II. Profile of the Three Study Sites

The three cities selected for this study are located in Negros Island, Northern Luzon and the National Capital Region (NCR) or Metro Manila (MM). Quezon City, MM has the biggest population and the most number of barangays. San Carlos City, Negros Occidental is second in land area but has the least waste generation per capita. San Fernando City, La Union although smaller in land area is more urbanized. It hosts major businesses, financial institutions, regional offices, universities and colleges in Region 1.

Figure 1: Philippine Map and the Location of the Three Study Sites

All three cities have designed their SWM systems and programs to comply with the requirements of the Ecological SWM Act of 2000 (RA 9003), although the level of compliance and effectiveness differ in different cities and its barangays. Table 1 provides the brief SWM profile of the three study sites. A more detailed discussion of each study site is presented in the next sections.

Table 1: SWM Profile of the Three Study Sites

Particulars	San Carlos City	San Fernando City	Quezon City
Land Area	45. 150 hectares	10,526 hectares	161,112.12 hectares
Population	129,809 (2007)	111,919 (2004) 142, 304 (2014 estimated)	2,861,081 (2009)
Number of households	22,166 (2011)	16,000 (2003)	535,890 (2009)
Number of barangays	18	59	152
Number of rural barangays	6	34	None
Number of urban barangays	12	25	152
SWM Organizational structure	Solid Waste Management Office under the Office of the City Mayor	General Services Office for collection and Disposal City Environment and Natural Resources Office for IEC and monitoring, technical assistance to barangay SWM programs	Environmental Protection and Management Department (EPWMD)
SWM Budget	PhP5.3 million for garbage collection; PhP3.8 million for Eco-center Operations (including SLF and MRF); PhP1.3 million for IEC; PhP4.7 million Maintenance of City Lanes (Street sweepers) (2011)	PhP15 million for collection and personnel services; PhP300,000 SLF operations; PhP2.5 million-subsidy to barangay collection PhP5.5 million for SLF operations (2011)	PhP630 million for collection; PhP180 million for operations and closure of controlled disposal facility (2008); PhP718 million for garbage collection package and PhP180 million for disposal (2010);

Particulars	San Carlos City	San Fernando City	Quezon City
			PhP22 million for operating the SLF (2011)
Per capita waste generation/per day	.44 kg	.3 kg / in rural areas .5 kg in urban areas	.66 kg
Waste generation/day	64 tons (2011)	617 .5 tons (2011)	1,889 (2009)

Sources: Collated from the LGU reports

II.1. Case Study A: San Carlos City, Negros Occidental

LGU Profile

The City of San Carlos is located at the northeast part of Negros Island. The city is at the crossroads of four major cities in the Visayas: Cebu City, Bacolod City, Iloilo City and Dumaguete City. Based on the August 2007 census, it has a population of 129,809 people and a total land area of 45.150 hectares. Sixty nine percent of its total land area is classified as agricultural land planted to sugarcane (main crop), rice, corn and some high value crops such as coffee, cabbage, carrots and other crops. It is also developing its Agro-Industrial Economic Zone where San Carlos Bioenergy, Inc. (SCBI) - the country's First Fuel Bioethanol and Co-generation Facility, is situated.

San Carlos City is politically subdivided into 18 barangays. There are 6 urban barangays, 6 rural barangays and 6 coastal and island barangays. The city is accessible by land through major arterial highways of the province and by sea through its own national seaport. The people of San Carlos City speak the *Ilonggo* and *Cebuano* dialects[1] .

Solid Waste Profile

Based on the City's Ten Year SWM Plan, the total solid waste generation of the projected total population of 40,162 is 17,671.28 kg in 2011. The waste analysis and characterization study conducted by GENESYS foundation show the following key results:

[1] http://www.swm4lgus.net/partner-lgu/SanCarlosCity.php

Table 2: San Carlos City Waste Profile

Particulars	Percentage/Amount
1. Per capita waste generation	.44 kg/day
2. Biodegradable waste generated	65.17%
3. Recyclable waste generated	20.25%
4. Residual and special waste generated	14.58%

Source: San Carlos City Ten Year Solid Waste Management Plan 2000-2010

SWM System

The SWM Program of San Carlos City is included in its Twenty Year Master Development Plan (2000-2020) as part of the City's environmental protection component. The Master Plan also provided for the construction of a sanitary landfill.

On February 14, 2002 the City created its Solid Waste Management Board. San Carlos City's SWM Board has since then bagged the Hall of Fame Award for winning the Model Solid Waste Management Board award for the three consecutive years 2008, 2009 and 2010.

In 2004, it passed an Executive Order for the " No Segregation, No Collection Policy". San Carlos completed its Ten Year SWM Plan in 2006 with the assistance from the German Development Service (which merged with the GIZ in 2011).

In 2002, the City in cooperation with the Global Environment and Nature Ecosystems Society (GENESYS) Foundation embarked on a four year massive information, education and communication (IEC) campaign entitled "A Lifestyle Change Project" covering the 18 barangays of the city. The focus of the Lifestyle Change Project is to promote waste diversion at source. During the first year IEC efforts focused on the lowland urban areas; the 2nd year on lowland and upland rural areas; the 3rd year on monitoring and evaluation of barangay SWM implementation; and the 4th year on the installation of a participative monitoring and evaluation system. The barangay health

workers, barangay tanods, purok leaders and day care workers were all trained to conduct the IEC campaign in their communities.

A Solid Waste Management Office (SWMO) under the Office of the Mayor was created in 2008 through Ordinance No. 080-14 with the following organizational structure:

Figure 2: San Carlos City SWM Organizational Structure

The IEC staff of the GENESYS Foundation was absorbed under the IEC and Enforcement Unit of the City's SWMO . The SWMO oversees the implementation of city's solid waste management program. There are two engineers and five other staff who take care of the SWM operations and information. Under the office, there are 8 permanent garbage collectors and 50 contractual garbage collectors and Eco Center laborers. The contractual employees work on a rotation basis; in effect they work for two weeks each month.

Segregation at Source and SWM Practices

The City's Ten Year SWM Plan calls for the segregation of solid waste into biodegradable, non-biodegradable and toxic/hazardous waste. In compliance with RA 9003, the City requires the barangays to be responsible for the segregation and collection of recyclables and biodegradable wastes and to establish their respective materials recovery facilities (MRFs). The four year IEC campaign was conducted in order to support the Plan implementation.

Key informants from urban and rural barangays were interviewed during the study. Regarding segregation at source, the urban respondents were more aware of the three types of wastes while majority of the rural respondents were more aware of the biodegradable and non-biodegradable waste classification. Key informants in both urban and rural barangays were all aware of the ban on open burning of waste but to a lesser degree not as aware of the law on anti-littering and dumping of wastes.

Seventy five of the rural key informants rated LGU performance on SWM as "very good"; while only 60% of the urban respondents gave the same rating. Only one respondent rated SWM services as "poor" because he observed that anti-littering is not effectively enforced. Reasons for the good SWM performance rating are the regular collection schedule and good information dissemination.

Regarding management of specific types of wastes, both rural and urban key informants sell the following to the itinerant waste buyers: glass bottles, tin cans, PET bottles, plastic containers, and aluminum (urban only).

Rural residents give their paper and plastic bags to their MRFs; although a few also drop off bottles and plastic containers at their MRFs. Sixty percent of urban residents give their yard waste to the garbage truck. Only 40 % give their kitchen waste to the garbage truck. Majority of the respondents reuse their kitchen waste as animal feed.

Waste Collection and Transport

The garbage collection system in the urban area or the city proper is done 8-hours daily on Sunday, which covers only 6 urban and 2 upland/sub-urban barangays out of

18 barangays. Waste generators in the 18 barangays are required to separate the biodegradable from the non-biodegradable wastes. Biodegradable wastes are collected daily while non-biodegradable wastes are collected twice a week in urban barangays. On the other hand, the rest of the rural barangays which are not covered by the city's collection system bring their residual wastes to the Eco-Waste Management and Recycling Center for final disposal.

Three out of the 18 barangyas have an average budget for collection of about PhP 25,000 per year. These are Barangays Quezon, Codcod and Punao. The average daily collection of waste is about 17 to 20 tons. The city collection consists of 3 compactor trucks and 2 open-dump trucks; most of which are old and break down often. Each truck has a garbage collection team made up of the driver, 3 paleros and 1 monitoring officer. The latter checks if the garbage is properly segregated and gives notice to waste generators if they have not properly complied with the segregation requirement [2]. According to the SWMO, they consider their segregated waste collection as 95% successful. Five percent of the biodegradable wastes collected are mixed with residual wastes so that this fraction is landfilled instead of being composted.

Waste Disposal

Closure and Rehabilitation of the Old Dumpsite

The City converted their old 0.90 hectare open dump (which was operated since 1990's) in Brgy. 1, Villarante Village to a controlled dumpsite in August 2006. It ceased its operation a day after the opening of the new Eco-Waste Management and Recycling Center on September 13, 2007. With a PhP 2.0 million allocation from the city, the physical closure of the old dumpsite was initiated in May 2008 utilizing biological treatment technology. The entire dumpsite was covered with a 45-cm. clay material final cover with an addition of a 15-cm. top soil cover to allow vegetation growth and to stabilize the slope protection layer. Five gas vents were also installed for controlling possible methane gas migration. In 2010, the status of closure/rehabilitation was already completed.

[2] Ibid.

Sanitary Landfill Establishment

San Carlos City has a six hectare sanitary landfill facility located at Sitio Mabuni, Barangay Guadalupe and which started its operations on September 13, 2007. The total construction cost of the SLF was PhP7.5 million and with an annual operation cost of PhP3.75 million. It has a projected life span of 20 years. The SLF site is under a lease agreement of ten years with a private landowner.

The sanitary landfill at the Eco Center receives 5 tons per day of residuals (31% out of the 17-20 tons daily collection of waste). To enhance the treatment process of the leachate from SLF, an aeration chamber was added and vetiver grass was planted at the last chamber to serve as biological treatment known as '*reed-bed*' treatment system. This has resulted to significant reduction of contaminants thus improving water quality prior to its final discharge to the environment.

The Eco-Center and SLF has a receiving and segregation and storage area and a composting area. There are 37 workers in the SLF. Table 3 shows the yearly disposal target for 2011-2020.

Table 3: Waste Projection and Yearly Disposal Target (in Tons/yr)

	2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Biodegradable	4,190	4,332	4,478	4,628	4,767	4,905	5.044	5,208
Non-biodegradable	2,256	2,332	2,409	2,489	2,566	2,642	2,723	2,803
Total	6,466	6,664	6,887	7,117	7,333	7,547	7,767	8,011

	2019	**2020**
Biodegradable	5,362	5,526
Non-biodegradable	2,887	2,975
Total	8,249	8,501

Source: San Carlos City Ten Year Solid Waste Management Plan 2000-2010

Based on its 2004 Waste Characterization Study (WACS) residual wastes include used diapers and sanitary napkins, sand and gravel, cloth/textiles leather and used tires. In the ocular visit to the SCC landfill, the researchers also saw other residual wastes such as single use plastic bags, Styrofoam and laminates.

Special wastes included in its WACS are pre-treated hospital wastes, spent fluorescent lights, batteries, broken glass, tires and rubber.

Cost Recovery

Presently, the city government is on the drafting stage of its comprehensive SWM Ordinance with cost-recovery mechanism. In line with the cost recovery initiative, the city established an account entitled Trust Liability Account No. 439 under the General Fund where all the sales of compost and recyclable materials are deposited. It is supported by City Ordinance No. 07-14 which allows the solid waste management office to sell compost and recyclables out from the processed materials.

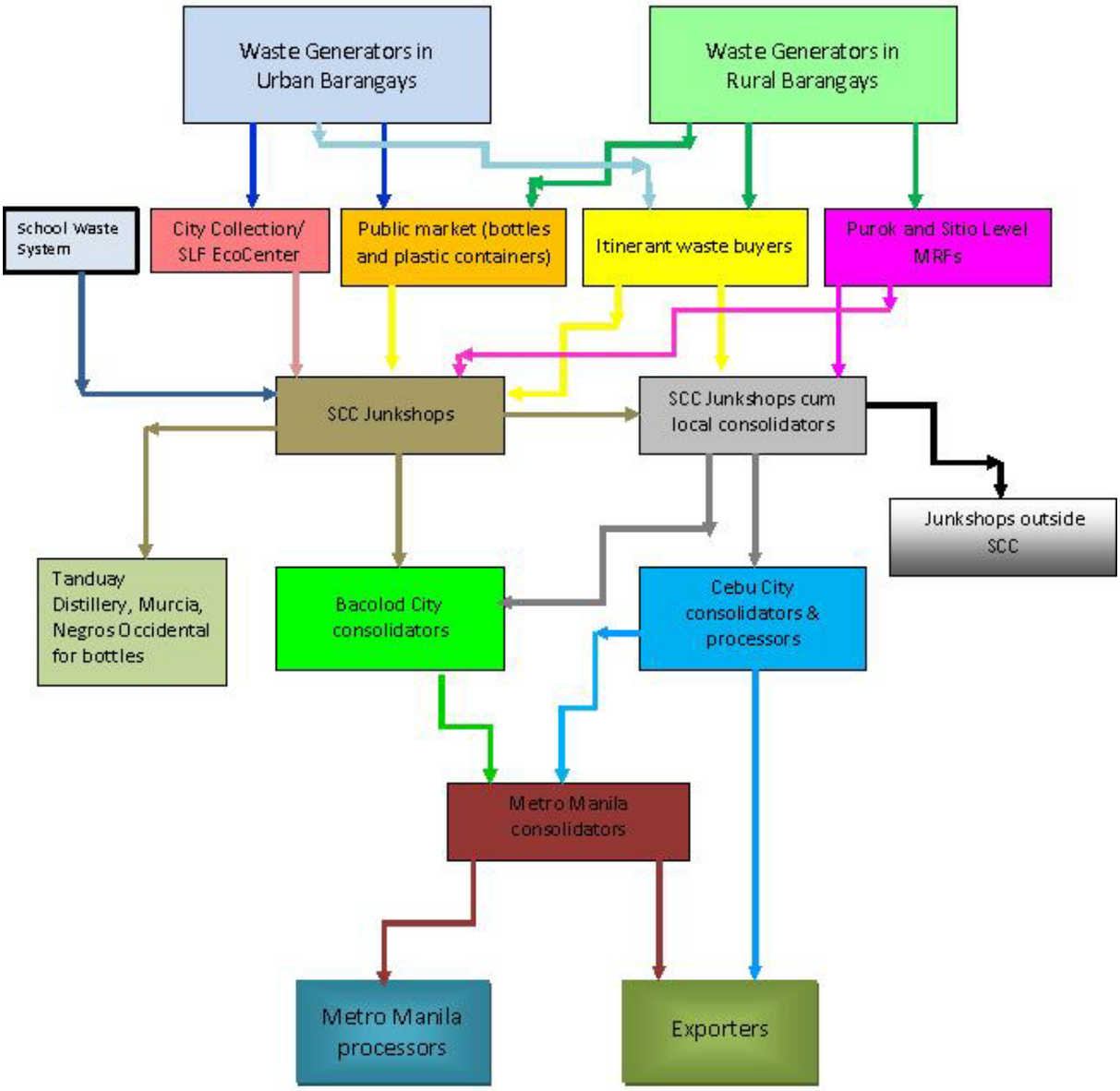
In December 2010, a total of PhP 1.07 million was deposited in the SWM Trust Fund Account from the sales of compost and recyclables (PhP 468,000) and from cash awards from various contests (PhP 610,000). Another income from the garbage collection fee of about PhP 148,000 was generated from business establishment went to the city's General Fund Account. Thus, a total of PhP 1.2 million has been accumulated for Calendar Year 2010 in line with the city's cost recovery measures for SWM [3].

Recyclable Waste Flow

An overview of the recyclable waste flow in San Carlos City (SCC) is shown in Figure 3. Recyclables flow through the formal collection system of the City managed garbage collection system, school recovery systems, the materials recovery facilities of the barangays and the San Carlos City Eco Center. From waste generators, recyclables also flow through the itinerant waste buyers and junkshops. Junkshops from nearby municipalities also trade through the SCC junkshops. From the SCC junkshops, the recyclables are brought and sold to Bacolod City or Metro Cebu and

[3] Ibid.

Figure 3: San Carlos City Recyclable Waste Flow



onwards to processors and traders in Metro-Manila. From Cebu, recyclables are sold to local Metro-Cebu processors and are either exported directly to other countries or sold to Metro-Manila traders and processors.

LGU Managed Waste Recovery System

Waste diversion and materials recovery started only in 2003 .The waste diversion rate was collected based on the total amount (ton) recovered by dumpsite wastepickers,

and starting 2007 also by sorters at the SLF. The waste diversion rates are shown below**:**

Table 4 : San Carlos City Waste Diversion Rates

Year	**Waste Diversion rate %**
2003	6.40
2004	7.73
2005	16.20
2006	21.30
2007	74.09
2008	59.73
2009	67.52
2010	70.53

Source: San Carlos City Ten Year Solid Waste Management Plan 2000-2010

The high diversion rate in 2007 coincided with the establishment of the City's Eco-Center and SLF. The City reached its projected 70% waste diversion rate for 2010 as targeted in its Ten Year SWM Plan. The city is aiming at maintaining its 70% waste diversion rate until 2015. The following is SCC's waste diversion target for 2011-2020 (tons/yr).

Table 5: Waste Diversion Target

	2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Bio	2,935	3.033	3,135	3,241	3,336	3,924	4,037	4,168	4,289	4,421
Non-bio	1,580	1,632	1,686	1,741	1,796	2,113	2,179	2,241	2,310	2,380
Total	4,515	4,664	4,821	4,982	5,132	6,037	6,216	6,409	6,599	6,801
Total In%	**70**	**70**	**70**	**70**	**70**	**80**	**80**	**80**	**80**	**80**

Source: San Carlos City Ten Year Solid Waste Management Plan 2000-2010

Barangay Recovery System

Instead of just having barangay based MRFs, many barangays established purok level MRFs on a voluntary basis. Villagers provided free labor in the construction of their MRFs . As of January 2011, the City SWM Office reported a total of 102 MRFs. Of these, seven were non –functional, most of which are those located in the city center. Most of these MRFs are sitio-based and each MRF functions as a drop-off center on specific days.

In the rural barangays, biodegradable wastes are not collected as waste generators are supposed to manage their biodegradable wastes. In Barangay Guadalupe, the hacienda owner provides a communal composting site where residents can bury their biodegradable wastes so that these can be composted. In the urban barangays, there are schedules set for the collection of biodegradable wastes.

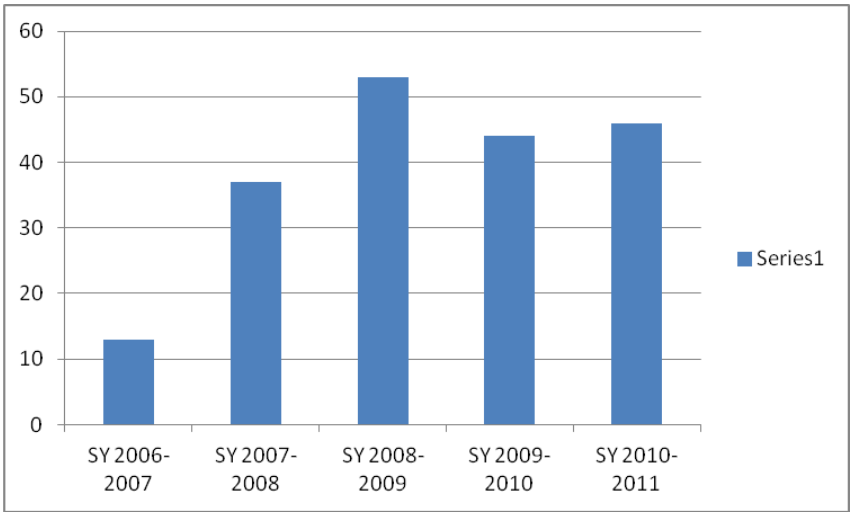
Residents have the option either to drop off their recyclables at the materials recovery facilities or sell them to the itinerant waste buyers locally called “canvassers” by the junkshops which provide the latter with buying capital.

School Based Recovery System

The SWM Office also works with schools to promote segregation, recycling and composting. They launched school competition and provided incentives in the form of “gift packages” for schools with the most volume of materials recycled. From July 2006 to 2007, the public elementary and secondary schools were able to recover a total of 40,000 kilos of recyclables which amounted to PhP 45,000.00. Registered junkshops were chosen by the City and assigned to specific schools for the recovery of recyclables.

Figure 4 below shows the increase in participating public schools from thirteen schools in School Year 2006-2007 to forty six in School Year 2010-2011.

Figure 4: Number of Schools Participating in Recycling Program



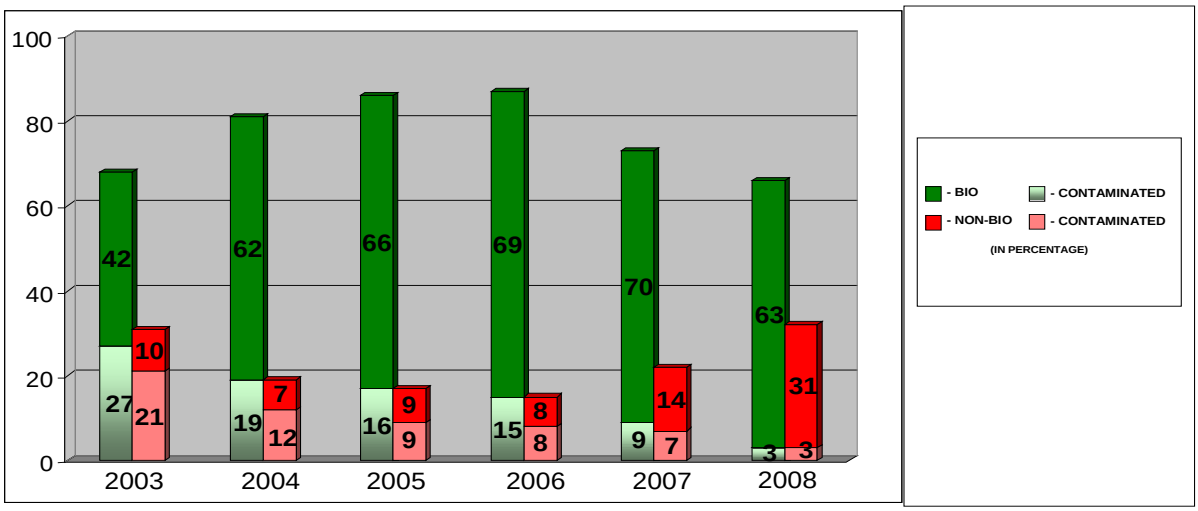
Source: San Carlos City SWM Success Story, 2009

As of 2011, the SWMO also has special collection scheme for paper wastes from schools which they sell to junkshops in Bacolod City since local junkshops do not buy paper waste. It has also three accredited junkshops as its partner in the school-based recovery system. Junkshop partners are required by the SWMO to record the volume of recyclables recovered in their assigned schools.

Waste Recovery System at the Eco-Center/Centralized MRF

Figure 5 shows that the wastes delivered into SCC's solid waste disposal facility were sorted into biodegradable and non-biodegradable wastes and further into whether the two types are contaminated from 2003 to 2008. The figure reflects also the impact of the three year SWM education campaign as shown by the increase in uncontaminated biodegradable wastes and non-biodegradable wastes.

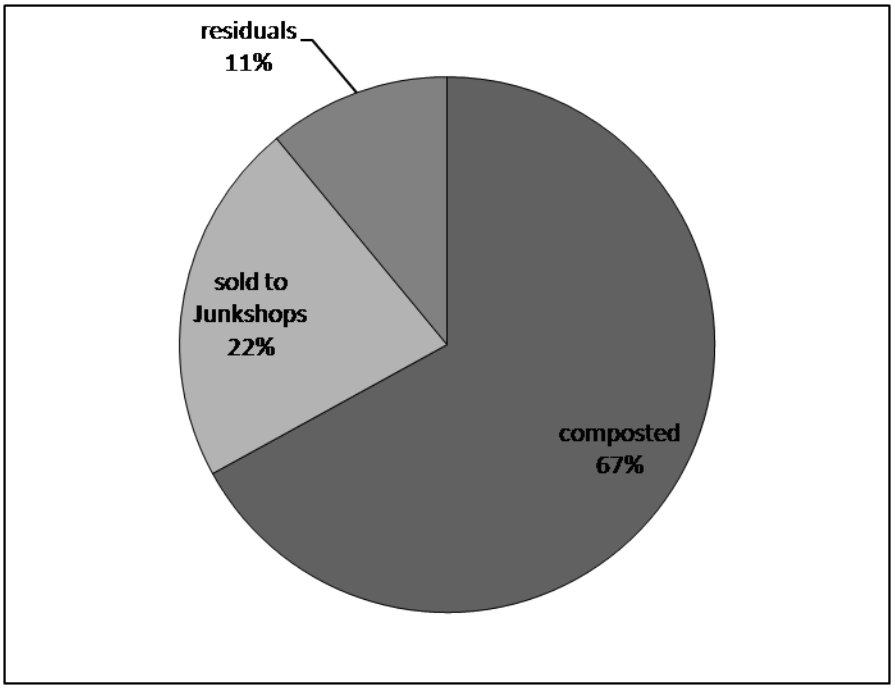
Figure 5: Wastes delivered at the San Carlos City Eco-Center and Disposal Facility



Source: SWM Success Story, 2009

As of 2011, of the average 18 tons brought to the SLF, waste diversion rate was 90 %. Figure 6 shows that the biggest fraction diverted are biodegradable wastes. This shows that the segregated waste collection of the city is effective. Only ten percent are disposed at the landfill cell.

Figure 6: Profile of SCC Waste Diversion in 2011



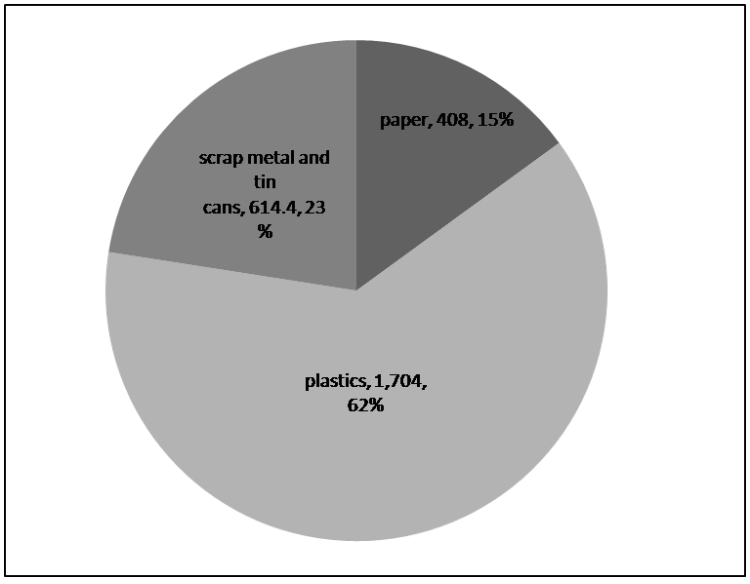
Source: San Carlos City SWMO Report, 2011

Waste Diversion of Recyclables

At the Eco-Center, there are nine former wastepickers (all are males) from the closed Villarante dumpsite who are currently working there. They were integrated into the formal system because of their knowledge in waste recovery but the City did not integrate the women wastepickers in the Eco-Center as waste segregator because they considered the job as unsafe for women. However, one woman wastepicker was given "light" jobs such as janitorial and clerical tasks.

Figure 7 shows the types of recyclable materials recovered by the EcoCenter workers in 2011. The top three materials recovered include: plastic, PET and cartons. The plastic bags are currently stockpiled awaiting arrangements with a cement factory to pick it up to be used as alternative fuel and raw material.

Figure 7 : Recyclables (kg/month) Diverted at the SCC SLF Eco Center



Source: San Carlos City SWMO Report, 2011

The SWMO was authorized to sell compost and recyclable materials generated at its Eco-Center through Ordinance No. 07-14 . As of April 11, 2011, the Eco Center generated PhP 500,196.20 from the sales of recyclables and compost (Table 6). The recyclables are sold by the City to the larger junkshops in San Carlos or are picked up by local junkshops cum consolidators.

Table 6: SCC Eco Center Income (April 11, 2011)

Source	Sales
Sale of recyclables	Php 347,605.20
Sale of Compost	Php 152,591.00
Total	Php 500,196.20

Source: San Carlos City Ten Year Solid Waste Management Plan 2000-2010

Informal Waste Recovery at the Former Dumpsite

Prior to the closure of the city's open dumpsite in Villarante in 2007, wastepickers recovered recyclables and sold the materials to the junkshops. Three key informants from the informal waste sector were engaged in wastepicking in the Villarante dumpsite for five to ten years. Two of the key informants also collected the biodegradable waste and sold it as pig slop. Two did wastepicking on a part time basis since they had other means of income. Wastepicking was done as a family activity. Recyclables recovered were sold to the local junkshops and they were paid on cash basis. Buying prices were determined by the junkshops. Estimated weekly income ranged from PhP1,000 to PhP1,600.

Itinerant Waste Buyers

The itinerant waste buyers (IWBs) are key suppliers of the junkshops in San Carlos City. The City does not have any data on the number of itinerant waste buyers within the city. The respondents from the IWBs are relatively young, their ages ranging from 15 to 30 years old. Two of them finished elementary education, two are high school undergraduates and one did not complete his elementary education. Three of them had been working in waste trading for just one year. Lack of other livelihood opportunities and family influence were cited as their reason for going into this kind of work.

The junkshops provide the itinerant waste buyers with buying capital. Junkshop A-2 has sidecars which it rents to the itinerant waste buyers whom they locally call "canvassers". Rental fee for sidecars are PhP20 to PhP40 per day. The IWBs go beyond city limits to neighboring municipalities such as Calatrava.

The “suki” system where the IWBs buy recyclables from “regular” suppliers is a prevailing practice. The table below shows the weekly amount of recyclables bought by the IWBs, its buying and selling prices.

Table 7: Itinerant Waste Buyers’ Recyclable Waste Flow

Recyclable Items	Amount Purchased/week	Buying Price	Selling Price
Glass bottles	100 pcs – 20 pcs	PhP0.50	PhP1 per piece
PET*	2 kg	PhP8	PhP10
Plastics	9-4 kg	PhP8	PhP10
steel	18 – 7 kg	PhP10	PhP13
copper	2 kg - .25 kg/month	PhP200	PhP220-PhP240
aluminum	2 kg – 5 kg	PhP25 –P30	PhP40
yero	30 kg – 3 kg	PhP4-P9	PhP9-PhP10

*Only one IWS bought PET separately from the other types of plastics. Co-mingling of the different types of plastics is the usual practice of the IWS and the small junkshops.

The top earners for the IWBs are the assorted metals specially copper which they recover from electrical and electronic goods where they either burn the wire cover or peel it off. Co-mingled plastics are their second biggest earner followed by glass bottles.

Private Sector Materials Recovery System

Waste Recovery of Junkshops

There are thirteen junkshops in San Carlos City, of which seven are legally registered with the local government. The profile of three of the registered junkshops is shown in Table 8.

Table 8 : Profile of Three SCC Junkshops

Particulars	Junkshop A-1	Junkshop A -2	Junkshop A-3
Year business started	1985	2007	2002
Owner's Age	58	34	26
Educational attainment of Owner	High school graduate		Vocational education
Monthly Buying Capital	PhP50,000*	PhP50,000	PhP300,000
No. of vehicles	1 ten wheeler truck; rents other vehicles as needed	2 trucks	5 vehicles
Activities	Sorting Baling through baling machine Crushing	Sorting Manual baling dismantling	Sorting, manual baling, dismantling
Suppliers	• Itinerant waste buyers • Walk in clients • Junkshops in SCC	• Itinerant waste buyers • Junkshops • Walk in clients	• Itinerant waste buyers • Walk-in clients • Junkshops • Schools
Buyers/Destination	• Metro Cebu • Processors • Traders	• Bacolod City processor	• Metro-Manila

*****Understated as junkshop A-1 is also a consolidator who brings scrap directly to Metro-Cebu

The SCC junkshops deal mainly with traditional recyclables such as scrap metal, glass bottles and plastic waste. The bigger junkshops segregate the co-mingled plastics supplied by IWS into PET, polystyrene cups, hard plastics and plastic containers. Only one junkshop identified e-wastes as part of its trading. However, it is a common practice among junkshops to dismantle the e-wastes into its components, i.e. metals and plastic. Waste paper with the exception of cartons are not traded in the city junkshops. Newspapers are reused in the local market as wrappers.

Table 9 : Inflow of Recyclables into SCC Junkshops

Scrap	Junkshop A-1	Junkshop A-2	Junkshop A-3
White paper	Not traded	Not traded	NA
Assorted Paper	NA	NA	NA
Boxes/cartons	5 tons/week	NA	NA
PET	2 tons/week	500 kg/week (includes all types of plastics)	100 kg/week
Glass bottles	500 sacks/week 12.5 tons	100 sacks/week (80-100 pcs/sack) Approximately, 2.5 tons	
Polystyrene cups	No data given	50 kg/month*	
Plastic Containers	2 tons/week		50 kg /week
Plastic bags	None traded	None traded	None traded
Plastic (hard)	1 ton/week		20 kg/week
E-waste	NC	No data given	30 kg/week
Steel	5 tons/week	375 kg/week	500 kg/week
Copper	100 kg/week	5 kg/week	50 kg/week
Aluminium	50 kg/week	5 kg/week	20 kg/week
Aluminium can	50 kg/week	5 kg/ week	15 kg/week
Yero	1 ton /week	300 kg/month	100 kg/week
Tin Cans	No data given	200 kg/ week	50 kg/week
Brass	No data given	No data given	12 kg/week
Lead batteries	No data given	No data given	8 pcs/week
Stainless steel	No data given	No data given	10 kg/week

The top recyclables in terms of volume recovered are assorted scrap metals, cartons, glass bottles and plastic containers. The projected total recyclable waste generated in SCC is 4.14 tons daily. The total waste intake of the three junkshops amounts to 2.1 tons which also includes an undetermined amount from nearby municipalities.

The buying and selling prices of the SCC junkshops are based on the buying prices of consolidators and processors. The local junkshops can access information on the prices through personal inquiry using their mobile phones. They keep a list of contact numbers and addresses of their preferred buyers.

Table 10: Buying (BP/kg) and Selling (SP/kg) Prices of Junkshops

Scrap	Junkshop A-1		Junkshop A-2		Junkshop A-3	
	BP	**SP**	**BP**	**SP**	**BP**	**SP**
White paper	Not traded	Not traded	Not traded	Not traded	Not traded	Not traded
Assorted Paper	Not traded	Not traded	Not traded	Not traded	Not traded	Not traded
newspaper	Not traded	Not traded	Not traded	Not traded	Not traded	Not traded
Boxes	P2	P5			Not traded	Not traded
PET	P10	P15-20 (crushed)	P10	P13	P10	P12
Glass	PhP70-P1	PhP1.20	PhP1	PhP1.50	No data given	No data given
Polystyrene cups	No data given	No data given	No data given	No data given	No data given	No data given
Plastic Containers	No data given	No data given	PhP7	PhP8	PhP9	PhP11.50
Monoblocks	No data given	No data given	PhP7	PhP8	No data given	No data given
Plastic (hard)	No data given	No data given	PhP7	PhP8	PhP9	PhP11
E-waste	No data given	No data given	PhP7	PhP8	PhP50/pc or P13/kg	PhP70/pc or P15/kg
Steel	PhP10	PhP12	PhP13	PhP15	PhP13	PhP14.50

Scrap	Junkshop A-1		Junkshop A-2		Junkshop A-3	
	BP	**SP**	**BP**	**SP**	**BP**	**SP**
Copper	PhP200	PhP230	PhP200	PhP280	PhP270	PP295
Aluminum	PhP30	PhP40	PhP40	PhP45	PhP55	PhP67
Aluminum can	PhP30	PhP40	PhP40	PhP45	PhP45	PhP55
Yero	PhP7	PhP10	PhP9	PhP12.50	PhP7	PhP8.50
Tin Cans	PhP5			PhP7.50	PhP5	PhP7
Brass	No data given	No data given	No data given	No data given	PhP150	PhP175
Lead batteries	No data given	No data given	No data given	No data given	PhP300-PhP1,400/ Per piece	PhP360-PhP1,550 Per piece

Within SCC, some of the local junkshops are also consolidators. One of them is a consolidator of bottles and cartons which he brings to Mandaue, Cebu processors or exporters. Each of the three junkshops studied have its own set of buyers/consolidators. The junkshops deliver their recyclables to the buyers in Bacolod City. These buyers are either based in Bacolod City and Cebu City with the latter having buying stations in Bacolod City. The Bacolod consolidator (Consolidator-Processor A-4) sells directly to Manila consolidators and processors. One Bacolod City trader sells to a foundry plant in Iligan City in Mindanao. Metro Manila based Consolidator/Exporter A-5 exports the scrap metals to China or sell to local foundry shops in Metro Manila and nearby localities. One Manila based company has a processing plant in China.

Table 11 : Destination of Recyclables

Scrap	Junkshop A-1	Junkshop A-2	Junkshop A-3
White paper	Not collected	San Miguel Corporation, Mandaue City, Metro-Cebu	
Assorted Paper			
Newspaper			
Boxes			
PET	Bacolod City	Mandaue City, Metro-Cebu	Metro-Manila
Glass bottles	Bacolod City	Tanduay Distillery, Bacolod City	
Polystyrene cups	Bacolod City	Mandaue City	
Plastic Containers PP and PU		Mandaue City	Metro-Manila
Plastic (hard)	Bacolod City	Mandaue	Metro-Manila
Lead Acid Batteries			Bacolod City
Steel	Bacolod City	Sold in Bacolod for shipment to Metro-Cebu	Bacolod City
Copper	Bacolod City	Bacolod City	Bacolod City
Aluminum	Bacolod City	Metro-Cebu	Bacolod City
Aluminum can	Bacolod City	Metro-Cebu	Bacolod City
Yero	Bacolod City	Metro-Cebu	Bacolod City
Tin Cans	Bacolod City	Metro-Cebu	Bacolod City
Stainless Steel	No data given	No data given	Bacolod City

Factors Affecting Recyclable Waste Flow

There are some local and national policies that impact on recyclables recovery in SCC. Local enforcement of waste segregation into biodegradable and non-biodegradable wastes has facilitated the recovery of relatively uncontaminated scrap by the City and

its barangay MRFs. The DENR regulation, DAO 2010-06 entitled " Guidelines on The Use of Alternative Fuels and Raw Materials in Cement Kilns", allowing the use of plastic wastes as alternative fuel and raw material has encouraged the SWMO to stock pile its plastics with no commercial value locally and to make arrangements with a cement company.

There is presently no ordinance regulating use of plastic bags but the City has an IEC campaign promoting "No Plastic Day" in the city. Except for cartons, paper waste has no commercial value so the City has made arrangements for school-based recovery and recycling of paper waste in partnership with three registered junkshops.

There is presently no ordinance regulating junkshop operations except for securing business permits. There are problems such as trade in stolen goods and informal recycling of e-waste. There are no regulations in support of itinerant waste buyers for their social protection and support of their livelihood from waste.

The recyclables flow from waste generators to the junkshops are primarily through the IWBs. Since SCC has a dearth of employment opportunities, itinerant waste buying is one of the easiest way for income generation. As a result, the respondents from IWBs group are complaining that their numbers are increasing thus, they have to move away into nearby municipalities to buy recyclables.

Trading operations between IWBs and junkshops and between local junkshops are on cash basis. Some of the junkshops provide the IWBs with cash advances that enable them to conduct their buying activities. Cash basis and open trading are the norm.

Between the junkshops and their buyers trading information is readily accessible through the mobile phone. Junkshop A-2 is a consolidator of Tanduay bottles which he delivers to Murcia but there are certain bottles which he has to sell as cullets when its consolidators stop buying. Presently, only Junkshop A-1 has plans to set up a crusher for plastic wastes, thus most of the local junkshops simply commingle the different types of plastics thus missing on a better selling price for each of the plastic types.

There are consolidators and traders from Cebu City and Metro-Manila who conduct their trading activities in Bacolod City. Due to the accessibility of Cebu, Junkshop A-1 prefers to bring his scrap directly to Cebu processors and traders. Small junkshops who want to save on transport sell their scrap to the big junkshops in SCC.

Table 12 : Factors Affecting Recyclable Waste Flow

Waste Materials	Facilitating Factors	Hindering Factors
1. Paper	• SWMO conducts special collection days in schools and sells the paper waste directly in Bacolod City. • School children and Eco-Center workers recycle paper waste into charcoal briquette.	• Junkshops do not buy paper wastes. Paper waste has no economic value except for cartons. There is no paper processing company in Bacolod City or nearby cities in Negros Occidental.
2. Bottles	• The bottles are usually sold by waste generators to the itinerant waste buyers and the local junkshops. • Junkshop A-2 is a consolidator for Tanduay bottles which he sells to Tanduay Distillery plant in Murcia.	• There is no market for UFC bottles so Junkshop A-2 breaks it down into cullets.
3. Plastic bags and styropor	• SCC was able to link with potential buyer and relatively uncontaminated bags are being stockpiled for use as alternative raw fuel for a cement factory; Current DENR policy allows the use of plastic waste as alternative	• The junkshops do not buy these materials. • There is no formal agreement between SCC and the potential buyer of plastic bags and Styrofoam.

Waste Materials	Facilitating Factors	Hindering Factors
	raw fuel.	
4. Assorted plastic containers (PET, PP, HDPE, monoblock chairs also called *sibak* or *malutong* in other cities)	• Junkshop A-2 will be setting up a flaking equipment that will facilitate transport costs of the plastics to Bacolod City or Cebu City. • In Bacolod City, Junkshop A-1's consolidator has several flaking equipment, a washing and drying system that allows for further classification of plastics.	• Transport costs and bulkiness of materials bring down the price of these materials. The local buying price is low and the volume needed is not quickly accumulated so that local junkshops are not motivated to segregate the plastics into its different types.
5. Electronic Wastes	• Dismantling allows for further segregation of the E-waste into various recyclable items.	• Dismantling is done by the itinerant waste buyers and junkshops which is not monitored by SCC. There are risks of health and environmental contamination from lead and other heavy metals.
6. Biodegradable Wastes	• The sugar plantations provide the market for the Eco-Center's compost products. Thirty percent of the compost produced are given to the owner of the Eco-Center site as land rental.	• There is still some contamination of biodegradable waste due to improper segregation but the level of contamination has gone down due to effective IEC.

Impact of Economic Recession on the Flow of Recyclables

Trading of recyclables are also affected by changes in the global market, especially changing demand from China, which is the number one export destination for recyclables. Prior to the 2008 Olympic Games in China, there was very high demand for recyclable materials specially scrap metal, steel and plastic wastes. As a result, junkshops in SCC increased in number in anticipation of consistently good buying prices from China. Many stockpiled scrap metal and steel but when the prices fell way below their buying prices, many of these new junkshops closed down. It was only the bigger junkshops that managed to survive the post Olympic Games price downturn.

Junkshop A-2 bought tin cans at PhP5 per kg but its selling price went down to PhP.50/kg. To survive, the owner stockpiled the inventory and shifted to alternative income generation through their small retail store, swine raising and operating 2 tricycles. Junkshop A-3 stopped buying certain scrap, downsized its operations 50% and stockpiled its inventory.

Issues and Challenges

In San Carlos City, the following are some issues and challenges facing the SWM program:

Local Government

- No enforcement of RA 9003 provision regarding open burning as it applies to the sugar cane plantation. Currently a project is underway to use sugar cane waste and other plant residues into biomass energy;
- No city SWM ordinance enacted;
- No junkshop ordinance enacted; and presence of illegal junkshops; and
- SWMO employees are co-terminus with the Mayor's term of office; there is no City ENRO.

Local Junkshops

- Access to capital affects the volume and scope of operation of the SCC junkshops;
- Transport costs also affect the flow of goods; and

- There is no association that can help the junkshops in terms of representing their interests with the government and facilitating support for each other.

Informal Waste Sector

Due to lack of livelihood opportunities in San Carlos City, the number of itinerant waste buyers have been increasing. They not only buy from San Carlos City but also from nearby areas such as Calatrava and Salvador Benedicto. They have no job security and are dependent on junkshop owners for their capital, usually ranging from PhP500 to PhP1,000. One junkshop has terminated its practice of working with the IWBs or canvassers as they are locally called because according to him, the IWBs do not bring back the recyclables to his shop and instead sell it to those who offer the highest price. Another junkshop mentioned that stolen goods is one of the problems encountered in the scrap trade.

II.2. Case Study B: San Fernando City, La Union

LGU Profile

The City of San Fernando is the center of trade and development in Northern Luzon. It serves as the regional center of Region I hosting major business and financial institutions, regional offices, universities and colleges and others. Also, the city has the Poro Point Special Economic and Freeport Zone with a functional airport and seaport and warehouse facilities.

The City is the capital of the Province of La Union and is situated about 270 kilometers north - northwest of Metro Manila. Its land area is 10,526 hectares or 105.26 sq. kms and is subdivided into 59 barangays. Twenty four barangays are classified as urban and 35 barangays as rural. Twenty barangays are located within the coastal plain while 39 barangays are found in the hilly mountainous terrain east of the Poblacion or the City center.

Its agricultural area covers 7,593, 668 hectares. or 72.14% and includes fishpond area of 141.67 has. and a poultry and piggery farm of 2,129 square meter (sq. m). Residential areas cover 1,001.70 has. or 9.52% of the City's total area. Forest

areas/timber lands grown with shrubs, mature trees and other forest species has an area of 636.53 hectares or 6.05% while the rest are utilized for commercial, institutional, industrial and infrastructure uses.

Solid Waste Profile

Based on the population census, the city has an estimated population of 111, 919 (urban: 77,540 and rural: 34,379) in 2004 and projected to increase to 142, 304 (urban: 90,362 and rural: 51,942) in the year 2014. Using the per capita SW generation of 0.5 kg/day/person of solid made among urban residents and 0.3 kg/day/person for rural residents, the estimated volume of waste generation for 2014 in the city is about 45, 181 kgs/day for urban and 15,582.60 kg/day for rural. Total waste generation is estimated at 60,763.kg per day.

Table 13. Solid Waste Generation Projection

Type of Brgy.	**Population**		**Per Capita SW Generation**	**Estimated Volume of Solid Waste** (in kgs.)day	
	2004	*2014*		*2004*	*2014*
Urban	77, 540	90, 362	0.5 kg/day	38, 770	45, 181
Rural	34, 379	51, 942	0.3 kg/day	10, 313.7	15, 582.6
Total	111, 919	142, 304		49, 083.7	60, 763.6

Source: Ten Year Solid Waste Management Plan of San Fernando City, La Union, 2003

In 2003, the City Government through the City ENRO conducted an actual solid waste characterization to determine the rate of solid waste generation in the city. Table 14 shows that the waste composition of the City's solid waste consisted of 54.25% biodegradable, 24 % non-recyclable or residual, 21% recyclables and .24% special wastes. The data was generated from households, market/commercial establishments, schools, offices and hospitals.

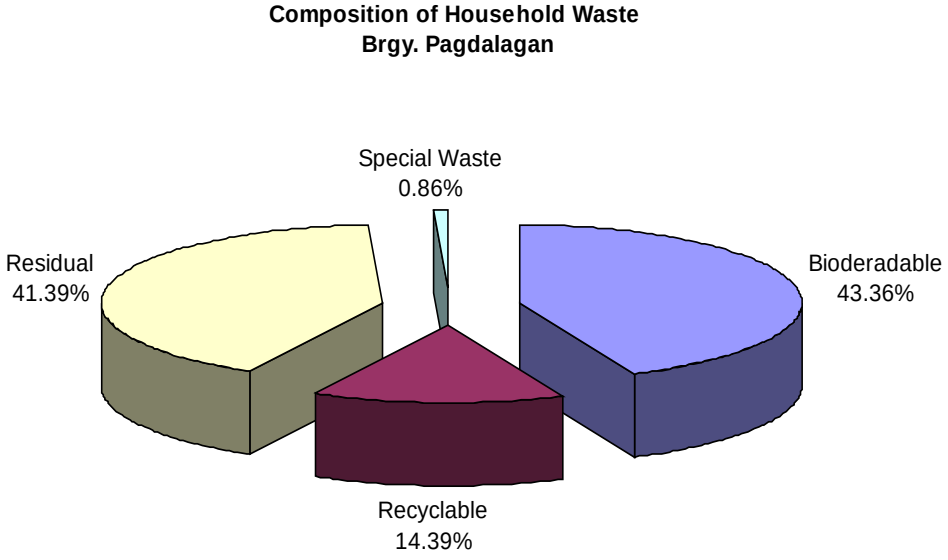
Table 14. San Fernando City Waste Profile, 2003

Type of Solid Waste	Weight (kgs)					Total Weight of SWM (kgs/ day)	Percent (%)
	House-holds	Market/ Commercial	Schools	Offices	Hospitals		
Biodegradable	138	74	50	10	63	335	54.25
Recyclable	50	20	15	9	36	130	21.05
Non-recyclable	45	40	25	11	30	151	24.45
Special waste	.5	-	-	-	1	1.5	0.24
Total	233.5	134	90	30	130	617.5	100

Source: Ten Year Solid Waste Management Plan of San Fernando City, La Union, 2003

The City conducted a WACS at the barangay level in 2008 as shown in Figure 8. The study showed that at the barangay level, biodegradable waste is lower is 43.36% while at the city level it is 54.25% while residuals are higher at 41.39% compared to 24.45 %. The advent of laminates as packaging materials for consumer goods may have been a factor in the increase of residual wastes and a consequent decrease in recyclables. The composition of residual wastes include the following: Styrofoam packaging, composites or laminates, plastic bags, sanitary napkins and diapers and inerts.

Figure 8. WACS Result of Barangay Pagdalagan



SWM System

In compliance with RA 9003, then Mayor Mary Jane Ortega issued Executive Order No. 2-2002 creating the City Solid Waste Management Board to respond to the needs of the city and calling for the formulation of a Solid Waste Management Plan/Program for the City of San Fernando. In 2003, the City conducted a planning workshop which led to the formulation of its Ten Year Solid Waste Management Plan. It was approved by the City Solid Waste Management Board in 2004 and will soon undergo a process of updating.

The City Solid Waste Management Board was created in 2004 but ceased functioning in 2009. At the barangay level, there are 15 barangay solid waste management committees; the rest of the barangays just utilize their committee on environment for solid waste management concerns.

There are currently two Departments handling solid waste management concerns, namely: City Environment and Natural Resources Office (CENRO) and the General Services Office (GSO) . The CENRO takes care of IEC and provides technical assistance to barangays in the establishment of their SWM systems. The latter takes care of waste collection and SLF operations.

The SWM approach developed by the City over the years is to strengthen the capacity of its barangays to implement their responsibilities through a clustering approach in the collection of solid wastes and MRF establishment. The City also provided technical assistance to some of the barangays in the conduct of their Waste Characterization Study and in the formulation of their SWM ordinances and plans.

Waste Segregation and SWM Practices

The City Solid Waste Management Ordinance classifies solid waste into four types as specified in the Ecological Solid Waste Management Act of 2000. The City Ordinance also requires that waste generators segregate-at source but to date there are different perceptions and practices on segregation.

Among the key informants in Barangay Langcuas, a rural barangay and Parian, an urban barangay, 80% of the respondents said that solid waste is classified into biodegradable, non-biodegradable/non recyclable, and residual wastes. In Barangay Parian, 40% said there are three types of solid wastes and another 40 % said there are four types.

At the city level, segregation at source is not widely practiced although some barangays with their own collection systems require their constituents to segregate their wastes into biodegradable and non-biodegradable. According to the barangay chairperson of Parian, segregation at source increased from 30% to 70% when they intensified their information campaign in 2011.

On prohibited acts, 70% are aware that dumping of wastes is illegal. Forty percent of respondents know that burning of wastes is prohibited. Thirty percent know that littering is also against the law.

Common among all the respondents is their segregation of household recyclable wastes that are bought by itinerant waste buyers and/or junkshops. The most common items include glass bottles, plastic containers and tin cans. Sixty percent of the respondents use paper waste as fuel for cooking. Seventy percent recycle kitchen waste as animal feeds.

In 2010, the City required city market vendors to segregate coconut shells and vegetable scrap from other waste stream The intention is to sell the vegetable scrap to hog growers as animal feed. Two composting bins were also made to process other biowastes from the market.

Waste Collection

Currently, forty-six (46) barangays or 78% of city barangays are covered by waste collection services. Collection services are being conducted by the City Government, barangays and other private haulers. Thirteen (13) barangays are still not covered by collection. In these areas, households dug pits to dispose their wastes. [4]

[4] San Fernando City SWM Data, CY 2011.

The current formal system of waste collection is a mix of city-based and barangay-based operated system as shown in Table 15:

Table 15: Coverage of City and Barangay-Based SWM Collection System

City-based	Barangay-based
1. Brgy. I	**Cluster 1**
2. Brgy. III	1. Brgy. II
3. Ilocanos Sur	2. Brgy. IV
4. Ilocanos Norte	**Cluster 2**
5. Langcuas	3. Lingsat
6. Pias	4. Dalumpinas Oeste
7. Camansi	5. Carlatan
8. Madayegdeg	6. Pagdaraoan
9. Parian	7. Bangcusay
10. Pagudpud	**Cluster 3**
11. San Vicente	8. Tanqui
12. Mameltac	9. Cabaroan
13. Canaoay	10. Santiago Sur
14. Birunget	**Cluster 4**
15. Tanquigan	11. Dallangayan Oeste
16. Bungro	12. Dallangayan Este
17. Siboan-otong	13. Namtutan
18. Abut	**Cluster 5**
19. Bato	14. Poro
20. Sagayad	15. San Agustin
21. Saoay	16. San Francisco
22. Narra Este	**Individual Barangays**
23. Narra Oeste	17. Pagdalagan
24. Bacsil	18. Catbangen
	19. Sevilla
Parts of	20. Santiago Norte
25. San Francisco	
26. Sevilla	
27. Biday	

The General Services Office supervises the collection and disposal operations of the city-based collection system while each barangay designates its officer-in-charge of garbage collection. National government offices and private institutions hire their own haulers.

By 2011, 55.9% of the total wastes collected and transported to the SLF were those collected by the barangay system. The city-based collection coverage comprised only

Table 16. Summary of Waste Collected by Various Entities, March 2011

Source	Weight (kg)/month	Weight (ton)	Number of Trips	%
City-based	520,650	520.65	358	41.77
Barangay-based	696,650	697	437	55.90
National (govt)	280	.28	3	00.02
Institutional	10	.01	1	00.0008
Total	28,720	28.72	28	2.30

Source: City ENRO. Waste Disposal Report, March 2011, San Fernando City, La Union

42%. This was due to the city approach to devolve garbage collection to the barangays.

The barangay managed collection are of two types: those that are barangay -based and those that are cluster-barangay in scope. Nine (9) barangays have their own collection trucks servicing 19 barangays because of clustering. The host barangay with the trucks collect the waste generated by their barangay and their member barangays.

To support the clustering system, the barangays collect PhP25 per household per month to the constituents and counterpart funds are also provided to the barangay hosting the truck. In addition, the barangays also receive subsidy from the City in the amount of PhP700 /truck/day of collection. The thrust of the City is to devolve garbage collection to the barangays. Table 17 shows the amount of waste collected and disposed by the barangays.

Table 17. Collection and Disposal Data of Barangays Implementing Garbage Collection, March 2011

Source	Weight (kg)	Weight. (tons)	No. of trips	%	No. of days	Subsidy (PhP)
Barangay 4	52,275	52.27	51	7.50	30	21,000
Catbangen	109,500	109.50	65	15.72	31	21,700
Dalangayan	24,680	24.68	24	3.54	26	18,200
Lingsat 1	100,915	100.91	62	14.48	31	21,700
Lingsat 2	90,890	90.89	48	13.05	30	21,000
Pagdalagan	29,910	29.91	18	4.29	16	11,200
Poro	73,140	73.14	30	10.50	24	16,800
Santiago	27,680	27.68	19	3.97	19	13,300
Sevilla	103,810	103.81	62	14.90	31	21,700
Tanqui	83,850	83.85	58	12.04	27	18,900
Total	**696,650**	**696.65**	**437**	**100**	**265**	**185,500.00**

Source: Waste Disposal Report, March 2011, City ENRO, San Fernando City, La Union

Segregated collection of wastes is encouraged at the household and barangays. Households are required to segregate their own wastes and allowed only to bring out their waste during collection days. Sanitary technicians collect the wastes from the different generators and transport it to the landfill. Leaves, tree cuttings/trimmings and other garden and kitchen wastes (fruit and vegetable trimmings) are segregated and transported separately to the landfill for composting purposes [5].

Although some of the barangays have already formulated their ordinances which require segregation at source and segregated collection, mixed waste collection is still the predominant system among the barangays. According to the SWEEP Officer who heads the collection and disposal operations, it is only in the Lingsat cluster and in Barangay Pagdalagan where segregated collection of wastes is strictly enforced.

[5] Jucutan, Celso. SWM Evaluation 2010, San Fernando City, La Union.

Aside from not being able to follow the provision on segregated collection, the collection schedule is disrupted by time taken out for truck repairs. Seventy percent of the collection vehicles experience breakdown due to aging of trucks.

Waste Disposal

SFC used an open dumpsite in barangay Canaoay from 1960-1977. In 1978, the disposal operations was transferred to Barangay Mameltac. The open dumpsite in Mameltac was converted into a controlled dumpsite in 1998.

In 2005, the controlled dumpsite was rehabilitated into a sanitary landfill (SLF). through a Design-Build-Operate (DBO) Scheme. The World Bank through the Department of Finance LOGOFIND Project funded the establishment of the city's sanitary landfill facility. The total project cost is more than PhP 163 million (80 % - 20 % cost sharing) to be paid within fifteen (15) years.

The SLF was constructed by the joint venture of Connestoga –Rovers and Associates and Kane Construction Inc. (CRA-KCI). After three (3) years of construction and operation works by the contractors, the operation and maintenance of the SLF was turned-over to the City Government in 01 October 2008.

The SLF has an area of 4.5. hectares. It also has a reserve area of 5.4 hectares in an adjoining parcel of land located in Barangay Dalangayan Oeste.

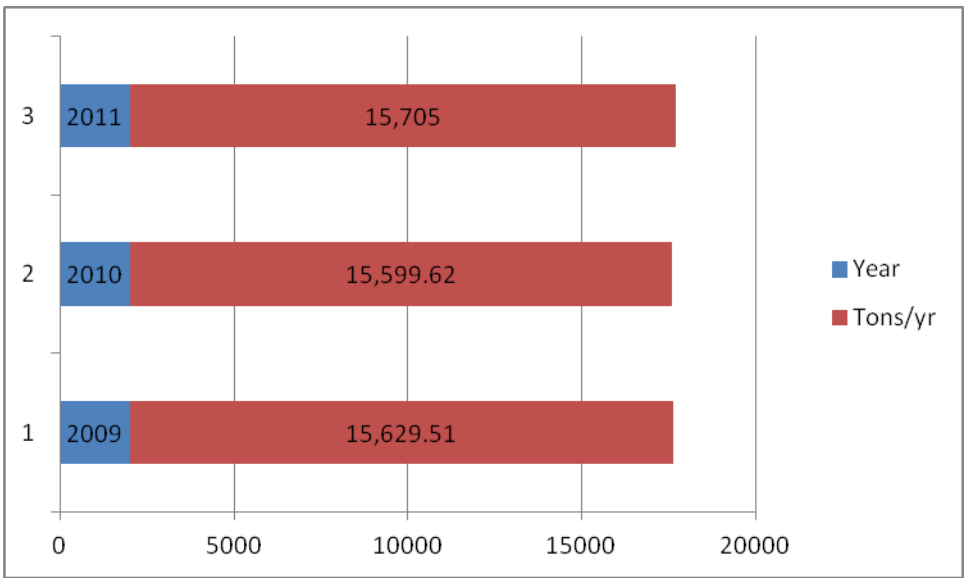
Waste disposed at the SLF from 2009 to 2011 show a decreasing trend but the rate of decrease is minimal as shown in Table 18. From January to November 2011, about 14,396 metric tons (average of 43.102 mt/day) of wastes were disposed at the City Engineered Sanitary Landfill compared to 48.04 mt in 2009 and 42.24 mt in 2010 [6].

The composition of residual and special wastes disposed as observed in the sanitary landfill included plastic bags, diapers, sanitary napkins, rubber, leather, laminates, inerts, and textiles. Due to mixed waste collection, biodegradables are contaminated and treated as residual waste instead of being composted. As reported in its 2011 data,

[6] GSO-SWEEP ISWM Data 2011.

the following special wastes are managed at the SLF: sharps, busted lights, tires and treated human waste from the Ecosan toilet project. The Ecosan toilets do not use septic tanks. Instead urine and feces are separated at source; with the feces undergoing primary composting. These are then collected and undergoes secondary composting at the SLF.

Figure 9: Waste Disposal, CY 2009-2011



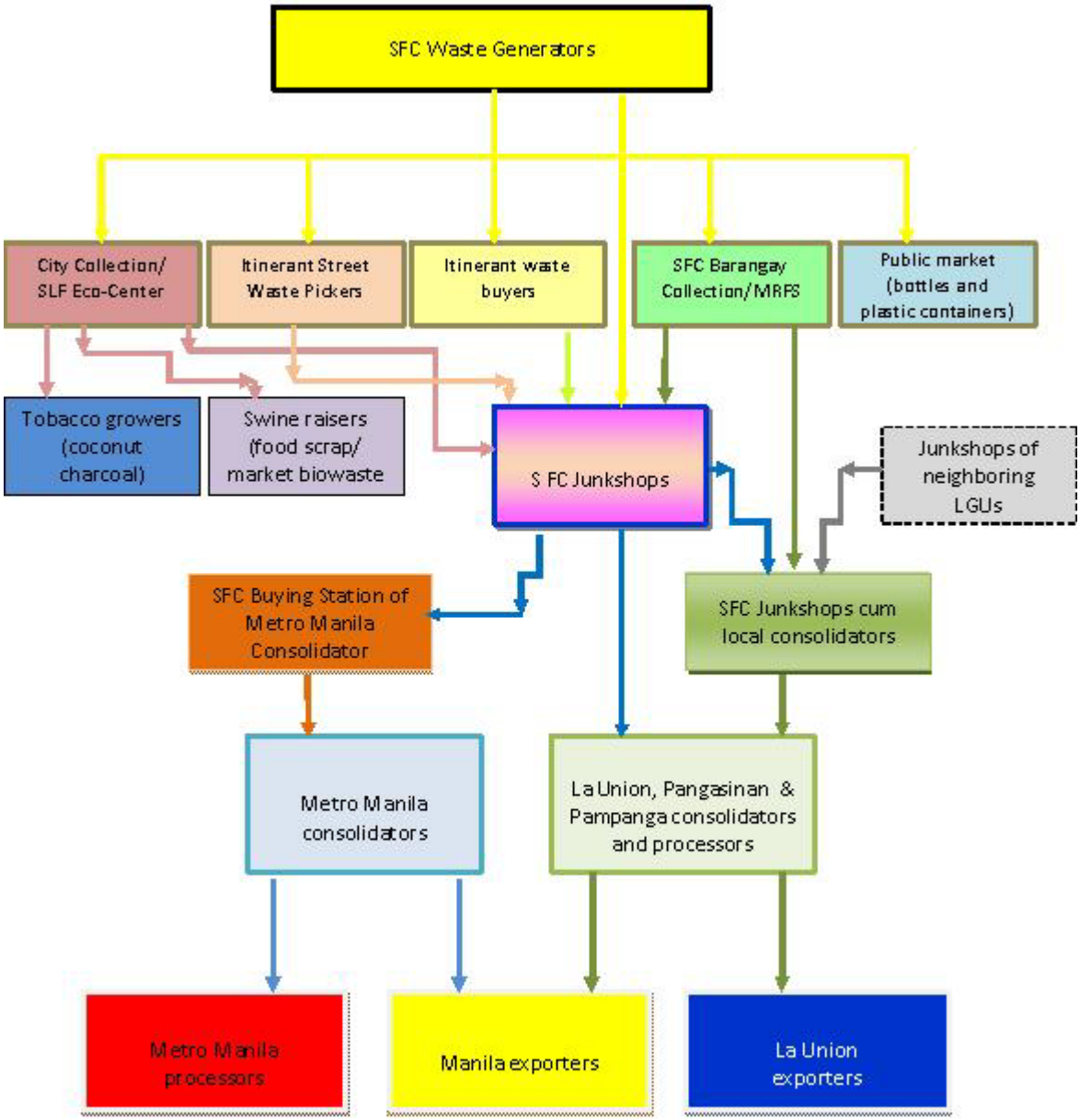
Source: GSO – SWEEP, ISWM Data, CY 2011, San Fernando City, La Union

LGU Managed Waste Recovery System

Recyclable Waste Flow

The recycling chain goes through several rings as shown in Figure 10. From waste generators, recyclables such as bottles and plastic containers are sold directly by households to the local market vendors. The primary collectors of recyclables are the itinerant waste buyers, the itinerant waste pickers in the city's commercial and business district, the garbage crew or paleros (wastepicking while the truck is in its collection route), and the operators of barangay MRFs. Some waste generators go directly to the junkshops. Recyclables recovered from the SLF are sold to a local junkshop. Recyclables from nearby municipalities also flow into the SFC junkshops. In SFC, consolidation of recyclables are undertaken by some of the big junkshops and the buying station of some Metro-Manila consolidators. Scrap materials are also sold

Figure 10: San Fernando City Recyclable Waste Flow



to processors in La Union, Pangasinan, Pampanga and Metro-Manila. Some of the recyclables are directly exported from SFC itself or through Metro-Manila traders to China (as disclosed by two SFC junkshop consolidators).

LGU Recovery System

SFC Waste Diversion

At the SLF about 1,120 metric tons of materials or 9.3% of total waste intake of 14,396 tons were recovered and diverted from the waste stream from January to November 2011 through the accredited wastepickers at its sanitary landfill. In 2009 there was only 4.17% waste diversion or recovery.[7] There is no data on waste diversion activities at the barangay level except for the Lingsat Barangay Cluster. The city managed collection trucks bring mixed wastes to the Mameltac Sanitary Landfill except for market wastes where they separate the biodegradable from non-biodegradable wastes. Twenty accredited wastepickers and some 25 to 35 unaccredited wastepickers recover and separate the recyclables from the residual and special wastes at the SLF.

The accredited wastepickers and their families reside in Mameltac, host barangay to the sanitary landfill and were chosen by the then barangay captain who eventually set up a private junkshop. Under a Memo of Agreement with the City Government, he is supposed to pay a monthly royalty fee of PhP5,000 to the City.

The unaccredited wastepickers come from the other barangays adjacent to the landfill. Although there is no formal permit allowing the other wastepickers, their presence is tolerated by those who are in charge of operating the landfill.

Two of the accredited wastepickers interviewed have been engaged in informal waste work for over a decade while two others have worked for more than four years. Wastepicking at the SLF is a family enterprise with at least two other family members assisting the accredited wastepicker. They like their work because it provides them with readily available cash on a daily basis and they do not have to deal with an employer or boss. They also have the chance to earn additional income by getting the

[7] Ibid.

food waste as animal feed for backyard pig raising. The usual health problems encountered include physical injuries, common colds, fatigue and fever.

From January to November 2011, a total of 1,120 tons was diverted from landfilling out of the total waste intake of 14,396 tons. Table 18 shows the type of materials diverted from landfilling from January to November 2011.

Table 18: Waste Materials Diverted from Land filling

Month	Recyclables	Coconut shell	Bio	Tires	Sharps	Food scrap	Ecosan	TOTAL
Kg/per day								
January	28,969	22853	9460	430	0	797	3175	65684
February	27,014	31469	18485	50	55	1183	1985	80241
March	34,100	30955	16705	60	0	1625	1145	84590
April	33,180	34145	16120	115	625	895	2020	87100
May	31,546	38675	28084	579	840	1910	2095	103729
June	26,756	44245	33170	323	495	1375	2415	108779
July	27,231	43800	36070	1174	300	2145	1065	111785
August	21,469	47,190	41,395	955	20	1775	1310	114114
September	32,343	38420	41838	180	0	2020	1795	116596
October	31,827	41530	54967	320	0	2165	2,010	132819
November	35,326	45710	28651	0	50	1924	2700	114361
TOTAL	329,761	418,992	324,945	4,186	2.385	17,814	21.715	1.119.798

Source: SFC SWM Report 2011

Scrap Vegetables and Other Bio-Materials

Scrap vegetables generated from the City Market are sold to hog growers to be used as feeds. In 2011, the wastepickers recovered 17.8 tons of food scrap.

At the landfill sites, two composting bins are intended to compost the biodegradable materials from the market. Also composted are yard waste from Park operations. All

Parks personnel and street sweepers were instructed to segregate leaves and plant trimmings generated from the areas and not to mix them with the general wastes.

SFC utilizes vermicomposting, in-vessel composting and windrow composting. Composts produced are utilized in the landscaping projects of the city. Vermicompost were also distributed to farmers . In 2011, the SLF diverted 325 tons of biodegradable waste for composting.

Coconut Shell Segregation at the City Market

In 2010, to save on landfill space, the market vendors were required to segregate coconut shells from other waste stream generated at the market. Coconut shells are dried and recycled into charcoal. This is given free of charge to city residents who use the shells as fuel for their tobacco kilns. Some are also sold locally. The coconut fiber is used as mulch for the city nursery and landscaping projects.

Other Waste Recovery Activities at the Sanitary Landfill

Scrap tires are recovered and stored in a specific area at the landfill. The accredited wastepickers sell the tires at PhP.50 per kilo to buyers from Bangar who then sell the scrap tires to processors in Bulacan. Broken glasses are also segregated to prevent the puncture of the liner.

Special wastes include the sharps and pre-treated human waste from the Ecosan toilets in Fisherman's Village. The sharps are placed in specific containers and placed in the hazardous waste storage facility within the SLF. The pre-treated human wastes are composted.

For eleven (11) months, 2,361 pieces of busted lamps were recovered and temporarily stored at the newly constructed hazardous waste storage facility.

The top three items recovered by accredited wastepickers at the landfill are hard plastic, assorted metals and cartons. The types recovered and its buying price are shown in the Table 19.

Table 19: Recyclables Recovered by Accredited Wastepickers, March 2011

Types of Recyclables	Weight (kg)/month	Weight (kg) per week	Buying Price of Timpuyog Junkshop/kg (PhP/kg)
1. Cellophane	1,257	314.25	PhP4
2. Cartons	2,725	681.25	PhP5
3. Hard plastic	6,091	1,522.75	PhP10-PhP14
4. Metals/steel	3,474	868.50	PhP18
5. Bottles/glass	18,034 pcs	4,508 pieces	
6. White paper	971	242.75	PhP5
7. Assorted materials	1,548	387	PhP2

All of the accredited wastepickers are required to sell their recyclables to Junkshop B-1. The unaccredited wastepickers are free to sell their recovered recyclables to the junkshop of their choice. The City presently has no estimates of how much recyclables are recovered by the non-accredited wastepickers.

The monthly income of the three wastepicker respondents are shown in the Table 20. Variances in income may be due to assistance from other family members, age and job skill.

Table 20: Monthly Income of Accredited Wastepickers

Respondents	Estimated Monthly Income
Respondent 1	P6,794
Respondent 2	P11,430
Respondent 3	P8,510

Other City-Led Recovery Systems

Tarpaulin Recycling Activity

Tarpaulins and streamers are being recycled in partnership with the People's Organization (PO) in the City. The tarps and streamers are made into bags and marketed to local consumers.

City Hall Materials Recovery Facility

Two bins were fabricated for the City Hall so that recyclables from offices can be dropped into the bins. Papers, plastics, metals and others are brought into the facility by the designated personnel in each office.

School-Based Materials Recovery System

There are 26 public schools and 30 private schools in SFC, all of which have school-based materials recovery facilities. The schools also recycle the wastes into bags, paper weights and decorations/souvenir items. Trainings on recycling were conducted by the Department of Trade and Industry and the City Government.

According to the Principal of South Central Elementary School, all public schools teach the 3Rs and implement their own materials recovery system. Recycling of waste into novelty items are usually taught in school. The South Central Elementary School has a MRF and a composting area. Recyclables generated within the school are sold to the local junkshops and the school's waste diversion is currently being monitored by the City GSO.

Barangay Waste Recovery System

Only fifteen out of fifty-nine barangays have existing MRFs in SFC. Two are cluster-based MRFs while the rest are barangay-based MRFs. The CENRO has no data on the volume and type of recyclables recovered at the barangay MRFs.

Table 21: Operational Materials Recovery Facility in the City of San Fernando

Barangay	Cluster members	Location of MRF	No. of barangays served
Biday		Kap-Teens Junkshop *Brgy. Biday*	1
Brgy. IV		Timpuyog Junkshop, *Barangay Mameltac*	1
Cadaclan			1
Catbangen			1
Dallangayan Cluster	Dallangayan Oeste, Dallangayan Este Namtutan	Dallangayan Oeste	3
Lingsat Cluster	Dalumpinas Oeste Lingsat Carlatan Pagdaraoan Bangcusay	Lingsat	5
Pacpaco			1
Santiago Norte			1
Sevilla			1
TOTAL			15

Source: GSO-SWEEP ISWM Data, CY 2011, San Fernando City, La Union

Instead of establishing their own MRFs, Barangay IV and Biday partnered with two junkshops which they selected.

The solid wastes of Barangay IV is collected by the barangay through its collection truck and these wastes are segregated by Junkshop B-1. As per agreement of the parties, Junkshop B-2 gives a share of the income earned from the sales of recycables to the barangay. Junkshop B-1 also used to be the partner of Biday but when there was a change in barangay leadership, Junkshop B-6 was instead selected. Junkshop B-

6 truck collects the solid wastes in Biday and provides segregation services. Residuals are then brought to the SLF.

All these MRFs do not pay residents for the recyclables collected from them. Presently, neither the GSO nor the City ENRO has a monitoring system in place to record the types and volumes of waste recovered through the barangays. Other barangays sell the recyclable materials to any junkshop of their choice depending on the better price. Junkshop B-1 also buys the recyclables of Lingsat, Sevilla and Santiago MRFs.

In the study area, the oldest materials recovery facility is the Lingsat MRF which was established in 2004 to serve the Lingsat cluster of barangays. Brgy. Lingsat collects monthly SWM fees from its constituents. The Lingsat cluster enforces a "no segregation, no collection" policy. The MRF serves as the sorting area for recyclables. The MRF custodian records the inflow of recyclables on a daily basis and the monthly income from sales of recovered waste.

According to the Lingsat MRF custodian in SFC , there has been a downward trend in the recyclable waste flow to their facility. In 2003-2004, the average monthly sales was fourteen thousand pesos (PhP14,000.00) but there was a decrease in the average monthly income for 2011 at PhP7,024. The decrease in the collected recyclables was due to the awareness of the households that there is money in waste, hence, they no longer give their recyclables to the barangay and instead sell their recyclables to the IWBs or directly to junkshops.

The top three items recovered at the Lingsat MRF are plastics, cartons and tin cans. Table 22 shows the monthly and weekly amount of scrap recovered by the Lingsat MRF.

Table 22: Lingsat MRF Recyclables for March 2011

Types of Recyclables	Weight (kg/month)	Weight (kg/ week)	Buying Price of Junkshop (PhP/kg)
Cartons	273	63.25	Ph5
Assorted Plastic	377	94.25	PhP10-PhP14
Bottles	187 pieces	47 pieces	PhP 1
Paper	13	3.25	PhP2
Tin Cans	251	62.75	PhP6-PhP7

Source: Lingsat Materials Recovery Facility Report for April 2011

Private Sector Materials Recovery System

Most of the recyclables generated within the city flow directly into the city junkshops through its IWBs and/or through their own collection system. At present, there are 16 junkshops that are registered but there are illegal junkshops as well. The City has enacted a Junkshop Ordinance which sets the requirements for the establishment of accredited junkshops in the City.

Some of the junkshops studied formalized their business by getting registered with the Department of Trade and Industry (DTI) and or the Securities and Exchange Commission (SEC). They also secured their business permit from the City Government. To get the business permit, the junkshops follow the permitting process followed by other businesses: i.e. barangay clearance, fire protection clearance, sanitation clearance, zoning or locational clearance. They also secure a provincial permit by paying for a road tax so that they can transport their goods outside the city limits. Junkshops with a 10,000 sq meter facility are required to get a Certificate of Non-Coverage (CNC) or an Environmental Clearance Certificate (ECC) from the Department of Environment and Natural Resources (DENR). The respondents did not encounter any problems related to the processing of their business permits except for one who cited the slow processing of ECC application by the DENR.

Table 23 presents is a profile of selected junkshops in San Fernando City. Three of these are the largest junkshops in the city while the two others are relatively smaller junkshops.

Table 23: Profile of Selected Junkshops in San Fernando City

Particulars	Junkshop B-1	Junkshop B-2	Junkshop B-3	Junkshop B-4	Junkshop B-5
Age of Owner	59	30	51	53	41
Educational Attainment	College, Civil Engineering undergra-duate	College undergrad--duate	College, civil engineering	College	College, Undergra-duate
Start of business	1997	2009	1996	2008	2000
Work hours	No Response	8-5/day/6 days/wk	8-5/day/6 days/wk	8-5/day/6 days/wk	8-5/day/7 days/wk
No. of workers	25 regular	12 regular; 6 part-time	7 regular; 6 part time	1 regular	1 regular
Benefits	• PhP300/ day – driver • P200 – travel allowance if outside SFC • P200-P240/day – worker • P100 travel allowance if outside San Fernando • Food	• PhP150/ day Transport-ation • Medical benefits • Philhealth • Life insurance	• PhP250/d ay • SSS • Philhealth • Group insurance	• PhP250/ day • Food • Housing • Trans-porta-tion • Philhealth	• PhP250/ day • Housing • SSS • Phil-health

Particulars	Junkshop B-1	Junkshop B-2	Junkshop B-3	Junkshop B-4	Junkshop B-5
	allowance • Emergency medical and basic needs loan				
Revolving Monthly Capital	PhP250,000*	PhP 1 million	PhP1 million	PhP50,000	PhP50,000
Net Monthly Income	No answer	PhP60,000	PhP30,000*	PhP10,000	PhP10,000

*Understated as can be gleaned from the volume of recyclables purchased and sold

Buying and Trading Activities

Some of the junkshops provide itinerant waste buyers with buying capital and transport. There are no formal agreements among the itinerant waste buyers and junkshops except that itinerant waste buyers are obliged to bring their recyclables to the junkshop that provided them with buying capital.

Based on the interview with junkshop operators, they usually pick up the recyclables from commercial establishments and companies and/or buy recyclables door-to-door. There is also trading among the local junkshops so that a smaller junkshop may transport its recyclables to a bigger junkshop or the bigger junkshop would pick up the recyclables from the smaller junkshop. The junkshop operators usually have several vehicles in varying sizes to accommodate their buying and trading requirements.

Table 24 shows that recyclables flowing into the city include recyclables from neighboring municipalities in the provinces of La Union and Ilocos Sur.

Table 24: Sources of Recyclables

Junkshop B-1	Junkshop B-2	Junkshop B-3	Junkshop B-4	Junkshop B-5
Building contractors; Other Junkshops; • Ilocos Sur La Union: • Agoo • Aringay • Caba • Bauang • Naguilian • San Juan • Sudipen • Balaoan • Bangar • Bacnotan SFC – La Union (6 barangays); SLF Ilocos Sur: • Candon • Tagudin	34 junkshops; La Union LGUs • Rosario • Bauang • Aringay • Caba • Agoo • Sto tomas • Tubao • Naguilian • Sudipen • Balaoan • Bacnotan • San Juan • Bangar • Luna Sta Cruz, Ilocos Sur	Itinerant waste buyers; Walk-in clients; SFC junkshops in Lingsat, Cabaloan, Poro and Catbangen Companies; Commercial establishments; Ilocos Sur junkshops; Ilocos Sur • Candon • Santa Cruz • Tagudin	Commercial; Establishments; IWS; Hospital Households; Walk-in clients; Door to door buying	Itinerant Waste Buyers from SFC; Households in SFC

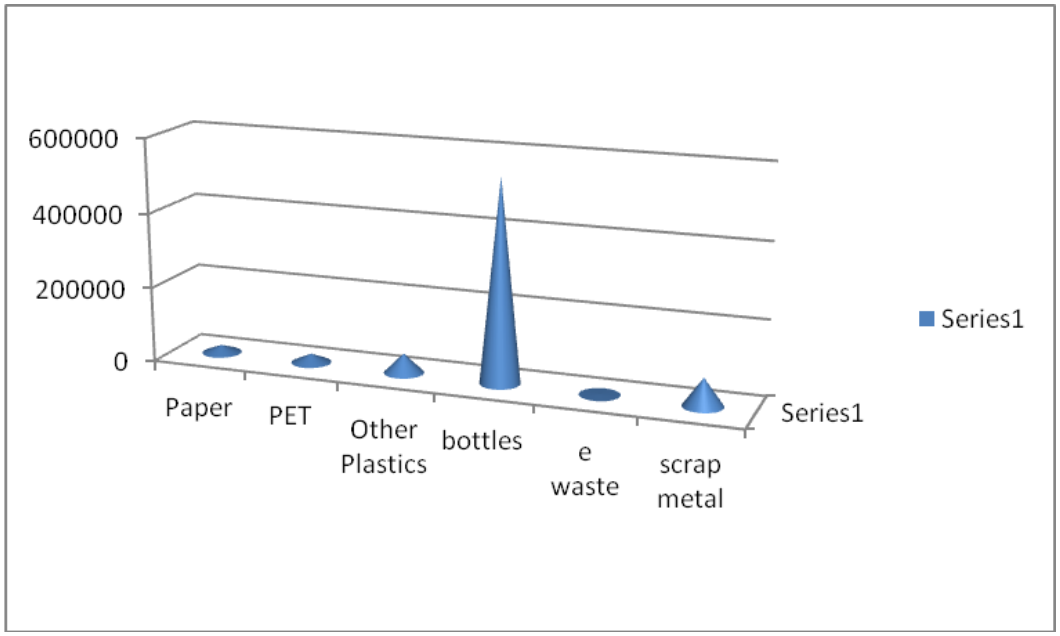
Traditional recyclables such as paper, cartons, plastics, glass bottles and assorted metals are traded. The junkshops vary in their sorting scheme of plastics, except for PET bottles which are separated from other plastics due to its high value.

Some junkshops separate polystyrene cups as a separate type of plastic but some include these items under plastic containers.

There was no record of lead acid batteries being accepted by the junkshop respondents. Not all junkshops accept plastic grocery bags referred to as "cellophane". The so-called plastic Labo bags (5 microns and below) are also not part of the recyclables inflow.

Figure 11 shows that bottles are the biggest consolidated item in SFC, followed by scrap metal (ferrous and non-ferrous) and plastics.

Figure 11: Distribution of Weekly Recyclables Inflow



Source: From primary data on SFC junkshop

Total weekly inflow of the 5 out of 16 registered junkshops is 739,470 kg. SFC's estimated recyclables waste generation per week is 778.050 kg. The large inflow also includes in recyclables from nearby municipalities since three of the junkshops below are the big junkshops of SFC. The volume of electronic wastes flowing to the bigger junkshops is still relatively low compared to other recyclables

Table 25: Inflow of Recyclables in Selected SFC Junkshops

Items	Junkshop B-1/wk	Junkshop B-2/wk	Junkshop B-3/wk	Junkshop B-4/wk	Junkshop B-5 /wk
White paper	500 kg	1 ton	1 ton	500 kg (includes assorted paper)	
Assorted Paper		2 tons	1 ton		
Boxes/cartons	2.5 tons	7 tons	2.5 tons/wk	2 tons/month	200 kg
PET	2-3 tons	7 tons	2 tons	12.5 tons	250 kg
Glass bottles	300 tons	25 tons	200 tons (per month)	12.5 tons	5 tons
Polystyrene Cups				10 kg	
Plastic Containers	12.5 tons (includes hard plastics)	10 tons	2 tons per month	350 kg per week (includes hard plastics	300 kg
Monoblocks	500 kg				
Plastic (hard)		1.5 tons	700 kg/month		100 kg
E-waste	800 kg	400 kg	500 kg/month	Rarely	
Steel	20 tons	8 tons	30 tons/month	500 kg	1 ton
Copper	300 kg	200 kg		10-20 kg	50 kg
Aluminum	200 kg	150 kg	500 kg/month	10-20 kg	50 kg
Aluminum Can	500 kg	100 kg	300kg/month	10-20 kg	20 kg
Yero		4 tons	3 tons/month	300 kg	400 kg
Tin Cans	5 tons			300 kg	200 kg
Zinc	50 kg				

The lower buying and selling rates of recyclable items are those that are utilized by the small junkshops. The higher buying and selling rates pertain to the big junkshops who have the volume and means to transport their materials to bigger junkshops, consolidators or the nearest recyclers. Thus the buying and selling prices vary from junkshop to junkshop. Buying price variances for the same types of recyclables take place due to competition among the junkshops.

Payment mode between the suppliers of recyclables, i.e. itinerant waste buyers, walk-in clients, commercial establishments and institutions and junkshops are on cash basis. Goods are paid with cash as soon as they are delivered to the buyer. There are also cases when payments are made in advance by a bigger junkshop to a smaller junkshop to ensure the inflow of recyclables.

Similarly, the consolidators and recycling industries have different modes of payment. They pay the junkshops cash on delivery, provide cash advance payments or pay through post-dated checks. The junkshops update their price information by calling or texting (SMS) the buyers of their materials.

Table 26: Buying and Selling Prices of Recyclables

Types of Materials	Buying Prices (PhP per kg)	Selling Prices (PhP per kg)
White Paper	PhP5 – PhP10	PhP8 - PhP13
Assorted Papers	PhP2-3	PhP3.50 – PhP5
Boxes/cartons	PhP5 – PhP7.30	PhP6 – PhP8.40
PET bottles	PhP12 –PhP26	PhP25 – PhP41
Glass bottles	PhP0.10 – PhP1	PhP0.35 – PhP1.85
Plastic containers	PhP12 – PhP16	PhP15 - PhP23
Plastic (hard)	PhP8 – PhP12	PhP12 – PhP17
E-waste	PhP10 - PhP15	PhP14 –PhP30
Steel	PhP14 – PhP18	PhP17 – PhP21
Copper	PhP130 – PhP280	PhP160 - PhP320
Aluminum	PhP40 – PhP56	PhP60 – PhP68
Aluminum cans	PhP40 – PhP50	PhP45 – PhP56
Yero	PhP9 – PhP14	PhP11 – PhP14.30
Tin Cans	PhP6 – PhP7	PhP8 - PhP9

Destination of Recyclables sold by Junkshop Respondents

Transport costs and selling prices of consolidators are factors which affect the decision of junkshop owners to whom and where they would sell their recyclables. Smaller junkshops save on transport costs by selling to the bigger junkshops in the city who specialize in consolidating certain types of recyclables. A Caloocan City based paper consolidator has a buying station in San Fernando City. Two of the junkshops interviewed used to sell paper waste to Trust Paper International Company (TIPCO), in Mabalacat, Pampanga. However, due to transport costs they now bring their paper wastes to consolidators in Dagupan City and Mangaldan, Pangasinan.

For PET bottles the smaller junkshops sell to the big SFC junkshops or nearer to the plastics consolidator in Bauang, La Union. The PET plastics are then brought to Manila to be exported or are sold to PET recyclers in Valuenzuela City.

Other plastic wastes are either transported directly to Valenzuela City where most of the plastic recycling industries are located or at nearby recyclers such as Bauang, La Union or Mangaldan and Rosales, Pangasinan where there are plastics consolidators with semi-processing capacity.

One of the big junkshops in SFC and another junkshop in Bauang, La Union are consolidators of glass bottles. The bottles are then transported to La Tondeña Distillery in Sta Barbara, Pangasinan. Some glass bottles are also sold at the local market for reuse.

Assorted metals are sold locally to Chinese and Korean consolidators at Poro Point where the materials are loaded on a ship for export. Some of the metals are also sold to consolidators in San Juan and Bauang in La Union; Dagupan City; Sison, Pangasinan and a smelting plant in San Simon, Pampanga. Some of the consolidators pick up the recyclables from SFC. The consolidators then export the scrap metal. According to key informants, the materials are exported to China.

Impact of Economic Recession on the Flow of Recyclables

Changes in the demand for post consumer materials as raw materials for local and foreign manufacturing affect the whole recycling chain. The traders and consolidators of SFC sell their scrap either to local processors and/or to traders and exporters. The fluctuation in demand is usually felt by the small junkshops and IWBs when the bigger junkshops and consolidators stop buying or lower their buying price. Many junkshops had to close down operations or lost money during the post China Olympic Games period when the demand and buying price specially for scrap metal went down.

For instance, one junkshop bought scrap metal at PhP20 per kg but the selling price went down to PhP8/kg then later to PhP3/kg. The buying price of PET was PhP15-PhP16 per kg but the selling price went down to PhP5/kg. The junkshop owner coped by stockpiling his 3 tons of scrap metal. Another junkshop closed its operation for five months and sold off their existing inventory at a loss. Other three big junkshops suffered a decrease in income also but did not close down.

Factors Affecting Recyclables Waste Flow

In the City and barangay led system, weakly implemented segregation at source and mixed waste collection affect the quality of recyclables that reach the barangay MRFs and the recovery activities at the SLF. The presence of both accredited and non-accredited wastepickers facilitate the recovery of recyclables. The accessibility of two junkshops, one of which is accredited by the City Government as its partner make the trading of scrap faster.

The establishment of recovery programs in schools also help improve the quality of recyclables that flow to junkshops. The waste diversion requirement of Republic Act 9003 is also a pushing factor for the City to engage in waste recovery activities in barangay MRFS and schools but they have no local policy and program providing incentives and support for those involved in the junkshop business and recyclable waste trade.

At the industry level, the SFC junkshops have no functional association that can represent their interests vis-à-vis potential support from local government such as fiscal and non-fiscal incentives. Because the junkshops and their partner IWBs operate on a cash basis, they are able to recover most of the recyclables generated by households, institutions and commercial establishments.

The presence of big junkshops also enable SFC to consolidate materials coming from nearby municipalities of Ilocos Sur and La Union. The presence of a port in SFC also facilitate the export of scrap to other countries such as China. The availability of processors and traders in nearby municipalities of La Union and Pangasinan is also a positive factor in the trading of recyclables. For instance, the accessibility of the Tanduay Distillery Plant in Santa Barbara, Pangasinan probably accounts for glass bottles being the top item consolidated by the SFC junkshops.

Issues and Challenges

- The city SWM approach to devolve waste collection at the barangay or cluster barangay levels are intended to strengthen segregation-at-source and to encourage waste recovery and re-use. However, the Lingsat MRF case shows a decreasing

trend in the volume of recyclables recovered as waste generators opt to sell to itinerant waste buyers and/or junkshops rather than giving it to the garbage trucks.

- Despite a city-wide ordinance requiring segregation-at-source, most barangays including those who have formulated SWM ordinances still do not enforce segregation; most have not conducted information campaign on SWM.
- The inflow and outflow of recyclables at the barangay MRFS, junkshops, collection crew and SLF are not systematically monitored.
- There is no complete data on waste recovery at the barangay MRFs, junkshops and the City Sanitary Landfill; only the accredited wastepickers recovery are monitored.
- The number of non-accredited wastepickers is not known to the City; there are as yet no measures on how to solve the issue of non-accredited wastepickers.
- The presence of MRFs and junkshops and scavenging by the collection crew has resulted to the decrease in the recyclables which the SLF wastepickers are able to collect and sell.
- The presence of the wastepickers in the SLF is a violation of the provisions of RA 9003 on disposal management.
- The wastepickers at the SLF, waste workers at the junkshops and collection crew do not have access to social benefits and protection. They do not use personal protective equipment.
- One of the main challenges of the junkshops is the cost of transport.
- The City has no support program for junkshops. There are no economic incentives provided to them.
- Buying prices vary among different junkshops. Increasing the buying price even by a few centavos can cause a seller to switch from one junkshop to another.
- The association of junkshop owners and operators is not functional.
- The city has a Junkshop Ordinance but there are still illegal junkshops which are able to set up their business within the city. Also, the provisions of the ordinance is only focused on regulating the impact of junkshops on traffic, sale of stolen goods, and sanitation and health. There are no provisions for monitoring waste inflow and outflow and curbing unsafe practices such as informal E-waste recycling.

II.3. Case Study C: Quezon City, Metro Manila

LGU Profile

Quezon City is the largest among the 17 cities and municipalities in the National Capital Region (NCR). The City has a total land area of 161,112.12 hectares covering one-fourth of the total land area of the National Capital Region's land area. Quezon City is bordered by Manila_to the southwest, by Caloocan and Valenzuela City to the west and northwest.

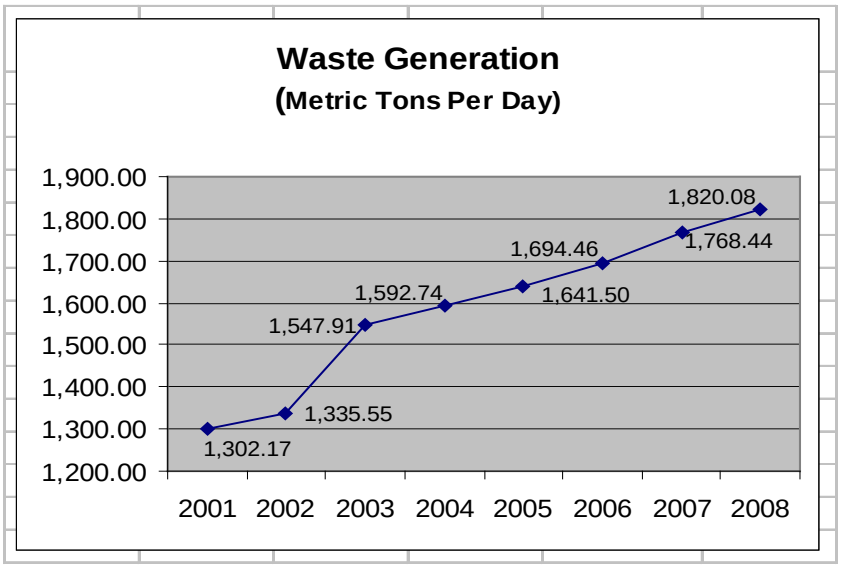
Its population in 2009 was 2,861,081 and the total households was 535,890. In 2010 NSO projection was 2,945,644 . The city is subdivided into four districts and 152 barangays. Forty percent of its residents are in formal settlers.

The following is the distribution of business establishment, by industry in 2006: wholesale and retail trade (47%); manufacturing (12%); hotels and restaurants (13%); real estate, leasing and various business services (8%); community, social and other personal services (6%); and others (14%). The city is dominated by small and medium-scale business establishment engaged in the distribution of finished products and the provision of basic personal services. Most of the businesses in Quezon City are small, marginal, and family owned.

Solid Waste Profile

Based on Figure 12, the waste generation of Quezon City has increased from 1,302.17 metric tons in 2001 to 1,820.08 metric tons in 2008 as a consequence of its estimated annual population growth rate of 2% and increase in commercial and other business activities.

Figure 12: Waste Generation Trend 2001-2008



Source: QC SWM Report,2008.

The per capita solid waste generation of Quezon City is pegged at 0.66 kg/day based on its 2003 Waste Characterization and Assessment Study (WACS). Hence, using the projected 2009 total population of 2,861,081, total waste generation is estimated at 1,889 tons per day. Figure 13 shows the percentage distribution of the waste by type.

The composition of residual waste include the following: construction demolition wastes such as soil, sand, rock, concrete, ceramics, fines, textiles, leather, diapers, cigarette butts, composite and other types of plastics, ash charcoal.

Special wastes generated include tires, animal remains, paint, oil/oil filters, small batteries, medical waste and electronic appliances as listed in QC's 2003 WACs.

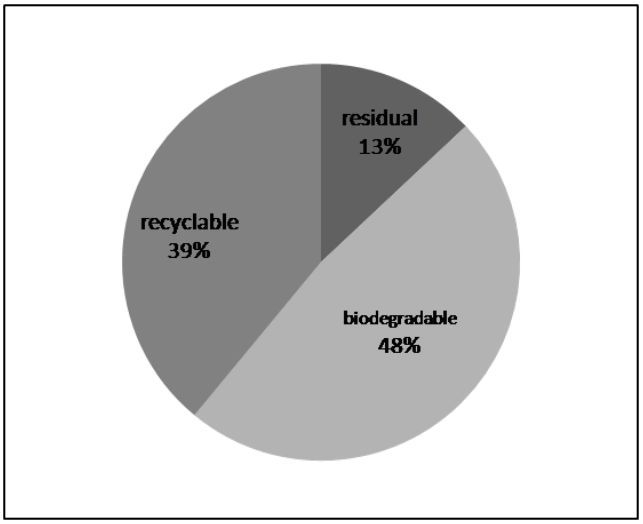
SWM System

The formal SWM system is implemented by Quezon City through its Environmental Protection and Waste Management Department (EPWMD). It begun as Task Force Clean and Green and became a full department in 2000 through City Ordinance SP-982, S2000. Its mandate include:

- implementation of an efficient garbage collection and disposal system;

- implementation of a pollution control program; and
- monitoring and enforcement of all environmental laws and city ordinances.

Figure 13: Quezon City Waste Generation Profile in Percentage



Source: Louie Sabater, QC SWM Experience presented at the SWAPPCon 2011, November 24, 2011

The City has privatized its waste collection and disposal system. EPWMD supervises six private haulers while the Payatas Operations Group (POG) oversees the operations of the Payatas Sanitary Landfill. Junkshop Standardization Ordinance SP No. 1711, S-2006 provides EPWMD with the mandate to monitor QC junkshops and enforce environmental compliance.

Waste Segregation and SWM Practices

City Ordinance No. SP-1707, S-2006, requires the segregation at source from households, institutional, industrial and commercial wastes and/or garbage into wet or biodegradable, and dry or non-biodegradable, pursuant to RA 9003. EPWMD reported that segregation rate in QC was 37% in 2006 which then decreased to 35% in 2008. No segregation rate was reported in its 2010 report.

Recognizing the low segregation rate, in July 2011 QC implemented its "*Hiwa-hiwalay na Basura sa Barangay*" (Waste Segregation at the Barangay) Program. Prior to this, segregation at source was practiced by some subdivisions and barangays but not on a wide-scale basis. It was only Barangay Holy Spirit which was cited by

the City government as already with on-going waste segregation at source even prior to the enactment of RA 9003.

The EPWMD conducted a three day summit in June 2011 to reorient the Barangay Chairpersons and the Kagawad in charge of the barangay's SWM program. Three hundred IEC campaigners were also deployed by the private haulers to the different parts of the city. The people were informed about the separate collection schedules for biodegradable and non-biodegradable wastes.

Three key informants from Barangay Payatas were interviewed regarding their awareness of the implementation of RA 9003. They stated that they are aware that wastes should be classified into biodegradable, recyclable, and non-biodegradable/non recyclable wastes while the fourth key informant was aware of segregation into biodegradable and non-biodegradable only. They are also aware that of the SWM services and activities of the barangay.

Majority of those interviewed were also aware of the prohibitions on burning, dumping and littering of waste. Majority also rated the barangay's SWM performance as very good due to their satisfaction with the SWM collection services and its information dissemination activities. Only one respondent made the observation that enforcement was not satisfactory.

With regards to SWM practices related to specific types of wastes – all respondents sold the following as recyclables to the itinerant waste buyers or junkshops: paper, cartons, glass bottles, tin cans, aluminum, PET bottles and plastic containers. Kitchen waste and yard wastes are generally used as animal feed and composted or used as fuel for cooking except for one informant who gave the yard waste to the garbage truck.

Waste Collection

The city-managed garbage collection service is implemented through a "Package Clean-up System" where the service is contracted out to the private sector. The contractor is given the full responsibility to manage/administer and directly carry out actual collection, cleaning and disposal of solid wastes from various sources. These

include households, commercial establishments, markets, institutions like offices, schools, churches and streets, alleys, vacant public lots or designated collection points within the area of assignment.

In 2010, there were six private companies servicing the five districts and sub districts of the City. A combination of 10-wheeler, 6-wheeler trucks and compactor trucks were used. Collection is on a door-to-door policy which means that garbage should be brought out only when the collecting truck has arrived and at no instance should the garbage touch the ground. However, the City did not require its contractors to follow a segregated waste collection system as required by RA 9003.

Further, since the system calls for a "Package Clean-up", the provision of street sweepers, conduct of information and education campaigns on solid waste management, riverways management, bulky waste collection and a subsystem of garbage collection for inaccessible areas are all included in the obligations of the contractors.

In 2001, before the system was implemented, the City was shelling out no less than PhP70 million per month on garbage collection. Now, the City is only spending around PhP 47 million per month as a result of the package clean-up system. The City is able to collect from 93.4% of the total households under its jurisdiction. The EPWMD 2010 Report states that there were a total of 136,042 garbage collection trips, an average of 377.89 trips daily. Its 2008 report recorded collection efficiency at 99%. Daily average of waste collected in 2010 was 1,027.80 tons.

Aside from City government contracted garbage collection, there are 56 barangays with independent collection systems. Barangay Payatas is one of these barangays. Cash reimbursements incurred in the collection of waste in their own jurisdiction are given to the barangays by the city government. The incentive scheme is provided in City Ordinance No. SP-1191, Series of 2002 - an ordinance granting incentives to all barangays utilizing their own trucks for solid waste collection service in their respective barangay.

Waste Disposal

Before the establishment of the current sanitary landfill, Quezon City has been using the 22.3 hectare Payatas dumpsite since 1973 as an open dumpsite. In July 2000, a major trash slide occurred causing the death of more than 300 wastepickers. In 2004 it converted its open dumpsite in Payatas into a controlled dumpsite in compliance with the provision of RA 9003 to close all open dumpsites within three years after the enactment of the law. In 2007 QC in partnership with PANGEA Green Eneregy, installed a methane gas capture system as part of its dumpsite closure and rehabilitation program. The Payatas Controlled Dumpsite was finally closed at the end December 2010.

From 2001 to 2008, total waste intake of the Payatas Controlled Dumpsite amounted to 18,669,994 cubic meters as shown in Table 27.

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Table 27: QC CDF Waste Intake

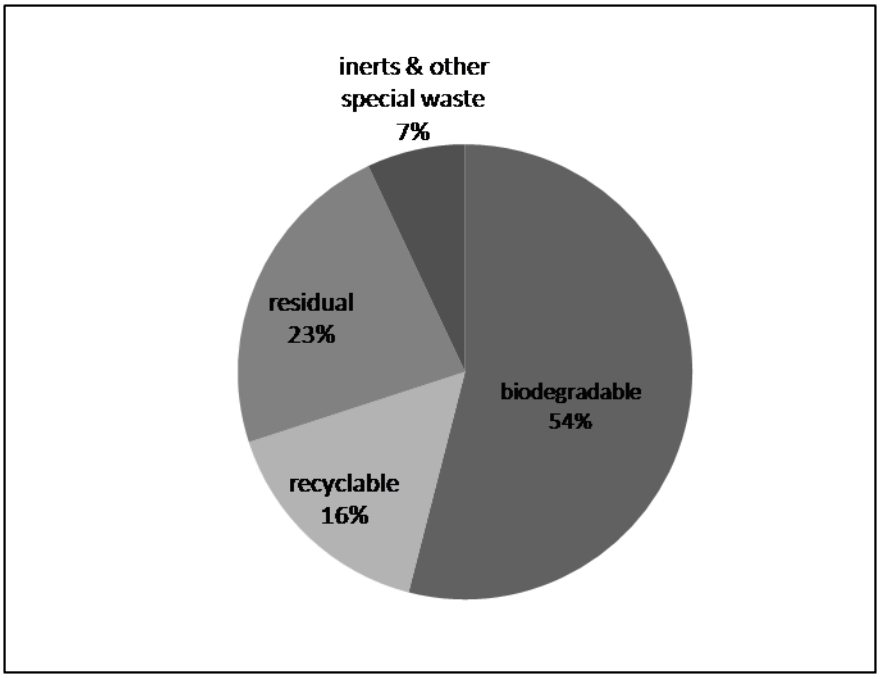
Year	Waste Intake		Truck Trips	
	Volume (total in cu. m)	Weight (mt/day)	Total	Daily Average
2001	2,727,554	1,495	*No Data*	*No Data*
2002	2,522,848	1,382	*No Data*	*No Data*
2003	2,294,218	1,257	*No Data*	*No Data*
2004	2,393,287	1,308	160,876	440
2005	2,222,281	1,218	150,769	413
2006	2,230,518	1,222	152,571	418
2007	2,136,337	1,171	149,806	410
2008	2,142,951	1,171	150,044	410
Total	**18,669,994**			

Source: EPWMD Accomplishment Report 2009

Currently, Quezon City disposes its waste at the 3.2 hectare Payatas Sanitary Landfill which is owned and operated by IPM-Environmental Services Inc. (IPM-ESI). It was formally opened in January 2011. The Payatas Operations Group is the oversight group responsible for the SLF while IPM-ESI is in charge of the SLF operations and management.

The composition of waste brought to the QC sanitary landfill is shown in Figure 14. The biodegradable waste is 54%, recyclable wastes is 16%, residual wastes is 23% and special wastes is 7%.

Figure 14 : 2010 Waste Composition at the QC Integrated Waste Management Facility



Source: Louie Sabater, Quezon City presentation, SWAPPCON 2011, November 24, 2011

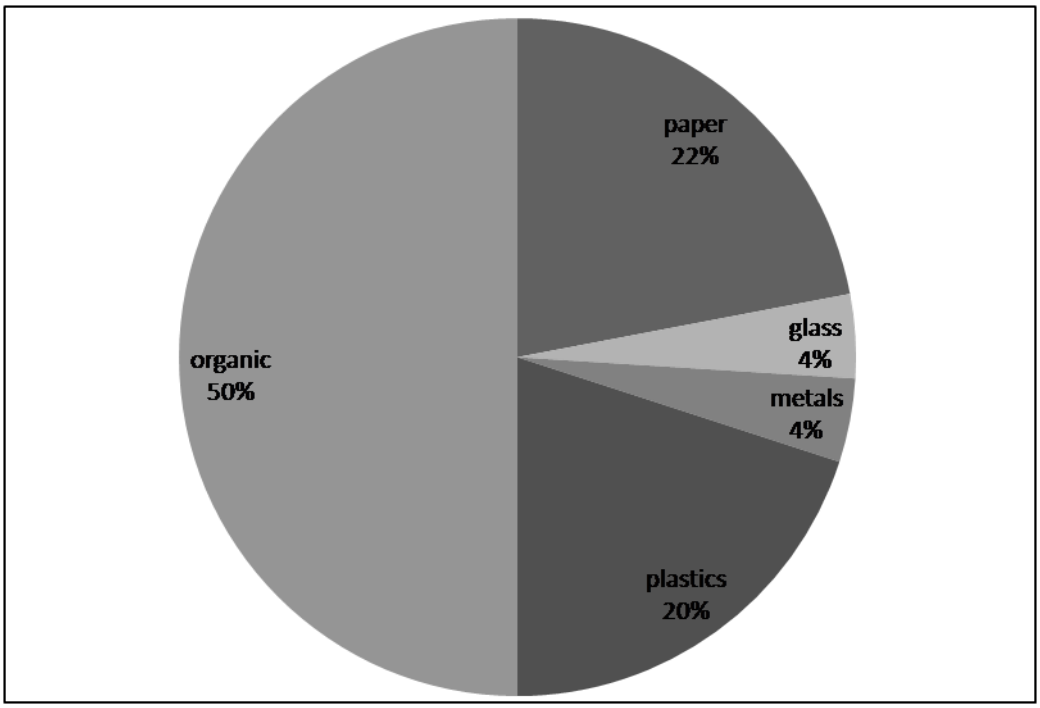
Residual wastes disposed in the landfill cell are diapers, cigarette butts, composite plastics, textiles, rubber, animal remains, inert or inorganic (rocks, soil, ash etc) and biodegradables contaminated because of being mixed with other wastes. Special wastes included paint, small batteries, electronic appliances and medical waste. The average daily volume of waste disposed at the SLF in 2011 is estimated at 1,200 tons per day of which 200 tons (17%) are recovered at the MRFs and 1000 tons are finally covered[8] .

Recyclable Waste Flow

In the 2009 EPWMD Report, recyclable waste generation for one year from all waste generators: residential, commercial, institutional and industrial was estimated at 329,585.97 tons. Its composition is shown in Figure 15. The total plastics reported was 21.36% but included diapers and cigarette butts, others and composite. Estimated plastics composition minus these residuals is 20%.

[8] Interview with Payatas Operations Group, 2012.

Figure 15: Composition of Recyclable Waste Generated in Quezon City

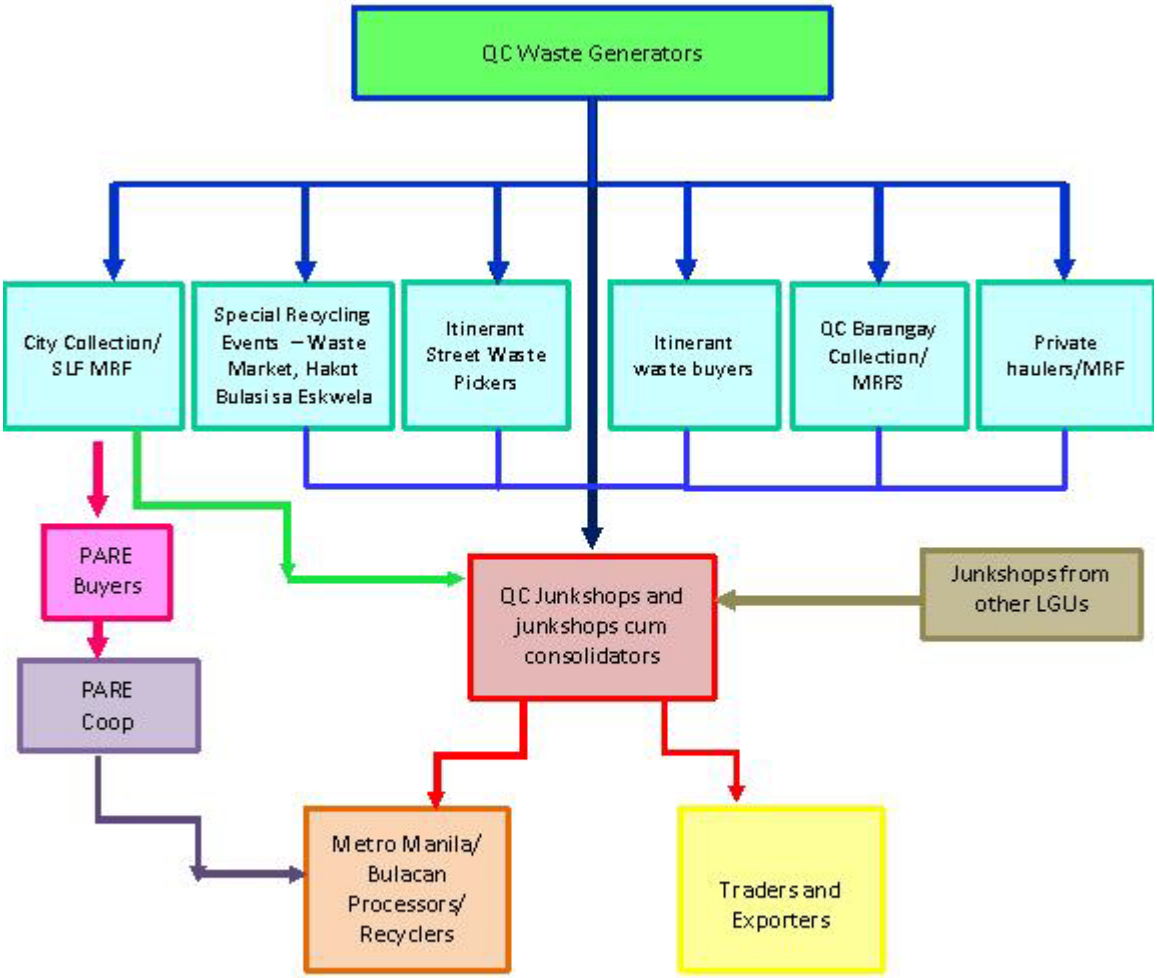


Source: Wilson, David et al. *Comparative Analysis of Solid Waste Management in Cities Around the World,* in UN Habitat's Third Global Report on Water and Sanitation in the World Cities, 2010

Figure 16 provides an overview of the recyclable waste flow in Quezon City. From waste generators recyclables flow through the formal system wherein recyclables are recovered by the City through accredited wastepickers in Payatas and through barangay MRFs. There are also special recycling events where the City partners with institutions and the private sector for waste recovery.

Recyclables also flow through the informal system where recyclables are recovered by street wastepickers and itinerant waste buyers employed by illegal junkshops. There are also instances when waste generators go directly to junkshops and skip intermediaries such as the IWBs, MRFS or the garbage crew. Some private haulers also recover recyclables in their own MRFs prior to transporting wastes to the SLF. Small junkshops sell to big junkshops which also engage in the consolidation of recyclables.

Figure 16: Quezon City Recyclable Waste Flow



LGU Managed Waste Recovery System

Subdivision-Based Waste Recovery

Ordinance No. SP 1501, S-2005 requires subdivisions developers and/or owners in QC to provide sufficient space for the installation of materials recovery facilities to accommodate the recyclables and biodegradable wastes generated by homeowners**.** EPWMD was tasked to implement and enforce this ordinance. The average volume of biodegradables composted by subdivisions in 2011 was 9,647.73 kgs. per day. There was no data on the number of subdivisions complying with the ordinance and the recyclables recovered and traded by the subdivisions.

School-Based Waste Recovery

EPWMD also mobilizes student and youth organizations through its Hukbong Luntian Para sa Kalikasan where student organizations are given environmental management trainings and are encouraged to implement environmental projects such as recycling, composting, tree-planting etc.

The Hakot Bulasi sa Eskwela Project is under this program. This project started in 2008 and was formerly called Sinop Bulasi sa Eskwela Project. The project target is to cover all public schools in Quezon City. Its goals are:

a. To impart the values of environmental stewardship among the youth by initiating a school-based waste segregation and recycling program;
b. To make the practice of recycling part of the school culture; and
c. To increase the rate of school-based waste diversion.

Participating schools are required to set a day per month wherein students will bring recyclables to school. Equivalent points are earned by students which they can redeem in the form of school supplies or basic commodities. For 3 months, in School Year 2009-2010 recovery amounted to 97,927.8 kg of recyclables in the 28 schools that participated in the project.

Table 28: School- Based Recyclables Collection Results

Month	Total Weight (kg)	Total Sales	Ave. volume per school	Ave. amount per school
Dec 2009	20,349.70	42,027.95	726.78	1,501
Jan 2010	35,068.10	65,286.25	1,252.43	2,331.65
Feb 2010	42510.00	76,979.80	1,518.21	2,749.28
Total	97,927.80	184,294.00	3,497.42	6,581.93
Average	32,642.60	61,431.33	1,165.81	2,193.98

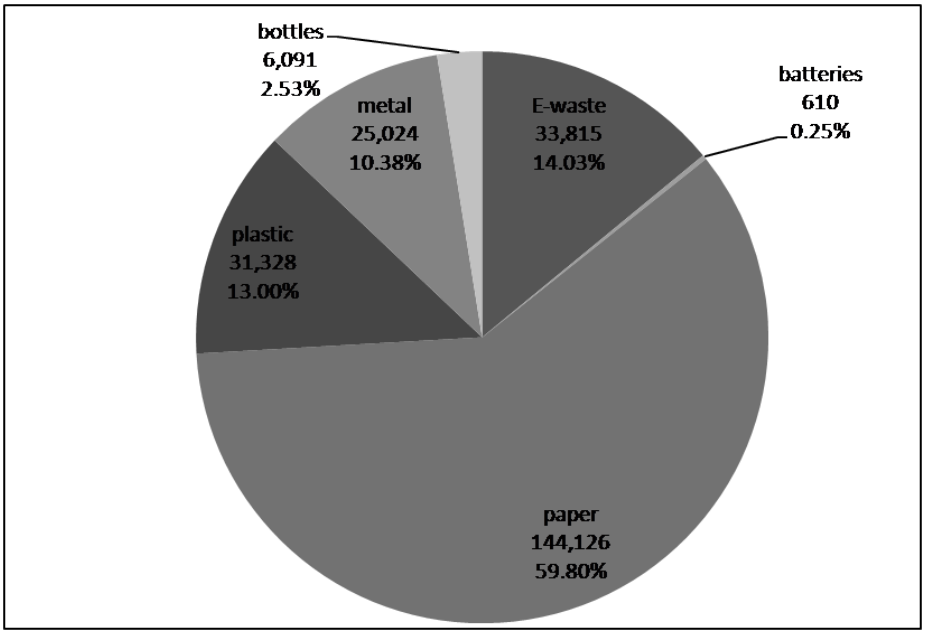
Source: EPWMD Report 2010

This is a joint activity of EPWMD, IPM, Green Lights Inc., QC Linis Ganda and Rotary Club of QC. As of April 2011, around 21 % of all public elementary and high schools in the city are already included in the project.

Waste Markets

Waste Markets are held in selected shopping malls every last Friday and Saturday of the month to promote recycling. Waste markets are also regularly held at the Quezon City Hall. It is in these waste markets that recycling of non-traditional wastes such as ink cartridges, lead acid batteries and waste electronics were first introduced. In 2008, the total amount of recyclables traded was 240,994 kgs with paper as the most traded with E-waste and plastics as 2nd and third.

Figure 17. Waste Markets' Weight of Recyclables Sold (Kgs.)



Source: 2009 EPWMD Report

In 2010, the amount traded went down to 8.433.39 tons. According to Linis Ganda, QC's junkshop partner in its Waste Markets, some of the sellers of scrap are already selling directly to traders and junkshops instead of waiting for the Waste Market schedule which is held only twice a month.

Barangay Recovery System

Quezon City barangays who achieved at least 25% waste diversion are awarded monetary incentives by the City through Ordinance No. SP-1203, S-2002 – an ordinance granting incentives to barangays practicing best solid waste management.

Table 29: QC Barangays with Best SWM Practices

Award	2004	2005	2006	2007	2008
1st Place	Holy Spirit	Vasra	Paang Bundok	Mariana	Bagumbuhay
2nd Place	UP Campus	Balonbato	Greater Lagro	Pinagkaisahan	Phil-Am
3rd Place	Phil-Am	Bagumbuhay	Horseshoe and UP Village	Greater Lagro	Pansol
4th Place	Bagumbuhay	Imelda			

Source: EPWMD Accomplishment Report, 2008

In 2010, Barangay Bagumbuhay and Horseshoe for their waste reduction initiatives awarded P460,369.27 for remarkable accomplishment in SWM in accordance with Ordinance SP 1203, Series 2002.

In 2004, the EPWMD initiated its Sinop sa Basura Program to assist the barangays in implementing their own solid waste management programs. The Program helped the barangays in the organization of their SWM committees, preparation of SWM plans, MRF establishment and information dissemination.

By 2008, there were 50 Barangays all over the City with Materials Recovery Facilities (MRFs). These barangays initiated their own recycling activities while 45 of the 50 had composting activities (composting conceptually includes other ecological means of managing biodegradable wastes such as the collection of kitchen waste for livestock feeds). Waste diversion contribution of barangays was at a low 2.35% in 2009[9].

In 2010, there were only 33 existing materials recovery facilities. These facilities were recovering 31,687.80 kgs./day of biodegradable waste and 30,916.94 kgs of recyclable wastes /day representing .04% of the total recyclables recovered in Quezon City. Only 7 barangays were reported to have composting activities by end of 2010.

[9] SWAPP, Economic Aspects of Informal Sector Activities in Solid Waste Management, City Report for Quezon City. October 2009

The decrease in the number of MRFs and composting activities may probably be attributed to changes in barangay leaderships as a result of the 2007 barangay elections as well as problems in management including sustaining funds for MRF and composting operations. The increasing household awareness of the economic value of recyclables also decreased support for MRFs since people preferred to sell their recyclables rather than have it collected by the barangay MRFs without any financial or materials exchange.

In 2011, Quezon City implemented a campaign to push barangays to implement their responsibilities in waste segregation, MRF establishment and composting. Some of the reasons attributed for low compliance of barangays are: lack of political will, manpower, funds, space for the establishment of an MRF, and technical capabilities in the operations of composting systems and compost marketing challenges.

Waste Recovery at Barangay Payatas

Barangay Payatas has a population of 200,000. There are 60,000 households distributed in Areas A and B. Barangay Payatas' estimated monthly waste generation is 3,360 tons and total monthly recovery is 42 tons which is only 1% of the total waste generation in the barangay. The barangay operates a mixed waste SWM system although it has started to conduct segregated collection in some parts of Area A. It allocates P3 million for SWM annually out of its P43 M budget.

It has one ten-wheeler truck with a capacity of 18 cubic meters , a six wheeler truck with 10 cubic meters capacity and 7 mini dump trucks with a capacity of 8 cubic meters. Barangay Payatas employs 30 workers assigned as drivers and paleros.

The employees also do sorting at the Payatas MRF on a rotating basis every two days. The paleros are paid an allowance of PhP3,000 per month and 50% of the net proceeds of recyclables recovered at the MRF. This amounts roughly to PhP50/week/employee. The paleros are also allowed to recover and sell non-traditional scrap materials such as e-wastes. The MRF Officer takes care of canvassing the local junkshops to secure the best price for the recovered scrap.

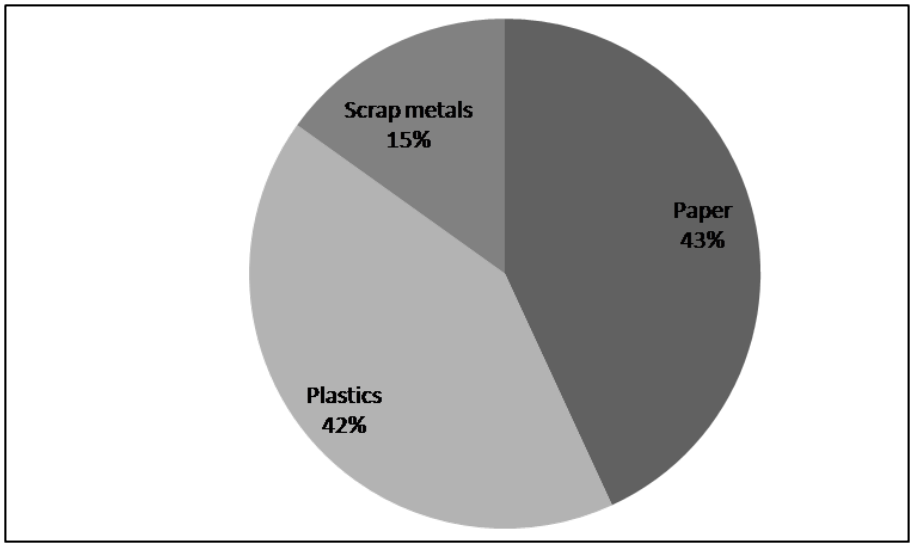
Table 30: Inflow of Recyclables in Barangay Payatas MRF

Type of Waste	Est. Qty (kg/week)	Selling Price (PhP)	Destination
White paper	295	PhP10	CARPEL
Assorted paper	3,238	PhP2	CARPEL
Newspaper	44	PhP5	ILS Trading
Cartons	933	PhP5	CARPEL
PP white	141	PhP18	Penaflor Junkhsop
PET	172	PhP25	ILS Trading
Glass bottles	3,130 pieces	PhP1	ILS Trading
Plastics (blowing)	129	PhP18	Penaflor Junkhsop
Plastics (sibak)	332	PhP14	Penaflor Junkhsop
Cups (PS)	107	PhP13	Penaflor Junkhsop
PVC	666	PhP5	Penaflor Junkhsop
sacks	2,824	PhP3	Penaflor Junkshop
Tin cans	1,355	PhP10	Penaflor Junkshop
yero	227	PhP14	ILS trading

Source: Barangay Payatas MRF Report, 2011

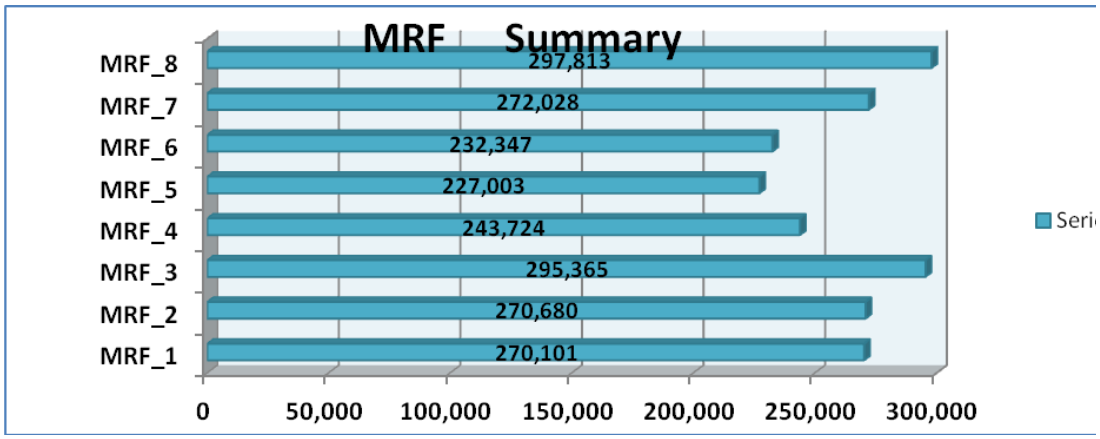
At the barangay Payatas MRF the top three recyclables recovered per month are paper (43%), plastics (42%) and scrap metals (15%).

Figure 18:Top Three Recyclables Recovered in Barangay Payatas MRF



Presently, there are 8 Materials Recovery Stations located at the SLF. Each station has three groups made up of 25 wastepickers. Approximately, 18 trucks dump the waste into the recovery stations for each shift (4-11 am and 11-5 afternoon shifts). Average total monthly recovery of all the MRFs is 1,320,965 kg or 1,321 tons.

Figure 19 : Summary of Monthly Waste Recovery Per MRF (kg) in 2011



Source: Louie Sabater, Quezon City presentation SWAPPCon 2011, November 24, 2011

Factors affecting variances in monthly recovery of each station include : variable amount of recyclables dumped by the truck, variable total number of wastepickers per MRF due to absentee wastepickers and individual differences in skills,work attitudes and physical capacities.

The Payatas Operations Group also cited the following problems which hinder efficient recyclables recovery :

- ❑ Lack of coordination among the Group leaders and their cluster leaders;
- ❑ Segregated items are not hauled out on the MRF in time;
- ❑ Late arrival of junkers which delay the hauling out of materials and payment to the waste pickers;
- ❑ Discounts and percentage that junkers imposed on waste pickers;

- Delays in the submission of reports to the leaders for recording purposes;
- Lack of concern or consideration on the part of junkers to waste pickers and their cluster leaders;
- Selective recovery of waste pickers due to fluctuating monetary value of materials; and
- Insufficient storage area of recyclables.

The average daily income of wastepickers is PhP130 from traditional scrap and PhP70 from non-traditional materials which they term as their ”sideline”. Sideline scraps include pig slop (PhP60/sack), bags, shoes, old clothes, foam, used tires and cotton, sachets with promotional value (i.e. from raffles organized by manufacturing as promotional activity), scrap wood etc. Those who are willing to spend more time on recovery of “sideline” scrap can earn as much as PhP400-PhP500 daily. Table 31 shows the average amount of non-traditional scrap recovered by the wastepickers.

Table 31: List of Non Traditional Recyclables Recovered by Payatas Wastepickers

Non Traditional Recyclables	Average Kg/month
Plastic linoleum	30,763
Plastic sando bag	10,239
Residual styrofoam	1,825
Reuse bag, umbrella	13,350
Used tire	8,285
Firewoods	101,523
Food scrap	371,116
Foam	17,462
Cotton	5,338
Fabric/tela	21,235
Tarpaulin	45,277
Plehe	3,749
Charcoal (uling)	3,179

Source: PARE Monthly MRF Report, January-August 2011

Due to Quezon City’s proximity to consolidators and end users, the sub-classification of traditional recyclables is more than the sub-types in the other study areas such as San Carlos City and San Fernando City in La Union as shown in the Table 32.

Table 32: Sub-Classification of Major Recyclables by PARE

Major Classification	Sub Types
1. Paper	• Paper waste no. 2
	• Bond Paper
	• Cartons
	• Newspapers
2. Bottles	✓ Cullets
	✓ Bottles of assorted sizes
3. Metals	o Aluminum
	o Steel (bakal)
	o Aluminum can
	o Tapalodo/yero (corrugated steel/chassis of vehicles)
	o Copper wire
	o Acrylic trans
	o Zinc
	o Stainless metal
	o Copper (red)
	o Copper (yellow)
	o Metal (jalousie)
	o Tin cans
4. Plastics	• Plastic spoons
	• Plastic cups
	• Wire covering
	• Plastic cd
	• Plastic H-10
	• Plastic HDPE (sibak)
	• Linoleum
	• Plastic toys (malutong)
	• PE with print
	• PE white
	• PVC pipes and bottles
	• PET bottles
	• Tarpaulin
	• PP white
	• PP colored
	• Used plastic sacks
	• Plastic blowing
	• Styrofoam
	• Monoblocks

Source: PARE Monthly MRF Report, January-August 2011

At the MRF station, the wastepickers may opt to sell the scrap to PARE , where all accredited waste pickers are members. There are 22 accredited buyers (called junker-affiliates) who are also PARE members. They go to the MRF stations where they

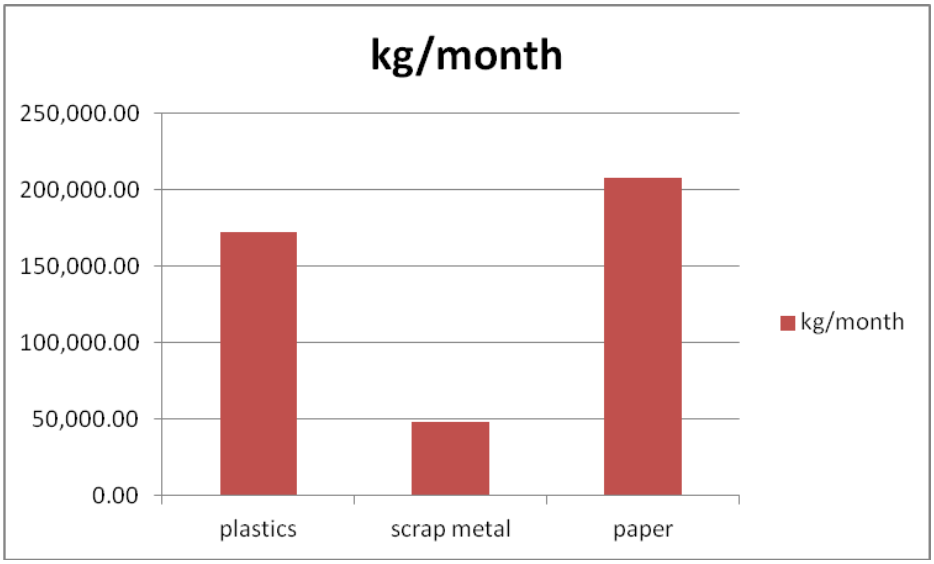
weigh and buy the scrap recovered by the wastepickers. The accredited buyer then sells the scrap to the PARE junkshop.

To date, only 50% of the 1,200 wastepickers sell the scrap to PARE. The other 50% opt to sell to the junkshops outside the SLF due to better pricing. The lower buying price of PARE as compared to the other junkshops is due to their present financial condition. PARE 's accumulated capital is PhP200,000. An additional PhP400,000-PhP500,000 is sourced from a big Payatas junkshop so they are obliged to sell their scrap to this junkshop instead of being able to seek other dealers with better buying prices.

For the period January to June 2011, the total amount of recyclables recovered by Payatas wastepickers was 11,444,956 kgs . The total amount purchased by PARE during the same period was 2,337,389 kgs. or just 20 %.

The top three items recovered are: paper, plastics and scrap metal as shown in Figure 20.

Figure 20: Top Three Recyclables in QC SLF



Other Waste Recovery Systems at the Payatas SLF

Used Tire Retrieval

The Used Tire retrieval started in 2003 in partnership with Holcim Cement. Used tires dumped at the disposal facility are retrieved and cleaned before being transported to Holcim's plant, where the tires are used as alternative fuel in the production of cement. Based on the interview of Mr. Louie Sabater of the Payatas Operations Group, about 450 tons or 65,000 pieces of used tires had been retrieved as of 2011.

Composting

The Payatas SLF has the capacity to compost 3 tons of biodegradable waste daily through composting and vermi-composting. Unfortunately, there is no data on how much biodegradable waste is composted at the SLF.

Pilot testing of the DOST Plastic Densifier Technology

This technology was set up at the SLF in order to determine the applicability of the technology to the kind of waste received at the facility and to study the viability of a livelihood based on the technology for the wastepickers. Presently, the products manufactured using the technology include chairs and tabletops, planters, catwalks and pavers. Based on the pilot test, the hindering factor to the use of the technology is the added costs since used cooking oil is needed as input to the process.

Recovery of Plastic Bags and Styropor

With regards to thin plastic bags, the Payatas Operations Group has discussed the problem of sando bags with the Philippine Plastic Industry Association (PPIA). PPIA has arranged for one of their members to buy these sando bags.

POG, in turn, has selected a buyer from among the PARE members to focus on the recovery and trading of plastic bags. PARE will buy the plastic bags from the wastepickers at P1/kg for dirty plastics and P2 for clean and dry ones.

The assigned PARE buyer has different options regarding the sale of the recovered plastic bags. A plastics consolidator and processor (Consolidator-Processor C-6) based in Novaliches, Quezon City, will buy the plastic bags at PhP4-PhP5 per kg if clean and dry and recycle it back to sando bags. Transportation cost will be shouldered by the PARE member for the delivery of the sando bags to the factory.

Another company, Poly-GreenTechnology and Resources Inc, also buys sando bags at the same price and converts waste plastic into diesel. A certain level of impurities is tolerated by PolyGreen. Transport costs are to be shouldered by the supplier of waste plastic. Since Poly –Green Technology and Resources Inc. is located near Payatas, the designated PARE buyer has been selling the plastic bags to the company.

The Payatas SLF has a styropor densifying machine that allows the recycling of styropor into pavers and other products. This recovery process is envisioned to be a source of additional income for the wastepickers but the process requires the procurement of used oil which is an added cost. Meanwhile the Payatas Operations Group has initiated contacts with the Polystyrene Packaging Council of the Philippines for the company to pick up and buy styropor waste recovered by the wastepickers as an additional option for Styrofoam recovery.

The same PARE buyer for plastic bags was also assigned to buy Styrofoam packaging materials from industrial applications from the wastepickers. He has already transported and sold the Styrofoam to a Marikina recycler. However, recovery of plastic bags and Styrofoam is still erratic because the assigned PARE buyer has limited capital. Furthermore, transport costs are high, so that his net profit per kilo is only PhP.50 per kilo.

QC Waste Diversion Profile

Table 33 shows that QC computes its waste diversion rate based on waste materials diverted by junkshops, barangays, business establishments, subdivisions, schools , malls, waste markets and other special marketing activities. The waste diversion rate does not include materials brought to the SLF and recovered by the SLF wastepickers**.**

Quezon City's reported diversion rate in 2008 is 37.78% diversion, which exceeded its goal of 33% diversion from disposal. In 2010, waste diversion rate increased to 38.21%.

Table 33: 2010 Quezon City Waste Diversion

Actual Volume Composted Materials (kg/day)		
Barangay	31,687.80	2.44%
Establishments	4,302.50	
Subdivisions	9,647.73	
Schools	29.09	
QC Hall MRF	331.26	
Barangays	30,916.94	35.77%
Malls	7,255.52	
Schools	112.08	
Sinop bulasi sa Eskwela Project	3,526.28	
Actual Volume of Recycled Materials (kg/day)		
QC City Hall Waste Market and other recycling activities	1,177.87	
Junkshops	632,399.90	
Others	735.98	1%
TOTAL	675,388.79	38.21%

Source: 2010 EPWMD Report

Private Sector Materials Recovery System

In a 2009 study conducted by SWAPP for a UN Habitat publication, it described the different recycling chains existing in Quezon City from the individual waste buyers (formal and informal), registered collectors/junkshops (registered and illegal) and the recycling industries as shown in Table 34.

Table 34: Recycling Chains in Quezon City

Type	Unit of measurement	Details	Source/Dates
Links Or Levels In The Chain – how many times the material is sold/ bought before it reaches the recycling factory	Number of rings in the chain	3 (ave.)	EPWMD Sample Survey 2009
Individual Collectors - or persons working	Itinerant waste collectors: 392 Itinerant waste pickers:		Computed from 2009 EPWMD Data

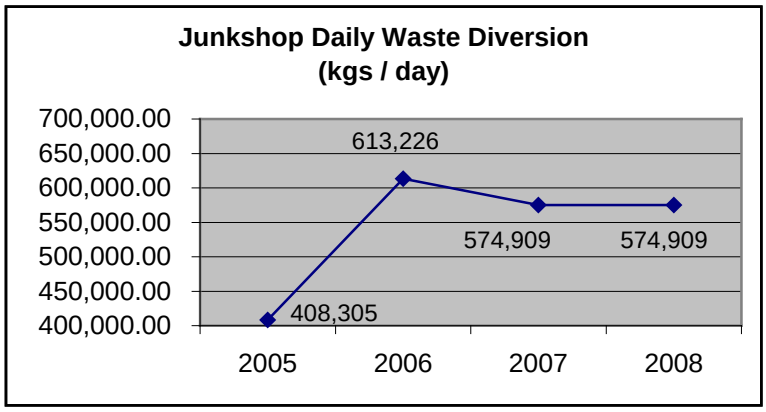
Type	Unit of measurement	Details	Source/Dates
in families to collect material	1,480 Itinerant waste buyers: 3,700 Garbage collection crew: 926 Dumpsite waste pickers: 3,000 Junkshop personnel: 3394 For a total of 12,892.		
Unregistered Buyers And Sellers - in the chain excluding individual collectors and family collectors	Number working without a business registration	740 Junk-shops	EPWMD survey 2008
Registered Buyers And Sellers - in the chain excluding individual collectors and family collectors	Number of registered businesses, permits, pay taxes	246	Business Process and Licensing Office data 2008

Source: SWAPP, Economic Aspects of Informal Sector Activities in Solid Waste Management, City Report for Quezon City. October 2009.

Quezon City Junkshops

Recognizing the major role of junkshops in the recovery of recyclables, EPWMD developed its Junkshop Standardization Program in August 2005. Quezon City issued Ordinance SP -1711, S-2006 regulating the operations of junkshops in the city. They were required to comply with specific standards to be approved through the issuance of a clearance by EPWMD prior to getting a business permit. In a survey conducted in 2007-2008, 740 non-registered and 246 registered junkshops in the city were identified.

Figure 21. Daily Waste Recovery of Junkshops



Source: 2010 EPWMD Report

The 2007-2008 figures reported by EPWMD show that the trade slowed down as a result of the economic recession but by 2010, trade had already picked up with a daily waste recovery of 632,399.90 kgs/day.

Representatives from two junkshop associations in Quezon City were interviewed during this study. The first one is the Payatas-Litex Junkshop Association which consists of haulers cum junkshop dealer and junkshop dealers. The other association is Linis Ganda, Quezon City Chapter.

The table below shows the profile of the interviewed junkshop operators: two with college education while the other two finished secondary school. Two operators have been in the business for over a decade while the other two have more than five years experience in the business. All had regular or full time workers whose salaries range from PhP270-PhP200 per day and contractual workers usually paid by volume of materials sorted or handled. Monthly revolving capital ranged from PhP20,000 to PhP500,000.

Table 35: Profile of Selected Junkshops in Quezon City

Particulars	Hauler/ Junkshop C-1	Hauler/ Junkshop C-2	Junkshop C-3	Junkshop C-4
Age of Owner	52	48	54	39
Educational Attainment	High School	College 3rd year	High School graduate	College undergraduate
Start of Business	May 2004	March 1992	1984	2001
Work hours	8 hrs/6 days/week	10 hrs/ 7 days a week	10 hrs./day	10 hrs/day
No. of workers	10 regular, 15 part time	15 regular, 2 part time	5 regular; 3 contractual	6 regular
Benefits	Regular – PHP250/day; Part time- PhP 150/ trip; Benefits- housing, medical, SSS	Regular- PhP 250/day; Part time- PhP350/day; Benefits- housing, medical	Regular – PhP270; Contractual- by volume of waste sorted	PhP 200/ day + 50 food allowance; Benefits- housing
Health problems of workers	Respiratory, physical injuries, sore eyes	Physical injuries, head aches	Coughs and colds	Coughs and colds
Revolving monthly capital	PhP 100,000	PhP 50,000	PhP500,000	PhP 20,000
Net Monthly Income	PhP 150,000/ month – not good	No answer	No answer	No answer

Buying and Trading Activities

The Payatas-Litex Junkshop and Truck Haulers' Association is composed of 56 junkshop owners and haulers. The haulers collect wastes from buildings and business/commercial establishments and subdivisions and bring the wastes to their MRF for sorting. Residual wastes are then hauled to the Payatas Sanitary Landfill. The waste generators and the haulers sign an annual contract specifying the terms of collection, e.g., frequency of collection and monthly or annual fees.

Other members are junkshop owners, whose main suppliers are the garbage crew who drop off and sell the recyclables recovered from the garbage truck to the junkshops before reaching the Payatas SLF. Other junkshops also get their supply from the wastepickers of the Payatas SLF who do not opt to sell their recyclables to the PARE

cooperative.

The Metro-Manila Linis Ganda Multi-purpose Cooperative is an organized cooperative of junkshop dealers and consolidators. It was founded by Leonarda Camacho and Sonia Mathay in the late 1980s. It has a total of 575 primary coop members with 80 members in Quezon City. The QC Linis Ganda members employ 200 eco-aides who perform the role of primary collectors of recyclables. The daily buying capital of the eco-aides is from PhP1,000 to PhP2,000 daily. As of December 2011, total loan amount released by the QC Linis Ganda chapter to its members was PhP 4,190,000.

Linis Ganda classifies its members into small (20%) , medium (50%) and large (30%) based on its revolving capital as shown in Table 36. The small junkshops would have a capitalization of about PhP20,000; followed by a medium junkshop with PhP50,000 and a large junkshop with about PhP100,000.

Table 36: Classification of Junkshops

Type	Revolving Capital/day	% of members
Small	P20,000	20%
Medium	P50,000	50%
Large	P100,000	30%

Source: Interview with Iluminada Teves, President QC Linis Ganda Chapter, Sept. 9, 2011

The inflow of recyclables in the table below shows that in terms of volume the top three materials recovered by QC Linis Ganda are paper, scrap metal and metal products and plastics. EPWMD figures for daily waste recovery of junkshops show that only 574,909 kgs were recovered in 2008 compared to 613,226 kg in 2006.

Table 37: 2010 Inflow of Recyclables: Linis Ganda Quezon City Chapter

Items	January-March (Tons/ Quarter)	April-June (Tons/ Quarter)	July-September (Tons/ Quarter)	October-December (Tons/ Quarter)	Total (Tons/ Quarter)
Old newspaper	49,059.60	56,055.12	46,763.82	27,815.13	79,693.67
White paper	51,952.32	47,532.12	31,606.71	21,693.63	153,047.49
Carton	44,187.81	48,768.15	34,892.28	25,119.39	152,967.63
Plastics	35,519.37	39,484.17	37,369.53	31,666.29	144,039.36
Whole/broken bottles	8,118,90	10,107.69	7,836.96	7,643.67	33,707.22
Scrap metal/tapalodo /Lata/yero	60,466.65	62,712.21	57,500.28	41,981.22	222,660.36
Aluminum cans/ Copper/bronze	14,087.37	13,540.65	14,733.63	15,080.10	57,441.75

Source : Linis-Ganda. Recyclable Purchase Report from Jan. – Dec. 2010

Destination of Recyclables

Final buyers of materials of the junkshops are local recyclers ,e.g. San Miguel for bottles, plastic scrap to various recyclers in Valenzuela, Bulacan (presently organized under the Metro Plastic Recyclers Association) and the Philippine Plastics Industry Association of the Philippines and unregistered consolidators exporting their scrap to China.

CARPEL Trading Inc. (Consolidator Processor C-7), a Linis Ganda member is also a paper and plastics consolidator. It has buying stations outside Quezon City. It is the main supplier of white paper, newspaper and cartons to Bataan 2020, a paper recycling company. Sixty percent of its waste paper is sold to Bataan 2020 while

waste paper which is not bought by Bataan 2020 is exported to China. The company also consolidates "sibakin" plastics (HDPE, LDPE and PP plastics) which it pelletizes and exports to China. It also buys waste paper from junkshops at PhP3.30 per kg and sells it to the recycling company or exporter at PhP3.50 to PhP3.70 per kg.

Linis Ganda consolidators have arrangements with some of its client recyclers that the latter will donate two centavos per kilo of scrap sold to them by the former. Each year the total money donated is distributed to members during their General Assembly.

Impact of Economic Recession on the Flow of Recyclables

Most of the responses of key informants regarding economic recession is associated with the slump in the demand for recyclables from China after the Olympic Games. They cited that the high demand for recyclables during the pre-Olympic Games period caused an increase in number of new junkshop traders. During the post-Olympic Games phase, many new traders lost their money but those who have been in the business longer and who had access to capital and space to stockpile their inventory were able to survive the slump. Some of them stopped buying temporarily and reduced their working hours. Some closed down temporarily.

Factors Affecting the Flow of Recyclables

Facilitating Factors

Quezon City LGU has definite targets for diverting its waste from landfilling and mechanisms to do so through recovery activities not only in its SLF but also through its barangay MRFs and special events in partnership with the business sector, schools and civic organizations. It has also established a comprehensive system for tracking waste diversion outcomes of the various strategies. It has also integrated the 3,000 wastepickers in the City's SLF and they have contributed to increase the waste diversion in the SLF and they are now more organized and efficient.

Its Junkshop Standardization Program which included the establishment of a data base on informal waste workers, passage of a junkshop ordinance and the accreditation

and affiliation of IWBs with junkshops also helped to partly regulate the informal recovery system.

At the industry level, two associations of junkshops, the Payatas-Litex Junkshop Owners and Truck Haulers Association Inc. and the QC Linis Ganda Chapter are able to assist its members and interact with government and protect their interests. Linis Ganda is also able to regulate unfair competition among junkshops by standardizing their buying price.

One of the junkshop consolidators state that the business is thriving because there are more types of recyclables at present, citing PET as an example of a no-value material then but now ranking as the most expensive type of plastic waste. The accessibility of consolidators, traders and processors in Metro-Manila and nearby provinces also strengthen the flow of recyclables. Hence, even recyclables with low or no commercial value in other places could find a market in QC as shown by the Payatas wastepickers.

Hindering Factors

Consolidator Processor C-6 who identified the free entry of cheap imported goods especially those from China as a hindering factor to his business since the imported products are cheaper than the locally manufactured product of the consolidator-recycler. As a local manufacturer, he has to pay taxes for importing his raw materials and additional taxes for manufacturing. Also, other production costs such as labor and energy are more expensive in the Philippines.

According to a Consolidator Processor C-7, the glut of cheap imported paper products caused local paper manufacturers to stop buying mixed waste paper. The coping strategy of the consolidator is to export the mixed waste paper to China. The consolidator also found exporting more favorable because there are signed agreements and prices are already fixed for the duration of the agreement. Payment is made within 30 to 60 days. The exporter also takes care of transport costs. In comparison, the local paper manufacturer has stricter quality requirements and the term of payment for goods is six months.

Issues and Challenges

The issues and challenges are presented by stakeholders in the matrix below:

Stakeholders	Concerns
Payatas SLF Wastepickers	• Decreasing volume of scrap due to recovery activities by barangay MRFs, paleros, etc. • Future displacement when SLF closes down • Access to alternative livelihood
PARE	• Only 50% of wastepickers in Payatas SLF patronize the PARE junkshop; continuing values formation needed • Increase in capital needed in order to cut their dependence on the Junkshop which lends them their revolving capital; so far, they have saved PhP200,000 but need at least PhP500,000 more to be able to cut their dependency on said Junkshop
Local Junkshops with paleros/garbage crew as their main suppliers	• Proliferation of junkshop competitors • Potential loss of business upon closure of Payatas SLF • Decreasing volume of scrap recovered by garbage crew/paleros as segregation campaign and no segregation; no collection intensifies
Hauler/Junkshop Operators	• Before: income comes from collection fee paid by private clients plus income from recyclables collected; Now: Clients deduct the value of recyclables from the garbage fee paid to the haulers • Increasing cost of transport • Increasing cost of tipping fees • Access to capital
Paleros/Garbage Crew	• Decreasing volume of scrap materials as waste generators sell their scrap to itinerant waste buyers and junkshops instead of giving mixed wastes to the garbage truck

Stakeholders	Concerns
Consolidators and Consolidator-processors	• High cost of operations – transport, energy costs, high taxes • Lack of support from government • Competition from illegal consolidators • Access to capital for acquisition of equipment such as balers, crushers, pressers etc.