GLOBAL INITIATIVES TO BEAT PLASTIC POLLUTION

ISWA

International Solid Waste Association



Foreword

According to the Global Waste Management Outlook 2024, jointly launched by ISWA and UNEP, waste generation is growing at a fast pace and if the current trend is maintained, the amount of waste will almost double by 2050. Access to waste collection services varies significantly within and between regions and still, 38% of municipal solid waste ends in inadequate sites or is openly burned. Plastics are one of the most visible part of it and plastic pollution is a global concern with significant environmental and economic impacts.

This report presents a compilation of 19 case studies showcasing diverse initiatives to addressing plastic waste management challenges across different regions. The focus of the report is on providing evidence of the impacts of plastic pollution and offering insights into the effectiveness and challenges of existing policies from different countries.

The case studies presented in the next pages encompass a range of interventions, including recycling innovations, community-based initiatives, and policy frameworks. The results demonstrate the effectiveness of these approaches in reducing plastic pollution and promoting sustainable practices. There is need for collaboration among various stakeholders, including governments, industries, communities, and NGOs, to implement effective plastic management solutions.

Consistent knowledge and practical solutions are out there available to serve as inspiration and to support the paradigm shift urgently needed to beat plastic and waste pollution.

Carlos Silva Filho
ISWA President

Introduction

Plastic waste is a significant global issue, causing widespread pollution and posing threats to ecosystems and human health. It is a major contributor to the triple planetary crisis, exacerbating environmental degradation, climate change, and biodiversity loss. Global plastic waste generation more than doubled between 2000 and 2019, reaching 353 million tonnes. A significant portion of this waste, nearly two-thirds, comes from plastics with lifetimes of under five years, with 40% attributed to packaging, 12% to consumer goods, and 11% to clothing and textiles. On a global scale, just 9% of plastic waste is recycled, while 22% is improperly managed (OECD, 2022). If the trends continue, around 12,000 million metric tons of plastic waste will be in landfills or the natural environment by 2050. Plastic waste generation is projected to triple by 2060 without significant policy changes (Geyer, Jambeck & Law, 2017).

Urgent measures are needed to address the plastic waste crisis and mitigate its impacts on the environment. Upstream and downstream measures such as waste prevention, reduction, and proper disposal are equally important to control waste generation and manage waste effectively. There is critical need for clear systems to track, monitor, and report on plastic waste management, along with the adoption of innovative and affordable technologies (Ferronato et al., 2023). Different sectors, including governments, producers, retailers, the waste management sector, and consumers, have roles to play in implementing these measures (UNEP, 2024).

This report comprises a collection of initiatives from the global waste management sector on tackling plastic pollution. These case studies provide evidence of the impacts of plastic pollution, showcase successful interventions and best practices, and offer insights into the effectiveness and challenges of existing policies from different countries. This report, presented at INC-4 in Ottawa, Canada, aims to inspire policymakers and provide technical considerations for the implementation of the waste management provisions of the treaty.

Methodology

The methodology for this report involved collecting initiatives from the global waste management sector aimed at addressing plastic pollution. These initiatives were gathered through a call for case studies issued by the ISWA Plastic Treaty Task Force and shared by the Awareness and Education YPG Group of ISWA. Out of the 37 case studies received, 19 relevant ones were selected for this report. The focus of the report is on providing evidence of the impacts of plastic pollution and offering insights into the effectiveness and challenges of existing policies from different countries. The publication is not intended to showcase ideal solution models but rather to highlight the community of action within the ISWA network that has already taken steps in this regard.

The selected case studies have been divided into four sections:

- Behavioral change;
- Community-based innovations;
- Recycling innovations, and
- Policy frameworks.

Case Studies

The selected case studies have been divided into four sections: Behavioral change, community-based innovations, recycling innovations, and policy frameworks, to showcase different projects on plastic waste management.

I - Behavioral change

II - Community-based innovations

III - Recycling innovations

IV - Policy frameworks



I - Behavioral change

A citizen reward system for sorting using digital solutions in Normandy, France

Location:
Normandy, France

Year of Implementation and Operations:
September 2022

Challenge:

Packaging waste presents a significant challenge due to the lack of selective sorting practices, which are crucial for combating plastic pollution. The sorting behavior of the population is the first step in achieving ambitious collection rates for recycling. However, incentivizing such behavior and changing habits without burdening the daily routine of inhabitants is complex. Challenges include the need for behavioral change, adequate infrastructure for sorting, effective incentive schemes, public awareness, and supportive policy and regulation.

Key Interventions:

In mid-2022, Rouen City introduced a free digital application dedicated to waste management called MonTri. Users were encouraged to scan the barcode on packaging as they sort it. When they deposit the packaging in a bin, bag, or voluntary drop-off point, the app asked them to validate the deposit by taking a photo. This second step allowed users to collect points that can be exchanged for rewards, such as €3 or €5 gift vouchers, cycling passes, free drinks, or free admission to temporary exhibitions at metropolitan museums. The project also implemented a packaging identification system and traceability of the sorting gesture for anti-fraud verification. To ensure the success of the initiative, the local authority compiled a catalog of rewards by engaging retailers in the region. Starting in late 2022, a trial phase for a new program named Tri Act, which targets the greater urban area was initiated.

Outcome:

Following the success of this scheme, in May, it was extended to all 71 towns and villages in the greater urban area of Rouen

to encourage citizens to adopt this virtuous practice. Tri Act had almost 900 users in May 2023, with 3,200 products sorted and around 200 rewards used or reserved. Positive communication, education, sorting instructions, zero-waste tips, and game aspect improvements (going from 10 levels depending on use) were implemented. It is still too early to gauge the impact on plastic pollution in the direct environment of the greater urban area of Rouen. However, it is noted that 22% of users declared themselves to be “beginner sorters” when they signed up for the TriAct app. The results of a satisfaction survey in June 2023 showed that 7 out of 10 users were satisfied with the system. Additionally, 40% of users reported learning more about recycling, and 55% stated that they actually sort more.

Lessons Learned:

The TriAct app was successful in reaching citizens who were previously not very keen on sorting, indicating that similar initiatives could be effective in other cities in France such as Cluses in the Alpes. This highlights the potential for digital solutions to drive positive behavior change and increase recycling rates in communities. Additionally, the positive feedback and high satisfaction levels among users underscore the value of incorporating user feedback into the development and improvement of such programs.



Giving new life to post-consumer plastic waste through circular economy

Location:
Lucknow, India

Year of Implementation and Operations:
2022 and ongoing

Challenge:

Lucknow generates 1000 tons of municipal plastic waste every day, but only a small percentage is recycled, leading to significant environmental pollution. The recycling value of plastic waste is diminished when it is mixed with other waste types, and inadequate waste management infrastructure exacerbates the problem. Implementing effective strategies to manage and recycle post-consumer plastic waste is crucial to reducing pollution and promoting a circular economy.

Key Interventions:

SparkLiv, a social impact company based in Lucknow, has initiated a program called ‘Wastology’ to bring about behavioral change among plastic waste generators. This program includes interactive workshops in schools, colleges, housing societies, and shopping malls to educate people about the harms caused by plastic waste and encourage them to practice the 4Rs: Refuse, Reduce, Reuse, and Recycle. SparkLiv also operates a network of drop-off centers where people can conveniently deposit their plastic waste for collection and recycling.

Outcome:

In one year, SparkLiv has conducted 25 Wastology workshops, organized 55 successful collection drives, and established four fully operational drop-off centers. They have collected over 1200 kgs of plastic waste, developed 18 upcycled products, and delivered 85 products to more than 12 cities in India. These efforts have prevented 3 metric tons of carbon emissions by diverting waste from landfills.

Lessons Learned:

SparkLiv has learned that people are highly concerned about the environment and willing to participate in recycling efforts if provided with convenient access points. Behavioral nudges, such as small rewards or appreciation, can encourage responsible behavior towards plastic waste. Additionally, clean plastic waste yields better upcycled products, and different plastic grades require individual treatment for better outcomes.

Providing sustainable alternatives to single-use plastic shopping bags and promoting 3R

Location:
Baramati, Pune, India

Year of Implementation and Operations:
March 2022

Challenge:

Implementing effective solutions for waste management, particularly in the context of plastic pollution, is a critical global issue. The challenge lies in finding sustainable alternatives to single-use plastic shopping bags and promoting the 3R (Reduce, Reuse, Recycle) principle in communities. This challenge requires innovative approaches that can engage various stakeholders, including government bodies, private organizations, schools, and the wider community, to drive behavioral change and reduce reliance on single-use plastics.

Key Interventions:

In March 2022, the Baramati Municipal Council appointed Social Lab Environmental Solutions Private Limited as a consultant for solid waste management (SWM) to establish a circular waste management system in Baramati. The initiative began with outreach efforts to local schools, identifying schools in the area, and contacting authorities to present the project's objectives and seek participation. Workshops were organized to engage students in waste management practices, including educational sessions on source segregation, the 3R principles, and the environmental impact of plastic usage. Students actively participated in hands-on activities, creating paper bags from old newspapers, which not only reinforced the educational content but also provided practical skills. The paper bags created by students were distributed to commercial establishments in Baramati, serving as a practical demonstration of using sustainable alternatives to plastic bags. To motivate students, incentives such as prizes for the most attractive paper bags were announced, encouraging creativity and participation.

Outcome:

The initiative successfully increased awareness about efficient waste management practices, the 3R principle, and alternatives to single-use plastic among 4,000 students from 25 schools in Baramati. It also led to behavior change, with students actively participating in creating paper bags from waste. Additionally, the project promoted community involvement, as paper bags were distributed to commercial establishments, engaging the wider community in the plastic ban initiative. Overall, the project contributed to a circular economy by reusing paper waste and promoted the use of locally sourced, sustainable alternatives to single-use plastics.

Lessons Learned:

The initiative highlighted the importance of starting early with environmental education, as engaging school children can lead to long-term behavioral change. Hands-on learning experiences, such as making paper bags, were found to be more effective than theoretical lectures. Community participation and collaboration between government bodies and private organizations were also crucial for the success of the initiative. The project's success in Baramati can serve as a model for similar programs in other regions, emphasizing the importance of sharing best practices and lessons learned.



Figure 1: Activity at school.



Sensitization campaign in primary schools for the reduction of marine plastic pollution

Location:
Global

Year of Implementation and Operations:
November 2022

Challenge:

The African Indian Ocean Developing Island States (AIODIS) face significant challenges in managing plastic pollution and climate change, which exacerbate existing environmental and social issues. Limited environmental education in schools, inadequate waste management infrastructure, and limited waste innovation across AIODIS further compound these challenges. To raise environmental awareness around marine pollution, the Captain Fanplastic environmental literacy program is active and adapted for each island state. The program is designed to address pollution at its very source by introducing prompts and enablers in schools and communities.

Key Interventions:

The Captain Fanplastic environmental literacy program was implemented in primary schools across AIODIS to raise awareness about marine plastic pollution and drive positive behavior change. The program aimed to foster a #NoTrashButTreasure mindset among young learners through experiential learning and gamified storytelling. It focused on teaching the 3R principle (Reduce, Reuse, Recycle) and promoting the value of plastics if managed properly.

Outcome:

The sensitization campaign reached over 12,000 learners in 120 primary schools across AIODIS. It led to a significant positive change in attitude towards plastic pollution, with over 100% change on the likert scale post-programme. Additionally, the distribution of environmental literacy materials and practical competitions enabled schools to manage waste effectively, with over 650kg of litter removed from each island and 1,500kg of waste recycled or upcycled at schools.

Lessons Learned:

The initiative faced challenges such as school reluctance to commit, time constraints, literacy issues among learners, language barriers, logistics difficulties, and limited resources for waste management. To address these challenges and achieve long-term behavioral change, it is essential to invest in waste management facilities and infrastructure in schools, build relationships between the public and private sectors for waste management, incentivize schools for environmental education activities, and upskill educators to integrate more environmental education into existing curricula.

Attitude shaping programme in waste management

Location:
Miskolc, Hungary

Year of Implementation and Operations:
2019 and ongoing

Challenge:

One of the key challenges in waste management is changing people's attitudes and behaviors towards waste. This is particularly true in cases where sustainability practices are relatively new or unfamiliar to individuals. Additionally, ensuring widespread adoption of sustainable practices requires ongoing education and reinforcement, as well as addressing barriers such as convenience and accessibility. Overcoming these challenges will require a concerted effort to engage and empower communities, as well as to provide the necessary infrastructure and support for sustainable waste management practices.

Key Interventions:

To instigate a shift in attitudes and behaviors towards waste management, the project approach focuses on making knowledge tangible and enjoyable. The aim is to engage every generation, encouraging them to actively embrace a sustainable and environmentally conscious mindset for a better future. The intervention includes providing practical and enjoyable education on waste management, highlighting the benefits of sustainable practices, and empowering individuals to make a difference. The project has developed several games to educate about the lifecycle of the main types of waste, including videos and the R-park. Guests can experience how waste collection works by using a small electronic garbage truck to collect packaging waste from the playing field, learning which waste belongs in each container. The sessions are also conducted at our station and in schools, and also organize attitude-shaping actions.



Figure 1: Photo shows kids having practical and enjoyable education on waste management.

Outcome:

All training sessions are personalized, taking into account the guests' age, time availability, and existing knowledge. Since 2019, over 3,300 children and adults have participated in the attitude-shaping programs.

Lessons Learned:

The lesson learned is that establishing connections with children and adults and gradually building knowledge over multiple sessions is crucial. This approach is essential to achieve the goal of making them environmentally conscious. It highlights the importance of building relationships and fostering ongoing engagement to instill sustainable behaviors effectively.

Reducing Norwegian plastic bag consumption through the Norwegian Retailers' Environment Fund

Location:
Norway

Year of Implementation and Operations:
2022 and ongoing



Challenge:

The challenges faced in Norway regarding plastic bag consumption and waste management are significant. Despite efforts to address the issue, such as the establishment of the Norwegian Retailers' Environment Fund (NREF) in 2017, the consumption of plastic bags remains unsustainable. In 2022, Norwegians consumed an average of 132 plastic bags per person, indicating a persistent reliance on single-use plastics. While the NREF has supported over 750 projects aimed at tackling plastic pollution and promoting sustainable alternatives, there are ongoing challenges in reducing plastic consumption and transitioning to a circular plastics economy.

Key Interventions:

The key intervention involved doubling the fee paid by member retailers on plastic bags to the NREF, from 0.10 to 0.20 USD. This fee increase received significant media coverage, providing ample opportunities to showcase the work of the NREF. Member retailers were well-informed about the fee increase and were trained on how to communicate the resulting price increase to consumers. Concurrently, the NREF launched an information campaign to reach a wide Norwegian audience, promoting reuse alternatives for shopping and waste handling bin liners.

Outcome:

Between September 2022 and September 2023, the project successfully reduced plastic bag consumption in Norway by 38%, resulting in Norwegians now using approximately 80-85 bags per person per year. The project aims to further decrease this consumption to 40 plastic bags per person by the beginning of 2025. This reduction, coupled with the increased usage of thinner bin liners, is projected to lead to a significant reduction of 5,000 tonnes of plastic waste. Additionally, the project has contributed to raising awareness about sustainable consumption practices among the Norwegian population.

Lessons Learned:

Before the end of 2022, there was no LCA analysis on the best alternatives to plastic bags in a Norwegian context. This analysis has now made it a lot easier to communicate with consumers about sustainable choices. The fee for plastic bags was introduced and increased with the involvement of member retailers, rather than being imposed on them. This approach has increased ownership of the issues and solutions among member retailers, enabling them to better communicate with their customers. Member retailers are incorporating the fund's case into their broader sustainability work (CSR) and take pride in contributing to a more sustainable consumption of plastic bags in Norway. Increasing the fee during an economic downturn has generated significant "free" publicity, as reducing plastic bag consumption not only saves consumers money but also contributes to environmental protection.

Addressing plastic management challenges in Nepal's schools: The green school program

Location:
Nepal

Year of Implementation and Operations:
2021 and ongoing

Challenge:

There are inefficient waste disposal practices due to the prevalent single-bin system in schools and communities in Nepal. This required a significant effort to overcome as it led to the mixing of organic and non-biodegradable waste, making it difficult to manage and recycle effectively. The Green School Program by Jiwanta Nepal aims to address these challenges by implementing sustainable waste management practices in schools. One approach is through waste upcycling workshops, where students learn to transform discarded materials, such as plastic bottles, into useful items like flower pots. This not only reduces waste but also teaches valuable skills and promotes creativity among students.

Key Interventions:

The Green School Program includes waste upcycling workshops as a key intervention to teach students creative ways to repurpose dry waste materials. These workshops provide students with PET bottles, cutters, paint, and brushes, allowing them to creatively transform waste items. Students are instructed on cutting and coloring PET bottles, giving them the freedom to explore their creativity. Some of the bottles are adapted into hanging pots, enhancing aesthetics and creating useful items from waste. In addition to upcycling workshops, the program establishes recycling programs for dry waste, including plastics, papers, and other non-biodegradable items. The collected recyclables are sold to scrap centers, and the money earned is used for child meetings or other events organized by students. These interventions not only reduce waste but also teach valuable skills, promote creativity, and instill a sense of responsibility for the environment among students.

Outcome:

The Green School Program has achieved significant success in addressing waste management challenges and promoting environmental sustainability in schools. Key outcomes include a noticeable reduction in waste generated by participating schools and active engagement of students in environmental and waste management efforts, cleaner school environments due to organized cleanup campaigns, and a collective sense of responsibility for waste management and environmental cleanliness among participants.

Lessons Learned:

The implementation of comprehensive waste management strategies, including waste segregation, composting, and recycling, has resulted in a noticeable reduction in the amount of waste sent to landfills by participating schools. This highlights the effectiveness of these strategies in minimizing environmental impact. Secondly, the project has successfully engaged both students and the broader community in environmental and waste management efforts. Furthermore, the project's cleanup campaigns, organized in school surroundings, have not only contributed to maintaining a clean environment but have also actively involved students, educating them about the importance of environmental cleanliness.



Figure 1: Students using used PET bottles to make flower pots.

Viana Abraça (Viana embraces) - Implementation of eliminating the use of plastic bags in organic waste collection

Location:
Viana do Castelo Municipality, Portugal

Year of Implementation and Operations:
January 01, 2016

Challenge:

The use of plastic bags in organic waste collection poses several challenges. Firstly, it hinders the composting process as plastic does not decompose easily, contaminating the organic material. Secondly, plastic bags can clog machinery at composting facilities, leading to operational issues and increased maintenance costs. Furthermore, the use of plastic bags contributes to plastic pollution, especially if not disposed of properly. Educating and encouraging citizens to use compostable or paper bags for organic waste collection, or to deposit waste directly into bins without bags, can help mitigate these challenges and promote more sustainable waste management practices.

Key Interventions:

Technical and awareness-raising visits were conducted for the participants of the Viana Abraça Project to explain the benefits of eliminating the use of plastic bags when depositing organic waste for separate collection. These visits aimed to highlight the environmental costs associated with phasing out plastic bags, including conventional and biodegradable or compostable bags, and the risks of their mass usage. Additionally, the financial impact of logistics in distributing plastic bags was identified during the visits. It was observed during the trial phase that using plastic bags for separating organic waste is unnecessary, as these bags are usually removed at the waste treatment plant. Moreover, the frequency of washing the area surrounding organic waste containers along the street has been increased, and anti-odor plates have been installed in these containers.

Outcome:

During the trial, it was observed that people no longer used plastic bags when depositing organic waste in a separate container, as it was clarified that using plastic bags for the separation of organic waste is unnecessary. This change led to a contamination rate of less than 5%, resulting in a higher quality of material.

Lessons Learned:

Despite these challenges, over two thousand families participated in the project by discontinuing the use of plastic bags in separate collections of organic waste. Another key takeaway is the importance of periodically maintaining the hygienic condition of the organic waste container based on its frequency of use.



II - Community-based innovations

Creating Rural Waste Management Infrastructure along Kerala's Coastline

Location:
Kerala, India

Year of Implementation and Operations:
2021 and ongoing

Challenge:

The coastal state of Kerala in south India generates over 130,000 tons of plastic waste annually, of which, only 3% gets recycled. A baseline study by rePurpose Global found that over 70-80% of the plastic packaging consumed in the region comprises flexible Multi-Layered Plastics (MLP) such as chips packaging and sachets. These types of plastic material are hard to recycle and costly to collect and process, compared to its worth as a material ('low value'). As a result, these materials remain uncollected, particularly by the informal sector who tend to cherry pick high-value recyclable plastics for resale.

The lack of material value of MLP means that in rural villages, where waste management infrastructure and collection services are limited, flexible plastics like MLP are either landfilled, openly burnt, or dumped into water bodies that eventually flow into the ocean. The cumulative effect of such practice is severe environmental pollution and a significant loss of resources.

Key Interventions:

The project aimed at establishing a hub-and-spoke model for collecting and processing the neglected low-value plastics in villages, lacking proper waste management infrastructure. The model runs through a unique Public-Private-Partnership (PPP) scheme engaging village administrative bodies and local women's self-help groups.

The project focuses on gathering and ethically processing thousands of tons of low-value plastics. Prior to implementation, a baseline study was conducted to identify the plastic types prevalent in the region and to assess the existing waste management situation.

Awareness campaigns were also being done to enhance knowledge of sustainable waste management practices.

During implementation, women's self-help groups were trained to provide professional door-to-door waste collection services, with financial incentives provided to compensate for their efforts. This approach has been adding value to the low value plastics. The collected waste was sent to a Material Recovery Facility (MRF), where materials were sorted, and the low-value plastics were baled and then transported to authorize processing facilities for further treatment and recovery. Rigorous tracking and auditing were also being done to ensure quality and impact assurance.

The project also prioritized social safeguards and intersectional impact by improving waste workers' conditions and capacities by providing fair compensation, personal protective equipment, and capacity building.

Outcome:

The project provided access to waste management services to 100,000+ rural households. Over 7.5 thousand tons of low-value plastics have been collected and sent to authorized recycling and recovery units, thereby preventing environmental leakage since 2021. Stringent traceability protocols ensured impact verification, with each tons tracked and verified by first and third-party auditors. Comprehensive evidence, including collection records, sorting logs, and geotagged photos, was maintained in rePurpose Global's digital traceability system - reTrace.

Community engagement and awareness raising activities were also being done including flash mobs, street plays, clean-up drives, and educational rallies.

Further, school tours have educated children on waste management. The project employed 500+ workers for collection, sorting, and processing of waste, providing fair working conditions. Several key investments that improved social and environmental safeguards, as well as intersectional impact provided through training on sustainable waste management practices, the provision of personal protection equipment, and the procurement of equipment. Worker well-being is enhanced through awarding programs and festive celebrations, fostering unity among the team.

Lessons Learned:

Developing projects under robust frameworks that deploy outcomes-based financing is crucial for effectively managing finances and achieving intended outcomes. For example, this project followed rePurpose Global's Verified Plastic Recovery Protocol, emphasizing additionality, traceability, verifiability, and environmental and social safeguards. Embracing local community solutions is another key aspect, prioritizing local engagement and community-driven solutions while fostering holistic transformation from the ground up. This approach amplifies the impact philosophy of 'Building Bridges, not Barriers.' Additionally, prioritizing intersectional impact is essential, addressing social standards and equity. The project adhered to rePurpose Global's Impact Code, emphasizing fair working conditions, local job creation, and empowerment, particularly for women and marginalized groups, to ensure equitable opportunities and fair social outcomes. Finally, incentivizing low-value plastic management by creating incentives for collecting the often-neglected low-value plastics ensures their proper processing and prevents environmental pollution.

Achieving clean oceans through clean communities

Location:
Indonesia and India

Year of Implementation and Operations:
2018

Challenge:

Marine plastic pollution poses significant environmental and health risks. Clean Oceans through Clean Communities (CLOCC) aims to reduce this pollution by implementing sustainable waste management practices in communities with high waste leakage. However, achieving this goal requires overcoming several obstacles, including inadequate waste management infrastructure, lack of awareness about proper waste disposal practices, and limited resources for implementing waste management initiatives. Additionally, changing behavior and promoting sustainable practices among community members can be challenging and requires ongoing education and engagement efforts.

Key Interventions:

CLOCC's key interventions include waste management capacity building, which involves educating and training local communities to improve their waste management practices. Another key intervention is the creation of context-specific waste management plans, tailored to each project location's unique conditions and needs. Additionally, CLOCC stimulates circular value chains, promoting the development of circular economy practices such as recycling and upcycling. These interventions are implemented in various projects across Indonesia and India, including in Banyuwangi, Tengal, Tabanan, and Chengalpattu. The projects start with mapping waste generation and management using the Waste Wise Cities Tool, which helps identify areas for improvement. CLOCC's approach is guided by the Integrated Sustainable Waste Management (ISWM) approach, emphasizing inclusivity and comprehensive planning to establish sustainable waste management systems created by and for local stakeholders.



Figure 1: A river in Tabanan, Bali, Indonesia filled with plastic materials

Outcome:

By focusing on waste management capacity building, creating context-specific waste management plans, and stimulating circular value chains, CLOCC has achieved notable outcomes. These include launching comprehensive waste masterplans in Indonesia's Banyuwangi, mobilizing stakeholders for waste management plans in Tabanan, and nearing completion of a plan in Chengalpattu, India. Through its participatory approach, CLOCC has fostered broad local ownership and stakeholder inclusion, vital for sustainable waste management systems. Moreover, by advocating for sustainable financing and emphasizing holistic waste management, CLOCC has demonstrated effective strategies for reducing plastic pollution and promoting environmental sustainability.

Lessons Learned:

CLOCC has learned several key lessons from its projects in Indonesia and India. Firstly, implementing holistic waste management systems that address all waste fractions, especially organics, is crucial to reducing plastic pollution and environmental impact. Secondly, building on existing systems and tailoring waste management solutions to local conditions are essential for long-term sustainability. Thirdly, sustainable financing through waste fees and blended finance is necessary for project success. Additionally, a participatory approach, despite its challenges, is crucial for creating local ownership and stakeholder inclusion. Lastly, behavior change requires upfront investments and subsidies to incentivize adoption of new waste management practices. These lessons guide CLOCC's approach to waste management, ensuring effectiveness, sustainability, and inclusivity.

Introduction of source segregation of collected wastes in Baku, Azerbaijan

Location:
District of Narimanov, Baku, Azerbaijan

Year of Implementation and Operations:
2020

Challenge:

Prior to the involvement of Mott MacDonald, the people of Baku placed all categories of waste in communal 1100-liter bins spread around the streets. Previous attempts to introduce source segregation in the region were unsuccessful, largely as a result of poor communication and a lack of buy-in from the local residents. In general, the local population was not engaged with environmental policies and activities. Additionally, there was concern that the significant informal sector might take the benefits of sorting materials before the municipality collected them.

Key Interventions:

Mott MacDonald worked closely with the city authorities to develop the communal bin system and a marketing strategy to communicate with the local population. We used a mix of marketing materials such as leaflets, television, and social media campaigns. In order to stand out, it was decided that orange would be the brand color for recycling bins and it was important that this color scheme was kept consistent across the whole city. The bins were thus easily identifiable, and the public could clearly see the changes taking place around them. To complement the media campaign, face-to-face communication with residents was employed. A local team was hired and trained to visit all 60,000 households in the case study. They distributed educational leaflets, and green and orange biodegradable bags, and addressed inquiries from residents. After the education system was settled, around 200 out of 461 communal bin sites had a supervisor stationed near the bins to monitor and promote the correct utilization of the systems. To encourage the use of the residual waste bins, they were positioned in easily accessible places. This meant that those residents who hadn't bought into the marketing campaign were less likely to dispose of their unsegregated waste in the recycling bins.

Outcome:

Three years later, despite delays caused by COVID-19, the program's success has led to its expansion across additional districts of Baku, totaling twelve in all. Composition studies have shown that the program is capturing up to 50% of all recyclable material, drastically reducing the waste that is burnt or sent to landfills. Using data available from the European Commission, it can be seen that the new system is comparable with other communal systems that have been introduced and established in cities such as Prague and Bratislava and is outperforming Bucharest. Concerning the capture rates for paper, cardboard, plastic, and metal, the system is even outperforming London. The success of the scheme provides us with a blueprint for garnering support for effective waste management worldwide. The success has enabled the dirty Materials Recovery Facility (MRF) in Baku to be modified to be a clean MRF such that the quantity and quality of recycled material have improved.

Lessons Learned:

One key lesson learned was the importance of community engagement and education in implementing successful recycling programs. Despite previous failed attempts at separate waste collection, the introduction of a comprehensive marketing strategy and door-to-door outreach significantly improved public understanding and participation in the recycling program. This highlights the need for proactive communication and involvement of local residents to ensure their buy-in and cooperation.

Plastic cup: Preventing river pollution in upstream countries

Location:
Ukraine/Hungary

Year of Implementation and Operations:
2013 and ongoing



Challenge:

The Danube River transports approximately 1500 tons of plastic per year into the Black Sea. The estimated amount of riverine litter accumulated in the coastal areas of the Tisza River basin, a tributary of the Danube, is 1665 tons. In the Transcarpathia region of Ukraine, an estimated 10,000 tons of waste are unmanaged each year. Plastic Cup, an organization, collects and manages around 70-100 tons of waste per year and prevents approximately 700 tons per year through supporting Municipal Waste Management (MWM) procedures such as selective collection, reuse, and education in regions where waste collection is inadequate. This effort to divert waste from natural environments to a circular economy is a significant achievement. Upcycling riverine plastics represents a crucial step in sustainable development.

Key Interventions:

Plastic Cup organizes professional and voluntary cleanup actions, establishing separate waste collection, waste separation, and upcycling efforts. Additionally, they engage in extensive communication, education, and roundtable activities, along with lobbying efforts. Research, development, and innovation (RDI) are key activities for Plastic Cup, focusing on cost-effective quantification of microplastic contamination and macroplastic accumulations. They target and manage temporarily halted riverine litter accumulations, while also empowering human resources to combat water pollution in the Danube River Basin.

Outcome:

This project aims to prevent river pollution in upstream countries through targeted support, education, and awareness-raising efforts. The outcome of these prevention measures is a larger amount of waste diverted from rivers, resulting in less pollution that would otherwise be collected in downstream countries through cleanup activities. Plastic Cup has built an excellent network of “riversavers” and organized high-level stakeholder meetings. The project, known as Tid(y)Up, has become a flagship project in the EU. Plastic Cup has also published a book, a waste reduction toolkit, a study on water quality, and a Policy Guidance with the International Commission for the Protection of the Danube River (ICPDR), which is currently being finalized. In the last 11 years, Plastic Cup has collected 367,000 kilograms of riverine waste, with 60% of these materials being recycled or upcycled back into the circular economy. Additionally, they have prevented/diverted 1780 tonnes of waste in upstream countries.

Lessons Learned:

One of the key lessons learned is that transboundary, cross-border issues can be effectively addressed through positive communication and cooperation. Roundtable discussions and workshops were instrumental in breaking the ice and engaging a wide network of cooperation.

III - Recycling innovations

A comprehensive, evidence-based strategy to reduce plastic pollution in South Africa

Location:
South Africa

Year of Implementation and Operations:
2022

Challenge:

The leakage of waste plastic into the marine environment has significant environmental and economic impacts. The 'Breaking the Plastic Wave' study analyzed the global plastics system to provide evidence of the extent and nature of the plastic waste and pollution problem. This first-of-its-kind modeling analysis describes actions needed to stop plastic from entering the ocean. The modeling and analysis used in 'Breaking the Plastic Wave' have been developed into a software application called "Pathways." To test and ensure applicability at the country scale and to inform the development of strategies to reduce plastic pollution in developing countries, the CSIR collaborated with the Pew Charitable Trusts (USA) and Oxford University (UK) to apply the Pathways tool to South Africa.

Key Interventions:
The study examined three scenarios for South Africa's plastic waste management from 2016 to 2040, using historical data. The Business-As-Usual scenario assumed no policy changes regarding plastic production, consumption, disposal, or waste management, along with no changes in the carbon intensity of electricity or plastic polymer production. The Extended Producer Responsibility scenario envisioned implementing EPR collection and recycling targets set by the government in 2023 for five years. Lastly, the Optimal System Change scenario aimed to balance sustainable development goals by reducing plastic pollution and greenhouse gas emissions, minimizing costs, and maximizing employment through strategies like reducing plastic demand and improving recycling. These scenarios help assess the potential impacts of different policy and management approaches to plastic waste in South Africa.

Outcome:

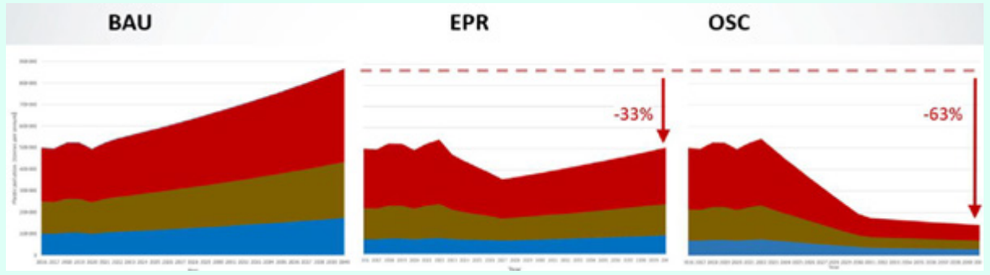


Figure 1: Scenario Comparison: BAU (A); meeting EPR targets for plastics (B); and OSC scenario (C), which combines the strategies of reducing demand, increasing collection and recycling, and increasing safe disposal to sanitary landfill.

Under a scenario of Business-As-Usual (BAU), there is a projected growth in plastic consumption of 1.33% per annum, due to the rising population and increased consumption. Without EPR regulations and with no new plastics-related policies and measures in place, plastic pollution is set to almost double – from 491 kt in 2020 to 865 kt in 2040. The Extended Producer Responsibility (EPR) scenario, which involves a strategy of increasing collection and recycling, with five-year targets as set out in the current regulations, can avoid 33% of total plastic pollution over the period 2023-2040, compared to BAU. This scenario depicts aquatic pollution will be reduced by 25% over this period, plastic pollution to land will decrease by 33%, and plastic pollution to air from open burning by 35%. The EPR scenario can also avoid 14% of projected GHG emissions between 2023-2040, compared to the BAU scenario, as a result of recycled plastics partially replacing the need for virgin plastic production. The Optimal System Change scenario combines the strategies of increasing plastic waste collection, recycling, and improved disposal to sanitary landfills, as well as reducing the demand for plastics. The Optimal System Change scenario can avoid 63% of total plastic pollution over the period 2023-2040, compared to the BAU. This scenario depicts that aquatic pollution will be reduced by 56%, plastic pollution to land will decrease by 66%, and plastic pollution to air from open burning by 63%. In addition, the Optimal System Change scenario avoids 37% of projected GHG emissions; reduces required investment by 67% as a result of avoided capital costs for plastic production, conversion, and disposal; and leads to a 3% increase in employment opportunities; compared to BAU.

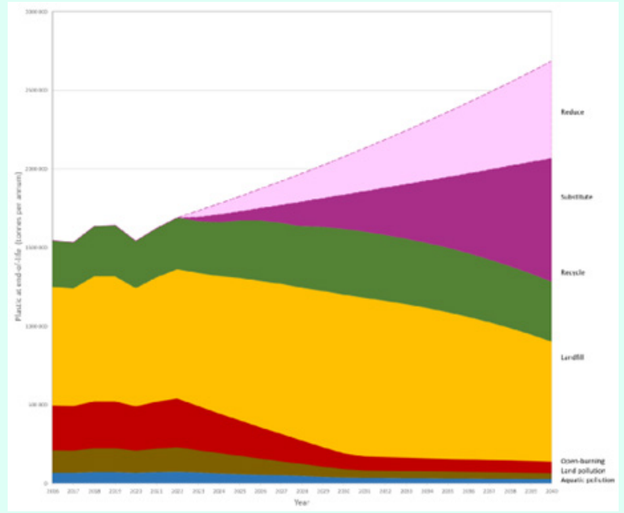


Figure 2: The avoided plastic pollution (tonnes/annum) of the Optimal System Change scenario compared to the Business-As-Usual plastics end-of-life.

Lessons Learned:

The key lesson learned is the necessity of a comprehensive system change to transition towards a circular plastics economy and effectively reduce plastic pollution. This involves reducing plastic production and consumption by eliminating unnecessary plastic and promoting reusable items and alternative delivery models. Additionally, substituting non-recyclable materials with more recyclable or compostable alternatives is crucial. Increasing recycling rates and the use of recycled plastic content, along with ensuring effective treatment of plastic waste through sanitary landfill disposal, are also essential components of this transition.

Circularity of HDPE packaging for sensitive and non-sensitive applications in Chalon-sur-Saône, France

Location:
Chalon-sur-Saône, France

Year of Implementation and Operations:
2019 – 2023

Challenge:

About 20 million tons (Mt) of plastic is used for packaging manufacturing in Europe (40% of plastics) and 6 Mt of HDPE (10%) is produced annually. The main challenge is to close the loop for sensitive HDPE packaging waste through recycling. Compliance with EU regulations and customer specifications in terms of hazardous substances, organoleptic requirements such as color and odor as well as contaminant migration is mandatory and must be addressed. The packaging producer has precise mechanical and physical requirements in order to produce the packaging in a safe way for the customer and also for the branding of the company. The circularity of all packaging is absolutely crucial in order to beat plastic pollution at waste management as well as reducing CO2 emissions and dependency on fossil resources.

Key Interventions:

The first step was the characterization of the packaging waste stream coming from households to identify the potential of the waste before recycling. The sorting technologies were explored in order to separate the different colors and the food packaging from non-food packaging. Washing technologies were also tested to improve impurities removal. Finally, at the regeneration phase, tests were done in granulation for deodorization and decontamination. Through mechanical recycling, in 2023 the inaugural kilos of regenerated HDPE material were produced. This was achieved through a close collaboration with industry leaders such as Pellenc, Herbold, and Starlinger to navigate through various stages.

Outcome:

The project still in progress, produced the first kilo of R-HDPE in 2023. Operational adjustments were made, including the incorporation of additional sorting stages to enhance waste traceability, resulting in four output streams instead of two. Furthermore, improvements to the washing process were implemented, integrating a cyclone function for increased efficiency. Decontamination equipment was installed at the regeneration phase, enhancing the purity of the secondary raw material to an impressive 98%. These technological enhancements signify a promising stride towards full compliance with European market standards and customer requirements. Notably, the project revealed that utilizing 1 ton of R-HDPE reduces CO2 emissions by 1.34 tonnes as compared to virgin HDPE and decreases energy consumption by three-fold.

Lessons Learned:

Key insights from the case study include the critical importance of waste traceability for preempting contaminants. Furthermore, there is a need for decontamination technologies to evolve alongside the ever-changing nature of waste. The project's success hinges on collaborative efforts between packaging producers and recyclers, emphasizing the necessity of designing packaging with recycling in mind.

Innovative recycling and waste minimization techniques for plastics in Accra, Ghana

Location:
Accra, Ghana

Year of Implementation and Operations:
2013

Challenge:

The challenges related to plastic pollution in Accra, Ghana, are primarily from the widespread use and improper disposal of single-use plastics (SUPs), as well as low-density polyethylene (LDPE) and high-density polyethylene (HDPE) plastics. These materials are commonly used for packaging, bags, and other disposable items, contributing significantly to environmental pollution. The improper disposal of these plastics leads to littering in streets, waterways, and open spaces, creating visual pollution and environmental hazards.

Key Interventions:

The case study revolves around the conceptualization, development, and implementation of a project focused on recycling LDPE into waste bin liners and waste storage containers.

Outcome:

The project successfully replaced 30-40% of virgin plastics in production by recycling LDPE into bin liners, and utilized recycled content in the production of waste bins and storage containers.

Lessons Learned:

The case study showcases several significant outcomes, including the reduction in the cost of waste bins and bin liners, the creation of job opportunities within the informal sector, and the successful recovery of plastic waste. This resulted in a decrease in the quantity of plastic waste destined for landfills, ultimately, achieving the protection of both the environment and public health.



PlastiLoop - enabling a successful ecological transformation of plastics for industrial clients

Location:
Globally

Year of Implementation and Operations:
2022

Challenge:

A significant hurdle is persuading plastic product manufacturers to transition from using solely virgin plastic to incorporating recycled materials. While achieving equivalent specifications with recycled plastic is technically feasible in most cases, there remains a slow uptake among manufacturers. Legislative measures are gradually evolving to enforce the use of recycled materials, but progress in this area remains slow. PlastiLoop has opted to establish a global network of recycling facilities, providing clients with access to a variety of recycled polymers. This ambitious approach requires internal alignment across processes, standards, commitments, and communication channels to address the global issue of plastic pollution effectively.

Key Interventions:

Veolia's PlastiLoop initiative, launched in October 2022, builds on its 37 existing plastic recycling plants to provide global industrial clients easier access to sustainable materials. By consolidating these facilities under one brand, PlastiLoop aims to share expertise and address plastic pollution collectively. Veolia engages in extensive communication efforts, including public outreach and advocacy, to promote behavioral change among clients, communities, and policymakers. Through its international network and ongoing initiatives, Veolia seeks to combat plastic pollution by leveraging its expertise and fostering partnerships, emphasizing the importance of sustained effort.



Figure 1: Workers at plastic recycling plant

Outcome:

The launch of Veolia's PlastiLoop initiative has yielded both immediate and ongoing impacts across short, medium, and long-term horizons. In the short term, the objective of establishing a unified identity among Veolia PlastiLoop sites has been successfully achieved within the first year. However, the initiative's ultimate goal is to evolve into the preferred partner and a benchmark for industrial clients seeking access to a global reservoir of high-quality recycled plastics tailored to their specific requirements. In the medium term, the initiative anticipates significant strides as policymakers increasingly mandate the incorporation of higher proportions of recycled materials. While this legislative momentum is encouraging, it also places additional pressure on Veolia to collaborate closely with clients in developing a broader range of grades to meet stringent quality standards and volumetric demands. Looking ahead to the long term, the PlastiLoop initiative remains an ongoing endeavor with no predefined endpoint. Rather, it is a continuous process of evolution and adaptation to changing market dynamics and regulatory frameworks. Despite its indefinite nature, the launch of this brand and offering has thus far been characterized as a success, laying a solid foundation upon which Veolia can continue to build and expand its impact in the fight against plastic pollution.

Lessons Learned:

The PlastiLoop project has revealed several important lessons. Firstly, it underscores the significance of meticulous preparation when launching a new brand, emphasizing the need for thorough planning and strategy development. Secondly, it highlights the importance of agility, acknowledging the necessity of adaptability in navigating unforeseen challenges and changes in the market landscape. Moreover, the project underscores the value of maintaining a long-term perspective, recognizing that overcoming significant obstacles requires both flexibility and patience. Crucially, it emphasizes the imperative of engaging all stakeholders, both internally and externally, in the initiative, ensuring collective commitment and alignment towards shared goals. Finally, emphasizing the importance of aligning actions with stated objectives. With PlastiLoop, the focus extends beyond mere product sales to offering a holistic solution aimed at fostering sustainability and catalyzing systemic change for a better future.

IV - Policy frameworks

Waste Pickers Project through the intervention of the Packaging EPR Scheme

Location:
Nigeria (Lagos, Ogun, Osun and Abuja)

Year of Implementation and Operations:
March 2022 and ongoing



Challenge:

Enhancing the operations of waste pickers for the collection and recovery of recyclables, especially plastics, faces several challenges. One key issue is the lack of infrastructure, which limits access to proper collection and storage facilities for recyclables, hindering the efficiency of waste pickers. Transportation is another significant challenge, as waste pickers often face difficulties in transporting collected recyclables to the closest collection partner, particularly in areas with poor road infrastructure. Limited storage capacity for recyclables further restricts the amount that waste pickers can collect before transportation. Market demand fluctuations for recyclables, especially plastics, can also affect the profitability of waste picking operations. Addressing these challenges requires supportive policies and measures to improve infrastructure, transportation, safety, and regulatory frameworks, while also addressing underlying socio-economic issues.

Key Interventions:

The Food and Beverage Recycling Alliance (FBRA) has partnered with collection partners to involve waste pickers in their areas of operation. They provide training and supply jumbo sacks for the collection and storage of recyclables. The collection partner measures these materials or waste streams and provides records to the Alliance on a monthly basis.

Outcome:

The program has been ongoing for over 19 months, during which a total of over 400 jumbo sacks were issued (281 jumbo bags issued in 2022 and 119 jumbo bags issued in 2023 to date). The total volume of PET plastics recovered during this period is 806 metric tons since the inception of the project. This material, if not collected, would have been left in the environment, potentially leaking into drainage systems, waterways, coastal areas, or communities without degradation. The project has had a significant impact, bringing over 400 waste pickers, both existing and new, into the formalized ecosystem. Additionally, the project has trained over 3,000 waste pickers, including more than 300 new waste pickers entering the sector.

Lessons Learned:

The project has taught us several important lessons. These include the need for accurate reporting of recyclable volumes, the importance of standardized reporting templates, and the challenges of logistics when recyclables are not collected on time. Storage constraints for recyclables over a long period were also highlighted. Additionally, the project showed the benefits of expanding the ecosystem with new collectors, creating new businesses and livelihoods for waste pickers. However, manual reporting was found to be tedious, highlighting the need for streamlined processes. The project successfully implemented EPR obligations through waste pickers and identified opportunities for scaling up at a national level.

Operation Clean Sweep (OCS)

Location:
Istanbul, Turkey

Year of Implementation and Operations:
2016

Challenge:

The challenge in Turkey lies in the absence of strict regulations to prevent the entry of microplastics into the seas and natural environments. While some companies voluntarily obtain certification for exporting to the European Union due to potential sanctions or heightened sensitivity to the issue, the recent Proposal for a Regulation by the European Commission aims to address microplastic pollution, particularly the unintentional release of microplastics, with expected implementation in the second half of 2024. To effectively address this challenge, changes to legislation in Turkey are needed to ensure full participation of every element in the plastic value chain in efforts to mitigate microplastic pollution.

Key Interventions:

Key interventions include periodic announcements aimed at raising awareness throughout the plastics industry and expanding the project's reach. These announcements are disseminated through news postings on the official PAGEV website. Additionally, seminars open to all are organized and publicized to further educate stakeholders. Furthermore, the establishment of the OCS Türkiye website serves as a centralized platform for accessing comprehensive details about the Operation Clean Sweep project, facilitating widespread dissemination of information.



Outcome:

The outcome of the project is a significant reduction in the contamination of seas and oceans by microplastics through the implementation of Operation Clean Sweep. This program focuses on minimizing the accidental release of plastic pellets into the environment. By raising awareness and promoting best practices throughout the plastics value chain, Operation Clean Sweep has supported industrial efforts to reduce the environmental impact of pellets. This initiative has helped safeguard marine ecosystems from further harm caused by plastic pollution.

Lessons Learned:
Upon evaluating the scope and implementation of the OCS project, identified deficiencies prompted the introduction of new obligations on a worldwide scale. Consequently, "CERTILOOP," an organization accredited under the 17065 standards, has initiated OCS audits and transitioned to a global scale as part of the OCS Certification Program.

Plastic Credit by recycling fishnets on the Argentinian South Coast

Location:
Puerto Madryn, Chubut, Argentina

Year of Implementation and Operations:
2023

Challenge:

The recollection and recycling of plastic fishnets present several challenges, primarily due to the nature of the material and the fishing industry's practices. One major challenge is the durability and resilience of plastic fishnets, which are designed to withstand harsh marine conditions. This makes them difficult to break down and recycle, requiring specialized processes and technologies. Additionally, the scattered and often remote locations where fishing activities occur can make it challenging to collect and transport the fishnets to recycling facilities, adding logistical complexities and costs to the process. Fundación Banco de Plásticos (Plastics Bank Foundation) is the first to implement Plastic Credits in the country, and also in South America. The first project behind emitting these Plastic Credits is about the recollection and recycling of plastic fishnets by the recycling company Cabelma SA.

Key Interventions:

The Plastic Credits circuit allows the recycling companies to bring these enormous projects to Argentina. So, Cablema SA, with the help of other organizations, was able to recollect and recycle the fishnets, and after that, emit Plastic Credits. This action was audited to ensure traceability.

Outcome:

The outcome was the recollection and recycling of 100 tons of plastic on the coast of the South of Argentina and the issuance of Plastic Credits in the international market. Some of these Plastic Credits were sold to a glasses company, which became a Plastic Neutral Company.

Lessons Learned:

This case study underscores the power of collaboration in addressing plastic pollution. By working together, we can combat this global challenge. The success of this initiative marks the beginning of many more recollection and recycling projects to come. Furthermore, the utilization of Plastic Credits emerges as an effective tool to achieve a plastic-neutral ecosystem.



Conclusion

The case studies presented in this report demonstrate diverse and innovative approaches used globally to address the challenges of plastic waste management. These projects highlight the importance of collaboration, creativity, and sustainable practices in tackling plastic pollution. By working together and sharing best practices, we can reduce plastic pollution and create a cleaner, more sustainable future for all.

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