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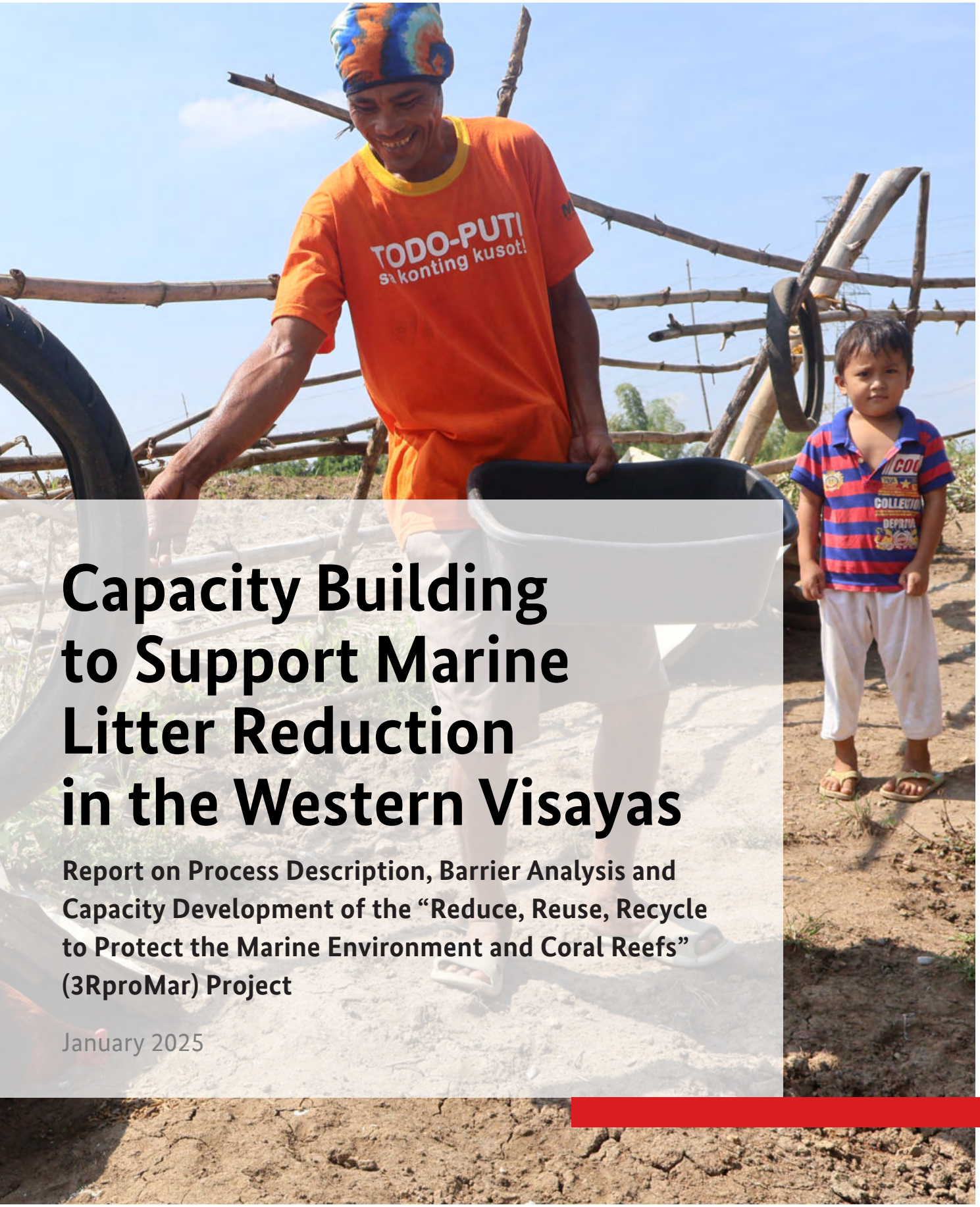

Capacity Building to Support Marine Litter Reduction in the Western Visayas

Report on Process Description, Barrier Analysis and Capacity Development of the "Reduce, Reuse, Recycle to Protect the Marine Environment and Coral Reefs" (3RproMar) Project

January 2025

As a federally owned enterprise, GIZ supports the German Government in achieving its objectives in the field of international cooperation for sustainable development.

Published by:
Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

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Bonn and Eschborn, Germany

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Programme/project description:
Reduce, Reuse, Recycle to Protect the Marine Environment and Coral Reefs (3RproMar)
Quezon City – Philippines
Commission Manager: Piyush Dhawan
https://www.giz.de/en/worldwide/129342.html

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Philippines 2025

About this Report

This report examines the contribution and support of the *Reduce, Reuse, Recycle to Protect the Marine Environment and Coral Reefs (3RproMar)* to the implementation of key national policies—Republic Act 9003 (Ecological Solid Waste Management Act), the Extended Producer Responsibility (EPR) Law, and the National Plan of Action for the Prevention, Reduction, and Management of Marine Litter (NPOA-ML)—by translating these into action at the local level through the project's implementation activities, particularly its initiatives in the pilot sites of Guimaras and selected cities in Negros Occidental. The report also discusses the barriers identified in the context of addressing land-based waste leakage and improving solid waste management, and presents the range of project activities undertaken, including capacity development initiatives, in response to these challenges. In summary, this report aims to highlight how the 3RproMar efforts, including stakeholder engagement and involvement, are informed by the identified barriers and aligned with applicable national laws, regulations, and action programmes to which the project's target outcomes are anchored.

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Acronyms And Abbreviations

3RProMar	Reduce, Reuse and Recycle to Protect the Marine Environment and Coral Reefs
ALDFG	Abandoned, Lost, or otherwise Discarded Fishing Gear
AMS	ASEAN Member States
ASEAN	Association of Southeast Asian Nations
AT	Aling Tindera
BESWMC	Barangay Ecological Solid Waste Management Committee
BFAR	Bureau of Fisheries and Aquatic Resources
BMB	Biodiversity Management Bureau
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung / Federal Ministry for Economic Cooperation and Development
CENRO	City Environment and Natural Resources Office
CHED	Commission on Higher Education
CMEMP	Coastal and Marine Ecosystems Management Program
COA	Commission on Audit
CRERDEC	Coastal Resources and Ecotourism Research, Development, and Extension Centre
CSO	Civil Service Organization
DA	Department of Agriculture
DBM	Department of Budget and Management
DENR	Department of Environment and Natural Resources
DepED	Department of Education
DICT	Department of Information and Communications Technology
DILG	Department of Interior and Local Government
DOE	Department of Energy
DOST	Department of Science and Technology
DOT	Department of Tourism

DOTr	Department of Transportation
EGL	Evergreen Labs
EMB	Environmental Management Bureau
EPR	Extended Producer Responsibility
ERDB	Ecosystems Research and Development Bureau
ESWM	Ecological Solid Waste Management
FAYOB	Federation of Accredited Youth Organizations in Buenavista
FMCG	Fast-Moving Consumer Goods
GAP	Good Agriculture Practices
GENRO	Guimaras Environment and Natural Resources Office
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GSU	Guimaras State University
HEI	Higher Education Institution
HOPE	Friends of Hope, Inc.
INC	Intergovernmental Negotiating Committee
IPO	Intellectual Property Office
ISWM	Integrated Solid Waste Management Plan
IUCN	International Union for Conservation of Nature and Natural Resources
IWAG	Integrated Women's Association of Guimaras
IWS	Informal Waste Sector
KALINISAN	Kalinga at Inisyatiba para sa Malinis na Bayan
LGU	Local Government Unit
MC	Memorandum Circular
MENRO	Municipal Environment and Natural Resources Office
MIGEDC	Metro-Iloilo Guimaras Economic Development Council
MRF	Material Recovery Facility
MSW	Municipal Solid Waste
NCWC	National Coast Watch Council

NEC	National Ecology Center
NEDA	National Economic and Development Authority
NGO	Non-Government Organization
NGPA	New Government Procurement Act
NPOA-ML	National Plan of Action for the Prevention, Reduction, and Management of Marine Litter
NSWMC	National Solid Waste Management Commission
OE	Obliged Enterprises
PCOO	Presidential Communications Office
PCX	Plastic Credit Exchange
PES	Payment for Ecosystem Services
PET	Polyethylene Terephthalate
PH	Philippines
PLCGA	Policy and Legal Compliance Gap Analysis
PO	People's Organization
PRO	Producer Responsibility Organisation
R&D	Research and Development
RA	Republic Act
SCP	Sustainable Consumption and Production
SDGs	Sustainable Development Goals
SGLG	Seal of Good Local Governance
SLF	Sanitary Landfill
SUCs	State Universities and Colleges
SUP	Single-Use Plastic
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TESDA	Technical Education and Skills Development Authority
UNEA	United Nations Environment Assembly
WFD	Waste Flow Diagram
WG	Working Groups

Executive Summary

Every year, over two billion tonnes of municipal solid waste (MSW) are generated globally, with a significant portion consisting of plastic from single-use items such as bags, cups, and straws. Improperly discarded plastic waste often escapes waste management systems, leaking into drainage systems, creeks, and eventually the oceans. Without effective interventions, an estimated 23–37 million metric tonnes of plastic waste could enter marine waters annually by 2040. Policy discussions on marine plastic litter have evolved through global platforms, from its inclusion in the Sustainable Development Goals (SDG) under Goal 14, to the 2022 UNEA Resolution UNEA 5/14, which established the Intergovernmental Negotiating Committee (INC) that will draft a legally binding framework. However, the last INC-5 session in November 2024 ended in an impasse over certain issues. Further negotiations are scheduled for 2025.

In the Philippines, approximately 61,000 metric tonnes of waste are generated daily, with 12-24% being plastic waste, including 163 million sachets, 48 million shopping bags, and 45 million thin-film bags. As of 2021, more than two decades since the enactment of the Ecological Solid Waste Management Act (RA 9003) in 2000, only 39% of barangays had material recovery facilities (MRF) and 29% of local government units (LGUs) had operational SLFs – a limitation that contributes to plastic leakages into oceans and threatens both aquatic and human health and ecosystems. The ASEAN-German project *"Reduce, Reuse, Recycle to Protect the Marine Environment and Coral Reefs"* (3RproMar), implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ) aims to support ASEAN Member States (AMS) in curbing this problem in the region. In the Philippines, pilot projects in Guimaras and the cities of Bacolod, Silay, Talisay, and Bago in Negros Occidental aim to enhance waste management along the plastic value chain and identify best practices and effective solutions for sharing and broader adoption and scaling up in the ASEAN region. The Waste Flow Diagram (WFD) revealed that of the unmanaged plastic in Guimaras, 52% remain on land, 23% is openly burnt, and 6% enters water systems, with dumping on land and open burning being the primary disposal methods.

RA 9003, RA 11898/EPR Law of 2022, and the National Plan of Action for the Prevention, Reduction, and Management of Marine Litter (NPOA-ML) form the core regulatory and institutional framework for 3RproMar in the Philippines. RA 9003 focuses on the post-consumer management of waste, while RA 11898 aims to close the loop by targeting upstream processes within the plastic packaging value chain and facilitating the shift from a linear to a circular economy. The NPOA-ML builds on the goals of both laws, while also addressing marine litter from a broader perspective, including sea-based sources such as abandoned, lost, or discarded fishing gear (ALDFG) and waste from maritime vessels. Initial reviews of existing ordinances in Guimaras and its LGUs revealed that not all provisions of RA 9003 are incorporated, but this provides an opportunity to update and harmonise local solid waste management (SWM) ordinances and environmental codes and strengthen local SWM efforts by integrating the NPOA-ML and RA 11898.

If fully implemented, national waste management policies in the Philippines could establish a closed-loop system for plastic packaging waste, preventing plastics from entering the country's waters. The 3RproMar project, as outlined in this report, showcases how these policies are adapted locally and supports partners in addressing gaps in their implementation. Through consultations and baseline studies, the project assessed the state of solid waste management

(SWM) at both national and local levels, identifying barriers, needs, opportunities, enabling factors, and potential solutions within the project's context. Identified barriers were summarised and grouped into distinct categories. Findings showed that 20% of the barriers identified were related to Business and Politics, while 3RproMar interventions mostly address barriers under the Education and Awareness category, which comprised 8% of the total barriers. Assessment of the barriers and 3RproMar activities helped develop the capacity building matrix that determined the level of intervention for each activity conducted. The matrix shows that most of the project activities were directed towards the development of an individual's competency and providing a platform for cooperation among the stakeholders along the plastic value chain.

3RproMar implements the agreed Work Packages 1, 2, and 3 for Guimaras Island to strengthen its Integrated Solid Waste Management (ISWM) that will address land-based leakages from unmanaged plastic waste. Other key activities to support the efforts in addressing the problem and related barriers include policy advisory to address local policy gaps, capacity development to empower LGUs and community stakeholders, and partnerships with private sector entities like Friends of Hope and Evergreen Labs to leverage opportunities under the EPR Law/RA 11898. Collaboration with Guimaras State University (GSU) ensures that environmental awareness and youth participation are central to the project. Lessons, innovations and best practices from these initiatives will be shared at the ASEAN level for potential scaling or replication in similar remote island contexts.

The project contributes to seven key strategies outlined in the NPOA-ML. **Strategy 1**, which focuses on gathering science-based baseline data on marine litter, was achieved through conduct of baseline studies and WFD analyses. For **Strategy 2**—mainstreaming circular economy and sustainable consumption and production (SCP)—3RproMar conducted studies recommending circular economy integration in sustainable tourism and higher education curricula as well as events that raise awareness of circular economy applications for the informal waste sector. Implementing ISWM Work Packages and partnering with private entities to strengthen waste recovery in pilot sites are anchored to **Strategy 4**. In support of **Strategy 7**, 3RproMar contributes to strengthening policy support and enforcement by drafting a model ordinance for Guimaras that integrates NPOA-ML and the EPR Law and strengthens the province's RA 9003 framework. Aligning with **Strategy 8**, the project develops awareness raising campaigns about plastic pollution and promoting sustainable waste management practices through positive behavior changes. For **Strategy 9**, the project also identified barriers encountered by private sector, which have impacts to the effective prevention of marine litter. Lastly, 3RproMar contributes to **Strategy 10** by capacitating LGUs in their local implementation of RA 9003 and leveraging of the EPR Law to enhance SWM and support the shift towards CE.

3RproMar's initiatives under the final two NPOA-ML strategies also contribute to the implementation of the EPR Law. In addition, 3RproMar engages youth in raising awareness of circular economy principles through initiatives such as the Circular Connect Competition, the study *"Mapping the Circular Economy Landscape in Philippine Higher Education Institutions (HEI)"*, and the SaveME program of GSU with their *"Bring-Your-Own (BYO) Initiative"*. These initiatives support the EPR Law's policy of strengthening the integration of ecological solid waste management and resource conservation topics into academic curricula and student awareness programmes to promote environmental awareness and action among the public, as outlined in *Article 1, Section 2*.

INTRODUCTION

1

Solid Waste and Marine Litter – A Global Problem

Every year, over two billion tonnes of municipal solid waste (MSW) are generated globally—enough to fill standard shipping containers that, when placed end-to-end, could encircle the Earth's equator 25 times or stretch farther than a round trip to the moon.[1] A significant portion of this waste comprises plastic, much of which originates from single-use items such as bags, cups, and straws. Improperly discarded plastic waste often escapes waste management systems, leaks into drainage systems and creeks, and ultimately finds its way into seas and oceans.

> ***At least 14 million tonnes of the over 400 million tonnes of plastic produced annually enter marine environments, making plastic the most abundant type of litter in these ecosystems. It accounts for 80% of all debris found from surface waters to deep-sea sediments, particularly in densely populated areas and popular tourist destinations.***[2]

Ocean currents further spread this pollution even to remote and uninhabited islands. However, the infiltration of plastic waste into oceans poses severe threats to aquatic ecosystems and biodiversity. Larger plastics break down into microplastics (particles smaller than 5 mm) and nanoplastics (particles smaller than 100 nm) due to sunlight, wind, and water currents. These tiny particles are easily ingested by marine organisms, leading to physical injury, toxic bioaccumulation, and disruptions to food chains, which can ultimately harm humans who consume fish and other seafoods.

Without effective interventions, an estimated 23–37 million metric tonnes of plastic waste could enter marine waters annually by 2040, [3] nearly triple the current pollution levels, and threaten ecosystems and human population world-wide.

1. United Nations Environment Programme, International Solid Waste Association (2024). *Global Waste Management Outlook: Beyond an Age of Waste – Turning Rubbish into a Resource.* Nairobi: Kenya.
2. International Union for Conservation of Nature and Natural Resources (IUCN) (2024). "Marine Plastic Pollution" IUCN *Issues Brief.*
3. United Nations Environment Programme (2021). *From Pollution to Solution: A Global Assessment of Marine Litter and Plastic Pollution.* Nairobi: Kenya.

The International Plastic Treaty

Through various global platforms and fora, policy discussions on marine plastic litter have evolved over the years, notably being first recognised, and tackled by world leaders during the 2015 G7 Elmau Summit as a threat to ecosystems and human health. Later that year, the United Nations incorporated the issue into the Sustainable Development Goals (SDGs), specifically under Goal 14, which includes a target to prevent and significantly reduce marine pollution, including debris and nutrient pollution from land-based activities by 2025.[4]

At the resumed Fifth Session of the United Nations Environment Assembly (UNEA-5.2), held from February to March 2022, member states adopted a historic resolution, End Plastic Pollution: Towards an International Legally Binding Instrument (UNEA 5/14).[5] This resolution launched the Intergovernmental Negotiating Committee (INC) process to develop a legally binding international framework to tackle plastic pollution, including marine environments. The fifth meeting (INC-5) held in Busan, South Korea from 25 November to 1 December 2024, was meant to conclude the two-year process with the creation of an internationally binding agreement. However, key disagreements over issues such as capping plastic production, establishing a financial mechanism for implementation, and managing toxic chemicals in plastic products led to a weeklong impasse. As a result, the session ended without a finalised treaty but with the adoption of a "Chair's Text," which will serve as the basis for further negotiations at the resumed INC-5.2 session in 2025.[6]

4. Ministry of Environment and Climate Change (MoECC) of Brazil. (2024). *G20 Report on Actions Against Marine Plastic Litter: Sixth Information Sharing Based on the G20 Implementation Framework.* Brazilia: Brazil.
5. MoECC-Brazil. *G20 Report on Actions Against Marine Plastic Litter*
6. Chris Voloschuk, "INC-5 concludes without global agreement on plastics treaty," *Recycling Today,* December 4, 2024, https://www.recyclingtoday.com/news/inc5-concludes-without-global-agreement-on-plastics-treaty/.

DEFINING THE PROBLEM – SITUATIONAL ANALYSIS

2

Solid Waste in Guimaras and Negros Occidental Cities

The Philippines generates approximately 61,000 metric tonnes of waste daily, with 12 to 24 percent of this comprising plastic waste. A staggering 163 million sachet packets, 48 million shopping bags, and 45 million thin-film bags are consumed every day, with only 33 percent disposed in landfills or dumpsites, and 35 percent leaking into the open environment and oceans. This inefficient waste management results in the loss of 70 percent of plastics' material value, costing the economy an estimated $790 million to $890 million annually.[7] Since the enactment of the Ecological Solid Waste Management Act (RA 9003) in 2000, which mandated the establishment of material recovery facilities (MRFs) and sanitary landfills (SLFs), only 39 percent of barangays were serviced by MRFs, and 29 percent of local government units (LGUs) had operational SLFs as of 2021, resulting to continued illegal dumping.[8] These shortcomings exacerbate the plastic leakage into waterways and coastal areas, particularly in an archipelagic country like the Philippines, where waste easily flows from land to sea.

> ***"Microplastics are also present in marine protected areas such as the Taklong Island National Marine Reserve (TINMR) in Guimaras Island."***
>
> **– Jon Alfonso P. Horvidalla,** Senior Science Research Specialist (DENR-Coastal Resources and Ecotourism Research, Development, and Extension Centre/CRERDEC), during the 3rd 3RproMar Regional Forum in Iloilo City

Estimates suggest that eight million tonnes of plastic waste enter the ocean globally each year, with half originating from just four countries: China, Indonesia, the Philippines, and Vietnam.[9] A 75 percent reduction in plastic leakage from these countries could decrease global marine litter by 45 percent.[10] Non-biodegradable packaging from fast-moving consumer goods (FMCGs) such as food wrappers, bottles, and plastic bags, is one of the most frequently collected marine litter in coastal clean-ups. Furthermore, research by the Ecosystems Research and Development Bureau (ERDB) showed the pervasiveness of microplastics in the Philippine waters, identifying the Tañon Strait Protected Seascape in Cebu as having the highest concentration of microplastics among the ten sites studied, which included the Taklong Marine Reserve in Guimaras.[11]

In response to the surge in single-use packaging and plastic waste that increasingly puts strain on the already inadequate waste management systems and worsens the marine litter crisis, the Association of Southeast Asian Nations (ASEAN) adopted the Bangkok Declaration on Combating Marine Debris and the ASEAN Framework of Action on Marine Debris during the 34th ASEAN Summit in 2019. To support these efforts, the ASEAN-German project *"Reduce, Reuse and Recycle to Protect the Marine Environment and Coral Reefs"* (3RproMar), implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ) aims to support ASEAN Member States (AMS) in reducing land-based waste leakage to protect the marine environment. The project particularly addresses four focal countries: Cambodia and Viet Nam along the Mekong River system, and the island states of Indonesia and the Philippines. In the Philippines, pilot projects in Guimaras and several cities in Negros Occidental (Bacolod, Silay, Talisay, and Bago) aim to enhance waste management along the plastic and packaging value chain and to share best practices for broader adoption and scaling up of effective solutions for reducing marine littering in the ASEAN region.

7. Bella Cariaso, "Philippines produces 61,000 million metric tons of waste daily," *The Philippine Star,* August 6, 2023, https://www.philstar.com/headlines/2023/08/06/2286595/philippines-produces-61000-million-metric-tons-waste-daily.
8. Commission on Audit (COA) – Philippines (2023). Performance Audit Report: Progress in the Achievement of the Goals of the Ecological Solid Waste Management Act Needs Stronger Support and the Cohesive Efforts and Strategies of All Stakeholders.
9.Jambeck, J., et al. "Plastic waste inputs from land into the ocean," Science 1979, no. 347 (2015): 768–771, https://www.science.org/doi/10.1126/science.1260352.
10. McKinsey Center for Business and Environment and Ocean Conservancy. (2015). *Stemming the Tide: Land-based strategies for a plastic- free ocean.*
11. Ralph Llemit. , *"Environmental group alarmed after study found microplastics in Davao Gulf,"* Sun Star, November 19, 2021, https://www.sunstar.com.ph/davao/local-news/environmental-group-alarmed-after-study-found-microplastics-in-davao-gulf

> ***"Beneath our province's pristine beauty lies a growing threat – marine litter. Marine litter pollutes our oceans, endangering ecosystems, livelihoods, and communities."***
>
> **- Leonard S. Pasiderio,** Head Guimaras Environment and Natural Resources Office (GENRO)

As a popular island tourist destination, Guimaras offers a unique lens into the urgency of addressing marine pollution. Metro cities such as Iloilo and Bacolod in particular, as neighbouring urban areas that add local tourism as well as marine waste transfer towards Guimaras, offer another vantage point. With the upcoming Panay-Guimaras-Negros Island Bridges Project, there is an expected surge of both traffic and people migration towards Guimaras, which will also affect the waste generation in the island.

As part of Metro Iloilo-Guimaras, one of the Philippines' 12 metropolitan areas, the province is also an important economic contributor. Guimaras comprises five municipalities—Buenavista, Jordan (the capital), Nueva Valencia, San Lorenzo, and Sibunag, with 98 barangays spread across 59,610 hectares, or about 3% of the total area of Western Visayas. Its municipal waters, covering 160,202 hectares, are over twice the size of its land area, underscoring the province's dependence on its coastal waters and marine resources.

Guimaras generates 67 tonnes of MSW daily, with households contributing 44 tonnes and non-household facilities producing 23 tonnes. Organic waste constitutes the largest share of household MSW at 41%, followed by plastic at 16% (12% dense plastic and 4% plastic film), and metal and special waste at 9%. Among plastic polymers, PET represents 4.6% of the total MSW. Despite generating significant waste, only 8,700 kg—or 13% of the total—is collected. The Waste Flow Diagram (WFD) reveals that 98% of unmanaged plastic waste originates from uncollected waste, while just 2% is attributed to collection services and disposal facilities combined. Of the unmanaged plastic, 65% remains on land, 28% is openly burnt, and 7% enters water systems, with dumping on land and open burning being the primary disposal methods (see **Figure 1**).

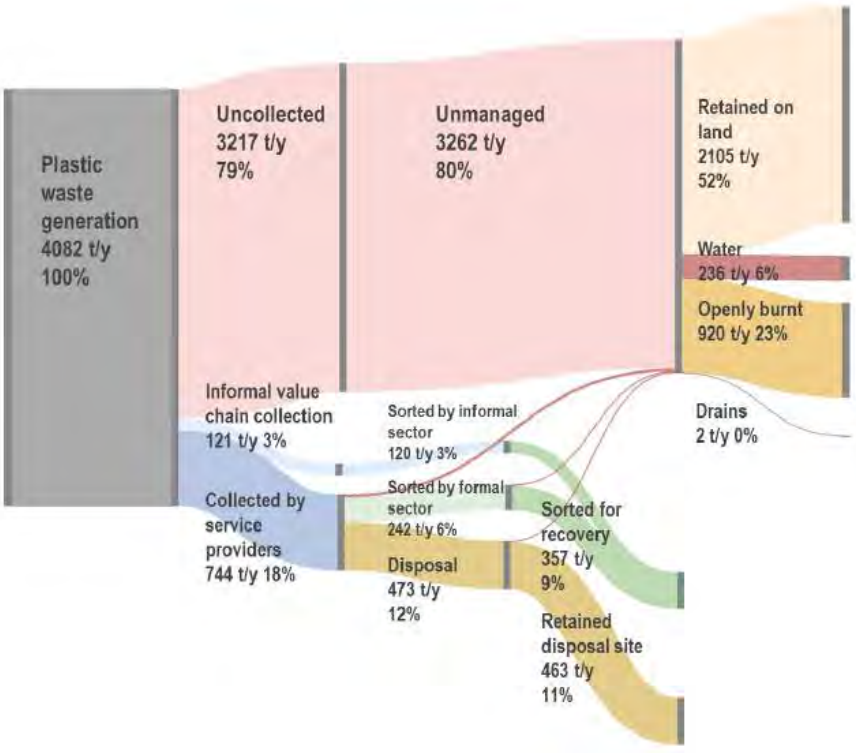


Figure 1. Baseline Sankey Diagram showing the plastic leakages in Guimaras (tonnes per year)

The WFD results shown for Bacolod City in **Figure 2** are taken from the study of the University of Kassel and indicate that over 210,000 tonnes of waste are generated annually in this city, with approximately 60% directed to the municipal disposal site. Around 3% leaks into waterways whereas the same percentage is retained on land. Less than 1% is openly burnt.

Several barangays in Silay, Bago, Talisay, and Bacolod City participate actively in 3RproMar's community-based waste management initiative with the NGO Friends of Hope, Inc. (HOPE) under the Aling Tindera (AT) Programme. They are recording household waste generation and the volumes of plastic waste recovered, including recyclables and residuals with potential. **Table 1** provides the available data on plastic waste, although volumes are city-based since updates are pending for some barangays. Currently, only Talisay has recorded plastic waste collection data, amounting to 482.53 kilograms per day across two barangays. Data from other barangays are expected to be submitted alongside a final summary report including lessons learned from the AT implementation.

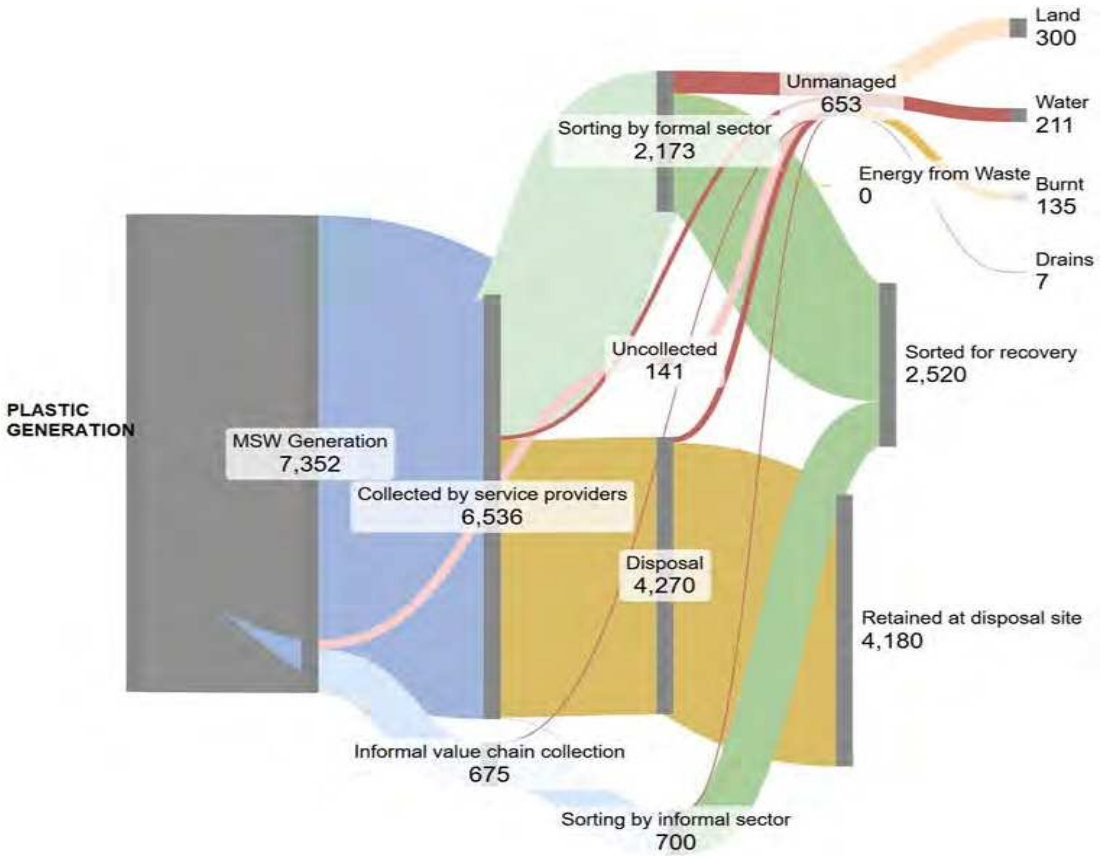


Figure 2. SEQ Figure * ARABIC 2. Baseline Sankey Diagram showing the plastic leakages from a rural area in Bacolod City (tonnes per year)

"As of March 2025 eight AT stations have collected over 57,000 kilos of plastic waste, generating Php 144,628 in additional income for the women managing them."

Table 1. Plastic waste data in AT-covered barangays in Bacolod, Bago, Silay and Talisay

LGU	Covered Barangays	Barangay Total Population	Number of Households	Waste generation rate (kg/capita/day)*	Plastic waste (kg/cap/day)**	Total plastic recovery (kg)
Bacolod	Felisa	13,273	2,228	0.59	0.0001	10,770
Bago	Ma-ao	63,052	3,880	0.36		41,462
	Poblacion		2,518			559.5
	Sampinit		1,615			1,520
	Taloc		3,300			430
Talisay	Concepcion	24,561	2,639	0.3		790
	Zone 12A		2,395			1,997
Silay	Balaring	5,884	1,409	0.54		323
Total served		103,558	19,984			

*kg/capita-day based on official LGU data for waste generation
*official LGU data for other barangays not yet available at the time of reporting

Regulatory and Institutional Framework

Republic Act (RA) 9003: Ecological Solid Waste Management Act of 2000: Marine litter, largely originating from land-based waste that leaks into waterways and reaches the seas, highlights the crucial need for effective waste management and prevention strategies. In the Philippines, RA 9003 serves as the cornerstone for such efforts, requiring LGUs, including barangays, to implement SWM programmes within their jurisdictions. The law mandates barangays to establish MRFs to support an integrated SWM system, enabling proper treatment of recyclables and organic waste, while LGUs handle the collection, disposal, and treatment of residuals. Guided by the 3Rs—reduce, reuse, recycle—RA 9003 provides institutional mechanisms and policy frameworks, including the formulation of Integrated Solid Waste Management Plans (ISWMPs), and designates LGUs as the primary implementers. It also institutionalises these measures through the creation of SWM Boards at national, provincial, municipal, and barangay levels, with local legislative councils enacting ordinances to integrate and enforce the law's provisions into local governance structures.

RA 11898: Extended Producer Responsibility (EPR) Act of 2022: RA 11898 amended RA 9003 with key provisions, including the integration of public participation in developing and implementing waste management programmes at national and local levels and incorporating ecological solid waste management and resource conservation into formal and non-formal education curricula to promote environmental awareness. The law institutionalises EPR as a practical waste management strategy, prioritising waste reduction, recovery, and recycling while promoting the creation of environment-friendly products aligned with sustainable consumption and production (SCP), and circular economy principles. The National Solid Waste Management Commission (NSWMC) under the Office of the President, must now be comprised of representatives from eight government agencies (see **Table 2**) and five private sector stakeholders, including non-government organisations (NGOs) and industry stakeholders involved in recycling and resource recovery. Obliged enterprises (OEs), or large companies generating plastic packaging waste, are required to implement EPR programmes, while micro, small, and medium enterprises (MSMEs) are encouraged to adopt these practices voluntarily. Within six months of the law's enactment, OEs must establish and implement EPR programmes to ensure the effective management of their plastic packaging waste, reduce low-reusability plastics, and achieve plastic neutrality through recovery and diversion strategies.

The Philippines' Extended EPR Law of 2022 (RA 11898), mandates companies with assets of at least Php100 million to be responsible to the lifecycle of plastic products from design to post-consumer waste management, and reduce their plastic footprint incrementally from 20% in 2023 up to 80% by 2028 and beyond.

National Plan of Action for the Prevention, Reduction, and Management of Marine Litter (NPOA-ML): NPOA-ML serves as a blueprint of strengthening the Philippines' resource and waste management efforts while addressing marine litter issues and preventing further waste leakage into water bodies. The Department of Environment and Natural Resources (DENR), through its Environmental Management Bureau (EMB) and Biodiversity Management Bureau (BMB) developed the NPOA-ML using a multi-stakeholder participatory process. The NPOA-ML envisions a "*Philippines free of marine litter through shared responsibility, accountability, and participatory governance,*" aiming for "Zero waste to Philippine waters by 2040" through ten strategic actions that are divided into: (1) the programmatic cluster, which includes establishing baseline data, and focusing on actions related to circular economy, recovery and recycling, waste leakage prevention, maritime litter reduction, and management of existing litter; and (2) the enabling cluster, which entails policy support, social marketing, financing, and enhancing local government capacities. Each strategy is defined by specific activities to guide key and supporting agencies in implementation.

RA 9003, RA 11898, and the NPOA-ML are the cornerstones of 3RproMar's regulatory and institutional framework in the Philippine context. RA 9003 addresses end-of-pipe of the waste stream, while RA 11898 focuses on upstream processes within the plastic value chain, helping close the loop and supporting the country's transition from a linear to a circular economy. The NPOA-ML, which incorporates strategies derived from the goals and desired outcomes of both laws, adopts a marine litter perspective and also addresses sea-based sources of waste, such as abandoned, lost, or discarded fishing gear (ALDFG) and waste from maritime vessels.

National-level policies, including DENR Administrative Orders (DAO) and memorandum circulars (MC) of the Department of Interior and Local Government (DILG), further support or enhance the implementation of RA 9003. RA 9003 mandates translation into local SWM ordinances, while local environment codes broadly encompass overall environmental protection and conservation. Initial reviews of existing ordinances in Guimaras and its LGUs found that not all RA 9003 provisions are incorporated. However, there is an opportunity to integrate NPOA-ML and RA 11898 in the update and revision of local SWM ordinances and environment codes, to advance grass-roots efforts toward a circular economy. **Table 2** summarises relevant regulations to be integrated into the 3RproMar project work and the main agencies involved.

The National Plan of Action for the Prevention, Reduction, and Management of Marine Litter (NPOA-ML) envisions ***"a Philippines free of marine litter through shared participation, responsibility, and accountability"*** *and aims to achieve* ***"zero waste to Philippine waters by 2040."*** *The 3RproMar project contributes to eight of NPOA-ML's strategies.*

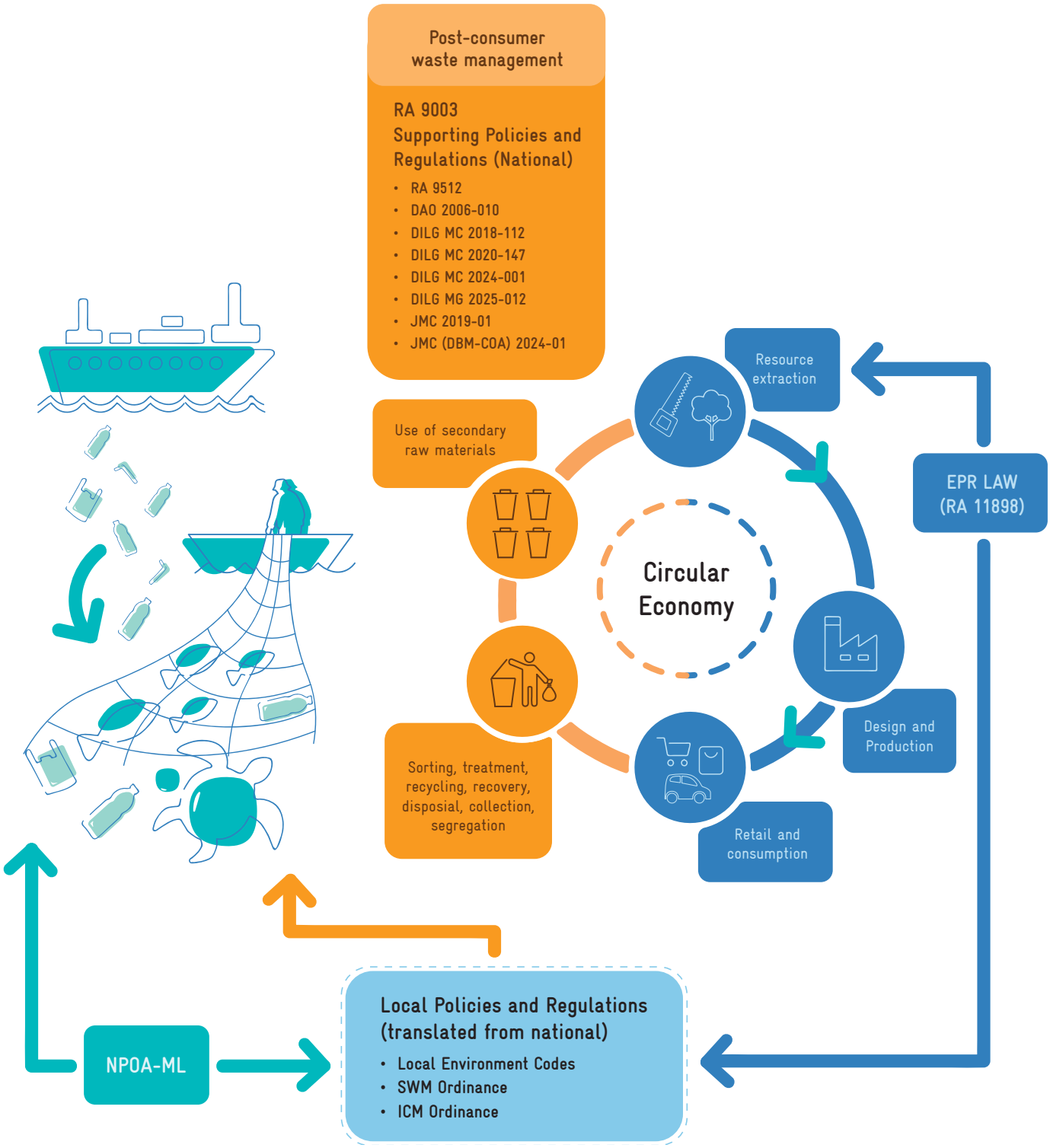


Figure 3. National and Local Regulations and Policies relevant to 3RproMar-PH

Table 2. Regulations and Agencies Relevant to 3RproMar - Philippines (PH)

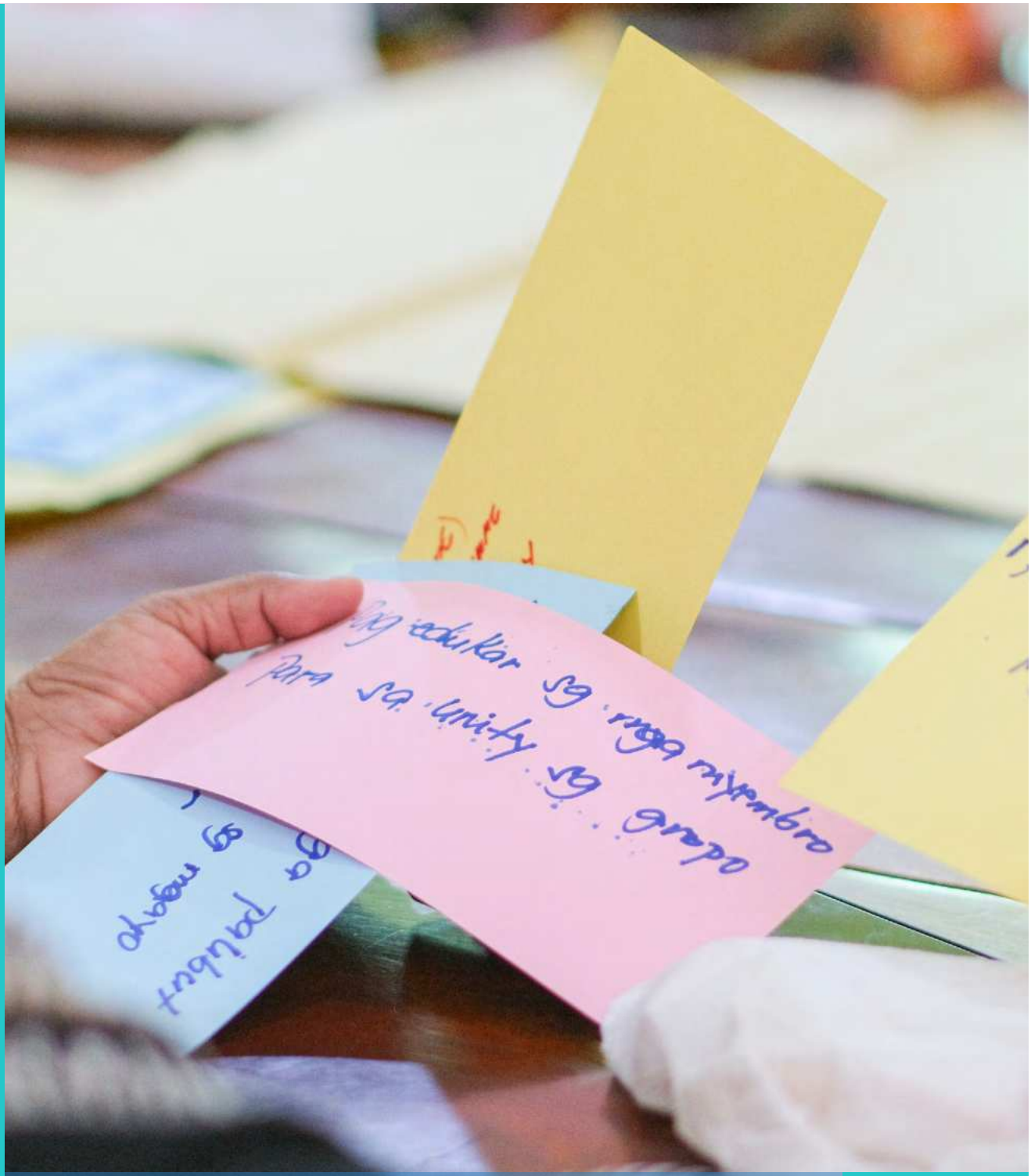
Regulations/Title	Purpose	Highlight/s	Agencies
RA 9003 Ecological Solid Waste Management Act of 2000	Adoption of a systematic and ecological solid waste management programme to protect public health and the environment, set waste reduction targets through resource efficient and minimisation measures like recycling and composting, ensure proper waste segregation and disposal practices, promote research and development (R&D) for improved techniques, encourage private sector involvement, assign LGUs primary responsibility while fostering collaboration with other sectors, apply market-based instruments for self-regulation among waste generators, institutionalise public participation in waste management programmes, and integrate ecological waste management topics into formal and non-formal education curricula to enhance environmental awareness and action.	- Cornerstone of solid waste management programmes and strategies in the country. - Aside from reduction, the strategies are focused more on management of post-consumer waste, which is implemented mainly by the LGUs. - Local SWM ordinances adapt RA 9003 to the local context, but gaps remain as not all provisions are fully incorporated, underlining the need for updates and revisions.	**Key:** NSWMC led by DENR **Other Agencies:** Department of Science and Technology (DOST); Department of Public Works and Highways (DPWH); Department of Health (DOH); Department of Trade and Industry (DTI); Department of Agriculture (DA); Metro Manila Development Authority (MMDA); League of provincial governors; League of city mayors; League of municipal mayors; Association of barangay councils; Technical Education and Skills Development Authority (TESDA); Philippine Information Agency (PIA) and private sector (NGO, recycling industry, manufacturing or packaging industry).
RA 11898 Extended Producer Responsibility Act of 2022	Developing a national EPR framework for plastic packaging waste that requires OEs or their Producer Responsibility Organisation (PRO) to implement strategies such as adopting reusable products, redesigning for reusability or recyclability, incorporating recycled materials, establishing refilling systems, setting reduction rate plans, conducting information campaigns, and ensuring proper labelling, alongside waste recovery programmes like buy-backs, recycling, waste diversion, clean-up efforts, and collaborations with LGUs and informal waste sector groups.	- Mandates producers to take responsibility for upstream processes in the plastic value chain, thereby closing the loop. - Strengthens solid waste management through partnerships with LGUs and the informal waste sector, fostering a multi-stakeholder approach. - Enhances support for rethinking product design and manufacturing to align with circular economy principles and SCP strategies. - Including the Department of Agriculture (DA) in the NSWMC in order to facilitate the use of agri-waste for biodegradable packaging and strengthen the implementation of good agricultural practices (GAP), which is beneficial to NPOA-ML efforts, particularly in preventing ALDFGs.	**Key:** NSWMC led by DENR **Other Agencies:** *As amendment to RA 9003, the NSWMC shall be composed of the following agencies, led by DENR:* DOST; DILG; DOH, DA, DTI, MMDA; Union of Local Authorities of the Philippines (ULAP); and private sector represented by: three representatives from NGOs with a track record on solid waste management or waste reduction, recycling and resource recovery; one representative from the recycling, composting, or resource recovery and processing industry; and one representative from the manufacturing industry, packaging industry, or obliged enterprises.

Regulations/Title	Purpose	Highlight/s	Agencies
NPOA-ML National Plan of Action for the Prevention, Reduction and Management of Marine Litter	Aims for a "Philippines free of marine litter through shared responsibility, accountability, and participatory governance" with the goal of achieving "Zero waste to Philippine waters by 2040," and outlines a programmatic cluster of six strategies—establishing science-based baseline data, mainstreaming circular economy (CE) and SCP, enhancing recovery and recycling, preventing waste leakage, reducing maritime-based waste, and managing existing litter in riverine and marine environments—alongside an enabling cluster of four strategies focused on enhancing policy support, implementing targeted social marketing campaigns, ensuring adequate financing and resources, and strengthening local government capacities, with added considerations on feasibility, scientific evidence, phased implementation, polluters-pay, and public participation, among others.	- 3RproMar have entry points in the strategies of both the programmatic and enabling clusters of NPOA-ML (see **Chapter V, Section A**).	**Key:** DENR thru EMB **Other Agencies:** NSWMC, DOST, DTI, DILG, National Coast Watch Council (NCWC), Department of Transportation (DOTr), Department of Agriculture-Bureau of Fisheries and Aquatic Resources (DA-BFAR), LGUs, Department of Budget and Management (DBM), Department of Education (DepEd), Presidential Communications Office (PCO), PIA.
RA 9512 Environmental Awareness and Education Act of 2008	Mandates integrating science-based environmental education into curricula across all levels, including barangay daycare, preschool, technical-vocational, and out-of-school youth programmes and teaching that cover environmental principles, laws, local and global environmental conditions, citizen responsibilities, practical activities like waste management, and related livelihood opportunities.	- Recognises the youth's role in nation-building and education's power to foster patriotism, social progress, and development. - Promotes awareness of natural resources' relevance for economic development and the need for environmental conservation and ecological balance for sustainable development. - Interagency and multi-sectoral collaboration, especially between DENR and education-mandated government agencies	**Key:** DepEd **Other Agencies:** Commission on Higher Education (CHED), TESDA, Department of Social Welfare and Development (DSWD), DENR, DOST.

Regulations/Title	Purpose	Highlight/s	Agencies
RA 12009 New Government Procurement Act (NGPA) ***Amending the RA 9184: Government Procurement Reform Act***	Modernises and enhances transparency, while institutionalising sustainable public procurement principles through embedding of economic, environmental, and social considerations in the government's procurement processes.	- Mandated integration of economic, environmental, and social considerations into public procurement practices will align the government spending with SDGs, particularly those related to SCP, and ensure long-term value within the product/ service's value chain, thus following some principles of circular economy. - Promotes continuous training for procurement practitioners on sustainable and inclusive procurement practices, which will cultivate a workforce adept at implementing strategies that prioritise environmental stewardship in procurement.	**Key:** DBM, National Economic and Development Authority (NEDA) **Other Agencies:** DPWH, COA, Department of Finance (DOF) , DTI, DOH), Department of National Defense (DND), DepEd, DILG, DOST), DOTr, Department of Information and Communications Technology (DICT), Department of Energy (DOE), A representative from the private sector, LGUs
DILG MC 2025-012 Integration of Informal Waste Sector into the Solid Waste Management System of LGUs	Provides the guidelines for integrating the Informal Waste Sector (IWS) into the SWM systems of LGUs.	- Directs LGUs to identify and document individuals and groups engaged in informal waste collection and recycling within their jurisdictions (**profiling**), integrate them into SWM systems, and provide them with access to capacity development and decision-making processes. - Encourages collaboration with private sector, NGOs/CSOs and other entities that will support LGUs with IWS integration. - Requires LGUs to monitor and evaluate the process of integration, and report best practices and progress to DILG.	**Key:** DILG, LGUs **Other Agencies:** Private sector, NGOs, CSOs, POs
DILG MC 2020-147 Guidelines on the Management of COVID-19 Related Health Care Wastes ***Adopted by the NSWMC Resolution 2020 – 1364***	Provides protocols for the proper segregation, collection, treatment, and disposal of health care waste generated during the COVID-19 pandemic to ensure public safety and environmental protection.	- Integration into local ordinances can help prepare for potential waste generation during pandemics and other widespread health concerns.	**Key:** DILG, DENR, NSWMC, LGUs **Other Agencies:** DOH

Regulations/Title	Purpose	Highlight/s	Agencies
DAO 2006-010 Guidelines on the Categorised Final Disposal Facilities	Establishes standards for the design, operation, and maintenance of waste disposal facilities based on their categorisation that is realistic and within reasonable conditions for LGUs to meet the legal requirements of RA 9003.	- Ensures LGUs adherence to legal standards and provisions within realistic environmental, financial, socio-economic, and hydro-geological conditions, while also opening opportunities for potential clustering with other LGUs (economies of scale). - Anticipates waste generation trends due to population growth and developments driving economic growth.	**Key:** DENR thru EMB, NSWMC **Other Agencies:** LGUs, DILG, DOST.
DILG MC 2018-112 Organisation or Reorganisation of the Barangay Ecological Solid Waste Management Committee (BESWMC)	Enforces ecological solid waste management (ESWM) at the barangay level, requiring barangay officials to be updated on their roles under RA 9003 and the Local Government Code of 1991 (RA 7160), which designates the Punong Barangay as the lead enforcer of laws on pollution control and environmental protection.	- Enforces the crucial role and function of barangays in ESWM, and all other policies and programmes that relate to it.	**Key:** DILG, LGUs **Other Agencies:** DENR.
DILG MC 2024-001 Kalinga at Inisyatiba para sa Malinis na Bayan (KALINISAN) sa Bagong Pilipinas Program	Consolidates government efforts in maintaining a healthy environment by empowering LGUs, raising awareness on environmental responsibility through proper SWM, promoting investments in SWM and ecological projects, recognising cleanest LGUs (incentivizing), organising clean-up activities with communities and partners, and advocating for the involvement of schools in environmental initiatives.	- Streamlines local government and community efforts in ESWM by uniting DENR and DILG mandates, ensuring stronger adherence and enforcement at the barangay level. - Engages youth, including students in schools and universities, and the Youth Council (Sangguniang Kabataan, SK), in environmental initiatives.	**Key:** DILG, LGUs **Other Agencies:** DSWD, Department of Labor and Employment (DOLE), Schools.

Regulations/Title	Purpose	Highlight/s	Agencies
Joint Memorandum Circular (JMC) 2019-01 Guidelines in setting reasonable rates for regulatory fees and other service charges imposed by LGUs	Calls on LGUs to review and adjust their local revenue ordinances according to a rationalised procedure for setting fees and charges that are not burdensome to the public but are necessary to recover the costs of services provided.	Legal justification for updating of fees related to SWM (collection tariffs, penalties, etc.) and a guide for the updating/ revising of the SWM ordinances, environmental codes.	**Key:** Department of Finance (DOF), DILG, Local Chief Executives (LCE) e.g., mayors, vice-mayors, council.
JMC 2024-01 Revised Manual on the Disposal of Government Properties	Provides updated guidelines to ensure the efficient, transparent, and sustainable disposal of government assets.	Supports the government's social, economic, and environmental sustainability goals by promoting efficient asset utilisation and disposal, thereby preventing unnecessary expenditures and maximising savings.	**Key:** DBM, COA **Other Agencies:** All Departments and Agencies Under the Executive Branch, National Museum, National Library of the Philippines, Intellectual Property Office (IPO).
Local Ordinances: **a. The Anti-Plastic Ordinance of 2014 of The Province of Guimaras (*sa Plastik Anay 'ta*)** **b. Integrated Coastal Management Ordinance of Guimaras** **c. SWM Ordinances and Environment Codes of LGUs (Jordan, Nueva Valencia, Sibunag, San Lorenzo and Buenavista)**	ESWM through regulated use and disposal of plastic, and overall environment protection (marine ecosystems, soil, air and human health) through measures preventing plastic pollution.		**Key:** Provincial Government of Guimaras, LGUs of Guimaras.



UNDERSTANDING BARRIERS

3

Barrier Analysis

Barrier Analysis is a methodology for better understanding the underlying determinants or factors that influence individual behavior choice. It is commonly used in the field of development work to conduct formative research to plan interventions more appropriately by identifying which of these underlying determinants play the most prominent role in decision making.

The barrier analysis methodology begins with identifying stakeholders and analysing their roles and influence in relation to the 3RproMar project. The Stakeholder Analysis identified the key, primary and secondary actors per sector. Key actors identified are as follows:

Table 3. Key Stakeholders for 3RproMar-PH

Sector	Stakeholders
Government	Partner Ministry: DENR thru EMB, BMB NSWMC including National Ecology Center (NEC), Department of Tourism (DOT), Guimaras Environment and Natural Resources Office (GENRO), Guimaras LGUs
Private Sector	Plastic Credit Exchange (PCx) thru Friends of Hope (HOPE), Metro Iloilo-Guimaras Economic Development Council (MIGEDC), Business groups in Guimaras (Investor Club, Inc., Resorts and Lodging Association, Junkshops, Fruit Growers and Eco-tourism Farm Owners)
Academe, Think tanks	Guimaras State University (GSU)
Development Partners	ASEAN Working Groups (WG), GIZ
Civil Society Organizations (CSOs), NGOs, People's Organisations (POs)	Informal waste sector groups in Guimaras, Integrated Women's Association of Guimaras (IWAG), Banaag Recyclers Association, Federation of Accredited Youth Organizations in Buenavista (FAYOB)

Stakeholder consultations and capacity-building activities at local and national levels identified barriers, needs, enablers, and opportunities in SWM, marine litter reduction, and EPR implementation – all of which are used as inputs to the barrier analysis. In addition, SWM related studies for the Southeast Asian region and locally available documents related to the project sites were also reviewed and included in the barrier analysis. This analysis examines factors influencing the successful implementation of a sustainable SWM system in the Philippines, highlights issues and opportunities within the plastic packaging value chain and identifies ways to strengthen key players along this chain. It also pinpoints entry points where the project can support DENR-EMB in designing effective interventions.

Based on the assessment, there are one hundred ninety-six (196) barriers that were identified in the desktop review and in-person project activities. The identified barriers were summarized into distinct categories, as follows:

Business and Politics (39 counts, 20%) – The top identified barrier among the eight categories defined, barriers listed under this category are obstacles that are created by business practices and political processes or systems such as policy decisions, governmental structure, inadequate accountability, corruption and influence of political ideologies. The specific barriers under this category mostly refer to lack of SWM policies, programs and legal guidance, limited access to market for recyclables, minimal efforts to stimulate business models based on reusable packaging/recycled plastics and putting SWM programs as least priority by LGUs and private organizations.

Infrastructure and Logistics (33 counts, 17%) – Another major barrier identified in this study is the lack of infrastructure on SWM especially in rural areas, thus leading to additional challenges when transporting wastes to the mainland. Communities living in remote areas which are not accessible by waste collection services due to the lack of infrastructure for efficient transportation (e.g. narrow alleyways) would often resort to illegal dumping.

Economical/Financial (29 counts, 15%) – Barriers identified under this theme refer to the financial factors which hinders the effective implementation of a SWM programme such as high cost for transporting and recycling waste, low value for recyclable materials and lack of incentives but also lack of supporting mechanism such as sufficient fee collection to refinance municipal services and SWM investments.

Institutional Capacity (25 counts, 12%) – These are overarching barriers that cut across different sectors within the plastic value chain which relates to the capability of an organization to effectively implement SWM programmes. While the exponential rate of urbanization has been a key driver in Asia, the associated exponential growth in waste generation is pushing cities beyond their SWM capacity.[12] The lack of manpower and technical expertise within an LGU (e.g. CENRO/MENRO) were identified as main barriers in multiple occasions during stakeholder consultations.
Socio-behavioural (25 counts, 12%) – These are the challenges that occur from human behaviour and societal attitude towards SWM such as low commitment of stakeholders involved, limited involvement of stakeholders in community SWM programmes and lack of active participation.

Coordination and Collaboration (15 counts, 8%) – Barriers identified under this theme refer to the lack of communication and partnership between the different stakeholders within the plastic value chain.

Education and Awareness (15 counts, 8%) – These barriers refer to the level of awareness of an individual towards SWM in relation to either formal (e.g. school, university), non-formal (e.g. seminars, conference) and informal (e.g. peer learning, information dissemination) education. The lack of awareness on waste management and the negative health impact of improper waste management often leads to the lack of active participation from the community members with regards to implement and operate a sustainable SWM system.
Technology (15 counts, 8%) – These are the barriers resulting from the limitations, accessibility, or adoption of plastic recycling technology and development of plastic alternatives.

1. Hondo, D., Arthur, L., & Dickella Gamaralalage, J.P. "Solid Waste Management in Developing Asia: Prioritizing Waste Separation (Policy brief)". November 2020
https://www.adb.org/publications/solid-waste-management-developing-asia

A summary of the identified barriers per category is shown in Table 4 while the full list of identified barriers from the desktop review and in-person project activities can be seen in Annex 2.

Table 4. Barrier Categories

Barriers	Count	Percentage
Institutional Capacity	25	12%
Coordination and Collaboration	15	8%
Socio-Behavioural	25	12%
Business and Politics	39	20%
Economical/Financial	29	15%
Education and Awareness	15	8%
Infrastructure and Logistics	33	17%
Technology	15	8%
TOTAL	196	100%

Linking Process Description with Barriers Analysis and Capacity Development

If fully implemented, national waste management policies can establish a closed-loop system that prevents unmanaged solid waste from leaking into Philippine waters. The 3RproMar project, as detailed in this report, demonstrates how these policies are adapted locally and how it supports local partners in addressing the gaps in their implementation. Through consultations and baseline studies, the project assessed the state of SWM at both national and local levels, identifying barriers, support needs, opportunities, enabling factors, and the impacts and challenges associated with current waste management scenarios.

The baseline study, using WFD analysis, revealed that 84% of MSW in Guimaras remains uncollected and hence substantially contributes to waste leakages into the environment. Challenges include inadequate waste segregation, collection, recovery, transportation, and disposal systems. These barriers underline the need for improved infrastructure and targeted interventions tailored to the specific requirements of each municipality to reduce plastic leakage and prevent marine litter.

Poor disposal management is another contributing factor to land-based waste leakage. Presently, only two municipalities in Guimaras have controlled disposal facilities. Addressing this issue requires strengthening recovery systems and strictly enforcing RA 9003 to reduce the volume of waste reaching disposal sites, which themselves need substantial improvement. ISWM needs investments in infrastructure, such as additional containers, proper equipment, and enhanced recovery methods at Barangay MRFs, and should be supported by capacity building, policy reinforcement, and public awareness initiatives to foster behavioural change and community participation.

The 3RproMar process, illustrated in **Figure 4**, implements Work Packages 1, 2, and 3 to strengthen ISWM in Guimaras. The baseline study and stakeholder analysis identified critical barriers as well as strategies to support ISWM that need to be addressed in order to reduce land-based waste leakages, whereas interventions include national and local levels to enhance the implementation of RA 9003, RA 11898, and related policies as well as as the targets formulated by the NPOA-ML. Key activities include providing policy advisory to address gaps in local regulations, conducting capacity development to empower LGUs and community stakeholders that lead SWM programs, and facilitating private sector partnerships to maximize opportunities under the EPR Law. Engagement with the academe ensures environmental awareness and active participation among the youth. Lessons and best practices from these initiatives will be shared at the ASEAN level for potential scaling or replication in similar remote island contexts.

> ***"We see plastic waste coming ashore. This issue affects us all, even our livelihood. We worry that our children will one day swim with more plastic than fish in the sea."***
>
> **– Interview with local fisherman in Nueva Valencia, Guimaras**

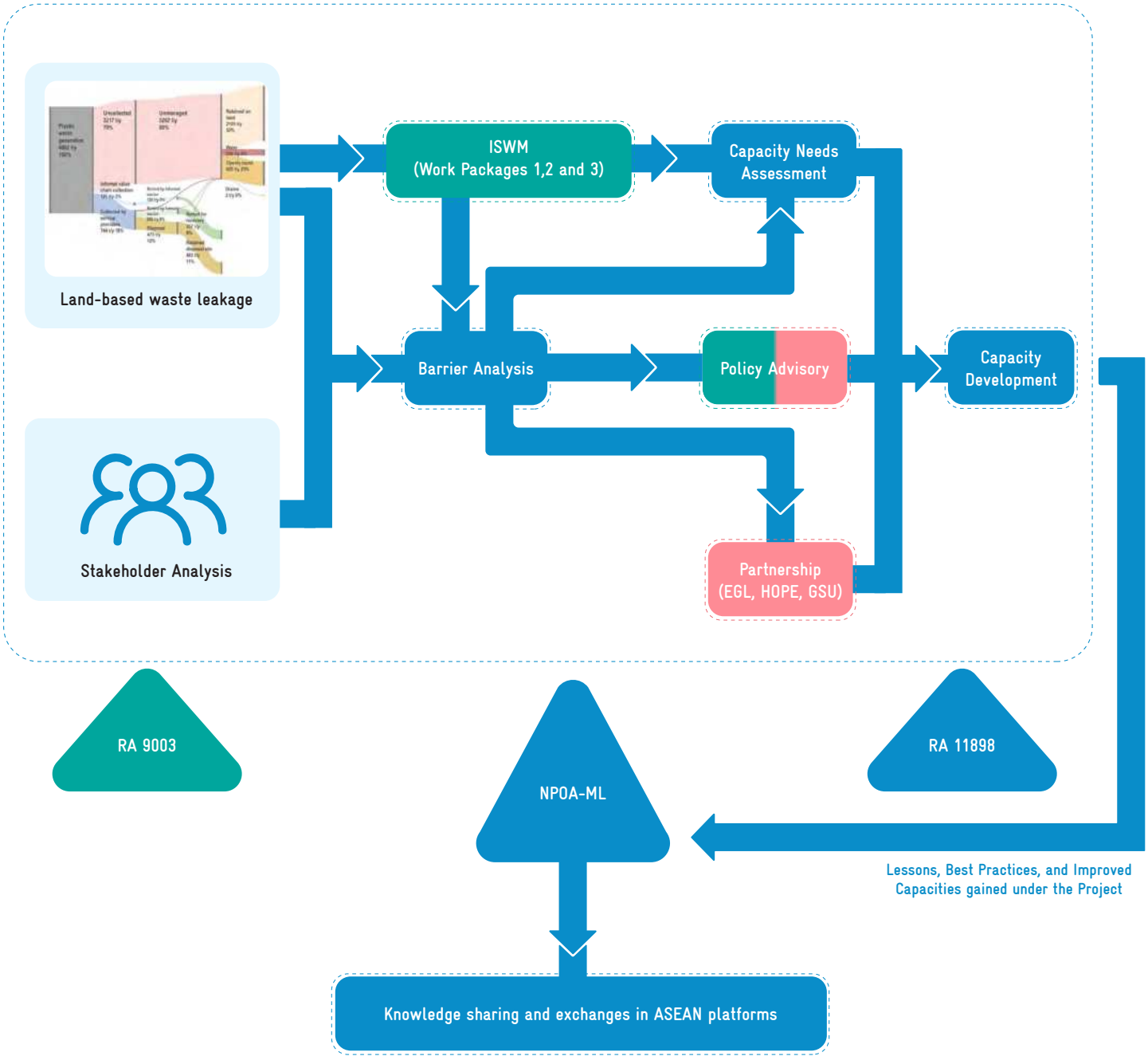


Figure 4. Overall Approach to Process Description for 3RproMar-PH

RESPONDING TO BARRIERS

4

The 3RproMar process in the Philippines addresses barriers driving land-based waste leakage into water bodies by enhancing the ISWM system in Guimaras through targeted work packages. These interventions aim to improve both the hard and soft components of ISWM while supporting enablers such as policy strengthening, capacity development, and partnerships with relevant actors to fill gaps within the work packages. Each intervention consists of various activities and initiatives designed to align with and to support the local implementation of national laws and regulations relevant to SWM at 3RproMar's pilot sites.

Capacity Building Activities

After a thorough analysis of the identified barriers and stakeholders, a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis and a capacity development needs matrix will be created to evaluate the specific needs of each actor or stakeholder group involved in the plastic value chain and to recommend tailored activities that address the identified needs. This matrix can be used by DENR–EMB in identifying the most appropriate actions for implementation at various intervention levels. Insights from the Barrier Analysis categorise capacity development into four dimensions based on the level of intervention: Individual Competence, Organisational Development, Cooperation Systems, and Enabling Framework.

Individual Competence: Developing the competency of an individual helps in enabling that individual to initiate and facilitate change within their own organisation or community. When links to the other levels of capacity development are effectively managed, activities at this level can develop their full potential.

Organisational Development: Organisations generate their own meaning – and have their own rationale. They usually develop in response to issues of concern within a society and supply corresponding solutions. The organisation referred to in this study is the DENR – EMB as the implementing agency of RA 9003 as well as RA 11898.

Cooperation Systems: Organisations need to cooperate with each other to achieve objectives that no organisation can achieve on its own. The same is true with DENR – EMB. Effective implementation of SWM policies will need the cooperation and active participation of different organisations. The activities on this level of intervention focus on the interaction of DENR – EMB with those external organisations that are the key and primary stakeholders along the circular economy value chain.

Enabling Frameworks: Any cooperation system operates within a policy space that sets key frameworks. The frameworks are determined by a fabric of rules, processes, structures, relationships, organizations and individuals. The activities for this level of intervention focus on the interaction of DENR – EMB with the external organisations that are the secondary stakeholders along the circular economy value chain. The secondary stakeholders are agencies that have indirect or temporary involvement in the envisioned transformation towards a circular economy.

The 3RproMar project conducts capacity-building activities at local and national levels, engaging stakeholders from government agencies, the private sector, NGOs/CSOs, the informal waste sector, and academic institutions. These activities include stakeholder consultations that share lessons and insights from resource speakers and experiences gained during the project's implementation. Additionally, knowledge in SWM, EPR, and circular economy is evaluated after these activities through participant feedback.

The project initiatives and capacity building activities that addresses the identified barriers in the previous chapter are shown in Figure 5. Based on the barrier analysis result, the topmost considered barriers identified were under the category of Business and Politics. However, the assessment of the 3RproMar project activities show that most of the project activities addresses the barriers under Education and Awareness. Some of the project activities that addresses barriers under the Education and Awareness category include the conduct of national and local stakeholder forums, trainings on specific topics relating to SWM and peer-to-peer learning visit. For instance, this is explored within the partnership with Guimaras State University (GSU) and their Save the Marine Ecosystem (SaveME) Programme with the engagement of the youth sector to raise awareness on positive behaviour towards SWM, whereas this also addresses several other barriers under the same category.

The 3RproMar project has conducted various capacity building activities with the involved partners and stakeholders. The levels of intervention for each capacity building activity are shown in Figure 5 to guide DENR-EMB in elaborating best suited activities that could be most effective in addressing barriers on SWM at the appropriate level within the organization. The result of the assessment shows that most of the 3RproMar capacity building activities conducted so far are aimed at developing the competency of an individual to provide a venue to enhance cooperation systems among the plastic value chain stakeholders to effectively deliver SWM services. Individuals within an organization, when well-capacitated, can contribute significantly to the organization's capacity to implement an effective SWM system.

> ***The SaveME campaign empowers students to take action, aligning with the province's Sa Plastik Anay 'Ta initiative. Together, we build a culture of responsibility—reducing plastic waste, protecting our environment, and shaping future leaders."***
>
> **Interview with Dr. Rhea Joy Flora, Dean** - College of Agricultural Sciences, Guimaras State University - Baterna, and SaveME Programme Manager

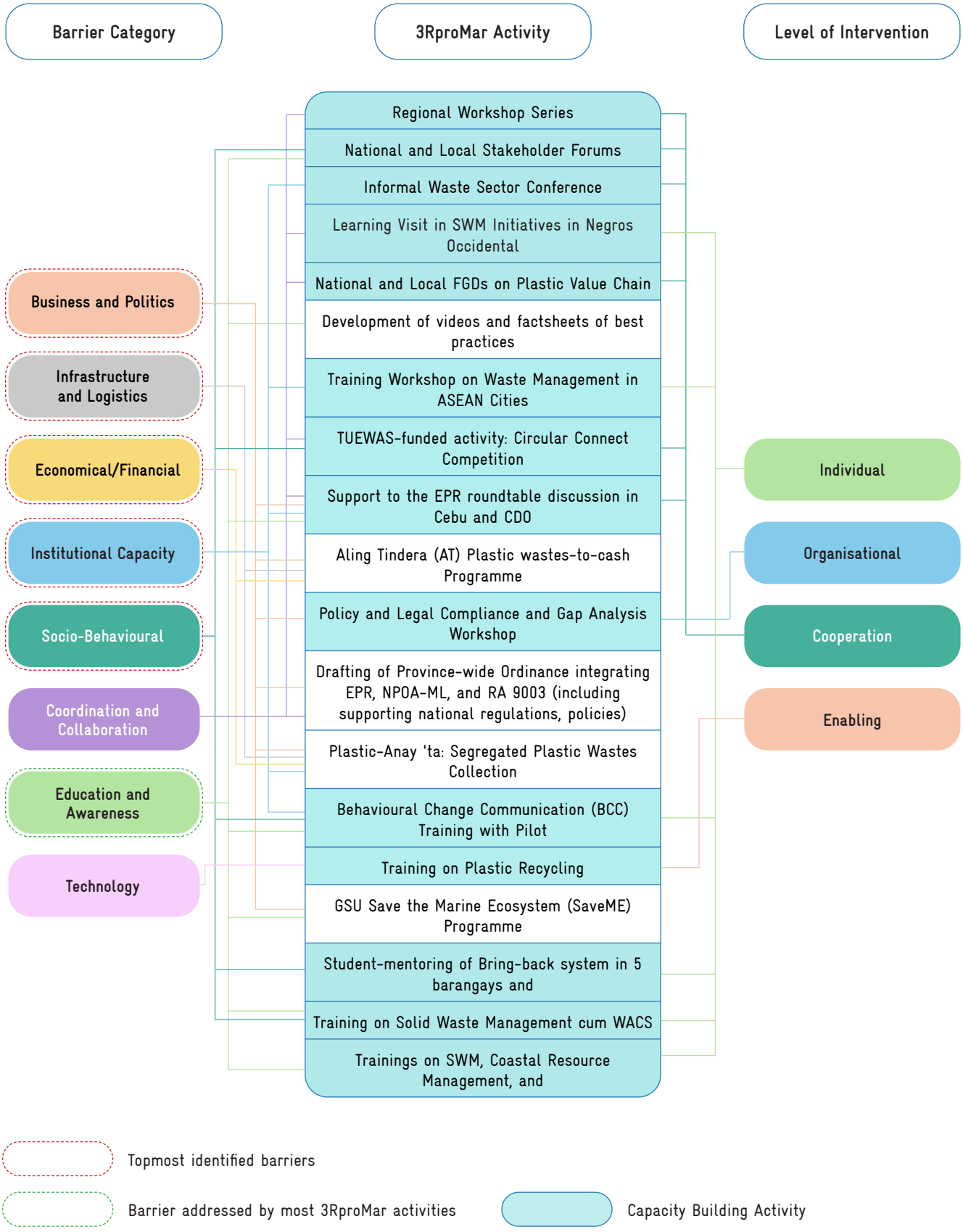


Figure 5. 3RproMar Activities in Response to the Barriers identified per Level of Intervention

A harmonised policy that is anchored to the National Plan of Action for the Prevention, Reduction, and Management of Marine Litter (NPOA-ML), the new EPR Law, and improving on the Ecological Solid Waste Management Act or RA 9003, is key to unifying stakeholder efforts and protecting the island of Guimaras and its resources.

Policy Advisory

As part of its work packages, 3RproMar is keen on improving local policies to guide the ISWM system of Guimaras. Part of its efforts is to draft a model ordinance that addresses identified policy gaps in RA 9003 and its Implementing Rules and Regulations (IRR) and considers integration of other policies such as the DILG MC 2018-112 and 2020-147, the Seal of Good Local Governance (SGLG), 3R/EPR policies, and the NPOA-ML. The drafting of the province-wide model ordinance will also consider the environmental challenges linked to the upcoming Panay-Guimaras-Negros Island Bridges Project and aim to harmonize the relevant framework for ISWM and EPR as far as possbile for all involved LGUs.

Initial recommendations from the inaugural Policy and Legal Compliance Gap Analysis (PLCGA) Workshop - that is part of the drafting of the model ordinance - included strengthening grassroots enforcement through the integration of DILG's KALINISAN Programme, involving women and youth, and aligning SWM initiatives with other government-funded programmes to address resource gaps. The DepEd should be included in Solid Waste Management Boards to engage the younger generation, while provincial-level efforts should attract private sector participation under the EPR Law. Additional recommendations involved using cost-service analysis for SWM fee-setting, increasing fines for non-compliance, and incorporating the DOT into SWM initiatives to include tourists in environmental efforts but also EPR related actions across all LGUs.

Partnerships

The implementation of 3RproMar in Guimaras has coincided with the enforcement of the EPR Law of 2022/RA 11898, creating new opportunities for activities that support the DENR-EMB in rolling out its EPR activities. This alignment also allows for the focused development of more 3RproMar initiatives that leverage the legal mandate. For example, to support the ISWM efforts in Guimaras, a partnership has been established between Evergreen Labs (EGL), a co-processing private entity, and the Province of Guimaras, along with its five municipalities. EGL collects and processes plastic waste across the province, including plastics that are currently considered without value.

"I joined Aling Tindera to earn extra income and help our environment. If we keep our environment clean, future generations will benefit – your children and my children."

- Interview with Welsie Cahilig, AT Member – Bago City, Negros Occidental

The partnership with HOPE's Aling Tindera (AT) programme in Metro Bacolod, though not yet operational in Guimaras, provides valuable insights into mobilising community-driven efforts for SWM and integrating the informal waste sector into these initiatives. The AT programme has successfully set up eight collection stations across Negros Occidental, including Bacolod City, which share high people traffic and tourism with Guimaras, and potentially contributing to the province's waste and marine litter. Lessons learned and best practices from these AT stations could benefit Guimaras, particularly the SWM focal persons in its municipalities. During a learning visit in August 2024, these officials had expressed interest in establishing AT stations in their respective jurisdictions, recognising the programme's positive impact and potential benefits to their SWM efforts.

The behavioural survey conducted in Guimaras found that education and young-age dependency are significant drivers of the circular economy, while old-age dependency acts as a barrier. Younger individuals are more inclined to purchase products containing recycled materials and separate waste for recycling, while those with higher levels of education are more aware of these practices. Environmental awareness and regulation were also identified as key drivers. These findings suggest that policies targeting older individuals and those with lower education levels are essential for fostering a transition towards a circular economy. Given that the youth represent the future stewards of the planet, integrating universities, its students, teachers, and other stakeholders from academic institutions into SWM efforts is vital. Guimaras State University (GSU), the primary higher education institution (HEI) on the island with three campuses and serving around 7,000 students, provides an opportunity to raise awareness and to embed a positive behaviour towards SWM by actively involving its faculty and students through the Save the Marine Environment (SaveME) programme, that is conducted in partnership with 3RproMar.

At the Sapal facility donated by DENR, plastics undergo shredding, melting through an extruder, and molding into recycled lumber that can then be used for furniture, construction materials, and other materials.

Integrated Solid Waste Management (Work Packages 1, 2 and 3)

Work Package 1 of the ISWM focuses on addressing waste leakage caused by uncollected waste, inadequate collection services, and insufficient disposal facilities. This includes establishing proper collection systems, expanding collection coverage, improving the operations of barangay MRFs, and enhancing disposal facilities. Key interventions under this package involve mobilising blue sacks and motorcycles for collection in pilot barangays, aiming to collect as much plastic waste as possible for processing by EGL and diverting recyclable plastics to local junkshops. Additionally, 3RproMar is assisting GENRO in drafting a pre-feasibility study for the province-wide SLF that the provincial government plans to construct. A Memorandum of Agreement (MOA) has been signed between the province and the five municipalities for this infrastructure project.

Work Package 2 aims to reduce plastic pollution by involving the informal waste sector in the collection and processing of recyclables in Guimaras. This involves recognising and formalising waste workers, expanding waste collection coverage, and engaging them in waste prevention and reduction efforts. It also includes providing gender-sensitive equipment and tools, offering training and capacity-building, promoting the formation of associations or cooperatives, and exploring innovation and entrepreneurship opportunities. To ensure active participation and continuous improvement of waste management systems, feedback mechanisms will be established for waste workers to share their experiences and concerns. Informal waste sector groups from Guimaras participated in the Informal Waste Sector Conference that was organised by 3RproMar in August 2024, where they exchanged experiences, aspirations, and lessons with other members of the informal waste sector from Bacolod, Bago, and Silay, as well as best performers of the AT programme.

The baseline assessment for Work Package 3 involved a survey conducted in Guimaras to assess consumption patterns, behaviours, practices and barriers that are relevant to plastic waste management of stakeholders. It found that women, as primary caregivers and consumers, play a key role in household waste management decisions. Education, age, and environmental awareness were also identified as significant drivers of a transition to a circular economy. The survey results are being used to develop behaviour change communication plans in collaboration with the LGUs and stakeholders, to enhance awareness, community participation, and the implementation of SWM campaigns. Technical assistance and capacity-building are being provided to ensure the effective implementation and monitoring of these plans.

3RproMar CONTRIBUTIONS TO NPOA-ML AND EPR LAW

5

3RproMar aligns its activities and addresses key strategies that are contained in both the NPOA-ML and the EPR Law, whilst working in close coordination with LGUs, government agencies, the private sector, academe, informal waste workers, and other sectors to ensure sustainable and positive outcomes for marine litter prevention and waste management in the Western Visayas region.

3RproMar Initiatives and Activities under NPOA-ML Strategies

3RproMar's activities contribute to seven strategies in both programmatic and enabling/cross-cutting clusters of the NPOA-ML. For Strategy 1, which focuses on establishing science- and evidence-based baseline information on marine litter, 3RproMar has conducted baseline surveys and WFD analysis to assess plastic waste management practices and identify key sources of marine litter in the pilot areas. It also offers an opportunity to consider WFD as one of the tools that DENR can use in assessing plastic waste leakages. 3RproMar mapped the circular economy landscape in HEIs and held focus group discussions (FGDs) on the plastic value chain at national and local levels (Guimaras-Iloilo), identifying barriers and opportunities for the academe and private sector in leveraging the EPR Law 2022. The Development of Black Soldier Fly (BSF) modules, as well as initiatives funded by the SNRD Asia and the Pacific, such as the development of the EPR Audit Guideline, a sustainable tourism strategy integrating payment ecosystem services (PES) and EPR programs, all of which support potential livelihoods for the informal waste sector—are all aligned with Strategy 2 of the NPOA-ML to mainstream circular economy and SCP.

The AT programme in Negros Occidental and activities under Work Package 1 in Guimaras which saw partnership with private sector entities such as junkshops, Subay Marketing, and EGL helped enhance the recycling and recovery of plastic waste, as aligned with Strategy 3 of the NPOA-ML. These partnerships also opened opportunities for establishing potential market links among stakeholders in the LGUs that can be sustained beyond the duration of the 3RproMar project. In line with Strategy 4, the 3RproMar project has focused on preventing leakage from collected or disposed waste through its ISWM Work Packages. The project has also fostered partnerships with private entities such as EGL and the AT programme to support and enhance waste management efforts being implemented in various pilot sites.

For the strengthening of policy support and enforcement for marine litter prevention (Strategy 7), 3RproMar contributes by drafting a model ordinance for Guimaras that aims to bolster the provisions of the RA 9003, integrate both the NPOA-ML and the EPR Law, and ultimately produce a more holistic *"Sa Plastik Anay 'ta"* campaign. In this regard, 3RproMar collaborates with LGUs to identify gaps in their policies and provide recommendations for improvement. 3RproMar supports Strategy 8 by developing social marketing campaigns aimed at raising awareness about plastic pollution and promoting sustainable waste management practices. This is achieved through the creation of awareness-raising materials and programmes that support the project's key initiatives, including ISWM, SaveME, and the AT partnership.

To support Strategy 9 of the NPOA-ML on cost-effective financing, 3RproMar conducted FGDs to map key plastic value chain actors and identify barriers and opportunities for development of potential business case models and EPR strategies. These insights will inform the plastic value chain study to be explored in the Phase 2 of the project and potentially serve as a guide to effective EPR system implementation. The project also contributes to Strategy 10 by strengthening the capacities of LGUs, particularly through capacity-building initiatives that enhance the local-level implementation of RA 9003. These initiatives also aim to help LGUs leverage the provisions of the EPR Law/RA 11898 to improve their solid waste management efforts. **Figure 6** illustrates the NPOA-ML strategies where 3RproMar's activities directly contribute. For a complete list of 3RproMar activities under each NPOA-ML strategy, see **Annex 1.**

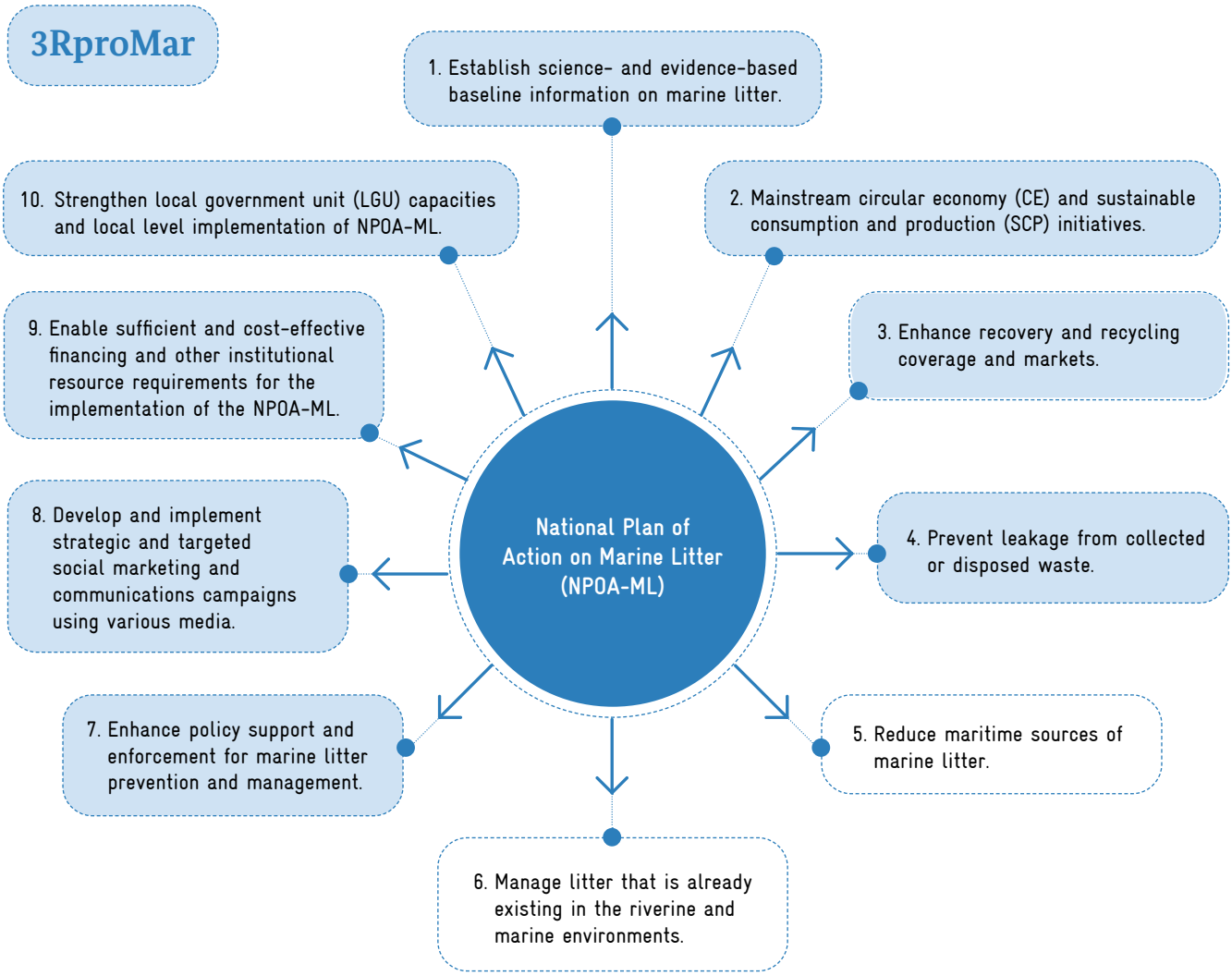


Figure 6. 3RproMar's contribution to NPOA-ML strategies

Integrating EPR and Circular Economy into 3RproMar Initiatives and Activities

3RproMar has actively supported its partner, the DENR-EMB, in the rollout of EPR Roundtable discussions with private sector entities. The project also envisions to conduct a plastic value chain study in Metro-Iloilo and Guimaras, to map key stakeholders and develop potential EPR models and business cases tailored to the region. These models could provide guidance to DENR-EMB for potential replication and/or scaling to other areas as part of the EPR Law implementation whereas this study may only be conducted within the envisioned Phase 2 of 3RproMar.

Given Guimaras' status as a major tourist destination, 3RproMar also considers the impact of tourism on waste generation, particularly with the expected increase in visitors in the event that the Panay-Negros-Guimaras Bridges are constructed. By integrating both the EPR Law and the RA 9003 into its local initiatives, there are opportunities for capacitating local partners on closing the loop on waste management, reducing land-based plastic waste leakage into water bodies, and promoting the transition towards circular economy.

Aside from the drafting of a model ordinance for the province, 3RproMar also initiated a study on *Development of a Sustainable Tourism Strategy Integrating Payment for Ecosystem Services (PES) Schemes and EPR Programs,* which

aims to develop an effective strategy for tourism establishments, using key resorts and hotels in Negros Occidental, as case examples, to address plastic pollution by positioning them as active contributors to the solution, providing guidance on implementing the EPR law, facilitating collaboration with LGUs and other programmes, securing the commitment of establishments through achievable benchmarks and streamlined waste management processes, and promoting environmental conservation and supporting sustainability efforts in the tourism industry through the adoption of the PES framework.

In addition, 3RproMar fosters youth engagement in raising awareness of circular economy principles through initiatives like the Circular Connect Competition. This competition invited students from HEIs and state universities and colleges (SUCs) in Western Visayas to develop solutions for local waste problems using circular economy and sustainability principles. 3RproMar also has an ongoing study, *Mapping the Circular Economy Landscape in Philippine HEIs* that aims to identify gaps and potential recommendations for integrating circular economy concepts into academic curricula. This initiative supports one of EPR Law's declaration of policies (Article 1, Section 2): *"Strengthen the integration of ecological solid waste management and resource conservation and recovery topics into the academic curricula of formal and non-formal education in order to promote environmental awareness and action among the citizenry."*

> ***"There is really a need to acknowledge that the root cause for marine litter has to be addressed at land, at the place where people work and live — in households, and by considering the sustainability of people's actions that in the first place produce and distribute goods and materials that are delivered to the community communities and its users."***
>
> **- Engr. Esperanza Sajul,** Assistant Director, Environmental Management Bureau, Department of Environment and Natural Resources (DENR), the Philippines, during the 3rd 3RproMar Regional Workshop in Iloilo City

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Annex 1. 3RproMar Contributions to NPOA-ML Strategies.

NPOA-ML Strategy	Sub-strategy	3RproMar Activities/Initiatives	Project Output	Deliverables
Strategy 1: Establish science-and evidence-based baseline marine information on marine litter	**Strategy 1.2**: Standardise methodology and appropriate data collection system for marine litter information	Conduct of Baseline Study of GOPA in Guimaras island with Waste Flow Diagram (WFD) Analysis	Output 4	Baseline Study. WFD Analysis
Strategy 2: Mainstream circular economy (CE) and sustainable consumption and production (SCP) initiatives		Conduct of National Stakeholder Forums (2022,2023)	Output 2	Activity Documentation with Gender and Sector Disaggregation
		Conduct of the knowledge sharing conference in Bacolod City (November 2024)		
	Strategy 2.3: Develop and implement an extended stakeholder responsibility (ESR) system applicable in the Philippine context, along the manufacturing–retail value chain, and ensure integration of the informal and semi-formal waste sector as well as communities	Partnership with the Aling Tindera Programme of HOPE	Output 4	Project and partner documentation
		Conduct of Plastic Value Chain Study		Technical Report
		Study: Mapping of Circular Economy Landscape in Higher Education Institutions		
		Audit Guideline, Sustainable Tourism Strategy Integrating Payment for Ecosystem Services (PES) Schemes and EPR Programs, and the Development of Black Soldier Fly (BSF) Modules		
Strategy 3: Enhance recovery and recycling coverage and markets.	**Strategy 3.1**: Strengthen domestic recycling industry for all types of materials and enable mechanisms for recyclables market creation and scaling with the involvement of all stakeholders along the value chain	Signing of Memorandum of understanding (MOU) with EGL and Guimaras LGUs	Output 4	Signed MOU documents
Strategy 4: Prevent leakage from collected or disposed waste	**Strategy 4.3**: Establish environmentally sound infrastructure, identify gaps, and provide funding for solid waste treatment and disposal	ISWM Work Packages 1, 2 and 3	Output 4	Annual and Quarterly Project reports (implementation progress and activities)

NPOA-ML Strategy	Sub-strategy	3RproMar Activities/Initiatives	Project Output	Deliverables
Strategy 7: Enhance policy support and enforcement for marine litter	**Strategy 7.4**: Participate in other venues of influence towards a global and regional governance and information-sharing framework for across-the-board actions by nation-states, business, scientific community, and the public	Participation of GIZ and DENR – EMB and BMB in the regional workshop series for discussions on approaches, challenges, and opportunities regarding land-based waste leakage in the region	Output 1	Input presentations by EMB and/or BMB
		Attendance/Participation in Envi Expo spearheaded by EMB Region 6		Activity Documentation with Gender and Sector Disaggregation
		Provision of support to the conduct of Iloilo Marine Pollution Forum spearheaded by EMB Region 6		
		Provision of support to the – Philippine Environment Month in Iloilo spearheaded by EMB Region 6		
		Provision of support to the Iloilo SWM Summit of EMB Region 6		
		Peer-to-Peer Learning Visit in SWM Initiatives in Negros Occidental		
		Conduct of the IWS Conference (August 2023)		
Strategy 8: Develop and implement strategic and targeted social marketing and communications using various media	**Strategy 8.2**: Implement massive campaigns and outreach programmes that target specific stakeholders to take interest in connecting their day-to-day actions with marine litter impacts and do their share	Behavioural Change Communication (BCC) Training of GOPA	Output 4	Training reports
		Development of video productions and factsheets of best practices and promising initiatives as part of 3RproMar implementation in Guimaras		Videos and factsheets showing best practices of 3RproMar implementation
		Implementation of SWM programs in the three (3) GSU campuses: 1. Bring Your Own Reusable Bag (BYORB) 2. Bring Your Own Eating Utensils and Tumbler (BYOEUT) 3. Plastic and Biodegradable Waste Management within GSU campuses		Implementation reports by partner; feedback of stakeholders from the programmes.
	Strategy 8.3: Capacitate national agencies and LGUs on relevant laws and measures for the prevention and management of marine litter, including strategic training rollout	Support for the roundtable discussion entitled: "Rethinking Plastics: EPR Paving the Way Towards Circularity" held in Cebu City (September 2023) and Cagayan De Oro City (October 6, 2023)	Output 2	Activity Documentation with Gender and Sector Disaggregation
		Support for partners' training in AIT (September 2024)		

NPOA-ML Strategy	Sub-strategy	3RproMar Activities/Initiatives	Project Output	Deliverables
Strategy 9: Enable sufficient and cost-effective financing and other institutional resource requirements for the implementation of the NPOA-ML	**Strategy 9.1**: Identify and address barriers to private sector investments or public-private partnerships (PPPs) aimed at reducing marine litter	Plastic Value Chain Study	Output 3	Activity Documentation with Gender and Sector Disaggregation
		Drafting of Barrier Analysis and Capacity Development Plan (CDP)		
Strategy 10: Strengthen LGU capacities and local level implementation of NPOA-ML	**Strategy 10.1**: Develop a roadmap for the local-level implementation of the NPOA-ML	Drafting of Province-wide Ordinance integrating EPR, NPOA-ML and RA 9003 (including supporting national regulations, policies)	Output 4	Draft regulations, policy studies
	Strategy 10.2: Conduct capacity building and support best practice sharing/learning to enhance technical competencies of LGUs and clusters of LGUs	Development of Rapid Assessment Tool for finding potential positive deviants based on assessment of best practices and barriers in SWM.	Output 1 (50%) Output 2 (50%)	Checklist of criteria for rapid assessment, Activity documentation
		Presentation of findings of the Best Practices Study to local (pilot) and national stakeholder forums		Activity documentation
		WFD training on the 2023 NSF	Output 4	Activity Documentation with Gender and Sector Disaggregation
		Conduct training on Plastic Recycling		
		Conduct training Workshop on Waste Management in ASEAN Cities		
		Support for partners' training in AIT (September 2024)		

Annex 2. List of Identified Barriers from Desktop Review and In-person project activities.

Source/Event	Identified Barrier	Barrier Category
POLICY BRIEF- Barriers for Implementation of the Philippine National Solid Waste Management Framework in Cities	"However, one to two thirds of MSW generated in the cities is not adequately collected and is **often dumped indiscriminately on the streets and into the drains** contributing to flooding as well as an increase in pests. The urban poor, living in slums or low-income settlements, suffer most from life-threatening conditions deriving from the deficient management of solid waste. Where waste is collected, the most common disposal method is open dumping in a more or less uncontrolled manner " (pg 2)	Socio-Behavioural
POLICY BRIEF- Solid Waste Management in Developing Asia: Prioritizing Waste Separation	"Households are not motivated to change their consumption habits and waste disposal practices **due to a lack of information about the negative health and environmental implications** of ever-expanding landfill sites and open dumping." (pg1)	Education and Awareness
POLICY BRIEF- Solid Waste Management in Developing Asia: Prioritizing Waste Separation	"The exponential rate of urbanization has been a key driver in the region, the associated **exponential growth in waste generation is pushing cities beyond their solid waste management (SWM) capacity.**" (pg2)	Institutional Capacity
POLICY BRIEF- Solid Waste Management in Developing Asia: Prioritizing Waste Separation	"In most developing countries, another factor limiting the transition to the 3Rs is **inadequate resources for organized and efficient waste collection services.**" (pg4)	Infrastructure and Logistics
POLICY BRIEF- Solid Waste Management in Developing Asia: Prioritizing Waste Separation	"While **governments may view expenditure on waste collection as a low priority,** without proper management, the increase of solid waste generation causes severe pollution, groundwater contamination, respiratory and airborne diseases, and excess GHG emissions, and urban flooding, all of which endanger lives and compromise livelihoods, particularly for the poor and marginalized groups" (pg4)	Business and Politics
POLICY BRIEF- Solid Waste Management in Developing Asia: Prioritizing Waste Separation	"because of the **lack of coordination between various industries and gaps in the current policies toward improving SWM**, it is challenging to convince citizens to adopt better household practices, such as sorting and recycling." (pg4)	Coordination and Collaboration
POLICY BRIEF- Solid Waste Management in Developing Asia: Prioritizing Waste Separation	"**None of the participating municipality officials indicated fully functioning solid waste collection services** in their respective cities. In three of the four municipalities, waste is dumped at open landfill sites without any controls or environmental regulations." (pg7)	Infrastructure and Logistics
POLICY BRIEF- Solid Waste Management in Developing Asia: Prioritizing Waste Separation	"To make waste separation programs a success, separated waste must be collected properly and transported to recycling businesses or treatment facilities; however, this can be a major challenge for all cities due to **limited resources, including human capital, equipment, and financing**" (pg8)	Institutional Capacity
POLICY BRIEF- Solid Waste Management in Developing Asia: Prioritizing Waste Separation	"the **lack of cooperation from citizens** (household level), and as a result, it is common for waste separation programs to be discontinued, especially in developing countries." (pg8)	Socio-Behavioural

POLICY BRIEF- Solid Waste Management in Developing Asia: Prioritizing Waste Separation	"However, while many cities already have recycling and other household solid waste separation systems in place, there is a lack of support and understanding of their importance among citizens. Moreover, the **gaps in the current policy frameworks do not promote public–private partnerships** to offset the high costs for operating such systems but instead rely solely on public funding, which is often inadequate and unsustainable." (pg9)	Socio-Behavioural
POLICY BRIEF- Solid Waste Management in Developing Asia: Prioritizing Waste Separation	"However, while many cities already have recycling and other household solid waste separation systems in place, there is a **lack of support and understanding of their importance among citizens**. Moreover, the gaps in the current policy frameworks do not promote public–private partnerships to offset the high costs for operating such systems but instead rely solely on public funding, which is often inadequate and unsustainable." (pg9)	Coordination and Collaboration
Applying the extended producer responsibility towards plastic waste in Asian developing countries for reducing marine plastic debris	"Results show that applying EPR system for plastic waste in developing countries faces many challenges, such as the existence of a market-based collection system of recyclables, **high transportation cost, lack of waste collection services in rural areas, a limited number of facilities to manage certain types of plastic waste, insufficient pollution control** and free riding and orphan products." (pg690)	Business and Politics
Applying the extended producer responsibility towards plastic waste in Asian developing countries for reducing marine plastic debris	"Results show that applying EPR system for plastic waste in developing countries faces many challenges, such as the **existence of a market-based collection system of recyclables,** high transportation cost, lack of waste collection services in rural areas, a limited number of facilities to manage certain types of plastic waste, insufficient pollution control and free riding and orphan products." (pg690)	Economical
Applying the extended producer responsibility towards plastic waste in Asian developing countries for reducing marine plastic debris	**"developing countries do not have well-established waste management as well as good engagement among key stakeholders,** therefore, leads to some difficulties in EPR application." (pg691)	Coordination and Collaboration
Applying the extended producer responsibility towards plastic waste in Asian developing countries for reducing marine plastic debris	"The **developed countries have experienced an increased cost of waste treatment due to increasing waste volumes,** including plastic waste." (pg692)	Economical
Applying the extended producer responsibility towards plastic waste in Asian developing countries for reducing marine plastic debris	"Jambeck et al. (2015) estimated that significant sources of marine plastic debris were rapidly growing in countries such as China, Indonesia, the Philippines and Viet Nam, where **plastic is increasing whilst waste collection and proper disposal were limited.** As a response, some Asian developing countries have applied or are planning to apply EPR to plastic waste, especially packaging and containers.	Infrastructure and Logistics
Production, use, and fate of all plastics ever made	"Furthermore, **contamination and the mixing of polymer types generate secondary plastics of limited or low technical and economic value.** Second, plastics can be destroyed thermally. Although there are emerging technologies, such as pyrolysis, which extracts fuel from plastic waste, to date, virtually all thermal destruction has been by incineration, with or without energy recovery. The environmental and health impacts of waste incinerators strongly depend on emission control technology, as well as incinerator design and operation." (pg2)	Economical
Production, use, and fate of all plastics ever made	The same **properties that make plastics so versatile** in innumerable applications—durability and resistance to degradation—**make these materials difficult or impossible for nature to assimilate.**	Technology

Reduce, Reuse, Recycle to Protect the Marine Environment and Coral Reefs Implementation of Pilot Project on 3R (Reduce, Reuse, Recycle) in the Philippines	"As expected, the **budget allocation of the five municipalities in Guimaras Province is insufficient** to properly run the local SWM operations." (pg1)	Institutional Capacity
Reduce, Reuse, Recycle to Protect the Marine Environment and Coral Reefs Implementation of Pilot Project on 3R (Reduce, Reuse, Recycle) in the Philippines	"A "No Segregation, No Collection" policy is followed in Guimaras, but the **level of adherence varies across municipalities.**" (pg3)	Socio-Behavioural
Reduce, Reuse, Recycle to Protect the Marine Environment and Coral Reefs Implementation of Pilot Project on 3R (Reduce, Reuse, Recycle) in the Philippines	"Because **other waste fractions are not accepted at the Barangay MRFs,** households need to manage their organic waste and wet residuals, usually burying them underground, in holes, in their own yards. Site visits have also identified that some households openly burn their waste, especially green waste resulting from agriculture or from cleaning of gardens and yards" (pg3)	Business and Politics
Reduce, Reuse, Recycle to Protect the Marine Environment and Coral Reefs Implementation of Pilot Project on 3R (Reduce, Reuse, Recycle) in the Philippines	**"84% of the MSW generated in Guimaras is uncollected,** resulting in large amounts of waste leaking into the environment." (pg6)	Infrastructure and Logistics
Reduce, Reuse, Recycle to Protect the Marine Environment and Coral Reefs Implementation of Pilot Project on 3R (Reduce, Reuse, Recycle) in the Philippines	"Poor management of the disposal sites, including no coverage of the waste disposed, insufficient fencing, and security contribute to leakage." (pg6)	Infrastructure and Logistics
Bacolod City 10-Year Solid Waste Management Plan	"while the city is pushing for segregation at source, the fact remains that **garbage being collected are mixed wastes**. No direct user fee is currently charged to residential generators for any of the collection services except for commercial establishments who pays for garbage fee." (pg40)	Socio-Behavioural
Bacolod City 10-Year Solid Waste Management Plan	**Landfill Operation entails huge cost** particularly in the maintenance of heavy equipment, manpower and land filling materials. (pg48)	Economical
Bacolod City 10-Year Solid Waste Management Plan	"The **collection of garbage within the City by the DPS is an expensive activity**. Based on figures supplied to CPDO by the DPS, the annual cost of the non-salary component of the SWM program in 2012 was ~PhP 51.5 million. The figure does not include capital outlays and procurement of garbage collection equipment and other operational maintenance costs plus depreciation costs." (pg55)	Economical

CHAPTER 2: CIRCULAR ECONOMY AND PLASTIC: A Gap Analysis on ASEAN Member States	"Because plastic materials extended the shelf life of many food products and made it easier to store and transport food over long distances, **they also shaped consumer preferences regarding hygiene, aesthetics, and convenience."** (pg 16)	Socio-Behavioural
CHAPTER 3: PLASTICS AND RELATED POLICIES IN ASEAN	This inconsistency between the **rapidly growing use of plastics and the general lack of infrastructure for safe end-of-life management of plastic materials** consequently leaves governments struggling. (pg21)	Infrastructure and Logistics
CHAPTER 3: PLASTICS AND RELATED POLICIES IN ASEAN	Basically **no attempts to discourage problematic kinds of plastics, combinations of materials, or designs.** (pg22)	Technology
CHAPTER 3: PLASTICS AND RELATED POLICIES IN ASEAN	**Weak or non-existent regulations of plastic additives, including hazardous substances. (pg22)**	Business and Politics
CHAPTER 3: PLASTICS AND RELATED POLICIES IN ASEAN	**Very limited attempts to encourage alternative materials,** including bio-based plastics and bio-degradable/compostable plastics. (pg22)	Technology
CHAPTER 3: PLASTICS AND RELATED POLICIES IN ASEAN	**Few efforts to influence packaging design or amount, or to stimulate business models based on reusable packaging,** or business models that reduce packaging need in the first place. (pg22)	Business and Politics
CHAPTER 3: PLASTICS AND RELATED POLICIES IN ASEAN	Often the **responsibility of local governments, insufficient coverage of collection services,** large leakage to the environment due to inappropriate disposal (both of uncollected waste and of collected waste that has been disposed of in dump sites), fairly widespread open burning. (pg22)	Institutional Capacity
CHAPTER 3: PLASTICS AND RELATED POLICIES IN ASEAN	**Few efforts to stimulate the demand for recycled plastics.** (pg22)	Business and Politics
CHAPTER 3: PLASTICS AND RELATED POLICIES IN ASEAN	**Environmental ministries have limited ability to engage constructively with the business community and to coordinate the work across government** on matters related to industrial development, commerce, trade, and science and technology – in other words, policy areas that are all pivotal to a transition to a circular economy. (pg22)	Coordination and Collaboration
CHAPTER 3: PLASTICS AND RELATED POLICIES IN ASEAN	Source segregation and separated collection of solid waste is generally encouraged, and in a few countries even mandated by law, but the **actual share that is collected in this way tends to be relatively low.** (pg22)	Socio-Behavioural
CHAPTER 3: PLASTICS AND RELATED POLICIES IN ASEAN	Environmentally safe waste treatment and high-quality, closed-loop recycling is much easier to attain if upstream businesses avoid plastic materials and designs that are problematic to deal with at the downstream stages, adopt reuse systems for packaging, limit the use of materials in general, and take other eco-design measures. But in the current situation, there are **few efforts to engage the upstream businesses that make many of these key decisions and to hold them accountable for innovating and implementing improved solutions.** (pg25)	Coordination and Collaboration
From laissez-faire to action? Exploring perceptions of plastic pollution and impetus for action. Insights from Phu Quoc Island	For a long time, provincial and local authorities considered plastic pollution secondary to prioritizing fast mass tourism. (pg1)	Business and Politics

From laissez-faire to action? Exploring perceptions of plastic pollution and impetus for action. Insights from Phu Quoc Island	Many **municipal governments in the Global South fall short of developing comprehensive and effective systems**... Along these lines, plastic pollution reflects decisions and actions taken at the individual and aggregated levels that are embedded in this wider, often weak, municipal infrastructural architecture. (pg2)	Institutional Capacity
Plastic Waste and Microplastic issues in South East Asia	The issue is exacerbated as these **plastic materials are highly durable** due to their unique molecular structures composed of hydrogen, carbon, and other elements that **take years to decompose fully**. (pg1)	Technology
Plastic Waste and Microplastic issues in South East Asia	Mismanaged contaminated and unprocessable waste, **poor domestic waste disposal management and facilities** and the lack thereof, and **insufficient land for proper waste disposal** are the main causes of the threat to Southeast Asia's environment. (pg3)	Infrastructure and Logistics
Plastic Waste and Microplastic issues in South East Asia	**current recycling rate for most Southeast Asian countries is below 50% due to the limitations of infrastructure and logistics** to provide the necessary operations for it to be profitable (UN environment, 2017). Private companies run most recycling facilities in Southeast Asian countries, and profitability is the main driving factor. In most cases, the waste produced is too dirty to qualify for mechanical recycling. (pg5)	Infrastructure and Logistics
Plastic Waste and Microplastic issues in South East Asia	current recycling rate for most Southeast Asian countries is below 50% due to the limitations of infrastructure and logistics to provide the necessary operations for it to be profitable (UN environment, 2017). Private companies run most recycling facilities in Southeast Asian countries, and profitability is the main driving factor. **In most cases, the waste produced is too dirty to qualify for mechanical recycling. (pg5)**	Socio-Behavioural
Plastic Waste and Microplastic issues in South East Asia	It would be difficult to develop the necessary infrastructure to keep up with the increase in plastic usage, making it a race against time. **Most of the recycling infrastructure is located in urban areas; hence, people from outside cities do not have alternatives for recycling their plastics.** (pg5)	Infrastructure and Logistics
Plastic Waste and Microplastic issues in South East Asia	There is **no specific unified system to homogenize the retrieval process,** which subsequently affects the entire supply chain process of the recycling route. This unreliable route further reduces the profitability of the recycling process, which further decreases the chances of plastics being recycled. In some instances, companies would instead import plastic waste from overseas for recycling purposes. (pg5)	Institutional Capacity
Plastic Waste and Microplastic issues in South East Asia	Another waste management process in Southeast Asian countries is the **waste-to-energy process, or incineration, which focuses on burning waste to create energy. (pg5)**	Business and Politics
Plastic Waste and Microplastic issues in South East Asia	Plastic waste is considered a good source of fuel. A similar problem can be seen in the implementation of incineration plants in Southeast Asian countries, which is due to **the lack of** infrastructure and **cooperation between governments, municipalities, and private companies regarding the supply of waste. (pg5)**	Coordination and Collaboration
Plastic Waste and Microplastic issues in South East Asia	The **approach used by Southeast Asian countries to tackle waste is regionally blocked and only focuses on specific areas,** resulting in significant oversights of an issue affecting the region on a large scale. For example, managing waste through incineration is only available and accessible in some regions, such as Myanmar, Singapore, Thailand, and Vietnam. Collaboration between major stakeholders, including government, non-government, and international bodies, is needed in order to tackle this issue. (pg 8)	Coordination and Collaboration

Plastic Waste and Microplastic issues in South East Asia	The members recognized that there is a **lack of capacity with regard to plastic waste management both in the public and private sectors;** hence, one of the goals of this process is to help bridge that gap and help improve the overall waste management system. (pg8)	Institutional Capacity
Socio-economic development drives solid waste management performance in cities: A global analysis using machine learning	Previous global comparisons have been **limited and constrained by scarce and inconsistent data, due to a lack of standard definitions, measurements, and standard methodologies and systems for reporting.** (pg2)	Education and Awareness
Socio-economic development drives solid waste management performance in cities: A global analysis using machine learning	Common weaknesses in middle-income countries include **lack of street-cleaning outside the central business district and more prosperous areas, issues with uncollected wastes in informal settlements** and low usage of personal protective clothing and equipment by collection workers. (pg10)	Institutional Capacity
Socio-economic development drives solid waste management performance in cities: A global analysis using machine learning	The challenge is that overall improvement in solid waste management performance is correlated with socioeconomic level, and **rates of development can be slow, particularly outside of the most affluent / capital cities in each country.** (pg11)	Institutional Capacity
Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	Solid waste and its associated environmental, health and wellbeing impacts and resource and land availability are becoming increasingly challenging to manage in remote and isolated communities. This is primarily due to the **lack of infrastructure, land availability,** high collection cost, poor economies of scale and low environmental awareness. (pg1)	Infrastructure and Logistics
Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	Solid waste and its associated environmental, health and wellbeing impacts and resource and land availability are becoming increasingly challenging to manage in remote and isolated communities. This is primarily due to the lack of infrastructure, land availability, **high collection cost, poor economies of scale** and low environmental awareness. (pg1)	Economical
Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	Solid waste and its associated environmental, health and wellbeing impacts and resource and land availability are becoming increasingly challenging to manage in remote and isolated communities. This is primarily due to the lack of infrastructure, land availability, high collection cost, poor economies of scale and **low environmental awareness.** (pg1)	Education and Awareness
Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	The review identified a **lack of waste collection** and recycling infrastructure, increasing trade and local economic development, low environmental awareness with respect to impacts of consumer waste products and disposal, and limited access to funding as the major drivers for the current un-sustainable waste problem in remote communities. (pg1)	Institutional Capacity

Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	Solid waste has been an on-going problem in regional, remote and isolated communities due to their lack of local landfill and recycling infrastructure, inadequate or unavailable kerbside collection services, **limited access to market for recyclables,** and lack of local expertise. (pg1)	Business and Politics
Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	Solid waste has been an on-going problem in regional, remote and isolated communities due to their lack of local landfill and recycling infrastructure, inadequate or unavailable kerbside collection services, limited access to market for recyclables, and **lack of local expertise.** (pg1)	Institutional Capacity
Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	There are **no incentives** and inadequate capacity to properly manage waste within these communities. (pg1)	Economical
Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	There are no incentives and **inadequate capacity** to properly manage waste within these communities. (pg1)	Institutional Capacity
Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	**Limited political attention has been paid to these communities because of the feasibility challenges** in enabling effective waste management and treatment. (pg1)	Business and Politics
Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	Economy is reported as the greatest driver to the existing waste management problems in remote communities (Table 2). **Trade and economic development is the most reported driver (72 counts) to the waste problem via increased consumerism (Owens et al., 2011) and tourism within remote communities.** (pg3)	Socio-Behavioural
Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	The second major driver is the **limited access to funding** (47 counts) whichhinders the development of necessary waste infrastructure to allow easier transport and processing of waste on-site within the community (Eckelman et al., 2014). Though remote communities may have reliable road access or alternative methods to transport the waste, the cost of waste management would be expensive (40 counts) due to the distance between the community and the urban centre. (pg3-4)	Economical
Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	Several papers also mentioned the **lack of waste regulatory framework** as a major economic driver (36 counts). Waste regulations across countries favour urban settings compared to rural or remote settings. (pg4)	Business and Politics

Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	Furthermore, **market for recyclables within remote communities is also another problem** reported in the literature. Especially, the collection of plastic and glass waste generated in remote communities are not economically viable because the demand for recyclable plastics and glass can already be met through waste collected within cities. Many recycling technologies are also only profitable to run in large-scale operations which is not economically feasible in remote or rural settings (pg4)	Business and Politics
Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	A major technical driver to remote communities' waste problems reported in the literature is the **lack of waste infrastructure in place such as landfill and waste treatment and recycling facilities** for specific products. (pg4)	Infrastructure and Logistics
Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	Problem is more prevalent due to the limited land availability for waste management activities (Eckelman et al., 2014), whereas **transporting waste to the mainland also present transportation and cost challenges.** (pg4)	Infrastructure and Logistics
Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	**Low environmental awareness** is the most reported major behavioural driver (49 counts, Table 2) to waste problems in remote communities, especially in relation to illegal dumping and inactions on waste separation and management. (pg5)	Education and Awareness
Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	**Culture and lifestyle** was identified as both barrier and enabler to sustainable waste management with some communities lacking hygiene and acceptability to properly dispose of their waste as part of the embedded culture and lifestyle (Fostinone, 2016). (pg5)	Socio-Behavioural
Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	However, illegal dumping (including marine litter) is one of the most reported waste problem in remote communities' literature (86 counts) (Mihai, 2018b). Due to the **limited landfill facilities and waste management infrastructure,** illegal dumping is a convenient and affordable option for community members to dispose of their waste. (pg6)	Infrastructure and Logistics
Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	Open burning is the second most practised 'quick-fix' solution to getting rid of the household waste problem (Mohee et al., 2015). In remote areas in LMIC, this situation is much worse due to the **lack of government regulation** and environmental awareness in this space. (pg6)	Business and Politics
Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	Open burning is the second most practised 'quick-fix' solution to getting rid of the household waste problem (Mohee et al., 2015). In remote areas in LMIC, this situation is much worse due to the **lack of** government regulation and **environmental awareness** in this space. (pg6)	Education and Awareness

Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	**Separation at source is reported as a less prevalent practice in the literature.** Some countries have a waste separation regulation in place via a bin separation system. LMICs and countries with remote communities that are geographically dispersed also have low occurrences of waste separation, particularly if there are less regulations in place as can be the case of LMICs (Han et al., 2019). When waste is not separated at source, then it is impossible to promote cost-effective waste management practices such as composting, reuse, and recycling. (pg6)	Socio-Behavioural
Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	Owing to the lack of environmental awareness among remote communities, many studies reported the **need for governments, not-for- profit organisations, universities, and private industries to effectively collaborate** to promote education, awareness raising to improve community knowledge and capacity for sustainable waste management. (pg7)	Coordination and Collaboration
Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	Reuse and recycling practices as a response to sustainable solid waste management in remote communities have been identified as the most difficult strategy to implement due to the **limited waste processing infrastructure in remote areas** (Crawford et al., 2017). (pg7)	Infrastructure and Logistics
Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	SIDS, coastal and island communities will face more challenges to establish a landfill facility and kerbside collection because of **lack of economies of scale,** limited land availability, lack of transportation access amongst other challenges. (pg8)	Economical
Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review	SIDS, coastal and island communities will face more challenges to establish a landfill facility and kerbside collection because of lack of economies of scale, **limited land availability, lack of transportation access** amongst other challenges. (pg8)	Infrastructure and Logistics
UBA's key aspects to increase plastic recycling and the use of recyclates	**Inadequate waste separation** and competition for energy recovery are the two most pertinent causes behind relatively small amounts of plastic waste being recycled. The absence of plastic-specific recycling quotas for individual waste streams has an additional negative effect. (pg6)	Socio-Behavioural
UBA's key aspects to increase plastic recycling and the use of recyclates	**Problematic additives can create difficulties in sales of recyclates** since recycled materials from old plastics can still contain substances that are no longer permitted in new plastics due to their negative effects on health and the environment. (pg6)	Technology
UBA's key aspects to increase plastic recycling and the use of recyclates	Furthermore, the **image problems associated with secondary plastics can distinctly hinder recyclate use in new plastic products.** The reservations that manufacturers hold regarding quality and technical characteristics coupled with assumed acceptance problems on the part of the consumers can lead to the use of plastic recyclates being avoided or used predominantly in non-visible areas (for example wheel arch liners or floor components in cars)	Business and Politics

National Stakeholder Forum Workshop	High Cost	Economical
National Stakeholder Forum Workshop	Recycling materials too expensive	Economical
National Stakeholder Forum Workshop	Perception of Lower Quality / Poor Product Quality	Socio-Behavioural
National Stakeholder Forum Workshop	Low Acceptance of Recycling Materials	Business and Politics
National Stakeholder Forum Workshop	Lack of legal guidance	Business and Politics
National Stakeholder Forum Workshop	Existing business models	Business and Politics
National Stakeholder Forum Workshop	Lack of Access to Alternatives	Technology
National Stakeholder Forum Workshop	Less reliable material	Technology
National Stakeholder Forum Workshop	Low Development of Recycling Technology	Technology
National Stakeholder Forum Workshop	Less reliable material supply	Business and Politics
National Stakeholder Forum Workshop	Lack of cost- effective/financially sustainable technology for design/production	Economical
National Stakeholder Forum Workshop	Recovery of plastic nets have no value	Economical
National Stakeholder Forum Workshop	Applicability of their technology/system using plastics is costly	Business and Politics
National Stakeholder Forum Workshop	Industry jobs will be affected	Economical
National Stakeholder Forum Workshop	Weak DTI-DOST link	Coordination and Collaboration
National Stakeholder Forum Workshop	Low level of awareness on relevant laws/programs	Education and Awareness
National Stakeholder Forum Workshop	Segregation not in practice	Socio-Behavioural
National Stakeholder Forum Workshop	How to provide value to RC in the provinces	Economical
National Stakeholder Forum Workshop	Lack of motivation	Socio-Behavioural
National Stakeholder Forum Workshop	Sachet/tingi culture (producers sell to cater to this market)	Business and Politics
National Stakeholder Forum Workshop	Low adoption of ecolabelling	Business and Politics
National Stakeholder Forum Workshop	Are these methods for recycling environmentally sound and safe to the workers?	Technology
National Stakeholder Forum Workshop	No available alternatives for the SUP subject by EPR law	Technology
National Stakeholder Forum Workshop	Enforceability of laws	Institutional Capacity
National Stakeholder Forum Workshop	Not feasible to explore alternative packaging, compromising quality and safety	Economical
National Stakeholder Forum Workshop	No standards authority that the public trusts (certification)	Business and Politics
National Stakeholder Forum Workshop	No testing facility to verify biodegradability	Technology
National Stakeholder Forum Workshop	No labels on the packaging	Business and Politics
National Stakeholder Forum Workshop	Traceability of products/packaging is lacking	Business and Politics
National Stakeholder Forum Workshop	Not all plastic packaging are recyclable	Technology
National Stakeholder Forum Workshop	Weak link to other segments of the value chain	Coordination and Collaboration

National Stakeholder Forum Workshop	Cost of using reusable packaging	Economical
National Stakeholder Forum Workshop	Added cost for shifting to non-plastic bags/containers	Economical
National Stakeholder Forum Workshop	Cost for transport/storage of buy back packages and bottles	Infrastructure and Logistics
National Stakeholder Forum Workshop	Value defines recyclability (e.g. nobody is buying fish nets)	Economical
National Stakeholder Forum Workshop	Value of PET too low for the junk shops (storage also a problem)	Economical
National Stakeholder Forum Workshop	Consumer behavior/habits	Socio-Behavioural
National Stakeholder Forum Workshop	Buy back centers/programs not attractive to the consumers and retailers	Infrastructure and Logistics
National Stakeholder Forum Workshop	Identification of plastics for proper segregation	Education and Awareness
National Stakeholder Forum Workshop	Different regulations per municipalities	Business and Politics
National Stakeholder Forum Workshop	Policy implementation	Business and Politics
National Stakeholder Forum Workshop	False advertising, "green washing"	Business and Politics
National Stakeholder Forum Workshop	Limited technical capacity of LGUs to implement EPR	Institutional Capacity
National Stakeholder Forum Workshop	Reusability of reusable bags	Technology
National Stakeholder Forum Workshop	Products are not designed to be easily segregated/disposed by average consumer	Business and Politics
National Stakeholder Forum Workshop	How to collect used plastic bags given by retailers and avoid these being reused as trash bags	Infrastructure and Logistics
National Stakeholder Forum Workshop	How to collect smaller plastic sachets etc.	Infrastructure and Logistics
National Stakeholder Forum Workshop	Limited dissemination of information as to types of packaging	Education and Awareness
National Stakeholder Forum Workshop	Cost is high for recycled products	Economical
National Stakeholder Forum Workshop	Lack of cheaper alternatives	Economical
National Stakeholder Forum Workshop	Households need to pay for waste collection	Economical
National Stakeholder Forum Workshop	No buyers for certain materials (bubble wraps, fish nets)	Economical
National Stakeholder Forum Workshop	Cost of transport for recyclables	Infrastructure and Logistics
National Stakeholder Forum Workshop	Lack of funds for program implementation	Economical
National Stakeholder Forum Workshop	No incentives for proper segregation	Economical
National Stakeholder Forum Workshop	Distributors prefer PET rather than bottles	Economical
National Stakeholder Forum Workshop	Trash Bins stolen	Socio-Behavioural
National Stakeholder Forum Workshop	Difficult to report open burning practices	Coordination and Collaboration
National Stakeholder Forum Workshop	Junkshops not registered	Business and Politics
National Stakeholder Forum Workshop	For maritime sector: pending bills on marine pollution (MARPOL)	Business and Politics

National Stakeholder Forum Workshop	Change of term/problem with sustainability	Business and Politics
National Stakeholder Forum Workshop	Lack of cooperation/consistency between LGUs	Coordination and Collaboration
National Stakeholder Forum Workshop	Monitoring capacity of LGUs	Institutional Capacity
National Stakeholder Forum Workshop	LGUs lack of regulation of junk shops	Business and Politics
National Stakeholder Forum Workshop	Island communities-areas outside service area of waste collectors.	Institutional Capacity
National Stakeholder Forum Workshop	Lack of reception facilities (3rd party), (for ports) accredited waste management service providers	Infrastructure and Logistics
National Stakeholder Forum Workshop	Many don't know where to send used Packaging	Education and Awareness
National Stakeholder Forum Workshop	No collection center for Sachets	Infrastructure and Logistics
National Stakeholder Forum Workshop	Lack of accessibility of collection drives illegal dumping	Infrastructure and Logistics
National Stakeholder Forum Workshop	System of monitoring waste (buoyage)	Institutional Capacity
National Stakeholder Forum Workshop	Not all of plastic waste are recyclable	Technology
National Stakeholder Forum Workshop	(For end-of-life of vehicles) need for expertise of systems to deal with dangerous goods (e.g. engine parts might be toxic)	Institutional Capacity
National Stakeholder Forum Workshop	Lack of data on informal waste sector	Institutional Capacity
National Stakeholder Forum Workshop	Recyclables mixed with other waste.	Socio-Behavioural
National Stakeholder Forum Workshop	Segregated waste but during collection of trucks, it will be mixed up upon collection.	Business and Politics
National Stakeholder Forum Workshop	Dirty recyclables cannot be processed	Technology
July 25 Bacolod Workshop	Unsegregated garbage (household, stores / commercial): as a result of problems with garbage collection: large volume of garbage (daily), uncollected garbage (interior area), no collection of garbage, improper waste disposal.	Socio-Behavioural
July 25 Bacolod Workshop	Lack of shoreline protection	Infrastructure and Logistics
July 25 Bacolod Workshop	Narrow Alleys / Pathways)	Infrastructure and Logistics
July 25 Bacolod Workshop	Lack of recycling facilities)	Infrastructure and Logistics
July 25 Bacolod Workshop	Lack of Signage awareness	Education and Awareness
July 25 Bacolod Workshop	Difficult to access / no access to locations or communities.	Infrastructure and Logistics
July 25 Bacolod Workshop	Breakdown of equipment units	Infrastructure and Logistics
July 25 Bacolod Workshop	SWM is NOT a priority	Business and Politics
July 25 Bacolod Workshop	No cooperation / discipling on community side	Socio-Behavioural

July 25 Bacolod Workshop	No orientation on SWM (Barangay)	Institutional Capacity
July 25 Bacolod Workshop	Low collaboration with LGUs	Coordination and Collaboration
July 25 Bacolod Workshop	Barangay linkages with collection and MRF management is NON-existent.	Coordination and Collaboration
July 25 Bacolod Workshop	No MENRO / CENRO office (An environment office must be established).	Institutional Capacity
July 25 Bacolod Workshop	Lack of Manpower	Institutional Capacity
July 25 Bacolod Workshop	Lack of budget	Institutional Capacity
July 25 Bacolod Workshop	High cost of quality drainage system	Economical
July 25 Bacolod Workshop	Late throwers" non-compliance of schedules. Informal waste workers / pickers (scattering of trash)	Socio-Behavioural
July 25 Bacolod Workshop	Lack of education and campaigns	Education and Awareness
July 25 Bacolod Workshop	Low environment IEC	Education and Awareness
July 25 Bacolod Workshop	No school official policies on students and faculty on solid waste management	Business and Politics
July 25 Bacolod Workshop	NIMBY Attitude: Lack of Trash Bins	Infrastructure and Logistics
July 25 Bacolod Workshop	Business reasons, personal reasons, political reasons	Business and Politics
July 27 Circular Connect Workshop	There are no programs to implement SWM	Business and Politics
July 27 Circular Connect Workshop	There is no proper orientation to both teachers and students	Education and Awareness
July 27 Circular Connect Workshop	There exists a lack of understanding on segregation	Education and Awareness
July 27 Circular Connect Workshop	Low commitment of the persons involved.	Socio-Behavioural
July 27 Circular Connect Workshop	Lack of active participation from all stakeholders.	Socio-Behavioural
July 27 Circular Connect Workshop	Focused on "band-aid solutions as compared to long-term solutions"	Business and Politics
July 27 Circular Connect Workshop	Lack of Funding (Off Campus Barrier As well)	Economical
July 27 Circular Connect Workshop	Lack of Research	Education and Awareness
July 27 Circular Connect Workshop	SWM programs are the LEAST prioritized programs in the Barangay.	Business and Politics
July 27 Circular Connect Workshop	Very few processing facilities for plastics	Infrastructure and Logistics
July 27 Circular Connect Workshop	No venue for waste reducing lifestyle: ex. "lack of cafeteria leads to excessive use of SUPs" (Barrier for Students)	Infrastructure and Logistics
July 27 Circular Connect Workshop	Lack of manpower to implement SWM / CE programs (LGU / Academe)	Institutional Capacity
July 27 Circular Connect Workshop	Teaching overload	Institutional Capacity

July 27 Circular Connect Workshop	Limited involvement of students in community engagement programs.	Socio-Behavioural
July 27 Circular Connect Workshop	Overtly strict policy of CHED for off-campus activities.	Business and Politics
July 27 Circular Connect Workshop	No regular conversation and fora on environmental problem	Socio-Behavioural
July 27 Circular Connect Workshop	Disconnect between academe and community	Coordination and Collaboration