

DEVELOPING EPR-READINESS OF THE WASTE DIVERSION SYSTEM OF CALAPAN CITY, ORIENTAL MINDORO, PHILIPPINES

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the People of Japan

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Introduction

The Philippines has been grappling with a significant plastic waste problem, with a considerable amount ending up in marine environments due to inadequate waste management infrastructure and practices. It is reported that of the estimated 2.7 million metric tons of plastic waste generated annually, a substantial portion of 20% leaks into ocean environments (Schachter & Karasik. 2022). To tackle plastic waste entering marine environments, implementing a circular economy offers a strategic approach by emphasizing reuse, recycling, and responsible consumption.

A circular economy is an economic model that promotes the continuous circulation of products, materials, and resources through various stages of their lifecycle. This involves ways that will minimize waste and maximize the utilization of materials (EPA, 2023). A popular approach is promoting practices such as recycling, refurbishment, and reusing products to extend their lifespan, thereby reducing the pressure on resources and minimizing environmental impact. The circular economy emphasizes the importance of designing products with the intention of easy disassembly, repair, and recovery of valuable components. The circular economy concept holds significant applicability in addressing the challenges posed by plastic materials. Plastic circularity aims to transform the traditional linear model of (plastic production, consumption, and disposal) into a sustainable cycle that prioritizes reuse, recycling, and responsible management (Lisiecki et al., 2023). In a circular plastic economy, the emphasis is on designing plastic products for

durability, easy repair, and eventual recycling. This involves adopting techniques such as extended producer responsibility, where manufacturers take responsibility for the entire lifecycle of their products, including proper disposal. Additionally, initiatives like plastic waste collection and recycling infrastructure development play a crucial role in closing the loop by diverting plastic waste away from landfills and oceans.

Applying the circular economy approach aims to eliminate plastic leakage into the environment, curb resource depletion, and mitigate the harmful impacts of plastic pollution. By adopting strategies such as extended producer responsibility and waste collection systems, a circular plastic economy fosters a sustainable balance between plastic usage, resource conservation, and environmental well-being. Plastic circularity in the Philippines is a challenge that necessitates urgent attention and comprehensive strategies. The country faces significant issues related to plastic waste generation, improper disposal, and limited recycling infrastructure. Single-use plastics, in particular, contribute substantially to the degradation of ecosystems.

The waste diversion chain provides the practical framework to implement the principles of plastic circularity. It reflects the objective of a circular economy which is to maximize resource recovery and minimize the environmental impact of waste. A waste diversion chain involves a series of interconnected steps that start at the source or the waste at its origin. The waste is then ideally directed towards recycling and composting facilities (Clean Robotics, 2022). Recycling involves collecting and processing materials like paper, plastics, glass, and metals to create new products.

Extended Producer Responsibility (EPR) is a crucial component of plastic circularity, aiming to shift the responsibility of managing post-consumer plastic waste back to the producers (Iqbal et al., 2015). In the context of plastic circularity, EPR ensures that producers take full accountability for the entire lifecycle of their products, from production to disposal. EPR encourages producers to design products with circularity in mind, considering factors like material composition, recyclability, and ease of disassembly. It promotes the use of recycled materials and encourages producers to create products that can be easily recycled or repurposed, thus reducing the demand for virgin plastic. Producers are incentivized under EPR to establish take-back systems for their products at the end of their useful life. This involves collecting, recycling, or properly disposing of the products to prevent them from becoming waste and polluting the environment, particularly the marine ecosystem. By linking EPR to plastic circularity, producers are not only financially responsible for waste management but also motivated to innovate sustainable packaging and product design, resulting in fewer single-use plastics and a more robust system for recycling and reusing materials. This holistic approach aligns with circular economy principles by closing the loop on plastic production and consumption, contributing to reduced plastic pollution and a more sustainable future.

In the Philippines, the principles of plastic circularity and extended producer responsibility (EPR) have gained significant traction as important strategies in combating the issue of plastic pollution and fostering sustainable waste management practices. Various policies and programs have been introduced to integrate these concepts into the country's environmental framework. The Plastic Bag Regulation Act (Republic Act 9003) exemplifies this integration by regulating the production, sale, and use of plastic bags, thereby encouraging the adoption of reusable and environmentally friendly alternatives. Additionally, the Eco-Friendly Packaging Act (Republic Act 10771) advances the cause of plastic circularity by incentivizing producers to adopt packaging materials that are recyclable or biodegradable, aligning well with the principles of EPR. Moreover, the implementation of bans on single-use plastics in select local government units underscores the commitment to both plastic circularity and EPR by pressuring producers to explore more sustainable alternatives. To reinforce these efforts, the country has also introduced the concept of Extended Producer Responsibility (EPR) in its environmental policy strategy which aimed at diminishing plastic waste through several key mechanisms. These include the elimination of unnecessary plastic packaging, the promotion of eco-friendly and recyclable packaging designs, and the retrieval of plastic packaging from waste streams for potential reuse or recycling within the production cycle.

Implementing an EPR framework that encompasses inclusivity and integration is essential to achieve a substantial impact in the fight against plastic pollution. In the Philippines, the EPR legislation emerged as a supplementary and amending measure to the preexisting Republic Act (RA) 9003, also recognized as the Ecological Solid Waste Management Act of 2000. As part of an overarching strategy, the Department of Environment and Natural Resources (DENR) is actively working towards developing a comprehensive EPR framework that holds producers accountable for the full lifecycle of their products. Through these policies, coupled with waste management initiatives, plastic-free campaigns, and educational programs, the Philippines endeavors to mitigate plastic pollution, encourage responsible plastic use and transition towards a circular economy model that benefits both the environment and society.

The Extended Producers Responsibility bill was passed into a law on 23 July, 2022, also known as RA11898 (Extended producer Responsibility Law) after a series of nationwide public consultations. It was formulated in accordance with “Polluter Pays Principle” wherein those who produce pollution should bear the costs of managing it. The law aims to provide a more effective policy instrument by amending the provisions of R.A. 9003 (Solid Waste Management Act) and introduce measures that extend the obligation of the plastic packaging producer to more plastic collaboration with various stakeholders to form a holistic circular economy that will minimize pollution while maximizing the use of plastic materials.

The policy set six (6) programs that target the recovery of plastic product footprint by up to 80% in the next 5 years (Art.I sec. 44-A-B).

- I. Waste recovery schemes through redemption, buy-back and offsetting with the goal of achieving high retrievability, high recyclability and resource recovery of packaging waste;
- II. Diversion of recovered waste with the intention of diverting packaging waste into value chains or other value-adding useful products;
- III. Transportation of recovered waste to proper diversion or disposal sites, ensuring proper tracking for traceability and transparency;
- IV. Involvement in waste clean-up in coastal and public areas, with close coordination with local government and communities;
- V. Investment in establishing commercial or industrial waste diversion or disposal facilities, backed by a business case or pre-feasibility study to justify the insufficiency of existing facilities in the country; and
- VI. Partnerships with local governments, communities and informal waste sectors for waste recovery-related purposes, ensuring the adequate and proper involvement of key stakeholders in the EPR program implementation

Under these schemes, the policy is set to increase the Philippines' solid waste diversion rate by strengthening collaborative efforts and institutionalizing compliance through incentives as well as appropriate fines. The Salient provisions of EPR law are the following:

- Article II Sec. 44-E- *Registrations*, An obliged enterprise or the PRO shall register EPR programs with the NSWMC, through the Department.
- Article II Sec. 44-G-*Audits*, Obligated enterprises or their PROs shall establish and implement an auditing system to monitor and assess their compliance performance with this Act and their EPR programs.
- Article II Sec. 7-*Incentives*, Rewards and recognitions, monetary or otherwise, shall be provided to individuals, private organizations and entities, obliged enterprises, and PROs, including nongovernment organizations, that have undertaken outstanding and innovative projects, technologies, processes and techniques or activities in reuse, recycling, and reduction.
- Article II Sec. 8-*Penalties*, The penalty shall be imposed whether or not the noncompliance is the result of the failure to register under Section 44-E, falsification of documents, misdeclaration of generated or recovered footprint, employment of any scheme to maliciously evade the responsibility of an enterprise.

The Study Site

The City of Calapan is a rapidly developing coastal city with a population of 145,786 (Official Census, 2020) with an area of 250.06 square kilometers located at the southernmost part of Luzon Island, Philippines (Figure 1, Table 1). It has an area of approximately 18,654.5526

hectares including five (5) islets and administratively subdivided into 62 barangays with 28 urban and 34 rural barangays.

The overall land character is that of a wide plain having meandering rivers interspersed with wetlands at the seacoast periphery. Lowland is the most extensive landform in the city and is best described as a broad flatland. Mangrove and beach are the forest types identified in the city. Mangrove species and nipa abound the eastern coast. The city's waters are home to well-known commercial fishery and ecologically important species.

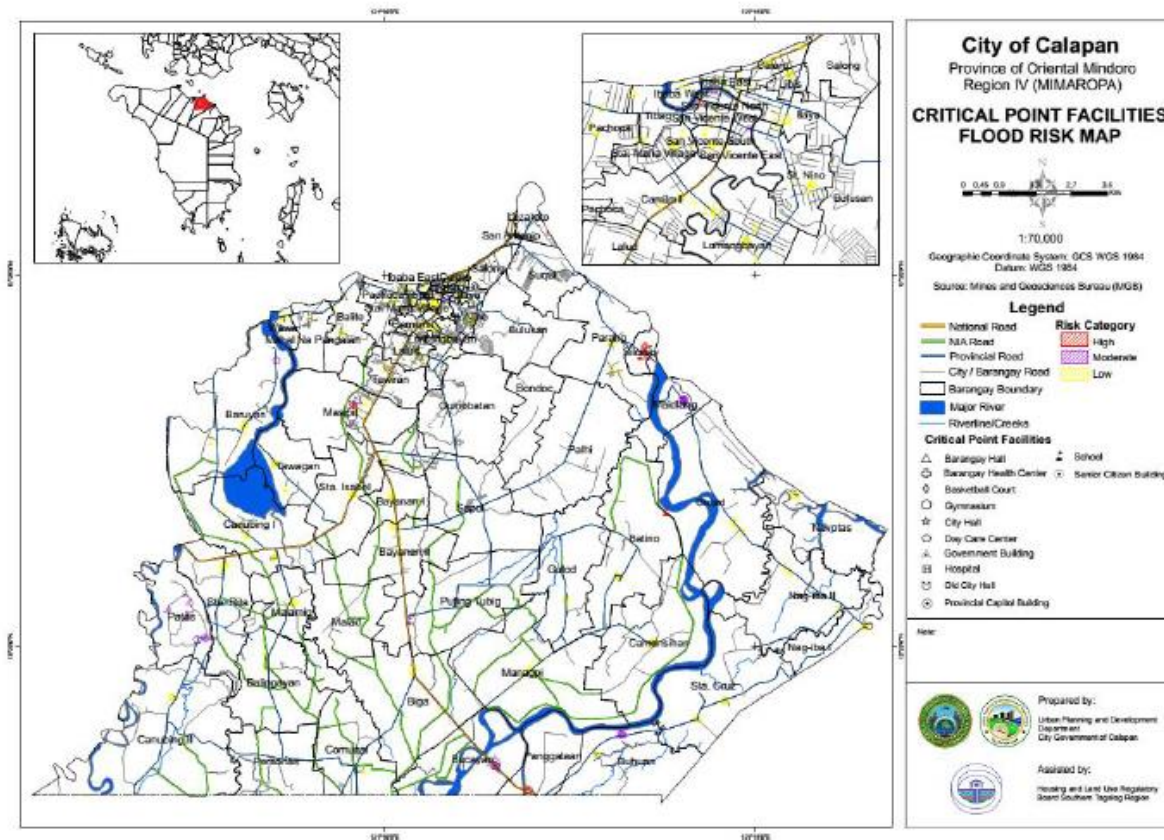


Figure 1. Map of the City of Calapan (Source: City government of Calapan)

The city falls under Type III climate according to the Modified Coronas Classification of the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAG-ASA). The seasons are not very pronounced unlike most of the northern part of the Philippines. It is relatively dry from November to April and wet for the rest of the year. Climate is favorable for vegetation throughout the year under the Type III climate type, with relative humidity at 81%. The average temperature ranges from 22.9 to 33.7 degree Celsius and the fairly humidity is 85.67%. However, based on the climate projections of PAG-ASA, the city will experience an increase in minimum temperature by 2011 to 2040 for all seasons.

Calapan City’s economy centers in agriculture, fishing, associated industrial activities including food processing, and is a major food supplier in the country though its tourism and machinery industry is expanding. Being the regional center of the MIMAROPA, Calapan City ventures into a new era of urban growth. With the city’s Vision: Metro Calapan 2026: MIMAROPA’s premier center of investment and agricultural industry, the Local Government of Calapan City is committed to promote a more inclusive growth and social equity by improving the living standards of local communities (Table 1).

Table 1. Salient information about Calapan City

| Source | Weight |
|---|--|
| Population | Official census (2020): 145, 786 Estimated daytime population (2020): Estimated (2021): 148, 424 Estimated daytime population (2021): |
| Land area, in square kilometers (sq.m.) | 250.06 |
| Number of Barangays | TOTAL: 62; Urban: 28; Rural: 34 |
| Total City SWM Budget (2021) | Philippine Pesos (PHP) 34 M |
| Total City SWM Budget (2022) | Philippine Pesos (PHP) 35M |
| Major Economic Activities | Agriculture, Fishing, Tourism and Commercial activities |
| Poverty Incidence (%) | 17.8 % - MIMAROPA Region |

Status of Plastic Waste Management in Calapan City

Like many other Philippine cities, Calapan sees ecological solid waste management as a priority, with emphasis on waste reduction. The city government implements programs and projects on solid waste management specifically segregation-at-source, planning workshops and trainings and provides technical assistance on recycling and composting.

It provides support at the local (barangay) level: strengthening Barangay Solid Waste Management Committees (BWMCs) to tackle solid waste management at the community level, organizing capacity enhancement programs, capacitating barangay eco-champions on proper waste handling and disposal, coordinates with the Association of Calapan Junkers to ensure the efficient collection of recyclables to meet the city’s waste diversion targets, conducts environmental information and education campaigns to raise public awareness and participation specifically in waste reduction and performs project partnership with local and international agencies and organizations on sustainable environment management.

Other activities includes eco-brick making with pulverize plastics utilized by the city government in its gardens and parking lots, No Plastic Day at the City market and other business establishments during Fridays and weekends, another initiative contributing to the city's plastic waste diversion strategies.

Ten-year Solid Waste Management Plan (2016-2025) of Calapan City

As of the year 2015, waste diversion of Calapan city is projected at about 54.94 TPD (tonnes per day) or 62.40% while waste to be disposed is 33.10 TPD. For the year 2016, only the recyclables (20%) and bio-waste (35%) are targeted for diversion. In the first 2 years of the ten-year plan, Calapan city had a target of 65% in 2016 and 75% in 2017 diversion rate from recyclables, bio-waste and residual with potential for diversion. In 2018, 2019, and 2020, the LGU anticipates that all of the 62 BWMCs are all organized, oriented in their functions and responsibilities, therefore a conservative but realistic 5% annual increase from the previous years' diversion target is projected. By 2021, Calapan city expects that all of the BWMCs are functioning according to what is required of them by RA 9003 in diverting bio-waste, recyclables and residuals with potential for diversion and the alternative technologies are in place, therefore a 95.54% diversion rate has been targeted and will be maintained within the duration of the plan.

In 2015, the baseline for source segregation is continuous IECs and City Ordinance No. 08-2004 – An Ordinance Promulgating Rules on Segregation and Proper Disposal of Solid Wastes by Commercial, Market, School, Business Establishments, Other Public and Private Institutions, Public Conveyances and All Households in the City of Calapan. The ten-year plan includes the following activities: strengthen IEC and incentive programs; ordinance on NO Segregation, No Collection; continuous law enforcement; continuous implementation of the Search for Most EcoFriendly and PRO Environment Schools; continuous organizing and strengthening of BWMCs; and organizing of Ecosavers Club in all elementary and secondary schools.

The 2015 baseline for residual waste is that Calapan city's final waste disposal site is the Sanitary Landfill (Category 2) located at Sitio Dalig, Barangay Batino. The 15 hectare SLF is administered and operated by the City Government of Calapan through its City Environment and Natural Resources Department. Residual and special waste ware being accepted by the SLF. The special waste is deposited in a separate cell specifically designed to accept such waste. Health care and its related waste are not accepted in the SLF. Regulated waste pickers are allowed to extract and retrieve recyclables from the area. In its ten-year plan, Calapan intends to strengthen its waste diversion strategy to lessen the wastes being disposed to the SLF through the use of alternative technologies.

The 2015 baseline for biodegradable wastes include campaign in organic farming that promotes the use of bio-wastes and IEC on bio-waste management. The ten-year plan includes continuous campaign, continuous IEC educating the community on how to properly manage their biodegradable wastes; No segregation No collection; implement new programs that can promote diversion of bio-wastes to usable products; and construction of MRF complete with composting facility.

The 2015 baseline for recyclable wastes include organized junkshop operators into an organization, then requested them to report to the Police the person suspectedly selling theft recycle products and linked them to the operators of MRF and Schools Savers Club, and continuous IEC activities. The ten-year plan includes continuous accreditation of junkshops; Ordinance on No Segregation, No Collection; Ecosavers Club in School; livelihood program that uses recyclables as the main raw materials; regulate buying prices of junkshops; and search for Eco-friendly and PRO Environment schools.

In 2015, Calapan city produced minimal special wastes (3.87% or 1,855 kg per day), and these wastes are placed in separate containers and are being hauled together with the residual wastes by CENRD to the SLF. In the ten-year plan, Calapan city has constructed a Special Waste Holding Area (septic vault) in the City SLF. This is designed to accommodate special wastes from residential sources and small clinics that cannot afford the services of a private collector and hazardous waste treater. Another plan is to enter into a joint venture undertaking with a private hazardous waste treater in putting up of a treatment facility in the city. Stored waste in the septic vault will be collected and treated by a private special waste collector and treater at least once every 6 months. The cost will be shouldered by the waste generators. This is relevant to the provision of RA 6969 in storage, treatment and disposal of special wastes. The septic was constructed in close coordination with the following national agencies; DENR for technical and other concerns, DOST to ensure it has the appropriate technology, DPWH to ensure it conforms to agency standards, and DOH for matters concerning health and other issues that need to be clarified.

In Calapan city, health care wastes are treated as special wastes because it can cause harm to people and it can pollute the environment. In 2015, health care wastes are transported by Batangas-based treaters, namely Pyrotech Incorporated and Eco-Safe Hazmat Treater Incorporated. They collect health care wastes once every quarter. Other diagnostic, lying-in and small clinics have current arrangement with other hospitals for proper disposal of their wastes. In the ten-year plan, big hospitals have contracted their own private haulers, while small clinics have arrangements with other big hospitals for the disposal of their healthcare wastes. Other clinics with no arrangements for disposal is mandated to safekeep their special wastes in a septic tank.

On institutional arrangements and partnerships, the LGU through the City Solid Waste Management Board, its Technical Working Group will be the main implementers of the plan. The City Environment and Natural Resources Department through the Solid Waste Management Unit shall assist the Board in the truthful and efficient implementation of the 10-year Solid Waste Management Plan. In the ten-year plan, the members of the CSWMB and the BSWMCs shall develop a wide network of SWM stakeholders and involve as many partners as possible in the implementation of the plan. Continuous IEC is one of the integral components for the successful implementation of the plan. The Board shall enjoin Barangay SWM Committees, the academe, environmental groups, institutional partners, and the private sector in coming up with a realistic and relevant plan for its IEC strategy. Waste generators (private entities and institutions) will now play a vital role in the success of this plan. Regular practice of waste prevention strategies (waste diversion and 4Rs) will decrease/lessen the amount of wastes that will reach the waste stream. Citizens and NGOS are encouraged to become environmental advocacy partners of the LGU. As advocates, they will assist the LGU in various IEC programs relevant to SWM.

In 2015 CSWM Board through the CENRD is responsible in the enforcement of environmental policies. The ten-year plan includes strengthen enforcement, encourage and recruit more eco-warriors and volunteers to impose laws related to proper SWM, and creation of different units under CENRD that can assist in enforcing present and future policies.

Land-based Waste Segregation and Composition

The Waste Analysis and Characterization Study (WACS) in Calapan city was conducted in March 2015. The City of Calapan has a calculated waste generation of 48,000 kilograms per day. The per capita per day solid waste generation for Calapan City is 0.3563kg/day. It is estimated that 30% recyclables, 60% biodegradables and 10% residuals will be diverted by Year 2025.

It is important to assess waste types generated from various sources: residential, commercial, institutional, industrial and agricultural in order to achieve a sound and sustained solid waste management system. In 2015, the major source of waste generation in Calapan city is the households, generating about 37,134 kg/day which is about 77.5% of the daily Municipal solid waste (MSW). Commercial buildings including malls generate 6,259 kg/day amounting to 13% followed by institutional sources with a daily waste generation of 4,488 kg/day amounting to 9.4% of daily MSW (Table 2). Agricultural waste is left in the field to decompose and serve as source of organic matter in the soil.

Of the total MSW generated in 2015 in Calapan city, 42% are biodegradable (Fig. 1). The city has implemented composting projects in the barangay MRF facilities to convert these biodegradable wastes into organic fertilizer that can be used in the barangay vegetable gardens and agricultural plots. Recyclables make up 40% of the daily MSW generation while another 10% has

the potential for diversion. The remaining 4% is disposed in the Sanitary Landfill while the Special waste (4%) is being stored in a designated cell in the SLF site.

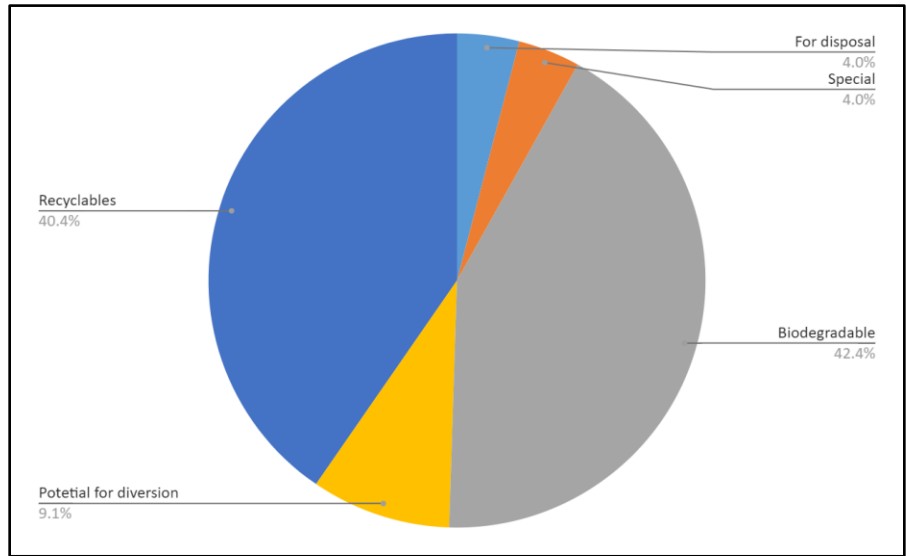


Figure 2. Waste Composition by all Sources (kg/day), Calapan City, CY 2015

Table 2. Sources of MSW in Calapan City, WACS 2015

| Source | Weight | | Percentage | |
|-------------------------------|------------------|-----------------|------------|----------|
| Residential / Households | 37,134.39 | tons/day | 77.53 | % |
| Commercial / Malls | 6,259.75 | tons/day | 13.07 | % |
| Industrial / Manufacturing | 16.70 | tons/day | 0.03 | % |
| Institutional | 4,488.40 | tons/day | 9.37 | % |
| Market | | tons/day | | % |
| Total Waste Generation | 47,899.26 | tons/day | 100 | % |

Out of the generated waste (47,889 kg/day), waste diversion by the city was projected at 54.94% in 2015. To promote segregation of solid wastes at source, City Ordinance No. 08-2004 (An ordinance promulgating rules and regulations on segregation and proper disposal of solid wastes by commercial, market, school, business establishment, other public and private institutions, public conveyances and all households in the City of Calapan) was approved by the city councilors. About 2,069 kg/day of residual waste is deposited in the Calapan city SLF while 20,093 kg/day of biodegradable waste was processed in the composting facility in 2015. The weight of recyclables collected daily in 2015 was 19,363 kg amounting to 40%. In 2015, Calapan City's waste diversion target was 62.40 per cent (%) of its waste through recycling, composting and other resource recovery activities.

Results of the 2021 WaCT survey showed that household waste is composed of 20% kitchen waste, 13% garden/park waste, 13% paper and cardboard, 13% plastic dense, 10% plastic film, and others (Fig. 3). At the disposal site, almost one third of the disposed waste (34%) is garden/park waste, followed by kitchen/canteen waste (9%). Plastic film and dense plastic make up 10% of the waste in the disposal site.

The WaCT survey likewise estimated each plastic waste fraction by polymer type. Specific breakdown on plastic waste fractions in 2021 was as follows:

Table 4. Specific breakdown of recyclable plastic waste by polymer type in Calapan City, 2021.

| Plastic Polymer Type | Daily Waste Generation | | Percentage (of Total Plastic Waste) | |
|--|------------------------|-----------------|-------------------------------------|----------|
| | | | | |
| Polyethylene terephthalate (PET, PETE) | 6 | tons/day | 46.15 | % |
| High-density polyethylene (HDPE) | 7 | tons/day | 53.85 | % |
| Polyvinyl chloride (PVC) | | tons/day | | % |
| Low-density polyethylene (LDPE) | | tons/day | | % |
| Polypropylene (PP) | | tons/day | | % |
| Polystyrene (PS) | | tons/day | | % |
| Others | | tons/day | | % |
| Total Plastic Waste Generation | 13 | tons/day | 100 | % |

The 2021 WaCT results show the potential recyclables from household wastes in Calapan city amount to 39 t/day (48%) out of the total MSW of 81 t/day (Figure 4). Food waste amounts to 11 t/day and this can be composted for the production of organic fertilizer. Plastic film and plastic dense together amount to 13 t/day making up 33% of the potential recyclable wastes.

Potential recyclables from households



| Types | Recyclable waste generation from households (t/day) |
|---------------------|---|
| Food waste | 11 |
| Plastic film | 6 |
| Plastic dense | 7 |
| Paper and cardboard | 7 |
| Glass | 3 |
| Metal | 2 |
| Total | 39 |

Figure 4. Potential recyclables from household in Calapan City, 2021

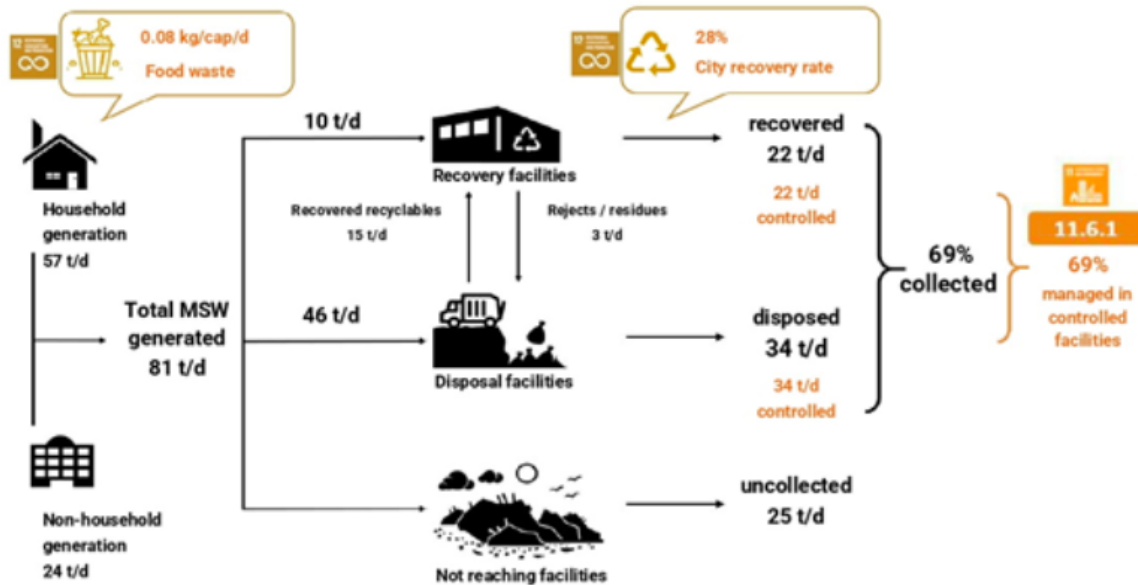


Figure 5. WaCT flow chart in Calapan city, 2021

Further, the 2021 WaCT survey results show that the households generate 57 t/d making up 70% of the municipal solid waste. In the 2015 WACS survey, households generated 37 t/day making up 77% of the MSW. The increase in household waste generation contributed largely to the increase in the MSW generation in 2021. Of the total 81 t/day MSW generation in the city of Calapan in 2021, 69% has been collected and managed in controlled facilities, with 22 t/day recovered and 34 t/day disposed in the SLF. A challenge to the city is the remaining uncollected waste amounting to 25 t/day.

Existing Local Initiatives, Plans and Policies

To achieve a target of 65% waste reduction, the city of Calapan is conducting several initiatives, including operation and management of SLF Category II; construction of perimeter fence in SLF Phase 2; development, construction, rehabilitation of SLF (soil covering, landfill and other facilities), city clean-up drive, reorganization and strengthening of BSWMCs; no segregation, no clean up policy; campaign on the prohibition of use of non-biodegradable plastics and Styrofoam; 3Rs implementation (reduce, reuse and recycle); establishment of MRF in all barangays; Information and Education Campaign on SWM; environmental quiz bee; and search for the most eco-friendly and PRO (Progressive, responsive, outstanding) environment schools; Search For Most Eco-Friendly Barangay; Partnerships and collaborative efforts with concerned SWM stakeholders; and Ordinance on segregation and proper waste disposal. These activities are in support of the following city plans and policies including the 10-year SWM Plan 2016-2025; Annual Investment Program; City Development Plan; Comprehensive Land Use Plan; Administrative Reports; City Ordinance No. 23-2008 To Promote Cleanliness in Calapan City by

Prohibiting Littering and Dumping of Garbage in the Streets, Public Places, Rivers and Coastal Waters Regulating The Disposal of Waste and Garbage Materials and Providing Penalties for Violations Thereof; City Ordinance No. 8 on Promulgating Rules and Regulations on Segregation and Proper Disposal of Solid Wastes By Commercial, Market, School, Business Establishments, Other Public and Private Institutions, Public Conveyances and All Households in the City of Calapan; and City Ordinance No. 13-2011 on Prohibiting The Use and Sale of Non-biodegradable Plastic Bags/Plastic Cellophane, Styrofoams/Styrophors As Packaging/Bagging Materials and Institutionalizing The Use of Biodegradable Containers Within The City of Calapan.

Calapan city is endowed with rich coastal resources including mangroves, sea grasses and coral reefs. To protect the coastal and marine resources, the city is conducting several activities and programs including coastal clean-up activities; dredging of Calapan river, Bucayao river and other waterways; monitoring and maintenance of marine protected areas (MPAs) including Harka Piloto Fringing Reef Fish Sanctuary, Calero-Salong seagrass and corals, Silonay mangrove conservation and eco-tourism park and two proposed MPA in Barangays Maidlang and Mahal na Pangalan; mangrove management and protection activities (i.e. regular coral reef check and survey on Calapan MPAs with Oriental Mindoro Resource Monitoring team); livelihood projects for fisherfolks organizations and federations; strengthening of Bantay-Dagay (trainings and capability enhancement); development of septage management system; Alive, beautiful and clean Calapan River program; assistance program for eco-tourism community-based organizations (KAKAMBAL ni Lazareto, SPNS in Silonay, SBBM in Maidlang and SAMA SA MNP in Mahal na Pangalan); annual celebration of marine protected area day; Araw ng mangingisda; strengthening of Fishery Law Enforcement; fish licensing project (registration of fisherfolks and fishing vessels); strengthening BFARMCs and CFARMC; implementation of Caluangan Lake Development and Management Plan; and of Coastal Resource and Management Plan.

Healthy Oceans and Clean Cities Initiative

With support from the Government of Japan (GoJ), UN-Habitat has been implementing HOCCI in the Philippines in cooperation with global, national, and local partners. HOCCI aims to enable local governments and communities in the Philippines to reduce marine plastic pollution, particularly with six partner cities namely, Cagayan de Oro, Calapan, Davao, Legazpi, Manila and Ormoc. This will be achieved through strengthened institutional capacity to support the operationalization and localization of the Philippines' National Plan of Action on Marine Litter (NPOA-ML) and the development of improved data collection and SWM systems.

As HOCCI supports the piloting of the global waste and plastic leakage assessments at the local level, non-waste baselining, and the development of pioneering CPOA-MLs, GoJ has allocated funds to support the demonstration of pilot projects that customize local approaches for the 3Rs of plastic waste stated in the respective CPOA-MLs. It is hoped that these pilot projects

will subsequently lead to the generation of good practices that can inspire replication and upscaling in the Philippines and across the Asian region.

HOCCI's Project Document and Work Plan lists down some examples of possible plastic 3R approaches for pilot project demonstration and documentation and includes, but not limited to:

- Improve and expand the coverage of existing segregated collection services for all households, neighborhoods and communities, including informal settlements;
- Increase the number and capacity of materials recovery facilities (MRFs) in neighborhoods as well as in coastal areas (e.g. beaches) to help prevent and reduce plastic pollution,
 - potentially also including junkshops and local recycling industries,
 - improve materials recovery system (MRS) in case of space limitations,
 - in consideration of material-specific (e.g., sachets) approaches, and
 - by integrating (or having the system inclusive of) the informal waste sector (IWS);
- Explore the separation and donation of plastic waste to recycling vendors within communities by enabling exchange for money, items or digital tokens (e.g., plastic bank in the Philippines)
- Promote entrepreneurship, specifically among women's groups or IWS within barangays, to financially empower members of the community to transform recycled plastic waste into new kinds of products, for example: shoes, bag, construction products (e.g. construction blocks made from PET bottles), kitchenware, carpets, art products etc. Explore options for community-based cooperatives (e.g. zero waste shop) and provide courses on entrepreneurship so residents have the knowledge to open their business;
- Engage the private sector in plastic 3Rs projects;
- Establish plastic waste reduction and removal platforms in partnership with communities, IWS, the youth, or schools; or
- Develop community-based education programs and materials based on 3Rs to be adjusted as necessary with measures under the "New Normal".

Mapping the Waste Diversion Chain in Calapan City

Mapping activity principally documented the waste recycling landscape in Calapan city including the various actors involved in the waste diversion chain and the volume of plastic recycled or diverted. Consultation meetings with all the actors involved in the waste diversion chain were conducted to present and explain to the various actors the purpose and objectives of the waste diversion credit system. It was emphasized during these consultation meetings the importance of the participation and collaboration of the various actors in successfully achieving the objectives and expected outcomes of this activity.

Mapping the waste diversion chain of Calapan city included various activities including an ocular visit to the sanitary landfill and interview of the SLF manager and staff, an ocular visit to

barangay MRFs and an interview with barangay officials on the operation of the MRF, consultation meetings cum workshops with junkshop operators and barangay MRF operators, and interview of 16 junkshop operators in the city.

The mapping process comprised of identifying and determining the volume of recyclable plastic items in the city; tracking the recovery of recyclable wastes in the waste diversion chain, and calculating the recyclable wastes that have not yet been recovered. This involved data collection through conducting surveys that will determine the amounts of recyclable wastes collected from each household by the barangay eco-champions, ambulant waste pickers and city truck garbage collectors (paleros) that are brought and accumulated in the Barangay MRF.

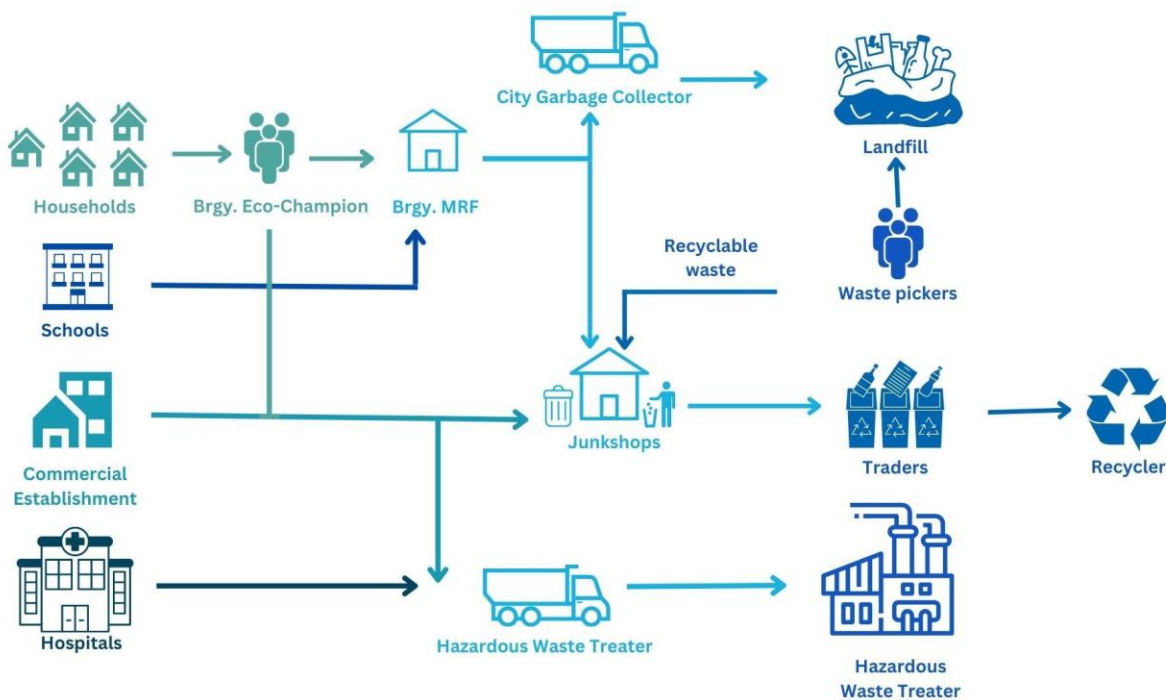


Figure 6. Waste collection and diversion chain in Calapan city.

Household wastes are collected by barangay eco-champions and are brought to the barangay MRF where the collected wastes are segregated into recyclables, biodegradable and residual (Fig. 6). The recyclables are categorized into metal, paper, glass, and plastic wastes and are sold to junkshops. The sales from these recyclable wastes comprise part of the compensation of the eco-champions. Some junkshops are extending seed capital to ambulant agents so they have ready recyclables collected from selected barangays. Biodegradables are composted in the MRF composting facility where compost materials are used as fertilizer for their community edible garden. On the other hand, households in rural barangays may have their own composting pit in their backyard. The residual wastes are then collected by the city truck garbage collectors and are brought to the Sanitary Landfill (SLF). Informal waste pickers are allowed to pick recyclable wastes in the SLF in the morning and these are sold to junkshops in the city.

Schools bring their wastes directly to the barangay MRF while commercial establishments have direct arrangements with junkshop operators for their recyclable wastes. Hospitals and commercial establishments have direct arrangements with hazardous waste treaters.

Table 5. Monthly waste diversion by category in Calapan City.

| Category | Type | Quantity (Tons/Month) | Diversion (%) |
|------------------------|-----------------------|-----------------------|---------------|
| Plastic | PET | 46.5 | 15.13% |
| | Hard Plastics | 30.5 | 9.92% |
| | Monoblock/PP Black | 1 | 0.33% |
| Paper | Writing/Newsprint/etc | 25.9 | 8.43% |
| | Cardboard | 52.5 | 17.08% |
| Metals | Steel | 131 | 42.62% |
| | Tin cans | 18.5 | 5.69% |
| | Aluminum cans | 1.5 | 0.49% |
| | Copper | 1 | 0.33% |
| Glass | (per piece) | 356,680 Pcs | |
| Total Diversion | | 307.4 | 100% |

Table 5 shows the monthly waste diversion statistics across plastic, paper, and metal categories in Calapan City. In the plastic category, PET dominates the diversion with 46.5 tons (15.13%), followed by hard plastics at 30.5 tons (9.92%). Meanwhile, paper waste diversion includes 25.9 tons (8.43%) of writing and newsprint materials, along with 52.5 tons (17.08%) of cardboard. In the metals category, steel leads with 131 tons (42.62%), followed by tin cans (5.69%), aluminum cans (0.49%), and copper (0.33%). For glass bottles, 356,680 pcs are diverted every month (Table 5). These figures underscore the need for diverse recycling efforts and highlight the environmental significance of waste diversion in various material types.

Table 6. Types of recyclable wastes traded by various junkshops in Calapan City.

| TYPE OF WASTE | | | | | | | | | | | | |
|---------------|------------------------|--------------|---------|-------|----------------------|--------|------------------------|-------|-------|---------|--------------|--------|
| | JUNKSHOP | BARANGAY | PLASTIC | | | PAPER | | Glass | METAL | | | |
| | | | PET | SIBAK | MONOBLOCK / PP BLACK | Carton | Writing/ Newsprint/etc | | Steel | Tin can | Aluminum can | Copper |
| 1 | Zamora Junkshop | Lazareto | | | | X | X | X | X | X | X | X |
| 3 | Festin Junkshop | Lazareto | X | X | | | X | X | X | X | X | |
| 4 | Jojo Junkshop | Lazareto | | | | | | | | | | |
| 6 | Bagong Junkshop | Lazareto | X | X | | | | X | X | X | | |
| 2 | Rommel Junkshop | Calero | | | | | X | | | | | |
| 8 | Cebu Junkshop | Calero | X | X | X | X | X | X | X | X | X | X |
| 5 | JMH Junkshop | Lumang Bayan | X | X | | X | X | X | X | X | X | X |
| 7 | Edwin Junkshop | Biga | X | X | X | X | | | X | X | | |
| 9 | Calapan Star | Bayanan I | X | X | X | X | | | | | | |
| 10 | Bct Junkshop | Lalud | X | | X | X | | X | X | X | X | X |
| 11 | Rudy And Baby Junkshop | Lalud | X | X | X | X | X | X | X | X | X | X |
| 12 | Baby Junkshop | Batino | X | X | X | X | X | | X | X | | |
| 13 | Aguilar Junkshop | Bayanan II | X | X | X | | | | X | X | X | |
| 14 | Frasqui's Junkshop | Lumang Bayan | | | | | | X | X | X | X | X |
| 15 | FAC Junkshop | Lumangbayan | | | | | | | | | | |
| 16 | Harold Junkshop | Guinobatan | | | | | | | | | | |

Table 6 shows that the Calapan City's network of junkshops is actively involved in recycling various materials. Notably, there are 10 junkshops trading PET plastics, 9 specializing in sibak plastics, and 7 handling monoblock/PP black plastics. One junkshop is still buying plastic cutlery (spoon and fork). Though plastic cutlery is already banned and is already replaced by wooden substitutes in the City, there are still old stocks circulating in the area.

Eight of these junkshop operators sell their plastic recyclable to Calapan Star, an apex trader of plastic wastes. This is the more practical approach since they don't have to spend huge trucking cost in transporting these plastic recyclables across the sea to the mainland Luzon island.

Calapan Star is even lending its truck for free for a minimum load of 2 tons per trip. Junkshops borrowing the truck just need to refill or reimburse the gasoline used in hauling.

One junkshop, Rommel Junkshop is directly delivering their recyclable plastics to St. Joseph Junkshop located in Batangas City. There are also other junkshops that provide fund capital (advance payment) to ambulant waste collectors provided that they will sell their recyclables to the same junkshop who funded or frontloaded them. A junkshop located in Bgy. Batino is an informal picker in the SLF that can be considered as one junkshop.

For paper materials, 8 junkshops are dedicated to cardboard, while 7 cater to writing and newsprint. In the glass category, 8 junkshops facilitate recycling. Metal recycling is also robust, with 11 junkshops trading in both steel and tin cans, and 8 dealing with aluminum cans, while 6 junkshops focus on copper.

Calapan City Waste Diversion Networks

As of August 2023, Calapan City has 16 operational junk shops operating for the city’s waste recycling and management. In a city of 62 barangays, only 11 barangays house these junk shops within their vicinity (Figure 7).

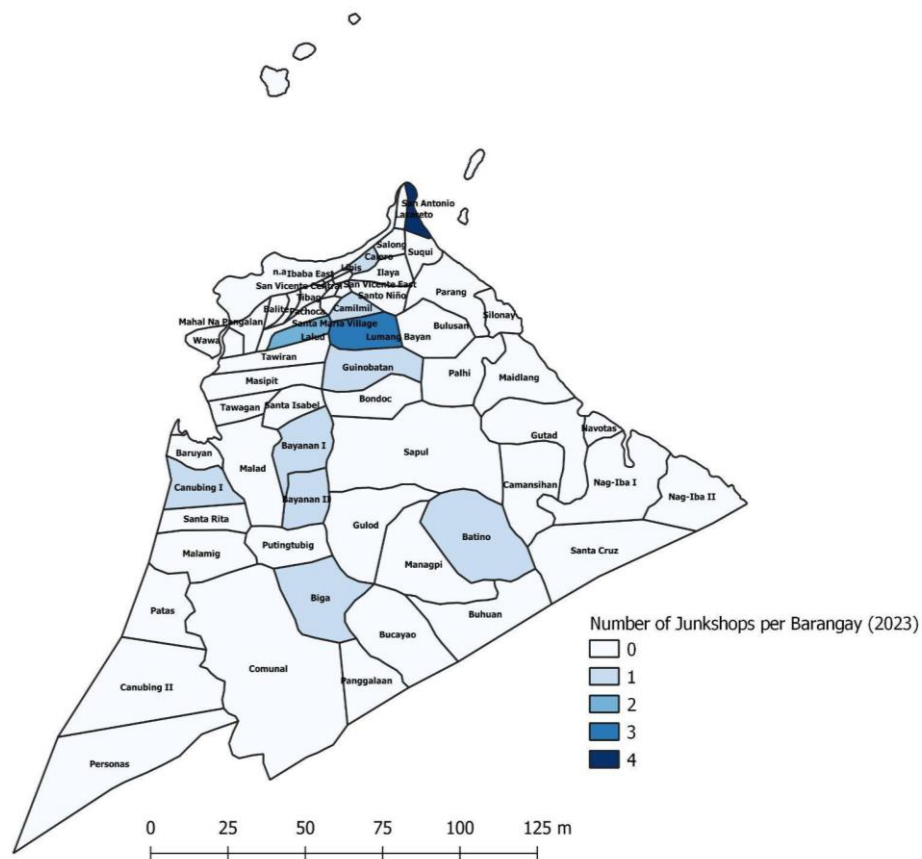


Figure 7. Map of operating junk shops in Calapan City, Oriental Mindoro (2023).

The distribution of junk shops in Calapan City is not uniform with most of the junk shops being centrally located within the city, and with some barangays having a higher concentration than others. Among the barangays, Lazareto stands out with the highest number of junkshops, with a total of four. Lumang Bayan follows with three junk shops in its vicinity. Barangay Lalud and Callero host two junk shops and lastly, barangays Bayanan I, Bayanan II, Biga, Camilmil, Canubing, and Guinobatan, have one junk shop each (Table 6, Fig. 7). This distribution across multiple barangays highlights the sporadic distribution of recycling services, making it challenging for residents in far flung barangays across the city to access these facilities.

Paper Waste

The recycling network of Calapan City for its paper waste exhibits a multi-level system with various destinations for processing and recycling. At the provincial level, Calapan city sends a significant portion of paper waste to various destinations. The highest volume, 30.34 tons per month, is directed to Cabuyao in Laguna, followed closely by 24 tons per month being directed to Batangas, while 14 tons per month goes to Valenzuela City in Metro Manila. Additionally, 2 tons per month are sent to Cavite, representing a diverse provincial-level recycling destination (Fig 8).

At the city level, the internal redistribution is represented by 2.13 tons per month of redirected paper materials from Barangay Batino to Barangay Lalud. Furthermore, 1 ton per month goes from Barangay Lazareto to Bayanan I, and 0.2 ton per month goes from Barangay Lalud to Bayanan I (Figure 9).

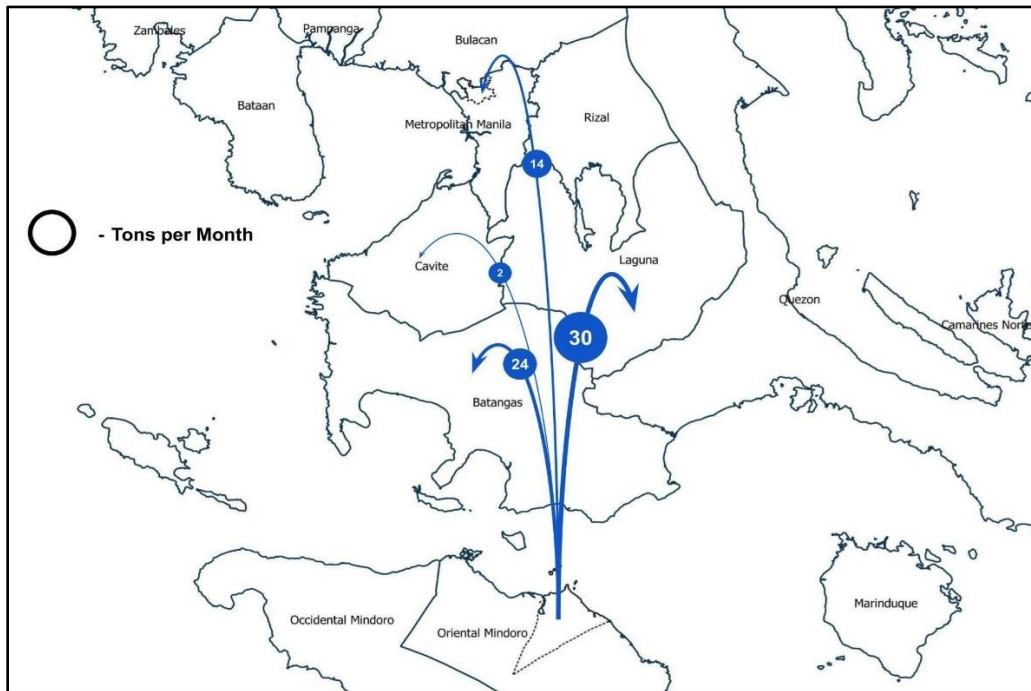


Figure 8. Provincial-level recycling network for Calapan City’s Paper waste.

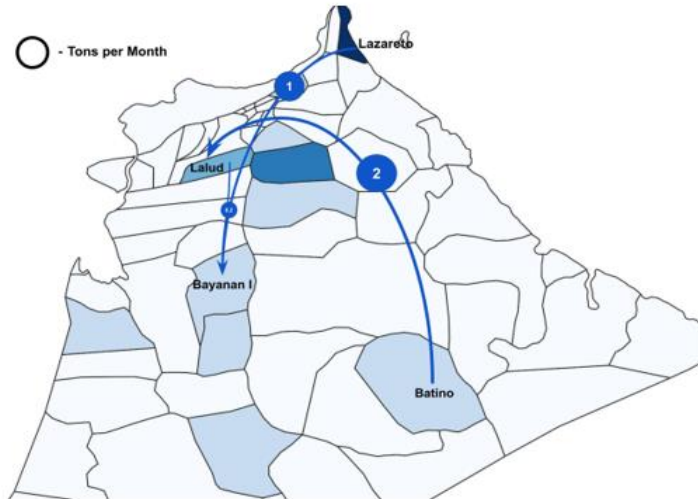


Figure 9. City-level recycling network for Calapan City’s paper waste. (The intensity of the blue color of the barangays represents the number of junkshops per barangay. Please refer to Fig. 7 for the legend of the blue color).

Metal Scraps

Steel

For Calapan City's steel recycling network, at the provincial level, 75 tons of steel per month are directed to Batangas, reflecting a significant volume of steel recycling activity, 24 tons are transported to Laguna, while 10 tons per month are sent to Cavite (Figure 10).

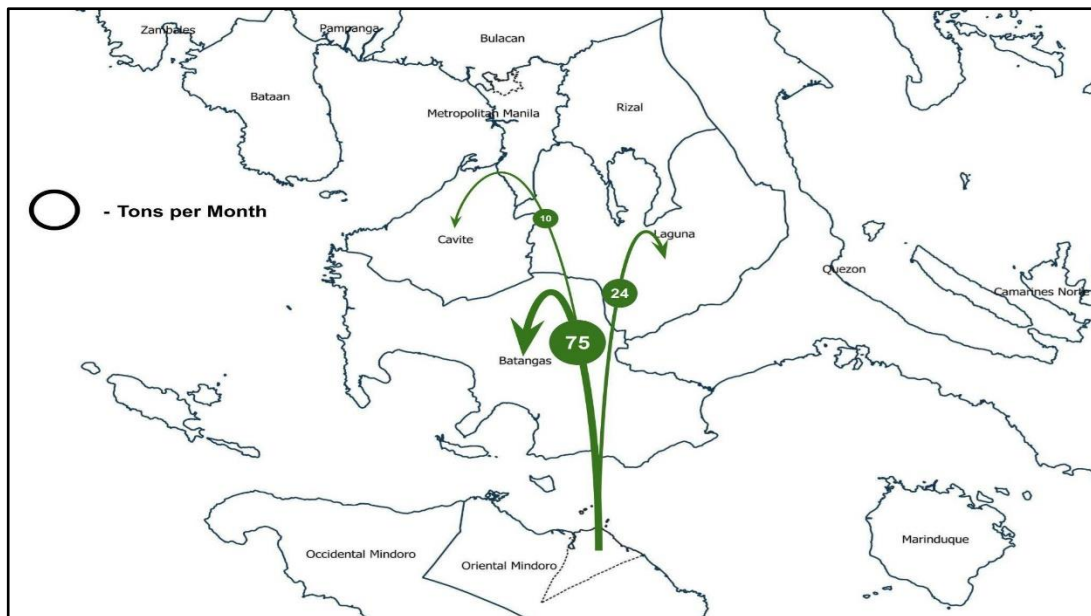


Figure 10. Provincial-level Recycling Network for Calapan City’s Steel Scrap

At the city level, the internal distribution of steel scrap materials for recycling is exhibited by 4 tons per month going from Barangay Lazareto to Barangay Lalud and 500 kilos of steel scrap materials are redirected from Barangay Batino to Barangay Lalud. Then, 11 tons per month of steel is transferred from Barangay Lalud to Barangay Lumang Bayan, representing the in-barangay network flow of steel scrap in Calapan city (Figure 11).

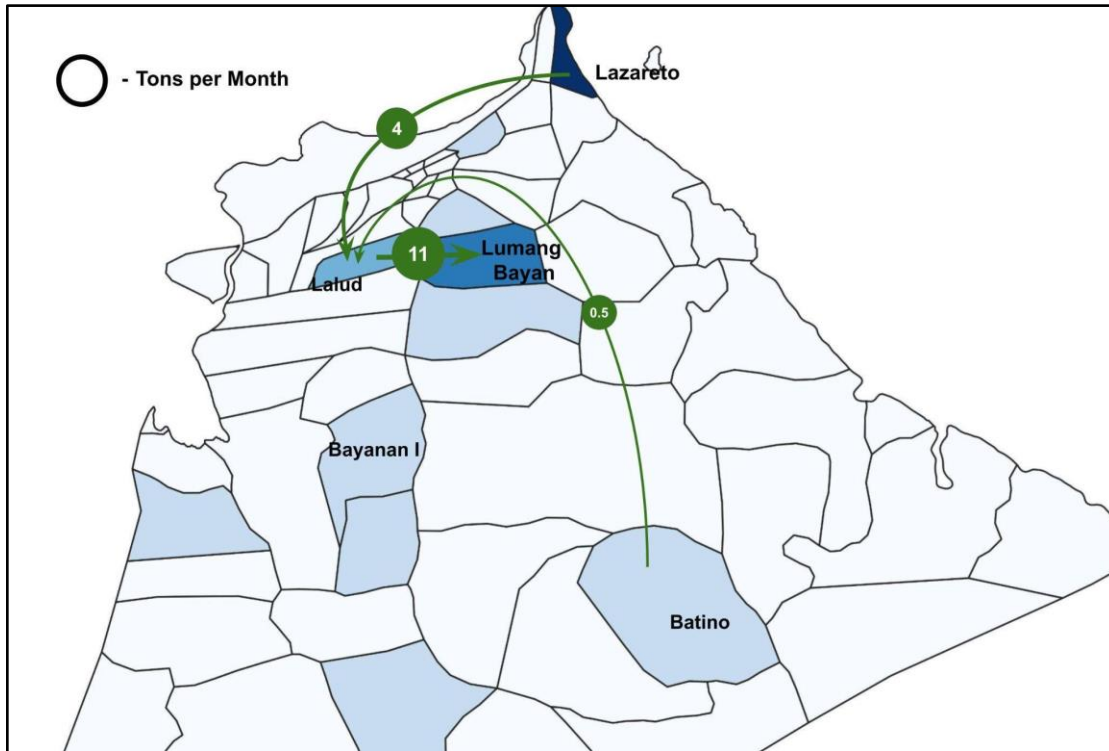


Figure 11. City-level recycling network for Calapan City's Steel Scrap.

Corrugated Iron sheets (Yero)

At the provincial level, Calapan City's recycling network for corrugated aluminum sheets plays a crucial role in redirecting corrugated aluminum sheets to various destinations. The largest quantity, 37 tons per month, are sent to Batangas, 15 tons per month are directed to Taguig in Metro Manila, 5 tons per month go to Cavite, and 3 tons per month are routed to Laguna (Fig. 12).

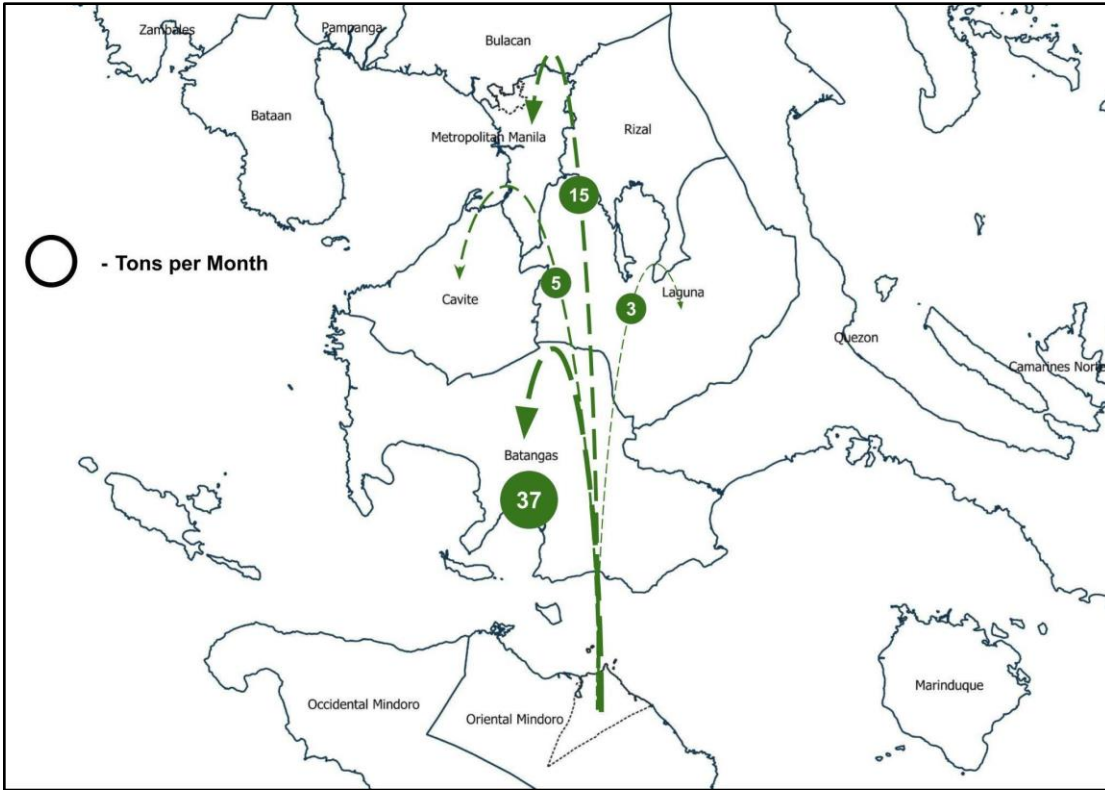


Figure 12. Provincial-level recycling network for Calapan City’s Corrugated aluminum sheets.

At the city level, 1.4 tons (or 1,400 kilograms) of materials are transferred from Barangay Lazareto to Barangay Lalud, 100 kilograms are redirected from Barangay Batino to Barangay Lalud, further strengthening the inter-barangay recycling network. Lastly, 30 kilograms are moved from Barangay Lalud to Barangay Lumang Bayan (Figure 13).

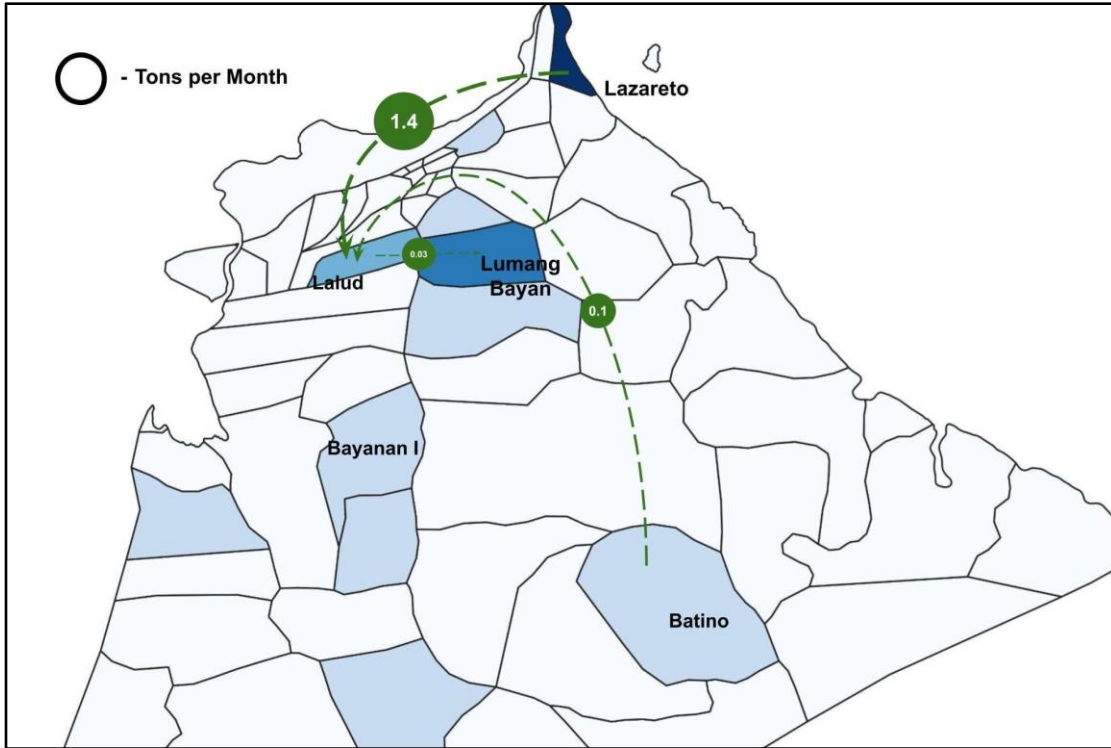


Figure 13. City-level recycling network for Calapan City’s Corrugated aluminum sheets.

Tin Cans

The distribution of Calapan City's tin cans for recycling demonstrates a similar pattern to other waste categories' recycling movement. The highest quantity, 11 tons per month, is channeled to Batangas. Laguna follows with 3.8 tons per month and an additional 2 tons per month are redirected to Cavite (Figure 14).

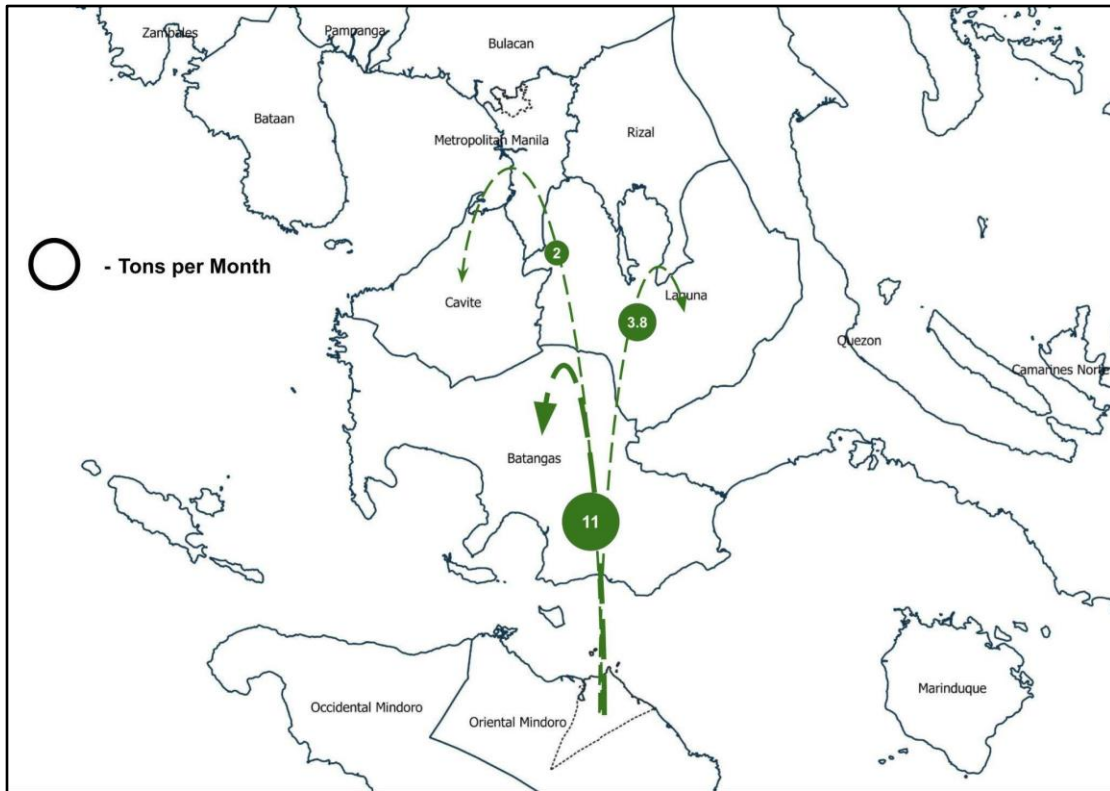


Figure 14. Provincial-level recycling network for Calapan City's Tin Cans.

At the city level, the local recycling network includes the transfer of 800 kilograms of collected tin cans from Barangay Lazareto and another 2 tons from Barangay Batino to Barangay Lalud (Figure 15).

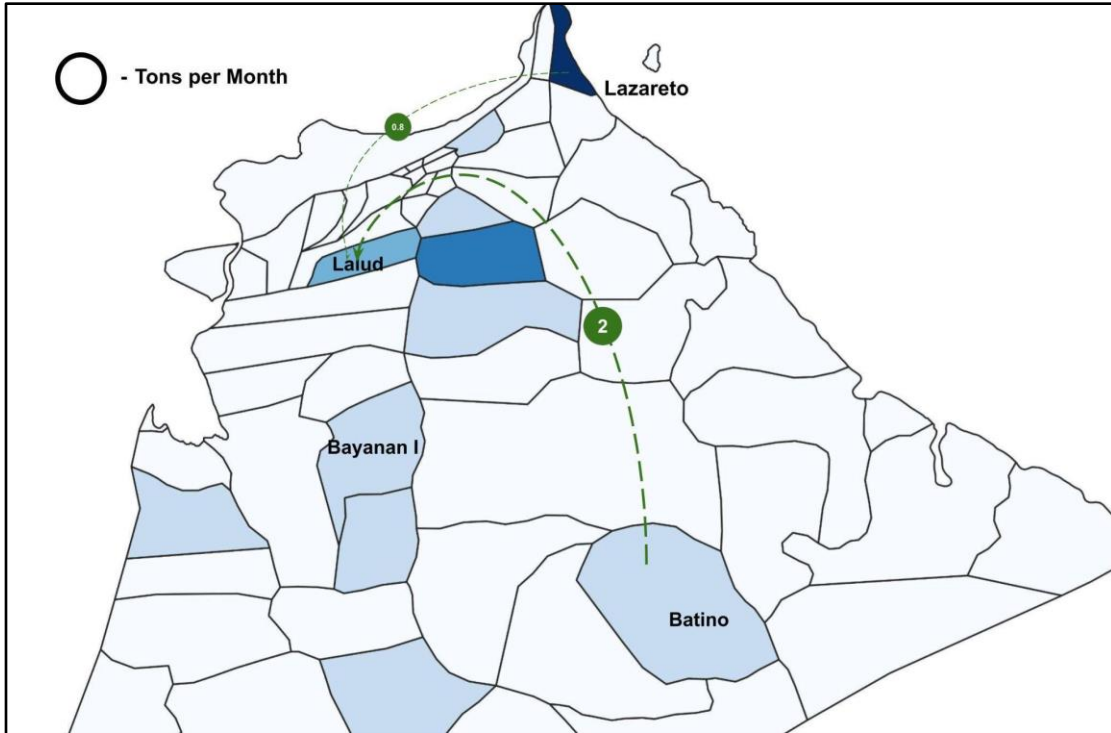


Figure 15. City-level recycling network for Calapan City's Tin Cans.

Aluminum Cans

For Calapan City's recycling network for aluminum cans, at the provincial level, a significant portion of aluminum cans, approximately 2.9 tons per month, is directed to Batangas. Additionally, a considerable volume of 500 kilograms is redirected to Cavite, while 400 kilograms are sent to Laguna (Figure 16).

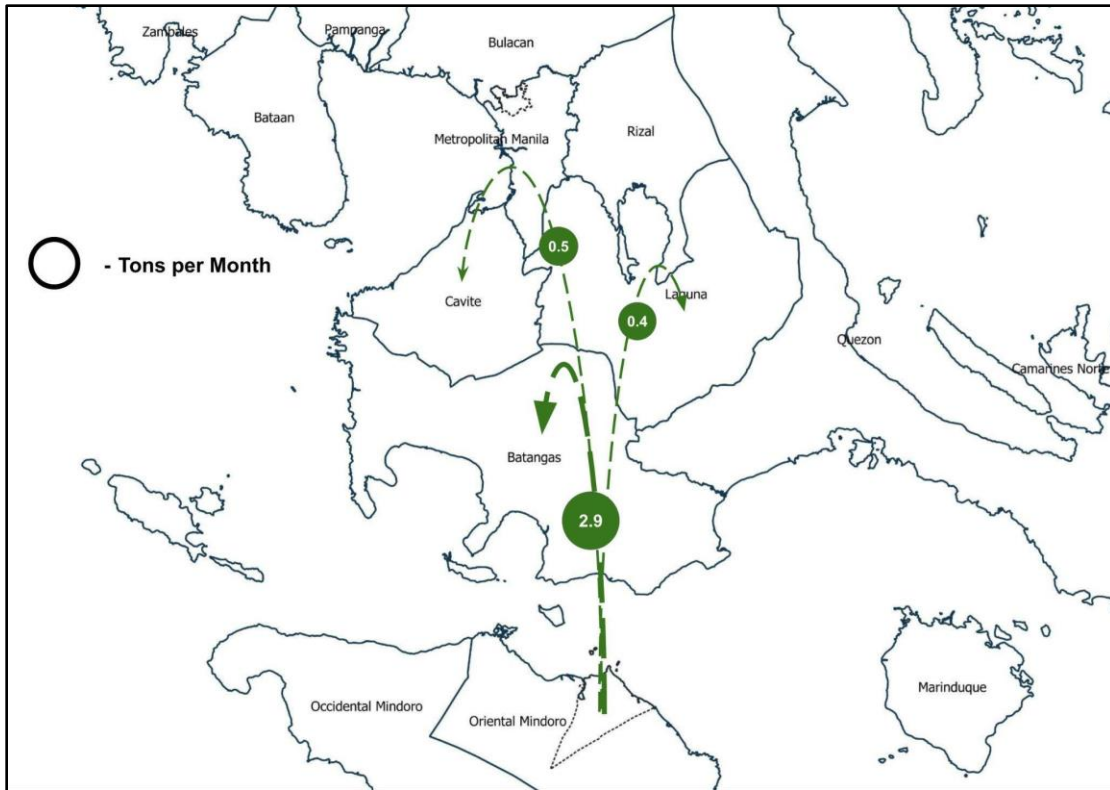


Figure 16. Provincial-level recycling network for Calapan City’s Aluminum Cans

In the localized aluminum can recycling network current data shows that the movement only involves two barangays from Barangay Lazaretos’ 400 kilograms of collected aluminum cans were transferred to Barangay Lalud (Figure 17).

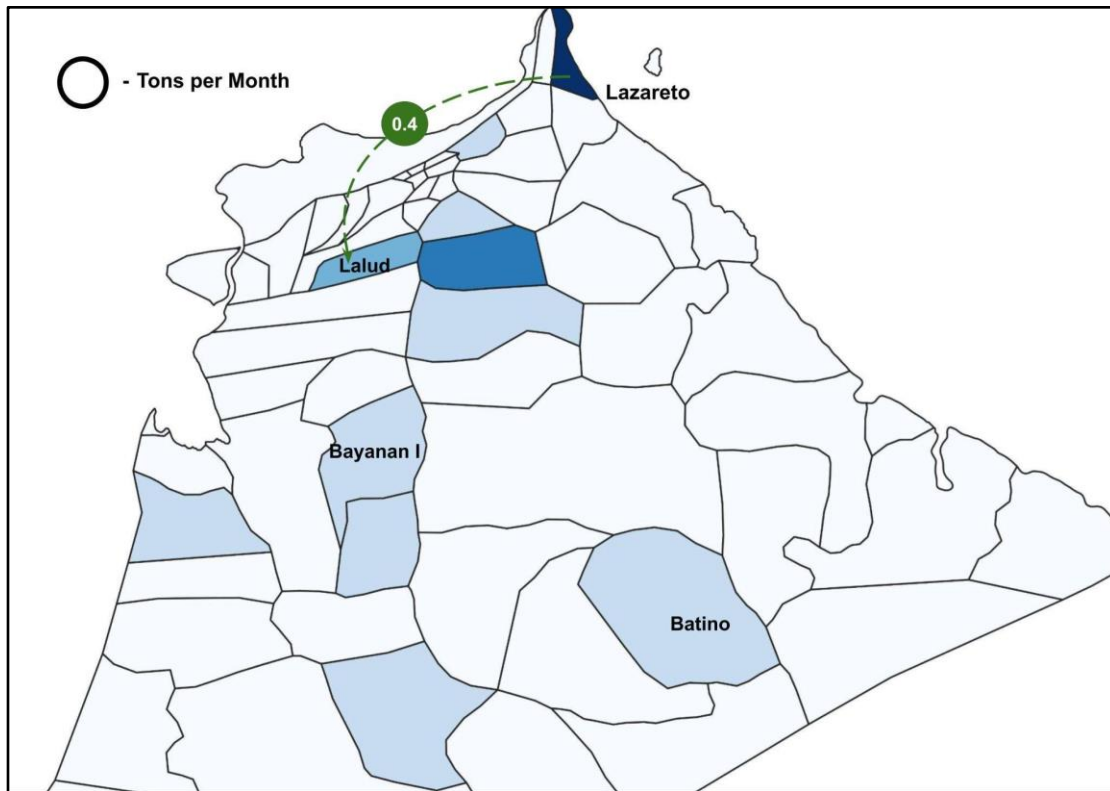


Figure 17. City-level recycling network for Calapan City’s Aluminum Cans.

Copper

Copper materials at the provincial level, are directed to various destinations for recycling. The most considerable quantity, 2.2 tons per month, is transported to Batangas, while 200 kilograms per month are sent to Laguna, lastly, an additional 100 kilograms per month go to Cavite (Figure 18). At the city level, 100 kilograms of collected copper scraps from Barangay Lazareto are transferred to Barangay Lalud (Figure 19).

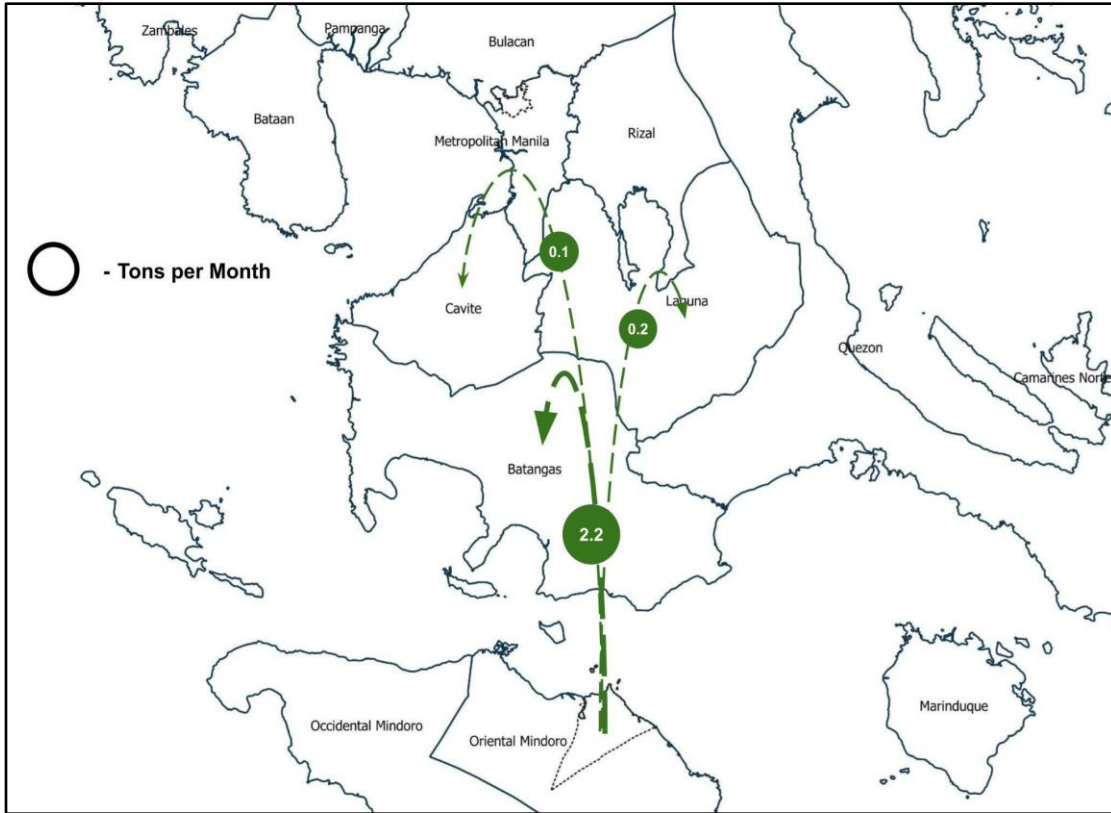


Figure 18. Provincial-level recycling network for Calapan City's Copper materials.

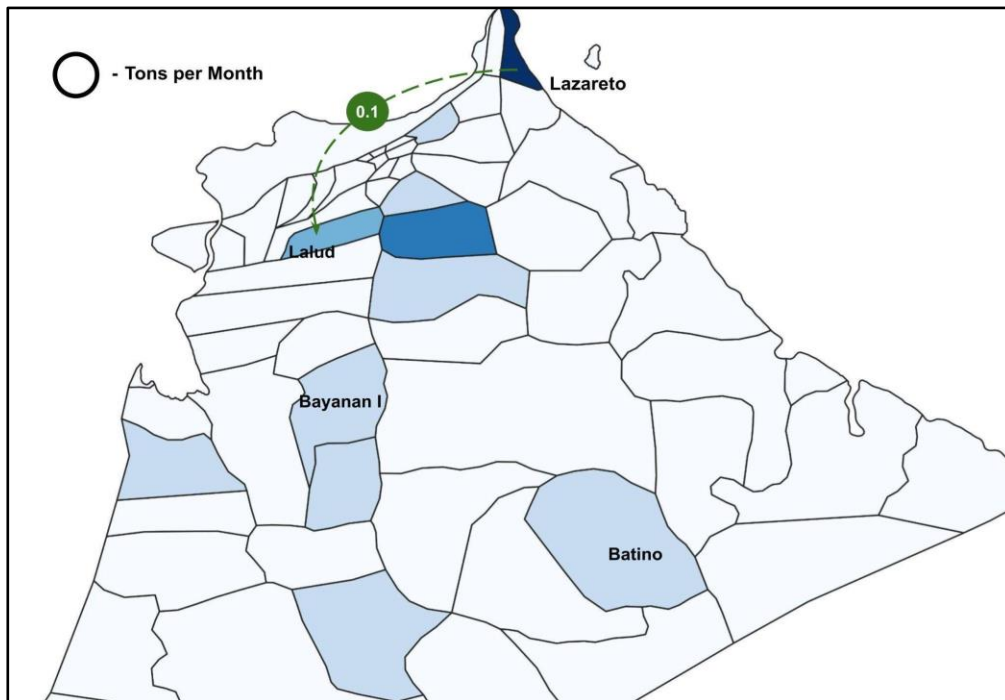


Figure 19. City-level recycling network for Calapan City's Copper materials.

For Non-plastic waste materials, Calapan City's recycling networks exemplify a holistic and collaborative approach to waste management. At the provincial level, significant quantities of recyclable materials are directed to neighboring provinces like Batangas, Laguna, and Cavite. At the city level, Barangay Lalud plays a pivotal role in Calapan City's non-plastic recycling network, as it serves as a significant hub for the trading of various recyclable materials. Among the barangays involved, Barangay Lalud receives and redistributes a substantial quantity of recyclable materials. For example, it receives 1.4 tons of steel scrap materials, 800 kilograms of aluminum cans, and 100 kilograms of copper scraps from neighboring barangays like Lazareto and Batino. This highlights its crucial function as a central point for material aggregation and transfer within the city.

Plastic Waste Material

Figure 20 shows that Calapan City's provincial plastic waste recycling network distributes plastic materials mainly to its neighboring provinces of Batangas and Valenzuela City, North of Metro Manila. For Polyethylene terephthalate (PET) type (green line in the map), Calapan City sends 2 tons to Batangas while the majority of PET materials, 38 tons, are directed towards Valenzuela City in Metro Manila where specialized recycling facilities transform PET plastic into various upcycled plastic products. For hard plastics (purple line), Calapan City sends 3 tons to Batangas province, and 19 tons are directed towards Valenzuela City, allowing for the upcycling of this plastic variety. Polypropylene (blue line), another prevalent plastic waste type, sees 3.2 tons routed to Valenzuela City, where it undergoes recycling processes to create new plastic products. In summary, a great proportion of plastic waste collected in Calapan city is diverted to upcycling facilities in Valenzuela city.

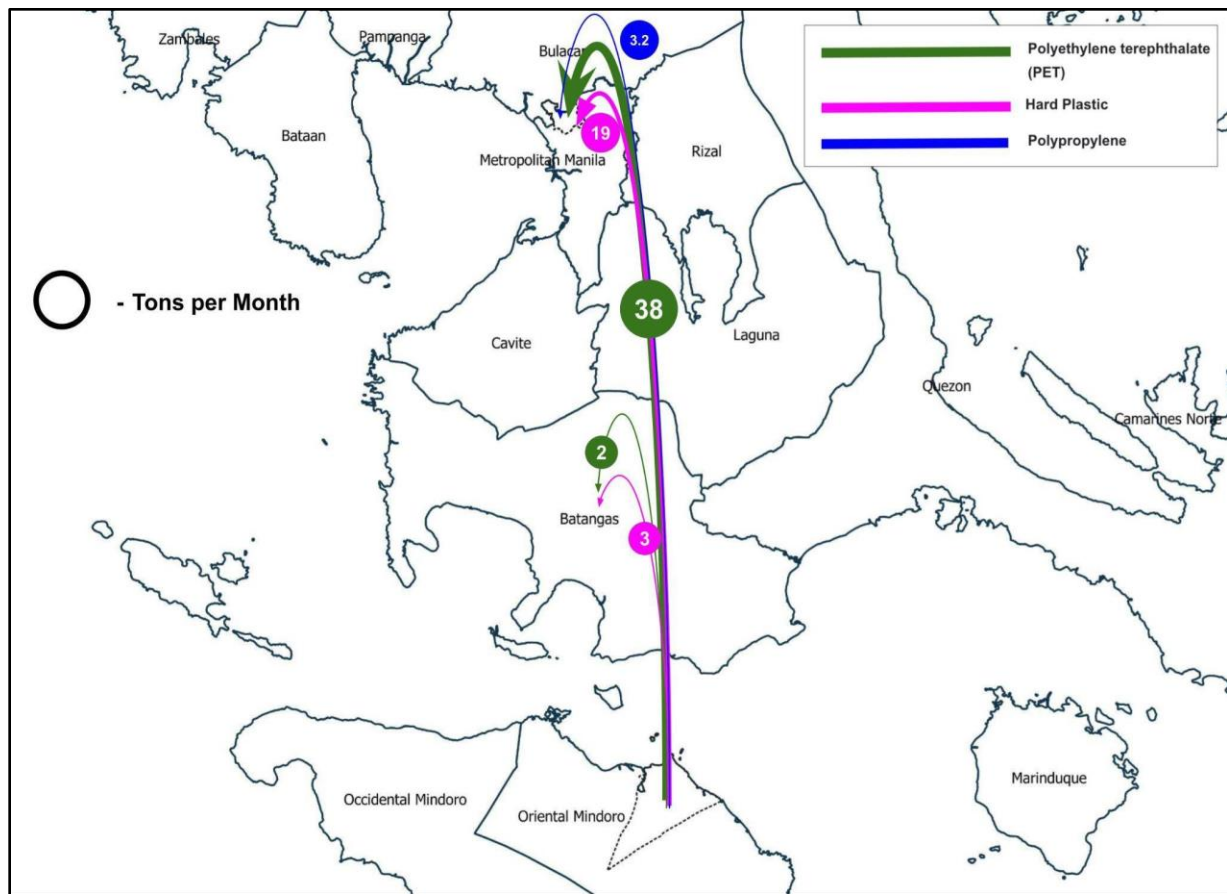


Figure 20. Provincial-level recycling network for Calapan City’s Plastic waste.

Hard plastics (Sibak)

Localized movement of hard plastics for diversion by barangay in Calapan City shows that Barangay Bayanan 1 is the central point for the diversion of hard plastic. Barangay Lalud receives hard plastic from neighboring barangays of Lazareto (1.5 tons), Calero (0.3 ton), and Batino (2 tons). On the other hand, Barangay Bayanan 1 receives hard plastic from Lalud (2 tons), Biga (3 tons), and Bayanan II (0.30 ton) (Figure 21).

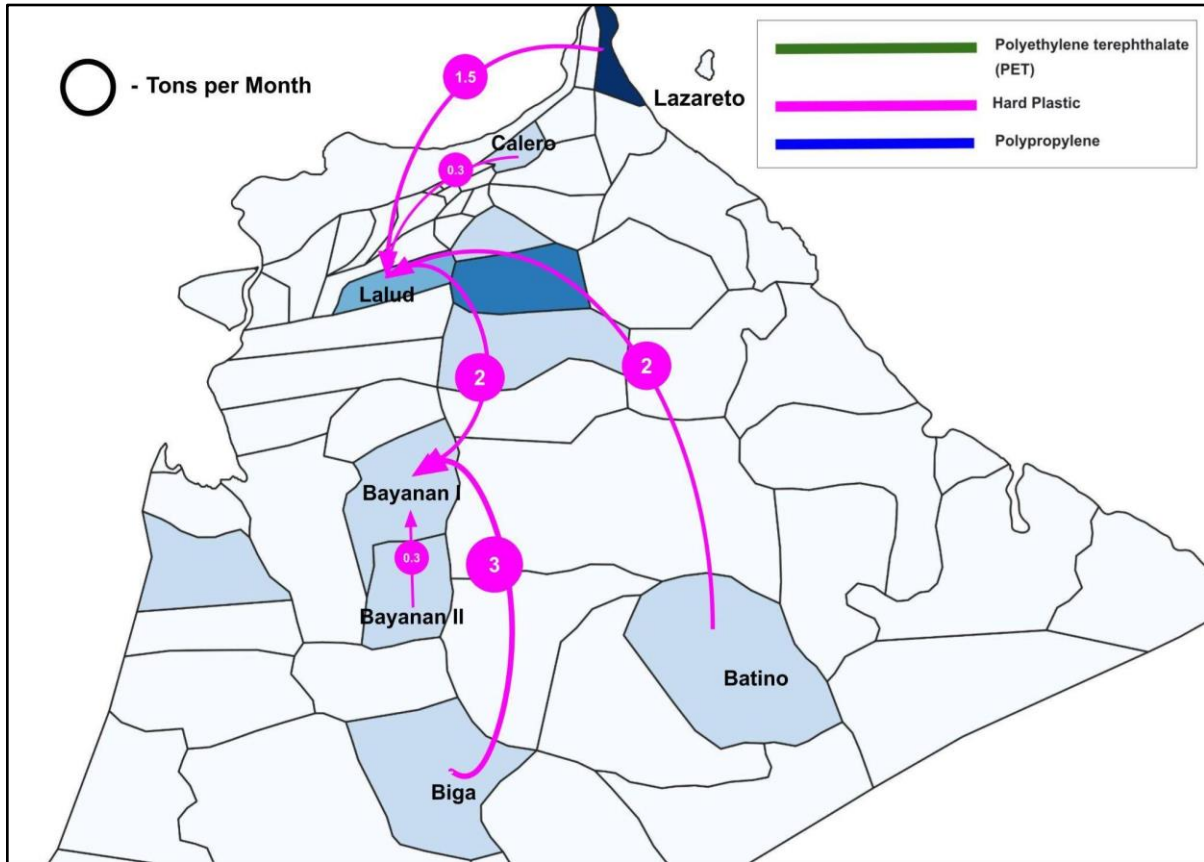


Figure 21. City-level recycling network for Calapan City’s Hard plastic materials.

Polypropylene

For the City’s Polypropylene recycling network, Barangay Bayanan 1 again plays a central role in diverting this type of plastic waste. Barangay Batino sends a smaller quantity (0.2 tons) to Barangay Lalud (Figure 22). Then polypropylene plastic wastes from barangays Lalud (0.8 ton), Calero (0.2 ton), Bayanan 11 (0.4 ton), and Biga (0.1 ton) are diverted to Barangay Bayanan I.

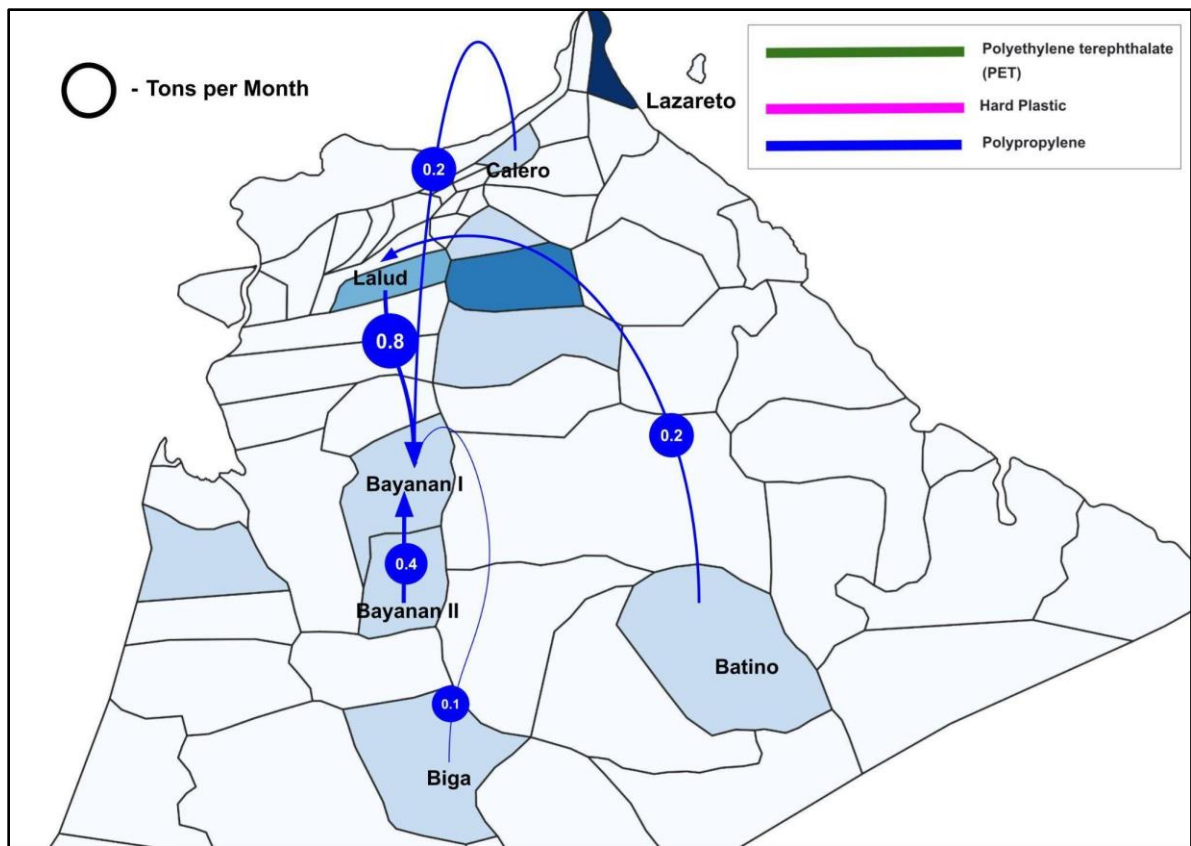


Figure 22. City-level recycling network for Calapan City’s polypropylene materials.

Polyethylene terephthalate (PET)

Calapan City's Polyethylene terephthalate (PET) recycling network operates seamlessly across several barangays, each contributing to the city's broader environmental goals. Similar to propylene waste diversion, Barangay Bayanan 1 plays a central role in diverting PET waste in Calapan City. This is due to the location of Calapan Star Junkshop, an apex plastic trader, in Brgy Bayanan I.

Barangay Lalud's is a significant contributor by transporting 2.5 tons of PET to Barangay Bayanan I. Barangay Biga follows suit with 2 tons of PET to Barangay Bayanan I. Barangay Lazareto sends 1.5 tons of PET to Barangay Bayanan I. While Barangay Bayanan II adds 500 kilograms of PET to Barangay Bayanan I and Barangay Calero adds to the initiative by channeling 300 kilograms of PET to Barangay Bayanan I. Lastly, Barangay Batino delivers 1 ton of PET to Barangay Lalud (Figure 23).

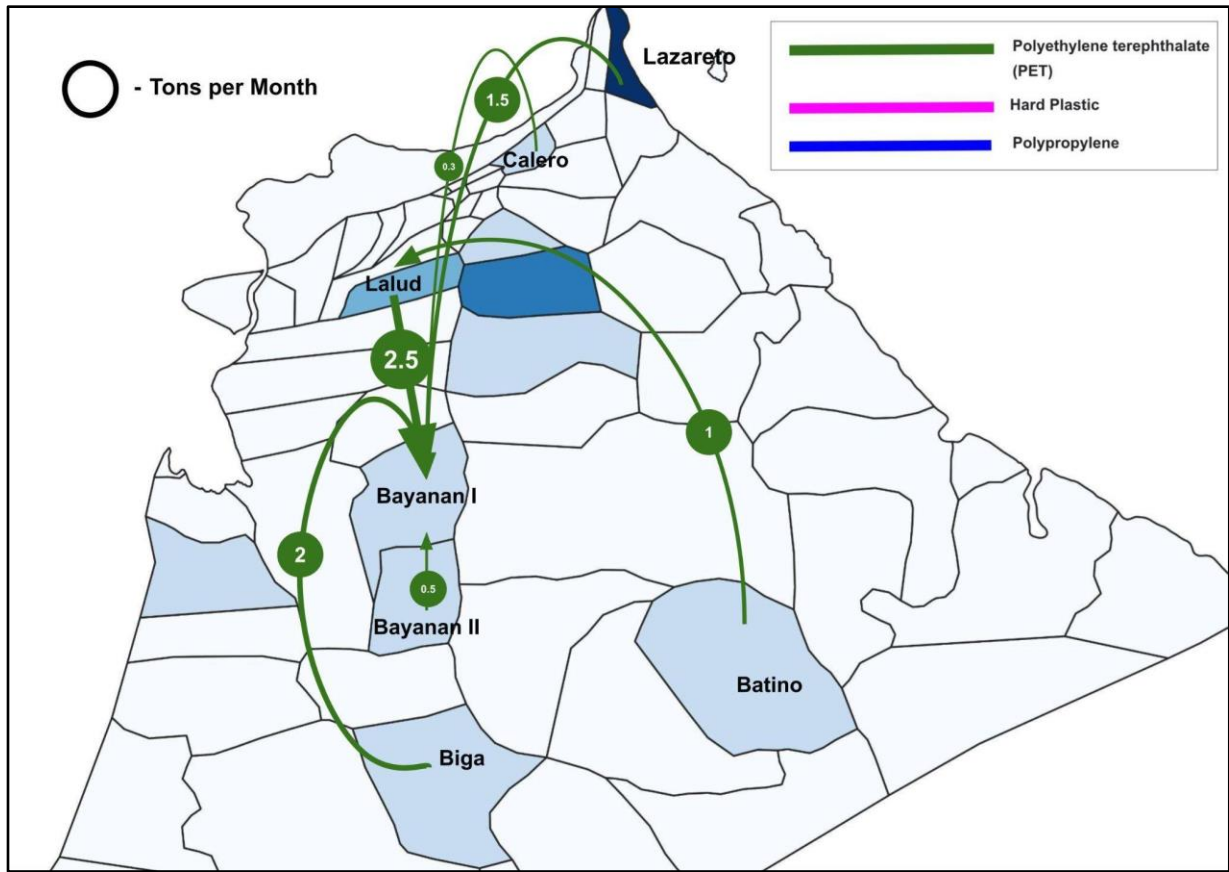


Figure 23. City-level recycling network for Calapan City’s Polyethylene terephthalate (PET) Materials.

Barangay Bayanan I, as the host barangay of the Calapan STAR junkshop, is the central node in the city’s plastic recycling network. It manages a substantial overall quantity of recyclable materials, encompassing Polyethylene terephthalate (PET), Hard Plastics, and Polypropylene materials. The total inflow into Barangay Bayanan I comprises 1.5 tons of PET from Lazareto, 2 tons from Biga, 300 kilograms from Calero, 2.5 tons from Lalud, and 500 kilograms from Bayanan 2 in the PET category. In addition, Barangay Bayanan I handles significant amounts of Hard Plastics, with contributions of 1.5 tons from Lazareto, 3 tons from Biga, 300 kilograms from Calero, 2.5 tons from Lalud, 2 tons from Batino, and 300 kilograms from Bayanan 2. Furthermore, the barangay oversees the management of Polypropylene, further showcasing its multifaceted role in the city's recycling effort

Developing Forms, Templates and Detailed Procedures on Waste Data Collection and Compilation of Recording System in Calapan City

The EPR Team introduced forms and templates that will be used by the Barangay MRFs in recording their daily collection or sales of recyclables. This is to ensure and see to it that barangay

have a uniform recording system for all the waste collection and waste diversions. The Eco-Champion Daily Collection Form is a simple collection form to be accomplished daily or every time the Eco-Champion routes in the households of his area. This form should be countersigned also either by the Councilor in-charge of the MRF/Environment or the barangay secretary.

The EPR team also introduced the Recyclables Collection and Sales Logbook wherein each of the data listed on the Eco-Champion Daily Collection Form should be logged daily on the Collection Logbook which can be summarized on the daily, weekly or monthly basis. The same process should also be applied on the sales logbook wherein every time there is output or sales of the recyclables to junkshop, each transaction should be reflected on the sales logbook. Whenever possible, receipt of the junkshop issued for every sales transaction should also be pasted or attached/stapled on the logbook. The logbook will serve as a repository of input documents for the electronic (through APPS) reporting system designed by the EPR Team.

Mobile Application System for Waste collection and Compilation of Recording System in Calapan City

To facilitate reporting of the data gathered at the barangay level and have it reported and compiled at the CENRD Office, the EPR Team crafted a mobile phone-based APPS SYSTEM.

Use of mobile phone-based Apps System to record and report recyclable collection and sales -

A new Apps System was developed by the EPR Team to easily record and report the amount of recyclable materials as well as tracking of where these recyclables travel along the value chain. Separate Apps system was develop for the MRF Operators (color coded green) and Junkshop Operators (color coded red). Another Apps is downloaded to the CENRD (color coded blue) as Admin of the EPR system. The Apps for the CENRD Admin has separate summary reporting for the collections and summary of sales of recyclables from sources to its destinations.

Apps System

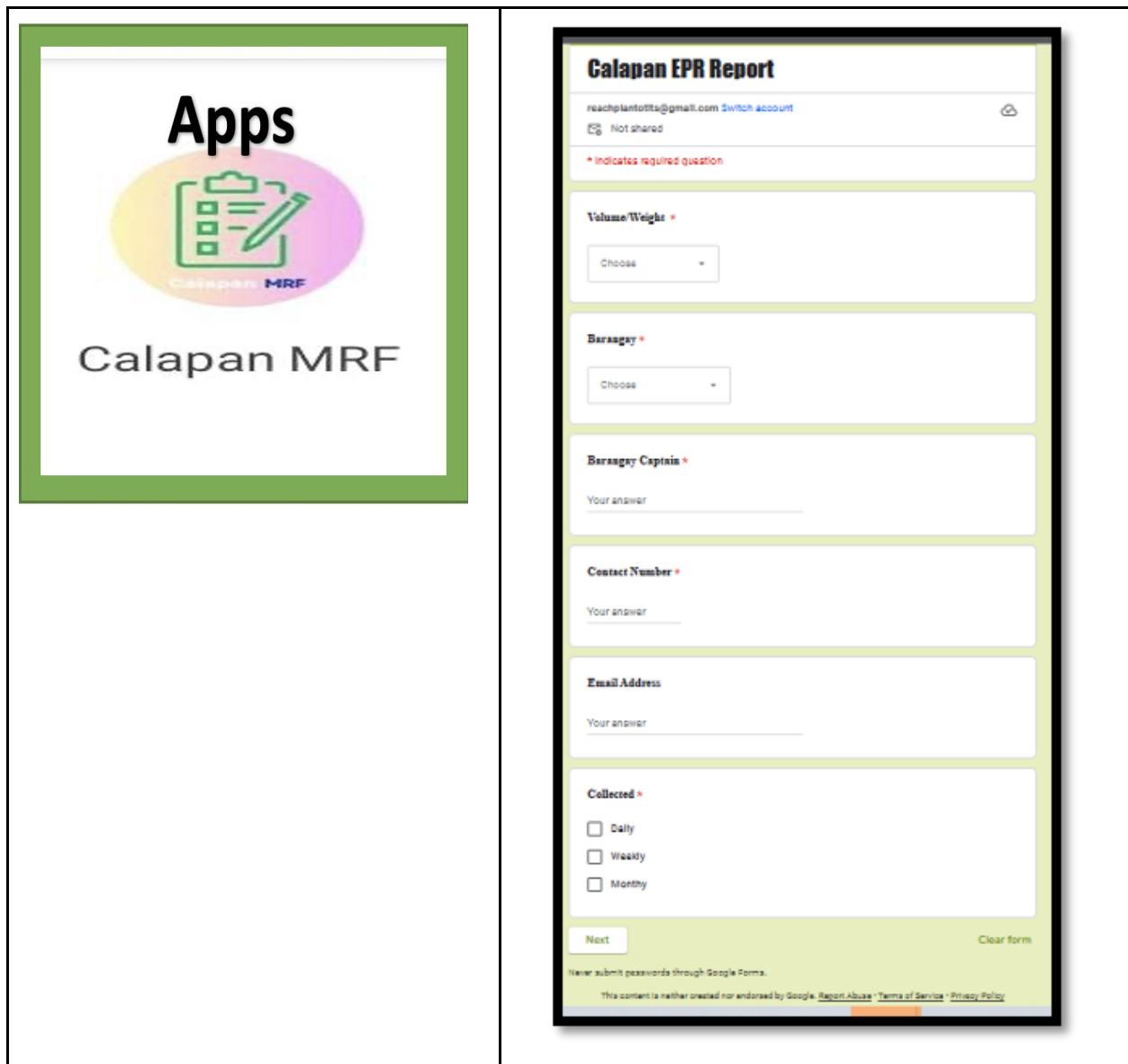
Three Apps Systems were developed by EPR Team to effectively record, process and manage the data gathered from the households, Eco-Champion, barangay MRFs, junkshop operators and Batino SLF. These are Calapan MRF App, Calapan Junkshop App and the CENRD Admin App.

Data gathered are summarized in an Excel Form and can readily be accessed, seen and print on a real time basis. The CENRD Admin has the sole responsibility and access to the three Apps system.

Barangay MRF Apps can only be viewed, accessed and encoded by the barangay personnel who has the authority to use the link downloaded them. On the other hand, Junskshop MRF Apps can only be viewed, accessed and encoded by the junkshop operators who has the authority to use the link downloaded them.

Calapan MRF Data Apps System

The MRF App is a user-friendly feature (Fig. 24). The Barangay MRF staff will fill-out the information needed. Some of the information fields are pre-filled already like name of barangay, etc. Once all the fields have been filled out, click to submit or review button and the information are readily sent to the Summary Report of the Admin Apps. The Calapan MRF Apps System merely captures the monthly recording system being done by the Brgy Councilor and/or Brgy Secretary to the data system entrusted to the CENRD Admin.



The figure displays two components of the Calapan MRF Apps system. On the left is the app icon, which features the word "Apps" in a large, bold, black font above a circular logo containing a green clipboard with a pencil and the text "Calapan MRF". Below the logo, the text "Calapan MRF" is written in a smaller, black font. On the right is a screenshot of a Google Form titled "Calapan EPR Report". The form is set to be shared with "reachplantotts@gmail.com" and is marked as "Not shared". A red asterisk indicates required questions. The form contains several input fields: "Volume/Weight" (a dropdown menu with "Choose" selected), "Barangay" (a dropdown menu with "Choose" selected), "Barangay Captain" (a text input field with "Your answer" placeholder), "Contact Number" (a text input field with "Your answer" placeholder), and "Email Address" (a text input field with "Your answer" placeholder). At the bottom, there is a "Collected" section with three radio button options: "Daily", "Weekly", and "Monthly". A "Next" button is located at the bottom left, and a "Clear form" link is at the bottom right. A footer note states: "Never submit passwords through Google Forms. This content is neither created nor endorsed by Google. Report Abuse Terms of Service Privacy Policy".

Figure 24. Calapan MRF Apps for submission of daily data.

Calapan Junkshop Apps system

The Junkshop Collection and Sales App is also user-friendly like the MRF Recyclables App. It shows the amount/weight of the various waste types collected on a monthly basis and the amount/weight sold and/or transported on a monthly basis. Various types of plastic are listed in the App to avoid double counting. Destination (recycling or final end of the plastic waste) of the diverted waste material is also listed. The Calapan Junkshop Apps System merely captures the monthly recording system being done by the Junkshop Operators and link/reports to the EPR data system turn over to the CENRD Admin.

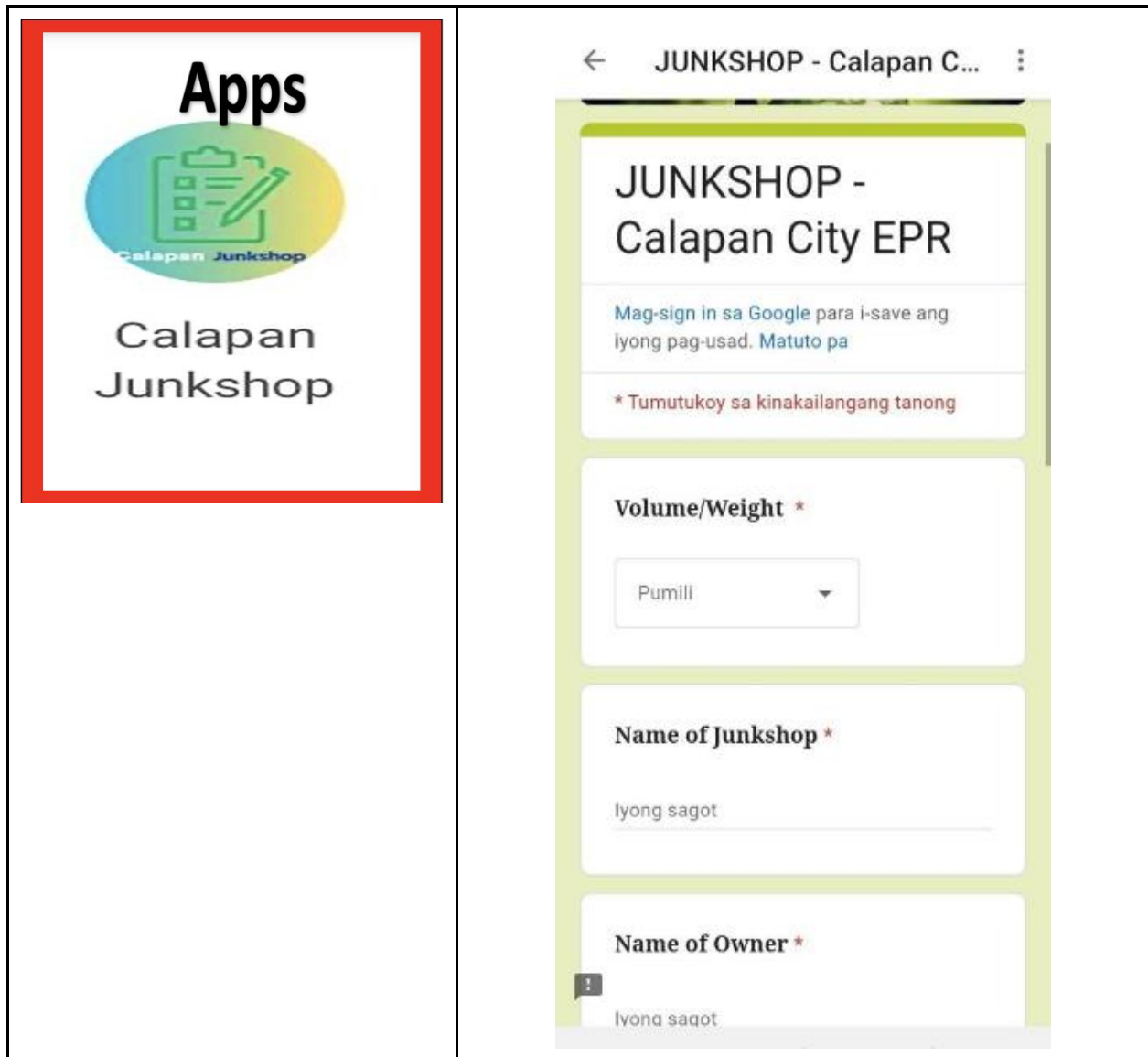


Figure 25. Calapan Junkshop Apps system.

The ADMIN APPS



Figure 26. Calapan Admin Apps.

The ADMIN APPS can access four apps reporting system (Fig. 26). It can view the Barangay MRF data entries as well as Junkshop Operators data entry. Data are not just limited to plastic waste but they also include the other recyclables like paper, cartons, metal, glass, etc. The ADMIN can also view summary of the recyclables collected and summary of recyclables sold on a monthly basis .

Recommendations To Improve the Data on Waste Collection and Compilation of Recording System in Calapan City

The following are the recommendations on how to improve more and sustain the data recording and data management on waste collection system in Calapan City :

- CENRD to cluster the 62 barangays into 6 clusters composing of 10-12 barangays per cluster. Each cluster will be assigned a cluster representative to collect and follow-up data, monitor and report the same to the CENRD EPR in-charge.
- CENRD-assigned cluster representative to ensure staff and team members involved in the data collection and recording are centrally and consistently trained in the correct processes. EPR Team will conduct a cascade training on the forms and templates develop during the process.
- Barangay Secretary and Brgy. Councilor assigned in MRF should check regularly and ensure that all data recording forms, templates and logbooks are working and has adequate backup. Cluster representative twill monitor this from time to time.
- CENRD to prepare checklists for tasks involved in data collection.

Plastic Credits Certificates

With a systematic waste diversion system for recording and reporting of diverted wastes from the various actors in Calapan city, the city will be able to generate waste diversion data that is credible, verifiable and auditable. This is a requirement for the EPR-readiness of Calapan city to negotiate for plastic credit certificates that the city may use in entering agreements with Obligated Enterprises under the Philippine EPR Law. Revenues from the plastic credit certificates will be used to support the livelihood projects of CCAPI and various stakeholders involved in the waste diversion system of Calapan city to ensure sustainable plastic waste management and thereby reduce leakage of marine plastic litter into Calapan waters and seas. Ultimately, this approach will usher Calapan city in its goal to achieve zero marine plastic waste by 2040 supporting the UN Sustainable Development Goals.

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