototype of a combined shredder and extruder machine, named the Shruder, was built not long after. Once built, Louise pitched the machine and her plan for it to investors, securing the funds needed for its commercial development.

Plastic Collective provides purpose-built plastic recycling machinery and newly developed Shruder Recycling Stations, as well as training and technical support that empowers remote and vulnerable communities. Plastic Collective works in Australia, Cambodia, Indonesia, Malaysia, Thailand and Timor-Leste. The bespoke “hardware stack” that makes up the Shruder Recycling Stations are an integral part of a business model that allows communities to take control of their plastic waste, keep their environments clean and improve the health of their communities as they create and operate their own plastic recycling microenterprises.



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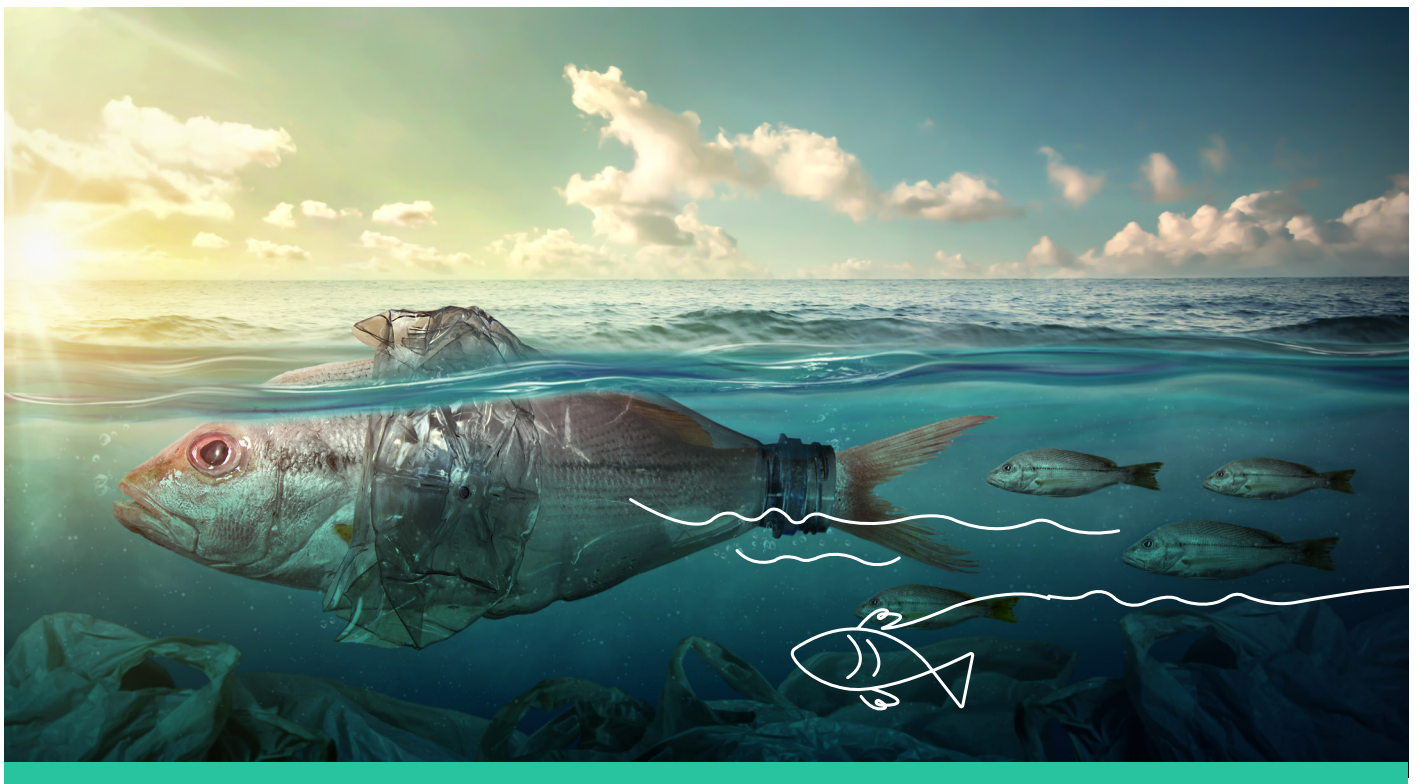


The issue

According to Ocean Conservancy, there are about 8-12 million metric tons of plastics entering oceans every year, on top of the estimated 150 million metric tons already in marine environments. Asia is responsible for around 74 per cent of this plastic waste, with many communities burning, burying or dumping the waste directly into oceans and the environment.

Remote communities in the Asia-Pacific region often have low gross domestic product (GDP), with people earning less than \$5,000 a year. As such, these communities have no access to waste collection facilities, and no financial capacity to set up their own. This results in up to 100 per cent of their plastic waste ending up in oceans.

Marine pollution threatens the biological ecosystems that support coastal livelihoods. The combined infrastructure issue and the decentralized nature of waste management in islands and remote regions dictate the need to plan for small, remote infrastructure that can be run independently of irregular and unreliable electricity supply.



The strategy

The strategy for market transformation involves coordinating both the supply and demand sides for recycled plastic.

The supply side

Education

Plastic Collective works with communities that are often forgotten by the rest of the world, as they struggle to hold back the tide of plastic waste engulfing their environment. Three such communities were selected to run pilot projects in the Mantanani Islands (Borneo, Malaysia), Les Villages (North Bali, Indonesia) and the Whitsunday Islands (Australia). The population densities of these communities are between about 1,000 and 40,000 people.

Community visits and education programmes that encourage plastic to be viewed as a valuable recyclable resource rather than rubbish were targeted to match people's capacity to learn, and were also integrated into schools and plastic recovery stations in these locations. Flexible online learning (education for communities that are not literate but have excellent visual skills) support people in the communities who have been identified for training, with a view to training the rest of the community.



Infrastructure

Several solutions exist that are easily scalable and suited to community needs. The Shruder machines and other equipment used are light enough and appropriately sized to enable easy transport within containers onto the islands, which is often a challenge due to the small islands' lack of harbours or ports and limited landing areas. This limited infrastructure availability also means that any materials leaving the islands must be small and compact enough in volume for easy handling.

Shruder Recycling Stations are mobile, robust, ready to use and fit for purpose. They are also easily transportable and can fit into either a standard 6 x 4 trailer or a 20 ft shipping container, depending on the equipment stack required. As electricity supply in island locations is mostly irregular and unreliable, the machines can be powered either through mains power (single phase) or by 3-phase generators. The machines sit inside a container, as usually there are limited decent, safe and dry locations to set up the equipment (single phase).

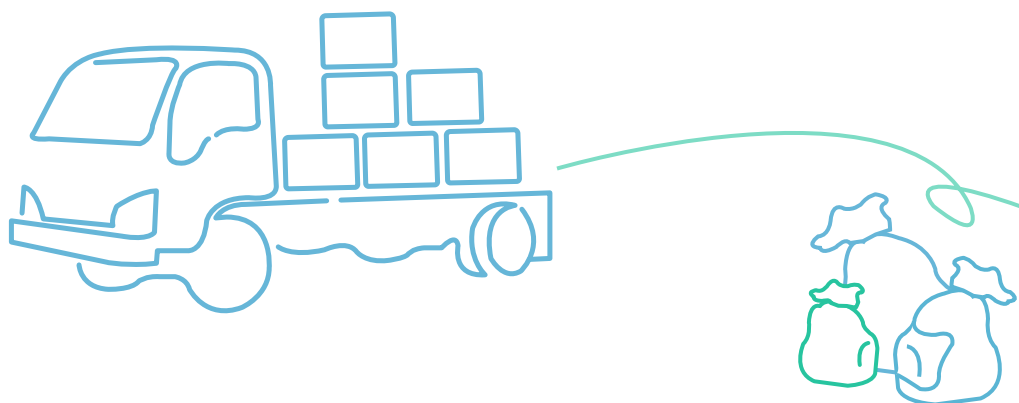
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The business model

With a package of technologies, machinery, training and support, these communities are in the process of establishing a profitable plastic recycling microenterprise that will allow them to be part of the recycling supply chain.

- In the pilot communities, plastic materials are collected via four streams – households, businesses, organizations and special programmes – with various modes of transport delivery and personal collectors making up the diverse combination of recovery channels available. These channels are evaluated, which helps establish the communities' collection capacity. Given the low population densities, discarded plastic material volumes are also limited, at about 10 tons on average per month for up to 10,000 people.
- Plastic materials are processed and sold to previously identified markets. Recycled plastic shreds, pellets or flakes that can be sold comprise 60 per cent of the output materials. With more processing, material prices can be around \$2-3/kg higher.
- Of the usable materials collected, 40 per cent are turned into local products, with values starting at \$4/kg.
- The collection and recycling process is certified according to the [3R Initiative's Plastic Waste Reduction Standard](#), a plastic accounting standard that not only validates the material mass, polymer type and form, collection location and energy and water consumption to collect the plastic, but also ensures that the communities conform to specified ethical, environmental and fair-trade standards. A transparent and measurable means for determining the amount and value of plastic removed from the environment allows for a clear basis for the creation of plastic credits.



The demand side

Selling plastic neutrality

Through Plastic Collective's plastic credit programme, companies that are aware of their plastic footprint are introduced to a strategy that helps them reduce their plastic consumption. Plastic credits backed by the community projects from both the Mantanani Islands, Les Village and the Whitsunday Islands provide an option for companies to address the final balance of their plastic footprint after implementing internal reduction, reuse and recycling activities.

Companies such as the Global Good Collective, for example, sought to purchase plastic credits to offset the sale of 1 million units of toilet paper. Using the anticipated number of units sold per year by the product's plastic footprint (the plastic weight of the product unit = plastic in the actual product itself + plastic used in the primary (customer-facing) packaging), a target for equivalent plastic credits was determined.

Purchasing such credits supported the company's plastic-neutral claims for the product for 12 months. If the company sells less than it forecasts, the matching unused credits can roll over to the following year. If more is sold, the company will purchase more credits.

The credits are sold on Plastic Collective's website (Figure 1).

Figure 1. Plastic credits for sale via Plastic Collective

The image displays three promotional cards for Plastic Collective's plastic credit program, arranged horizontally. Each card has a teal border and a background with a pattern of small dots. The cards are titled 'PLASTIC NEUTRAL', 'PLASTIC POSITIVE', and 'PLASTIC AWESOME'. Each card lists a price per year, the amount of plastic waste removed, and a 'SELECT' button. At the bottom of each card is a 'Gift a Pledge?' button. The cards are set against a background of teal wavy lines.

Category	Price per year	Waste removed
PLASTIC NEUTRAL	US\$55 per year [*AUD\$78, GBPE44, EURE49]	53kg
PLASTIC POSITIVE	US\$110 per year [*AUD\$156, GBPE88, EURE98]	106kg
PLASTIC AWESOME	US\$220 per year [*AUD\$312, GBPE176, EURE196]	212kg

The profits from the sale of the recycled plastic and plastic credits are reinvested into the communities as payment for the waste materials brought in by the community and for the maintenance of the recycling equipment.



The challenges

Community buy-in

Community involvement is crucial for the programme to succeed. Working closely with the community on how to plan and approach the plastic pollution issue – and the potential for collective microenterprises to use plastic waste as a resource – is part of the ongoing effort to build awareness. Community capacity is supported by providing training that is appropriate to the learning capabilities and style of the participants.

Scaling

Small and remote communities cannot pay for the cost of the equipment, meaning seed funding from investors and sponsors is necessary to start the projects. To ensure sustainability, it is crucial to demonstrate that the returns from selling recycled materials and plastic credits can support investments in the microrecycling equipment. There is a clear need for a financing vehicle that will provide the capital upfront to buy and install the equipment in the community, with the returns to be recovered from plastic credit sales.

Critical mass to justify economic returns

Plastic material volumes from many of the smaller communities are not enough to justify the investments. The experience from projects in two pilot communities highlights the fragility of the economics, given the low plastic volumes, as well as the limited opportunities with the recycled outputs and upcycled materials.

Plastic Collective is therefore seeking to build capacity within a network of islands to ensure scale, with the main processing taking place in the biggest islands (or nearest mainland), which would act as a processing hub. The smaller islands (or spokes) would then be organized to collect the material, undertake a light level of processing and send the materials to the hub.

Dramatic economies of scale are achieved with more participants, especially when considering the cost of transporting the goods across islands.

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Impacts

Employment creation and greater profits for the community

The community can employ local staff (6-12+ people) to run the resource recovery microenterprises, generating a profit for the good of the community. Educating and raising awareness among families and their children helps reinforce the value of reducing single-use plastics and recycling higher-value plastics.

Social benefits

Co-benefits and positive social impacts from the pilot projects include better health and sanitation from a cleaner environment, empowerment through collective enterprises that address waste management and provide a livelihood source for the community, and the sense of pride and well-being it affords for the residents of the Mantanani Islands, Les Village and the Whitsunday Islands.

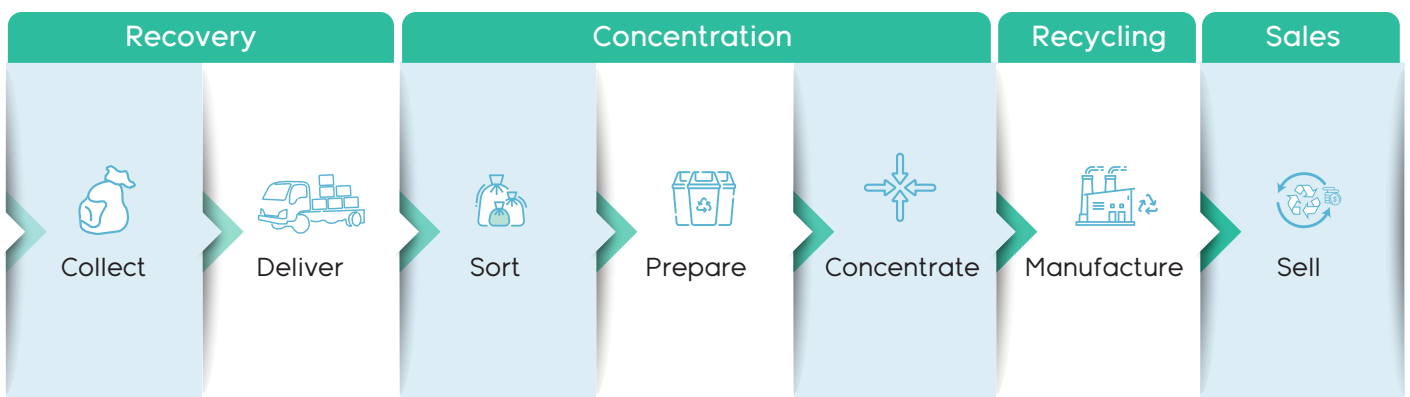


Moving forward

Promoting a hub and spoke model

Not all island communities can justify the investment needed for the equipment, or may not have enough plastic material available to match the machine's capacity, making it economically unviable for communities to invest and expect returns. In such cases, the hub and spoke model would afford these communities access to solutions (Figure 2).

Figure 2. The hub and spoke model



Smaller islands can be equipped to recover plastics, which includes collection and sorting processes that allow for simple yet valuable processing. These island spokes would then send their sorted materials to larger island hubs, where the Shruder Recycling Stations would concentrate and recycle the materials into raw and finished products.



Machine improvements

The ability to upgrade the Shruder recycling equipment to increase output and capacity is also an option, as the modular nature of the design provides a range of suitable equipment for baling, granulating, extruding and compression and injection moulding, with power consumption able to be increased to 3-phase and other options. A greater range of processing equipment would also allow for an expanded product portfolio, with product design, mould and dyes also available along with Plastic Collective's expert recycled-product technicians.

New markets

Many fast-moving consumer goods companies are expressing interest in including plastic offsets in their plastic-use reduction efforts. Calculating a product's footprint is a simple approach, and therefore an easy opportunity to achieve plastic neutrality.



We thank Plastic Collective 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.

 www.sea-circular.org

