

3. Issues on Recycling Industry Development in the Philippines

3.1 Issues on Current Distribution Mechanism of Recycling

3.1.1 Issues in Separation and Discarding of Recyclable Materials at Generation Sources

Proper separation of recyclable materials at the sources of generation is the fundamental key to their efficient collection and utilization through material recycling. Mixed discarding of recyclable materials with other non-recyclable waste makes it difficult to collect and properly utilize recyclable materials. In this regard, discarding behavior of waste generators is of great importance in establishing the firm recycling system in the Philippines.

In the case of the Philippines, segregation of recyclable materials at the sources of waste generation strongly depends upon the monetary value of such materials in the market.

According to the result of interview surveys to the major waste generators, i.e. household and business entities, the ratio of households who separate recyclable materials at sources is as shown in the tables below.

Table 3.1.1 Segregation of Recyclable Materials at Households

(Unit: %)

Survey Area	Recyclable Material	A	B	C	D	Separation Ratio (B+C)
Metro Manila	Paper	47.25	29.52	4.12	19.11	33.64
	Aluminum	64.71	25.13	6.42	3.74	31.55
	Other Metals	74.85	16.36	4.24	4.55	20.61
	Plastic	56.48	19.83	3.71	19.99	23.54
	Glass	58.86	24.13	4.58	12.42	28.71
Metro Cebu	Paper	25.28	27.88	1.13	45.71	29.01
	Aluminum	24.32	64.86	6.76	4.05	71.62
	Other Metals	46.70	42.86	5.49	4.95	48.35
	Plastic	33.24	34.37	4.65	27.74	39.02
	Glass	31.56	46.91	5.06	16.48	51.97
Southern Mindanao	Paper	21.31	9.51	11.24	57.94	20.75
	Aluminum	50.00	31.03	5.17	13.79	36.21
	Other Metals	31.79	49.23	9.23	9.74	58.46
	Plastic	31.08	30.83	11.29	26.80	42.12
	Glass	20.86	51.69	8.54	18.91	60.23

(A) Discarding into waste bin for municipal waste collection.

(B) Sell or give to door-to-door collectors.

(C) Bring to recycling centers

(D) Others

Clearly conscious behavior of segregating recyclable materials falls into category B and C. Segregation ratio is comparatively lower in Metro Manila than other regions except for the paper. Percentage of the households who sell or give to door-to-door collectors is high in Metro Cebu and

Southern Mindanao. The highest ratio of segregation is found in aluminum scrap in Metro Cebu, which is about 70% of the interviewed households.

Meanwhile, the table below shows the behavior of segregating recyclable materials by business entities.

Table 3.1.2 Segregation of Recyclable Materials at Business Entities

(unit: %)

Survey Area	Recyclable Material	A	B	C	D	Separation Ratio (B+C)
Metro Manila	Paper	37.79	32.34	5.84	24.02	38.19
	Aluminum	51.58	31.58	14.74	2.11	46.32
	Other Metals	40.24	29.27	19.51	10.98	48.78
	Plastic	52.40	24.89	8.02	14.69	32.92
	Glass	46.85	21.45	7.19	24.51	28.64
Metro Cebu	Paper	22.72	31.65	1.26	44.36	32.91
	Aluminum	41.18	47.06	0.00	11.76	47.06
	Other Metals	47.83	47.83	0.00	4.35	47.83
	Plastic	32.09	30.64	7.97	29.30	38.61
	Glass	36.92	42.88	6.35	13.85	49.23
Southern Mindanao	Paper	41.68	21.06	0.00	37.26	21.06
	Aluminum	44.44	44.44	11.11	0.00	55.56
	Other Metals	46.43	39.29	3.57	10.71	42.86
	Plastic	46.34	29.70	3.21	20.76	32.91
	Glass	38.33	23.81	6.67	31.19	30.48

(A) Discarding into waste bin for municipal waste collection.

(B) Sell or give to door-to-door collectors.

(C) Bring to recycling centers

(D) Others

In the case of Metro Manila, the ratio of separating recyclable materials is higher than the case of households. It may reflect higher awareness of recycling in business entities. In the case of other regions, the difference between households and business entities is mixed.

Comparatively lower separation of papers in Metro Cebu and Southern Mindanao is estimated to be the no or limited users of nearby waste/scrap papers since most of them are located at nearby area of Metro Manila.

The issues that were raised from households and business entities regarding the separation of recyclables are as follows:

- a Households and business establishments mentioned the different problems when it comes to segregation of recyclables. It was mentioned that some households and even business entities do not segregate because it is time-consuming and at the same time a very tedious activity. They feel that they have far better things to do rather than spend time with this kind of activity. It was also mentioned that some recyclable materials are hard to segregate. The lack of extra garbage receptacles or bins for recyclables was also

mentioned wherein household members or employees would like to have a particular container to dispose or place these recyclable materials.

- b The lack of discipline by the people was also stated as well as the manner of garbage collection. Household members said that even if they segregate, the garbage collectors would still mix them inside the collection trucks.
- c Several issues were also stated with regard to the sale of recyclable materials. Household members mentioned that most of the time, Eco-aides would have very low buying prices or been also choosing what to buy. Sometimes, there would be no buyers resulting in the stockpiling of materials on households or at offices.
- d Other problems mentioned are the infrequent garbage collection as well as the need for information dissemination among communities and business establishments to further promote recycling activities.
- e Suggestions vary from creating programs to advance the recycling activities as well as the improvement of the garbage collection covering the residential and commercial establishments. A stricter implementation of the provisions of RA 9003 in particular with the recycling activities is also strongly suggested by households and business entities.

Regarding the issues that must be addressed in further promoting waste minimization and recycling, the following were mentioned in the interview survey; 79% of interviewed business entity and institution respondents answered that raising awareness on recycling is the main issue that must be addressed; 70% answered that strict enforcement of the regulation must be implemented; and 58% are in favor of establishment of clear policies and regulations as the majority. The minor issues raised includes that 30% agree that there should be more material recycling facilities; 25% are in favor of consistent collection of wastes and implementation of buy-back system; 12% affirm that there should be provision of incentives; 10% answered that there should be an introduction of waste collection and disposal taxes; and 5% cited other issues that should be addressed.

3.1.2 Issues in Collection and Distribution of Recyclable Materials

In the Philippines, various informal/formal players are involved in collection and distribution of recyclable materials. Such players include primary collectors such as street collectors, collection truck crew and disposal site scavengers and middleman/traders including Eco-aides, junkshops and consolidators. Table below shows the collection rate of individual primary recyclers interviewed in the survey.

Table 3.1.3 Collection of Recyclable Materials by Primary Collectors

(Unit: kg/psn/day)

Recyclable Material	Primary Collector	Metro Manila	Metro Cebu	Southern Mindanao
Paper	Street Collectors	3.18	3.59	2.45
	Collection Workers	21.83	1.81	0.62
	Disposal Site Scavengers	22.01	8.21	12.86
Aluminum	Street Collectors	0.76	0.35	0.40
	Collection Workers	0.78	0.13	0.02
	Disposal Site Scavengers	2.50	0.05	1.79
Other Metals	Street Collectors	1.39	5.04	14.76
	Collection Workers	12.35	0.94	0.64
	Disposal Site Scavengers	16.75	6.34	13.75
Plastic	Street Collectors	1.63	3.94	3.50
	Collection Workers	9.79	0.50	0.63
	Disposal Site Scavengers	20.32	4.48	25.00
Glass	Street Collectors	0.85	0.58	6.65
	Collection Workers	6.58	0.26	0.94
	Disposal Site Scavengers	9.96	0.32	49.64

As shown in the table above, the amount of recyclables collected are also dominant by disposal site scavengers. It indicates that still a large amount of recyclable materials is brought into landfills although some of them are collected by street collectors and collection workers on the way to the landfills. The next table below shows the collection of recyclable materials by middleman and traders.

Table 3.1.4 Collection of Recyclable Materials by Middleman and Trader

(Unit: kg/day/dealer)

Recyclable Material	Trader	Metro Manila	Metro Cebu	Southern Mindanao
Paper	Eco-aides	12.76	12.76	12.76
	Junkshops	167.94	95.31	103.26
	Consolidators	385.71	709.82	661.43
Aluminum	Eco-aides	0.88	0.88	0.88
	Junkshops	17.03	7.37	8.38
	Consolidators	127.14	2.34	20.00
Other Metals	Eco-aides	11.79	11.79	11.79
	Junkshops	137.76	250.94	87.52
	Consolidators	1242.86	959.82	500.00
Plastic	Eco-aides	5.20	5.20	5.20
	Junkshops	266.39	160.53	330.31
	Consolidators	114.29	550.25	442.86
Glass	Eco-aides	3.56	3.56	3.56
	Junkshops	49.12	183.76	48.86
	Consolidators	74.29	0.00	532.36

Eco-aides is the organized door-to-door collectors of recyclable materials under the management of NGOs, LGUs, or Barangay offices. Therefore, the collection amount by Eco-aides is much higher than informal street collectors. Junkshops are the receivers of recyclables from primary collectors

inc. Eco-aides and also the traders to the bigger traders such as consolidators or final users of the products. Consolidators are the biggest traders of recyclable materials receiving them from large-scale generators of recyclable materials such as factories, commercial facilities, and office buildings as well as from smaller junkshops and even from individual primary collectors. Most of the consolidators are the suppliers of recyclable materials to their final users as well as importers/exporters of such materials.

The issues that are raised by primary collectors and middleman/traders are as follows:

- a Primary collectors and eco-aides experience various problems in collecting recyclable materials from different sources. Some of them complain on the quality of materials that they are collecting, which in most cases are either dirty or damaged. These damaged recyclables are most of the time not being bought by junkshops.
- b Big junkshops and consolidators also experience problems regarding the collection and transport of recyclable materials. In particular, the collection vehicles are often caught by traffic enforcers for overloading. This is a common dilemma for junkshops considering that a vital part of their operations is the transport of materials to different trading partners.
- c In terms of segregation of collected recyclable materials, this particular activity is conducted within the premises of each junkshop or consolidator. This is an important process for scrap dealers for it is a must that each material should be segregated accordingly before selling to a bigger consolidator or recycling industry. However, there are problems that occur in the conduct of this activity such as the difficulty in the proper segregation because of the presence of different compounds that are mixed together with the recyclable materials. Most often, the recyclables become unusable due to the difficulty in removing the unwanted parts. Also, the discipline among the workers is a problem as well. The proper segregation also depends on the effectiveness of the workers in the junkshops.
- d In relation to the sale or trading of recyclable materials, most junkshops cited the mode of payment of their partners as one of their problems. As mentioned in the questionnaire, the issuing of checks delays the capital circulation. Some payments are also made on an installment basis which does not contribute well in the day to day operations of the junkshops.
- e Another problem stated is the bribery of some local government officials. This problem is a common practice in the Philippines. Even small players are victimized by this practice that brings forth the failure of businesses, in some cases.

- f Various other problems were mentioned by junkshops, focusing mainly on their dilemma with consideration to their daily operations. One major problem is the presence of illegal or underground junkshops which are quite rampant. These establishments serve as competitors to legitimate junkshops, wherein they enjoy the same trading activities despite not paying the proper taxes for their operations. High business taxes are also a problem for this adds up to the capital expenses of the junkshop owners.
- g Junkshop owners would also like to recommend the strict implementation of RA 9003. They are still hoping that the government would support them in their efforts and that policies would be implemented accordingly in order to create more programs for recycling activities.
- h The collectors on the other hand would like to have a standardization of prices for recyclable materials. They are quite uneasy with the fluctuating rates which happen very often.

3.2 Issues on Current Recycling Industries

3.2.1 Waste/Scrap Papers and Paper Industry

(1) Import and Export of Waste/Scrap Paper and Paper/Paper Products

In the year 2004, the import of waste/scrap paper was 370 thousand tons in the Philippines while its export was only about 7.5 thousand tons. Major country origins of waste/scrap paper import are Australia, USA and Japan in 2004.

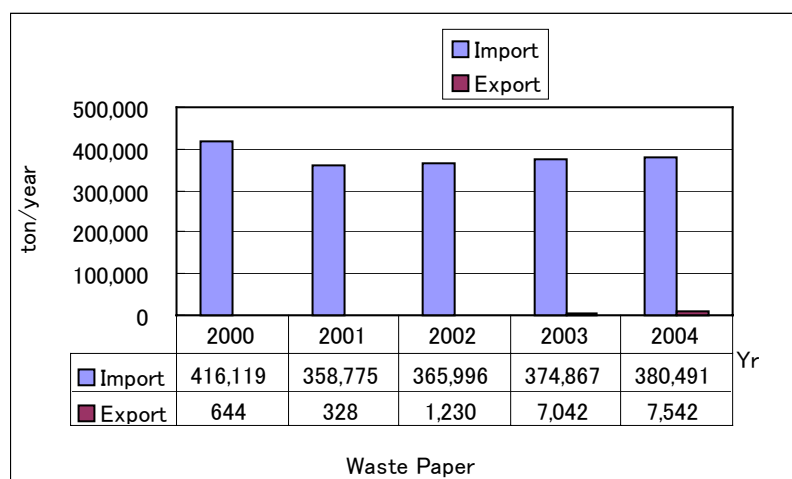


Figure 3.2.1 Trend of Waste/Scrap Paper Trade (2000-2004)

As to the international trade of paper and paper products, the import in the Philippines was 610

thousand tons in 2004 while its export was 137 thousand tons. Major country origins of paper and paper products import are USA occupying about 20% in 2004.

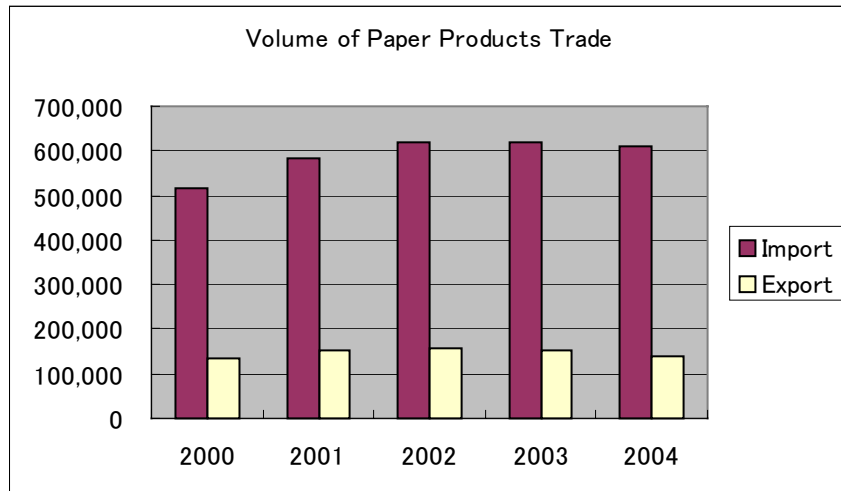
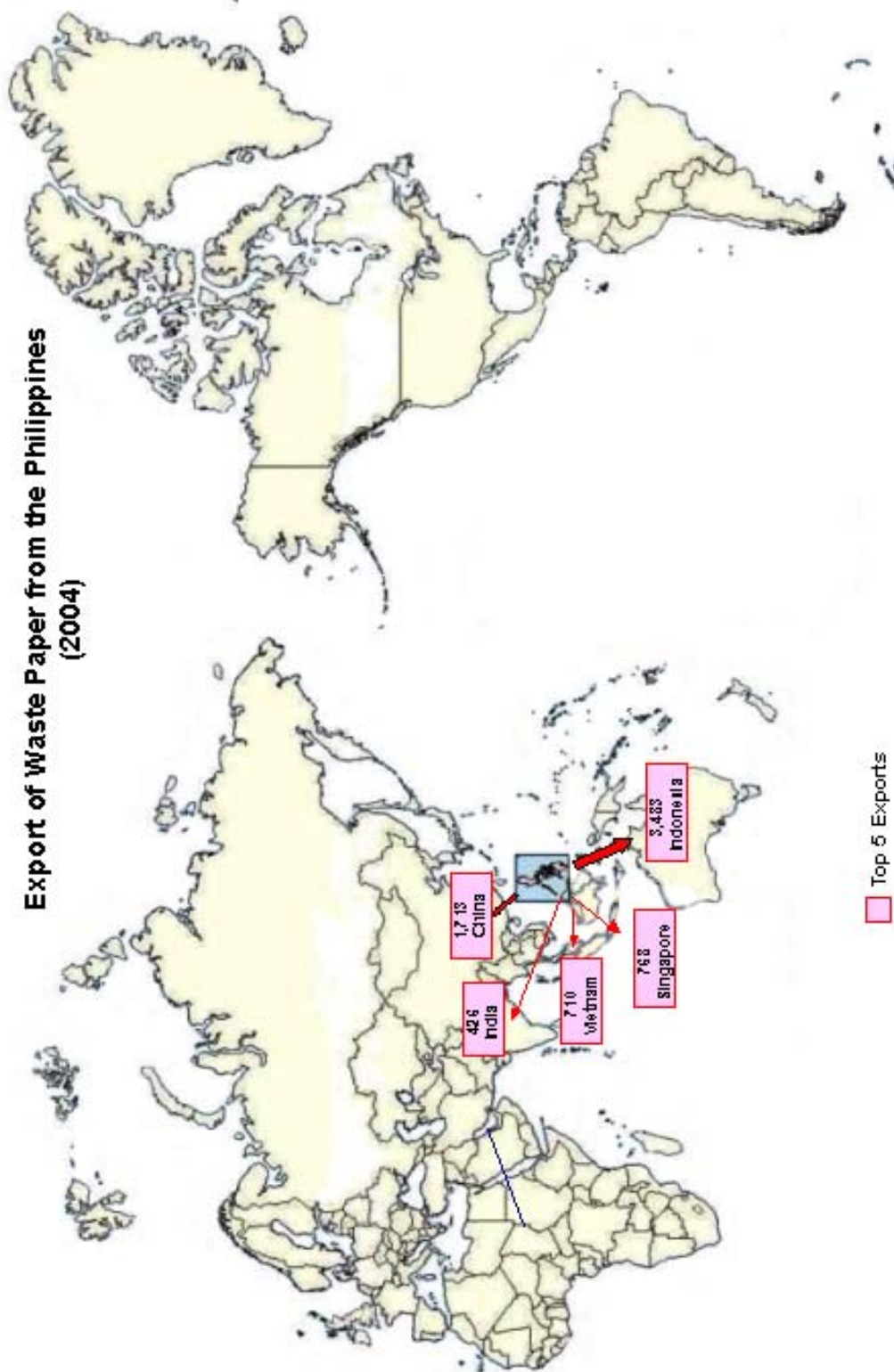
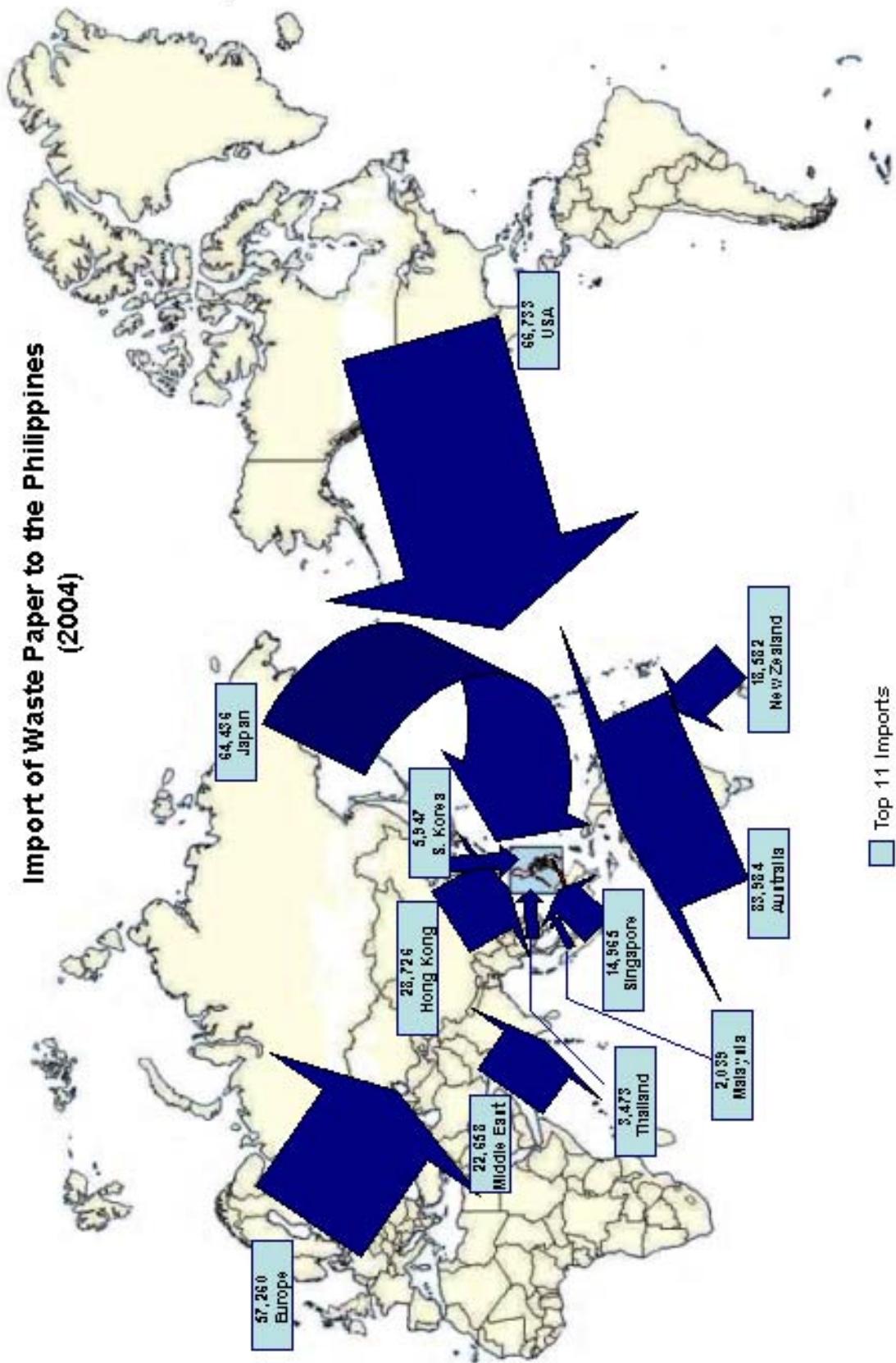


Figure 3.2.2 Trend of Paper/Paper Products Trade (2000-2004)

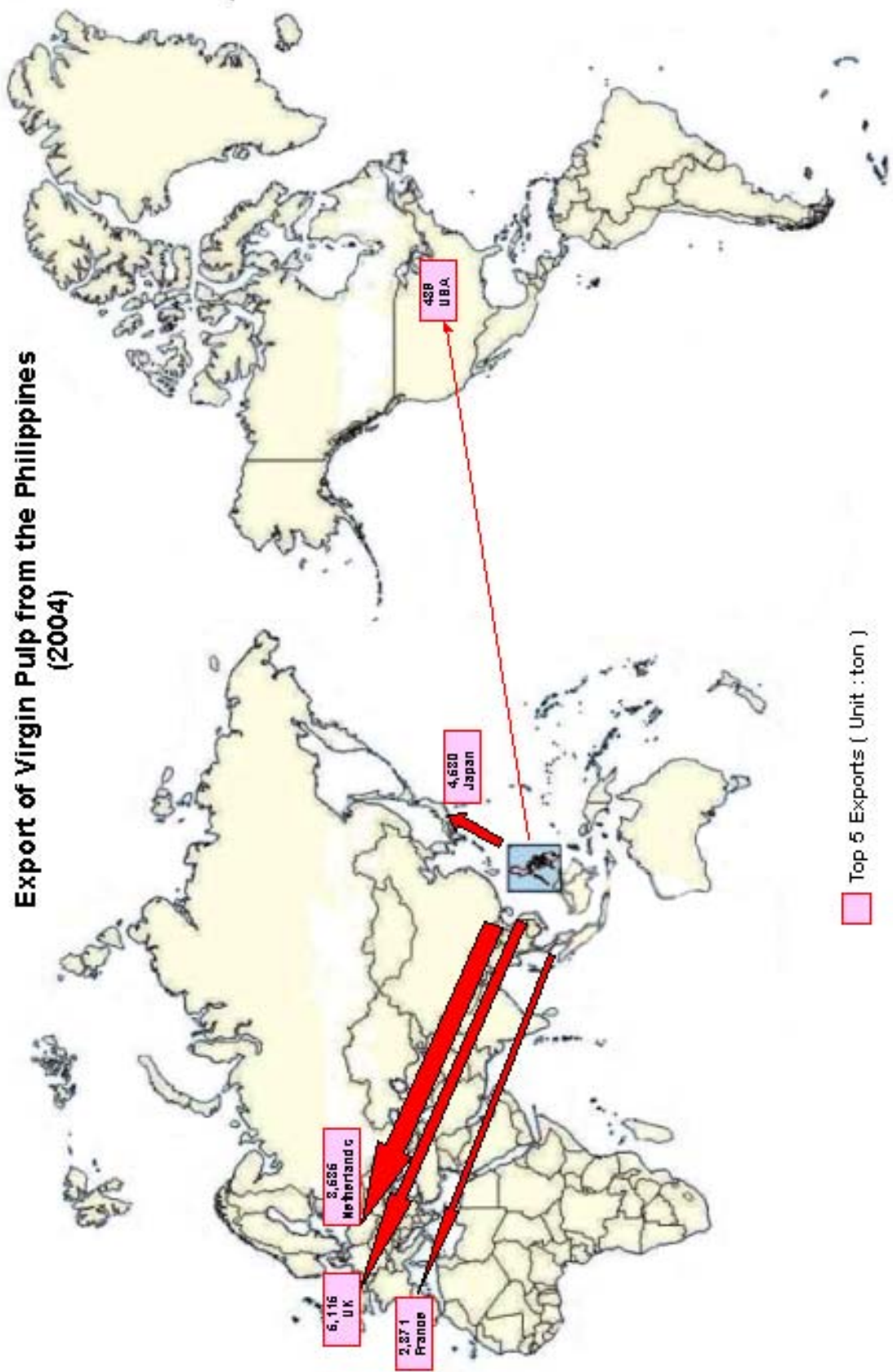
Export of Waste Paper from the Philippines (2004)



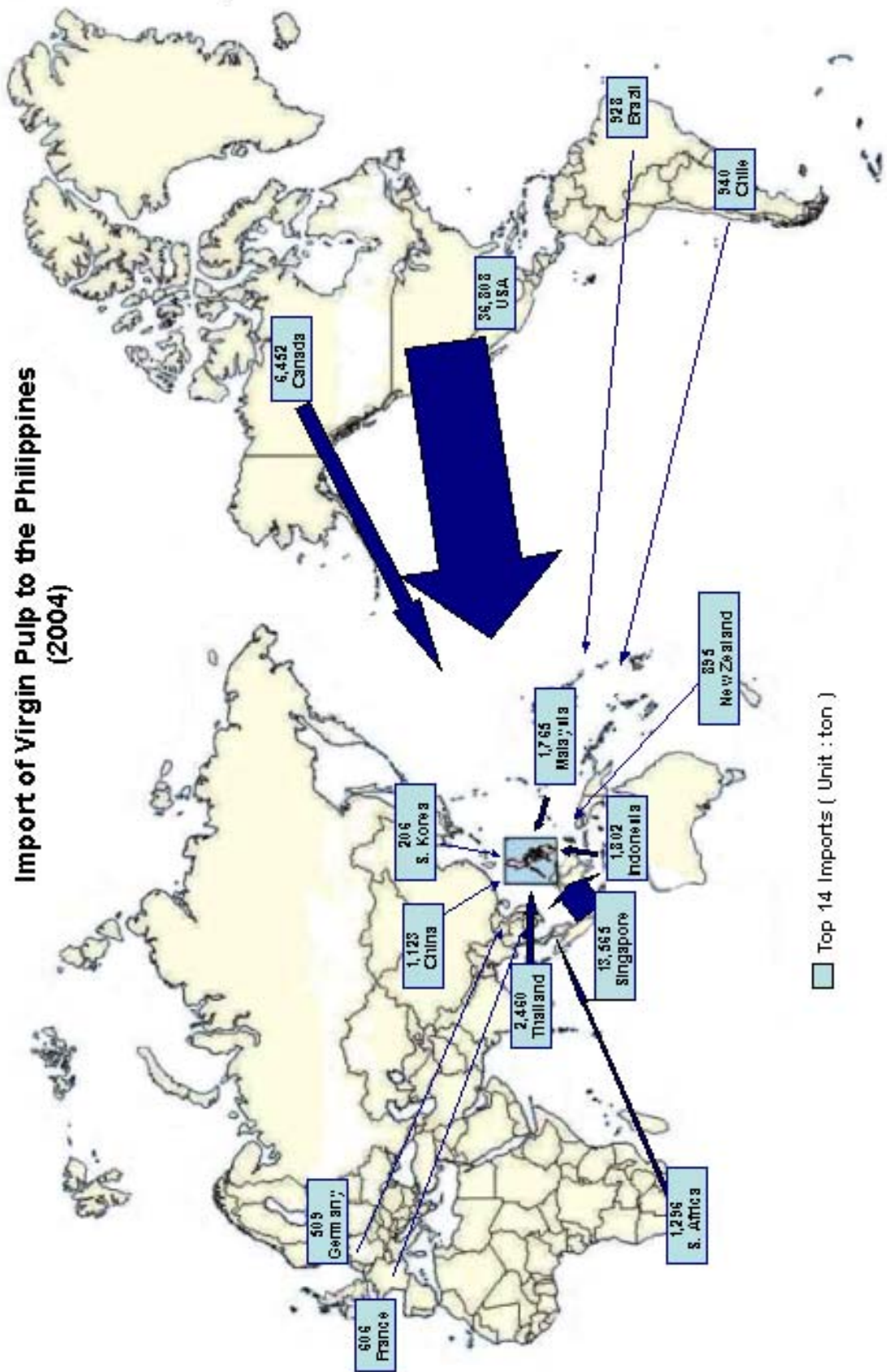
Import of Waste Paper to the Philippines (2004)



Export of Virgin Pulp from the Philippines (2004)

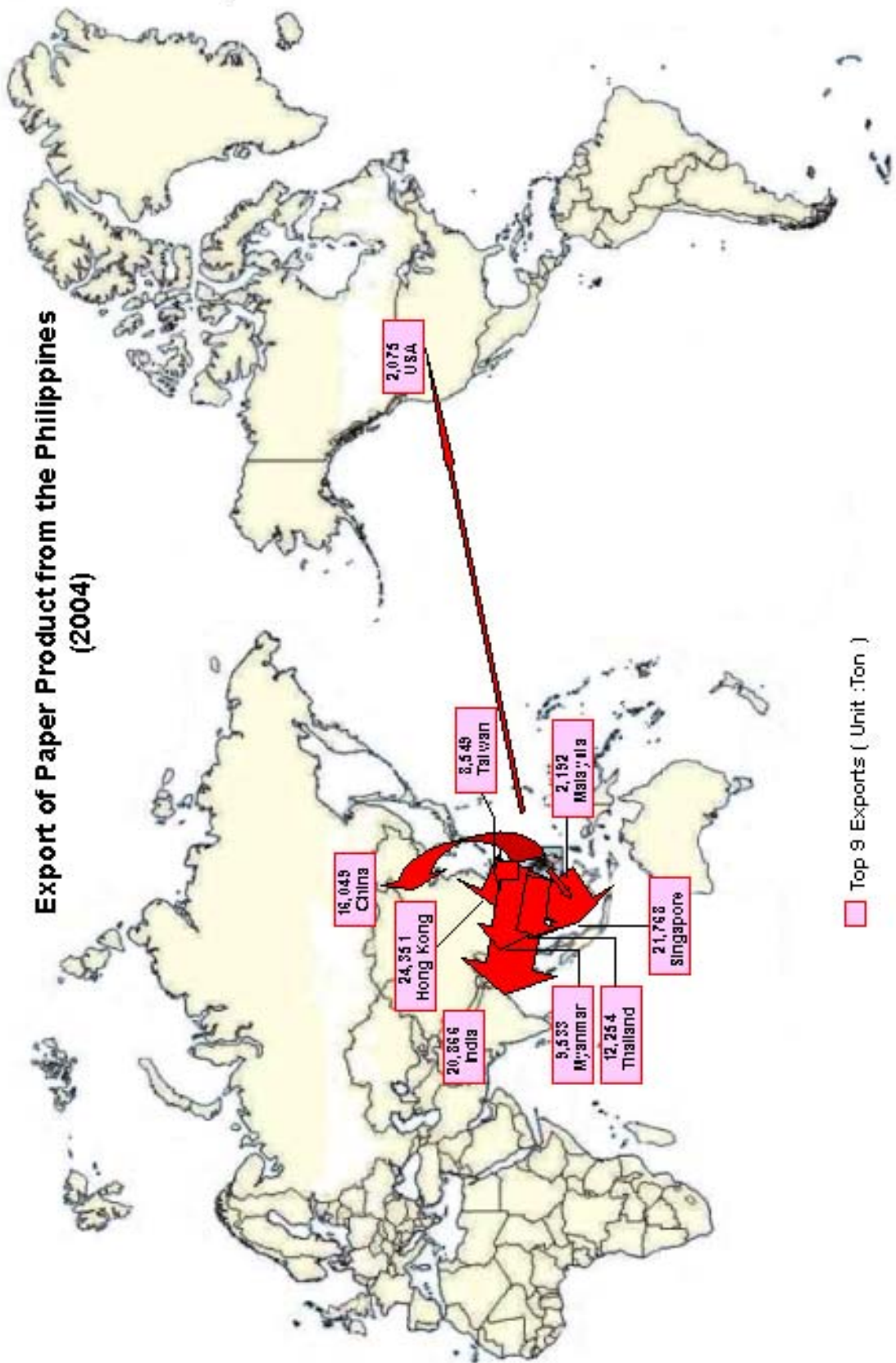


Import of Virgin Pulp to the Philippines (2004)



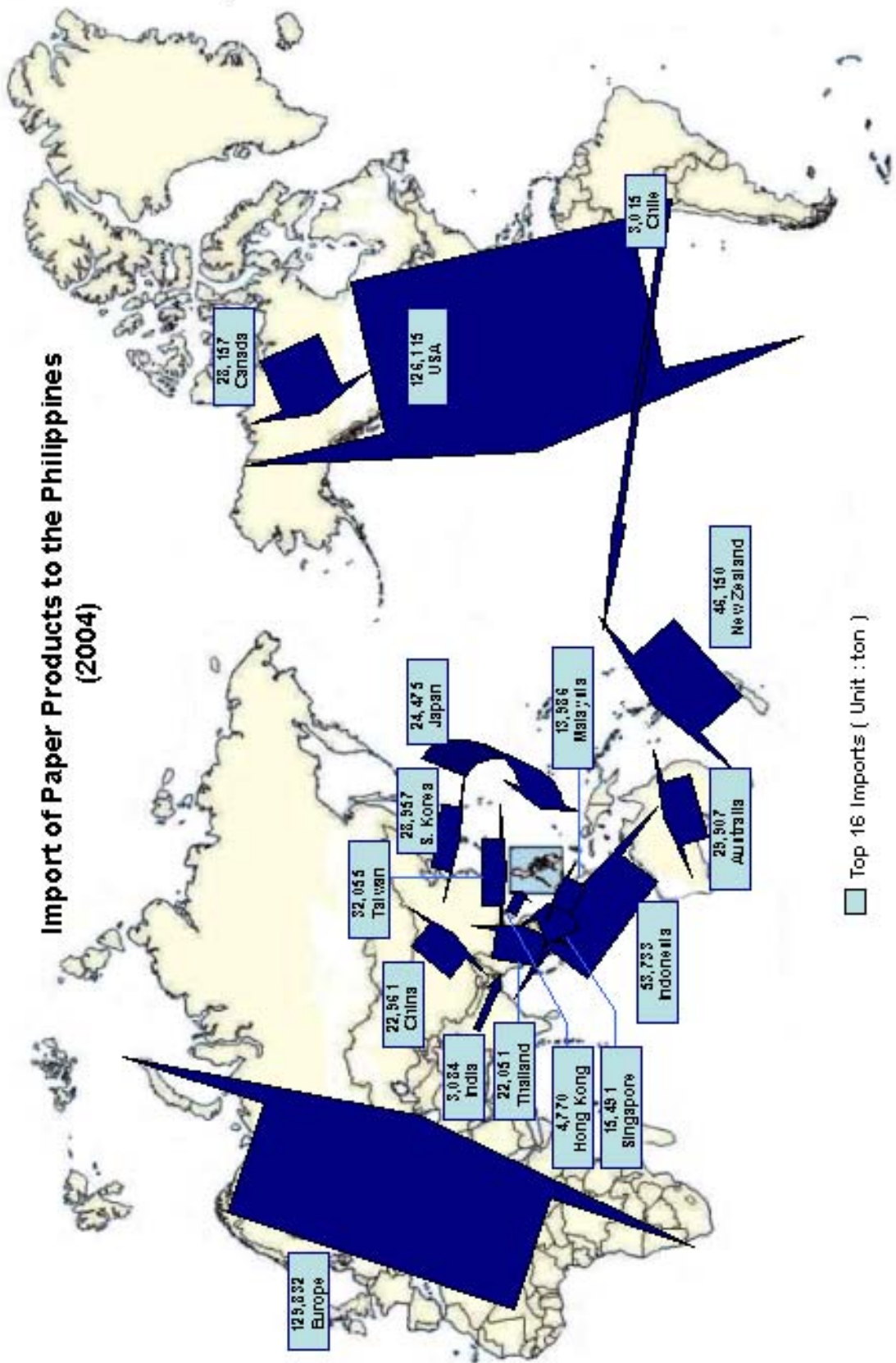
Top 14 Imports (Unit : ton)

Export of Paper Product from the Philippines (2004)



Top 9 Exports (Unit :Ton)

Import of Paper Products to the Philippines (2004)



Top 16 Imports (Unit : ton)

(2) Domestic Production, Consumption and Material Flow of Papers and Paper Products

The Figure below shows the estimated material flow of papers and paper products in the Philippines.

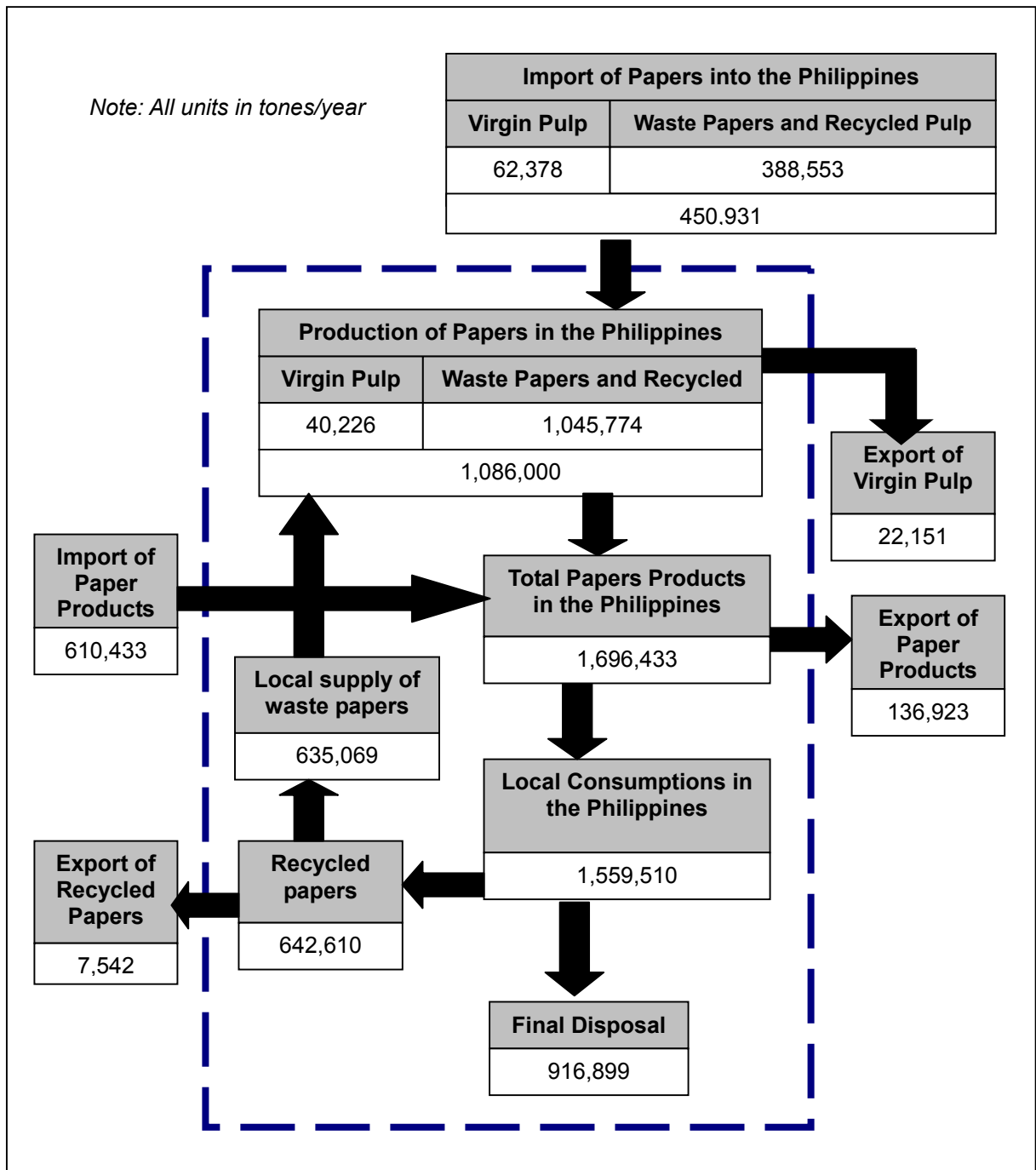


Figure 3.2.3 Estimated Material Flow of Papers and Paper Products (2004)

The annual domestic production of paper and paper products reached approximately 1.1 million tons in the Philippines in the year 2004, which is only about one thirtieth of Japan. Although the total production capacity of existing paper mills in the Philippines is about 1.6 million tons annually, its capacity usage ratio only reaches 70% in 2004.

Most of paper manufacturers in the Philippines utilize waste/scrap papers as raw material except a few manufacturers producing special papers such as Abaca pulp and so forth (30 to 40 thousand tons/year). The ratio of waste/scrap papers for paper production is about 80%, of which 40 to 60% depends upon import from overseas. The ratio of waste/scrap paper collection is estimated around 40% (60% in Japan in 2005)

On the other hand, the annual consumption of paper is estimated around 1.5 to 1.6 million tons or 16kg/person/year, which is as small as 1/15 of Japan or 1/3 of Thailand.

In the Philippines, most of paper and paper product manufacturers are located in Metro Manila or CALABARZON area except for a few ones in Mindanao. Therefore, most of the domestic demand for papers comes from CALABARZON area.

According to the interview surveys to various paper manufacturers, the roughly estimated cost structure of paper manufacturers is as shown in the table below.

Table 3.2.1 Estimated Cost Structure of Paper Manufacturing in the Philippines

Item	Percentage to the total cost
Raw material cost	47%
Electricity cost	26%
Fuel cost	13%
Manpower cost	5%
Others	9%

(3) Key Issues of Paper Recycling in the Philippines

The key issues in paper recycling in the Philippines are identified as follows:

- Replacement of old equipment is required for increasing production efficiency in many paper manufacturing industries
- Increase demand for waste/scrap papers in the international market and increase its trading price, which becomes heavy financial burden to domestic paper industry.
- Due to concentration of paper industry in Metro Manila and CALABARZON area, waste/scrap papers generated outside such area are not well-utilized and stockpiled because of high transportation cost.
- High cost of electricity and fuel in paper production in comparison with other ASEAN countries.
- Incremental cost for water use and wastewater pollution control with the strict enforcement of relevant laws.

3.2.2 Iron Scrap and Iron & Steel Industry

(1) Import and Export of Iron Scrap and Iron/Steel Products

In 2004, the import of scrap iron was only about 23 thousand tons while its export was 882 thousand tons. Major country origins of iron scrap export are Taiwan, Thailand, and Singapore.

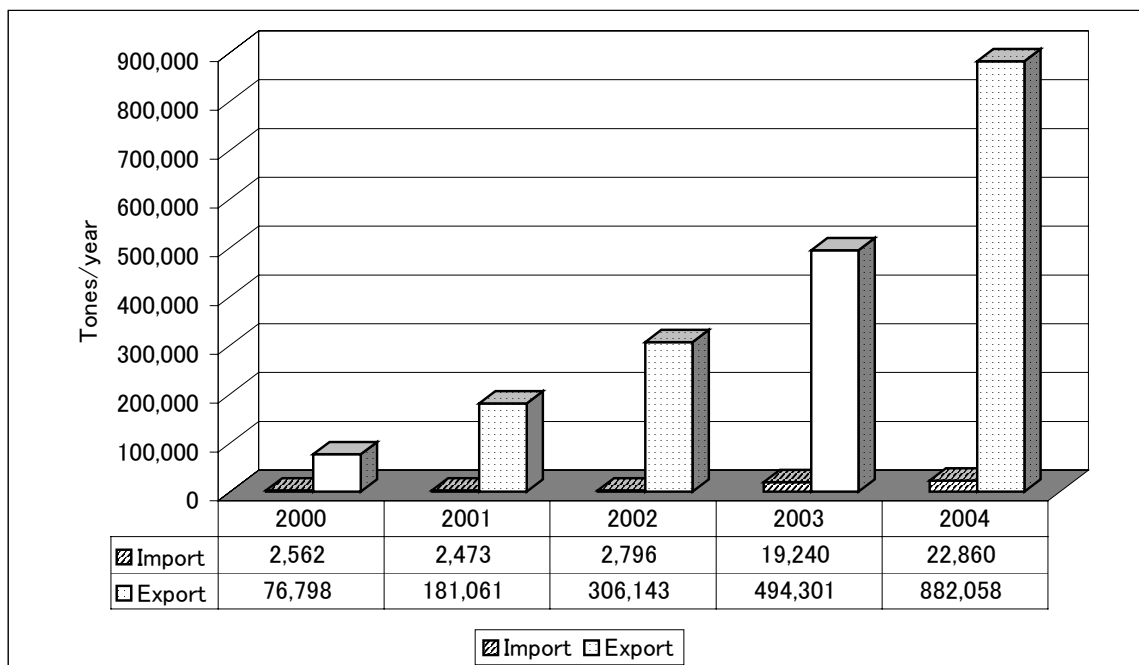
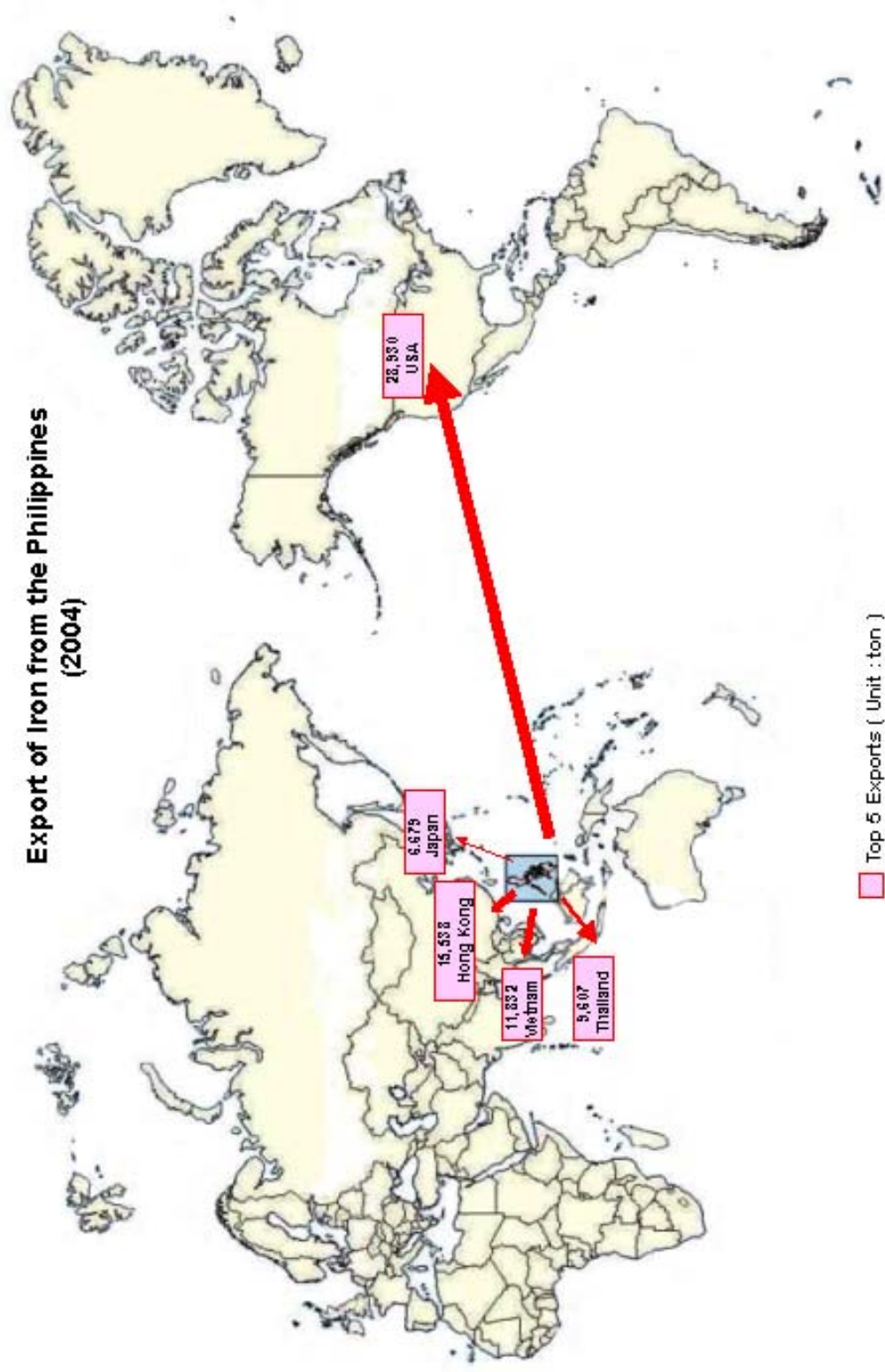


Figure 3.2.4 Trend of Iron Scrap Trade (2000-2004)

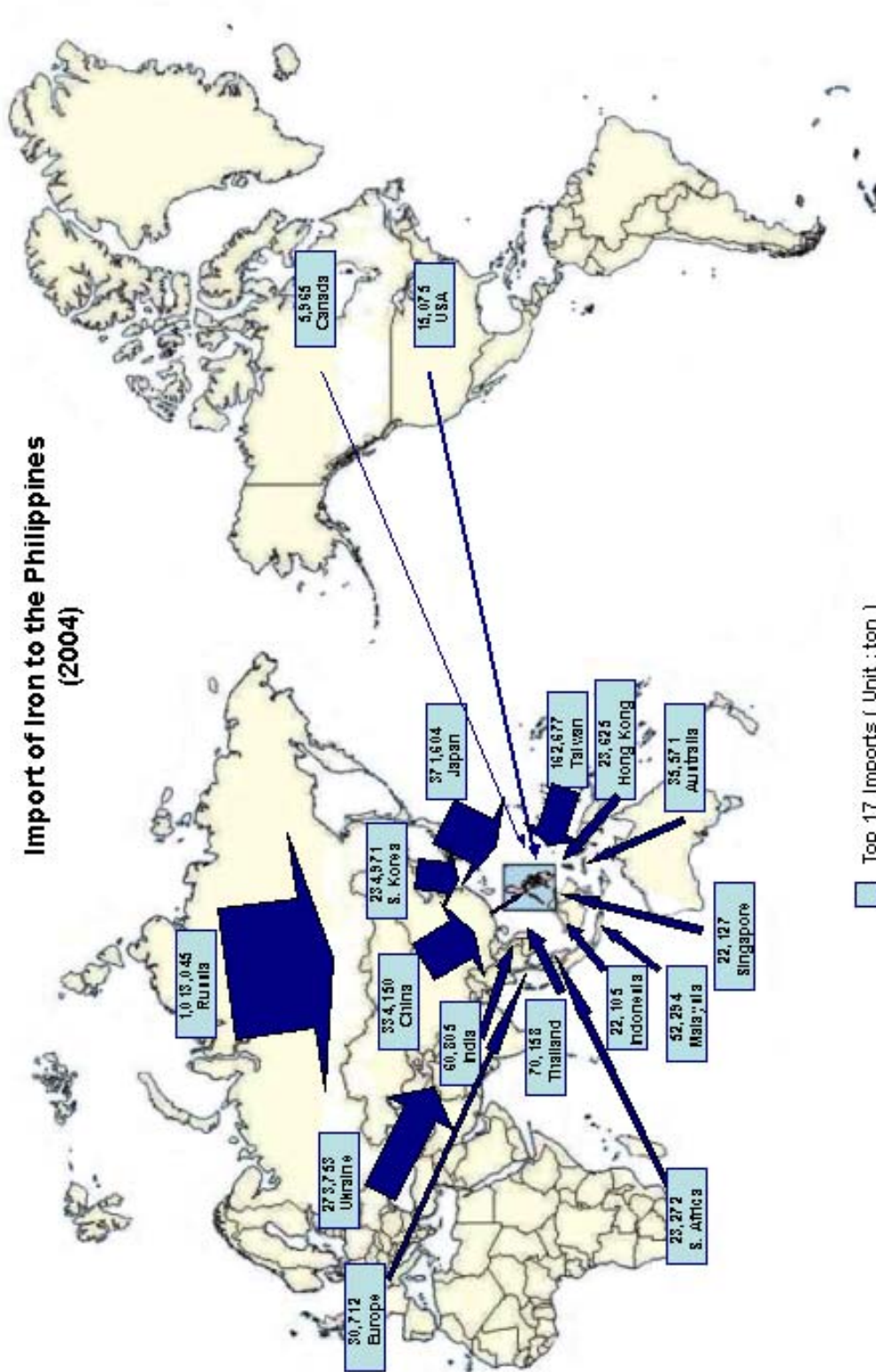
As to the trade of iron and steel products, the import was about 2.8 million tons in 2004 while its export was only about 100 thousand tons. Major country origins of iron and steel product import are Russia (about 40% of total import), followed by Japan, China and Ukraine. Import of semi-finished products such as billets occupies 1/3, while the remaining are finished products. Most of semi-finished products come from Russia and Ukraine while the finished ones are imported from various countries.

Export of Iron from the Philippines (2004)



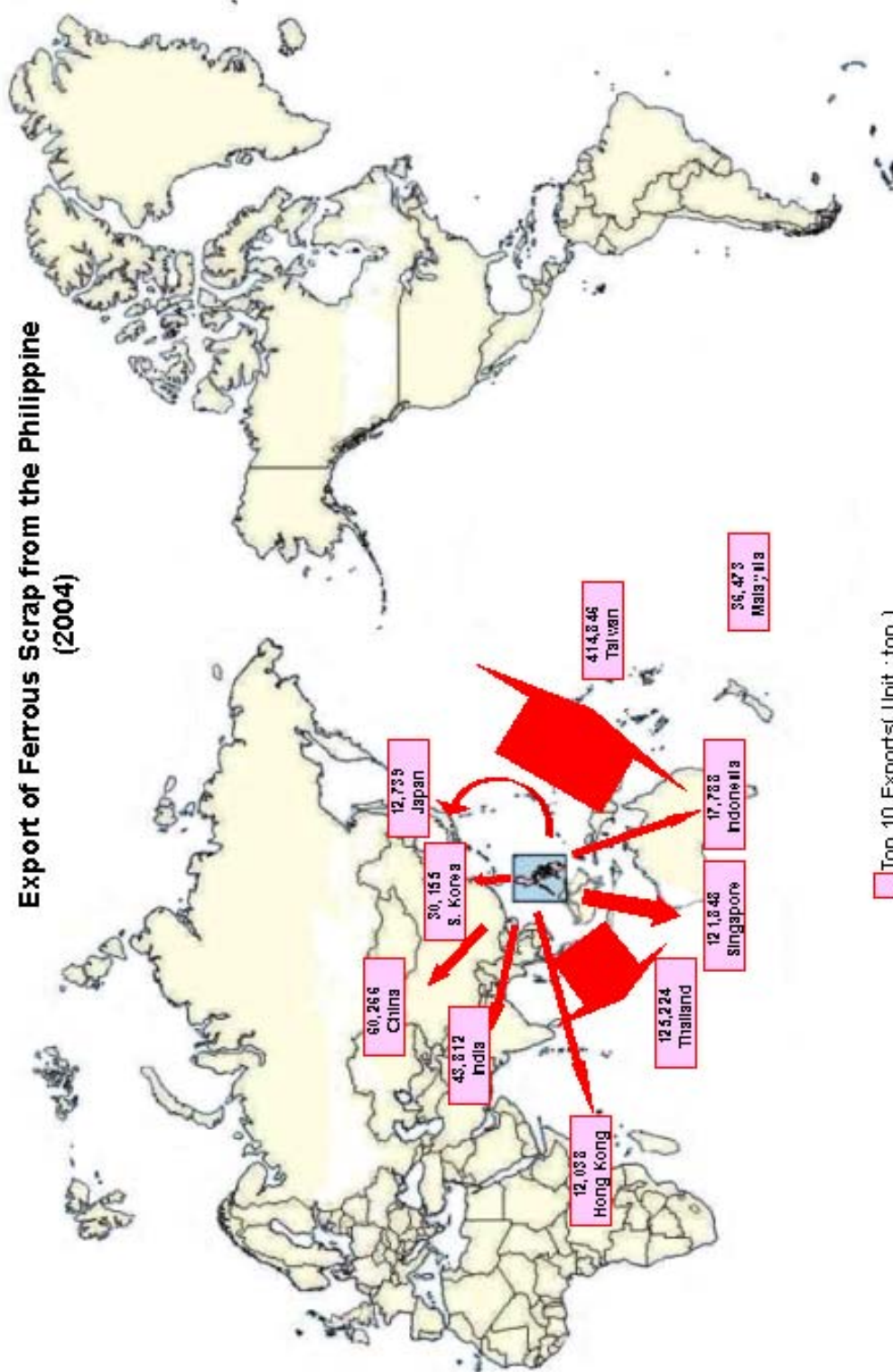
Top 5 Exports (Unit : ton)

Import of Iron to the Philippines (2004)



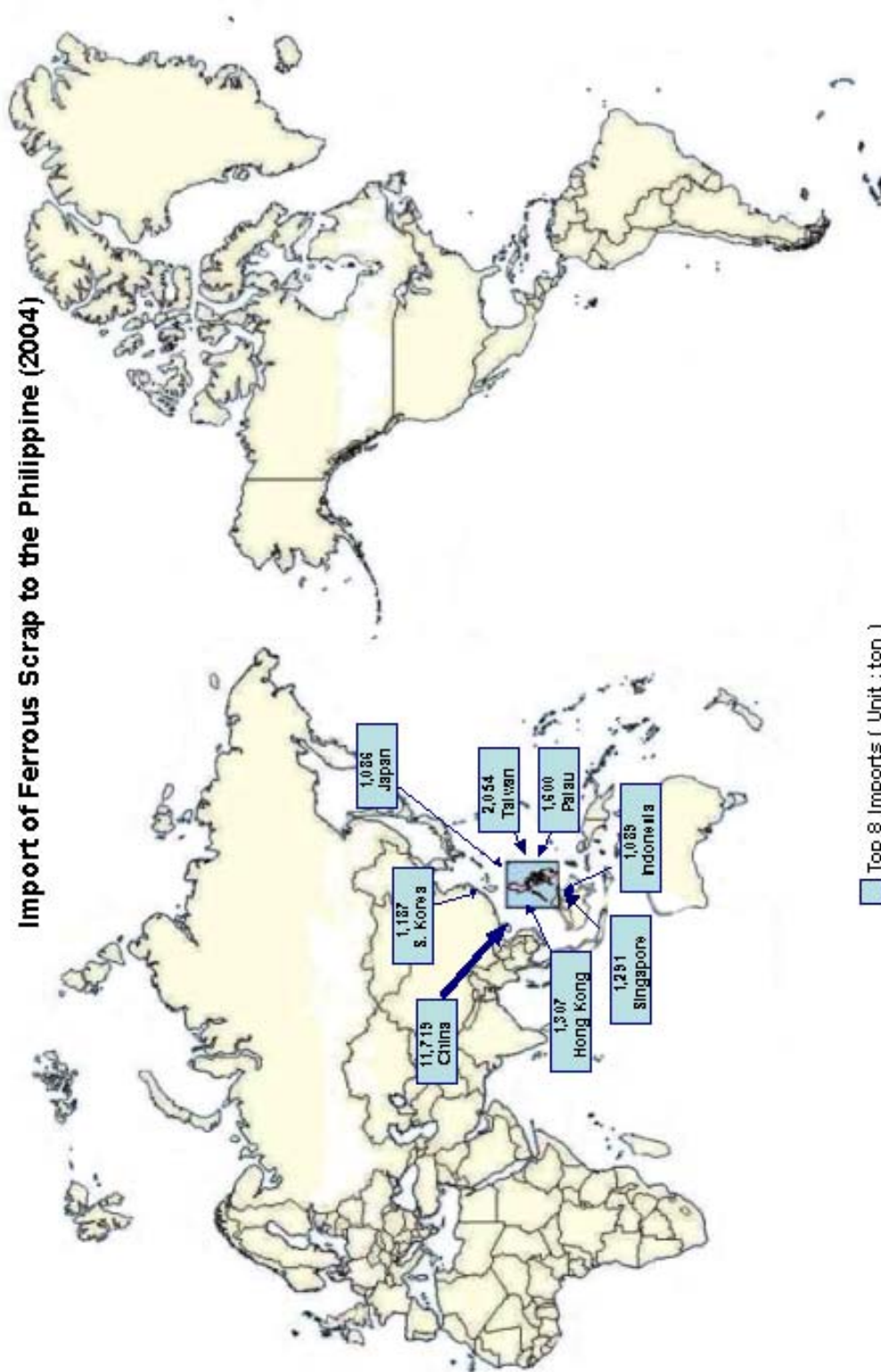
Top 17 Imports (Unit : ton)

Export of Ferrous Scrap from the Philippine (2004)



Top 10 Exports(Unit : ton)

Import of Ferrous Scrap to the Philippine (2004)



Top 8 Imports (Unit : ton)

(2) Domestic Production, Consumption and Material Flow of Iron and Steel

The Figure below shows the estimated material flow of iron and steel in the Philippines.

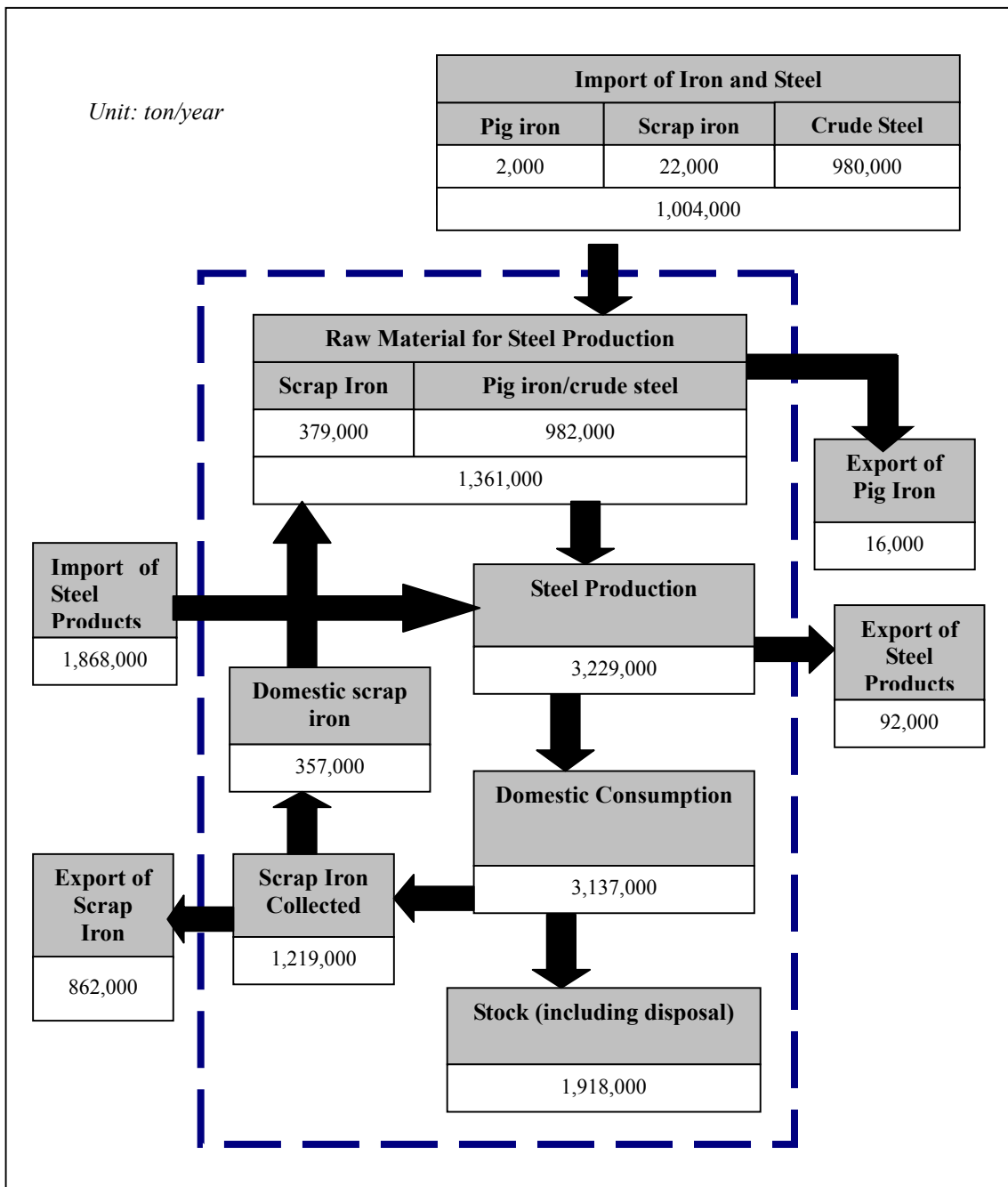


Figure 3.2.5 Estimated Material Flow of Iron and Steel (2004)

The annual production of crude steel in the Philippines was about 400 thousand tons in 2004, which only occupied 3% of the total production in ASEAN countries. The total production also drastically decreased from 1 million tons in 1997. All the steel making operations are currently carried out at electric furnace.

The annual production of steel products, on the other hand reached 1.9 million tons in 2004, which is much bigger than crude steel. However, due to limited domestic procurement of raw material (billet),

totally about 1 million tons of ingots, billets and other semi-finished products were imported also in 2004.

In addition, because of the limited production capacity of iron & steel products in the Philippines, approximately 1.8 million tons were also imported in 2004 to meet the domestic demand.

The annual consumption of steel products was about 3.7 million tons in the Philippines in 2004. In terms of per capita consumption, it only reached 37kg per year, which is much smaller than neighboring countries. About 60% of the total consumption is for construction while the consumption of high-grade steel products (for cars and home appliances) is limited and depends upon import.

In the Philippines, the export of iron scrap has been drastically increasing due to shut down of large domestic billet makers, increase of iron scrap price resulting from the increasing demand in China, and increase in generation of scrap iron with the reconstruction and demolition of the buildings since 2002.

(3) Key Issues of Iron Scrap Recycling in the Philippines

The key issues in iron scrap recycling in the Philippines are identified as follows:

- Limited capacity of existing billet maker and severe competition in price with the imported billet. The existing capacity is about 900 thousand tons per year, but current operation remains at 400 thousand due to severe competition with the imported billet.
- High cost of electricity especially for steel making industry with electric furnaces.
- Severe competition in iron and steel products manufacturers with the imported ones. With the reduction/elimination of import duties, the competition is estimated to be severer.
- High cost of domestic transportation of iron scrap due to concentration of steel industry in Luzon and adjacent area of Metro Manila.

3.2.3 Scrap Aluminum and Aluminum Industry

(1) Import and Export of Aluminum Scrap and Aluminum Products

In 2004, the import of scrap aluminum was only about 1.2 thousand tons while its export was 19 thousand tons. Major country origins of scrap aluminum export are Malaysia, South Korea, China, and Japan.

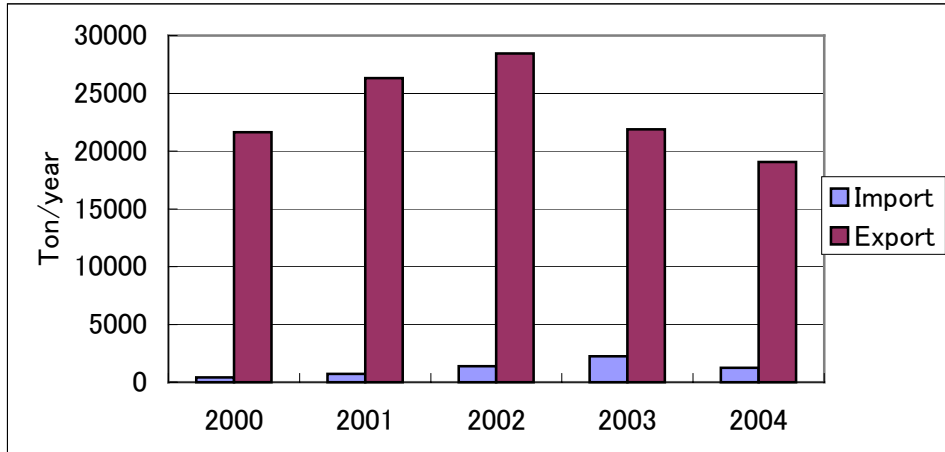


Figure 3.2.6 Trend of Aluminum Scrap Trade (2000-2004)

As to the aluminum products, the import (inc. semi-finished ones) was more or less 70 thousand annually during 2000-2004 while its export was less than one thousand tons in 2004. Major country origins of aluminum products import are Australia, followed by South Korea, Indonesia and China.

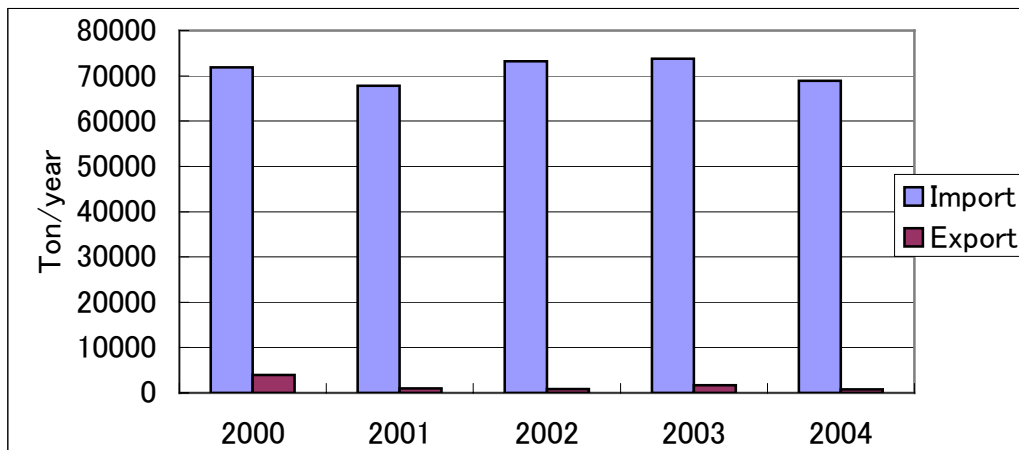
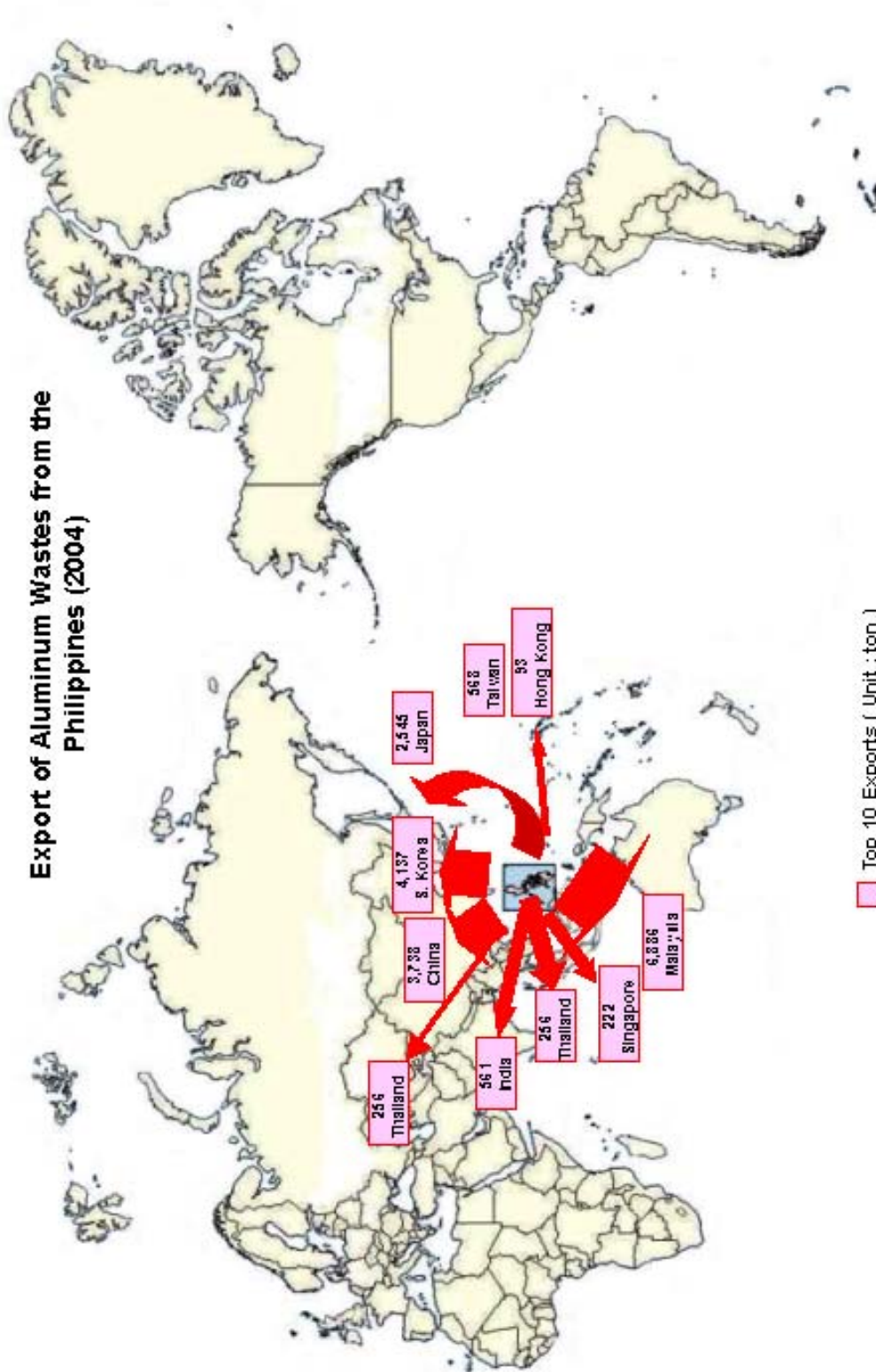


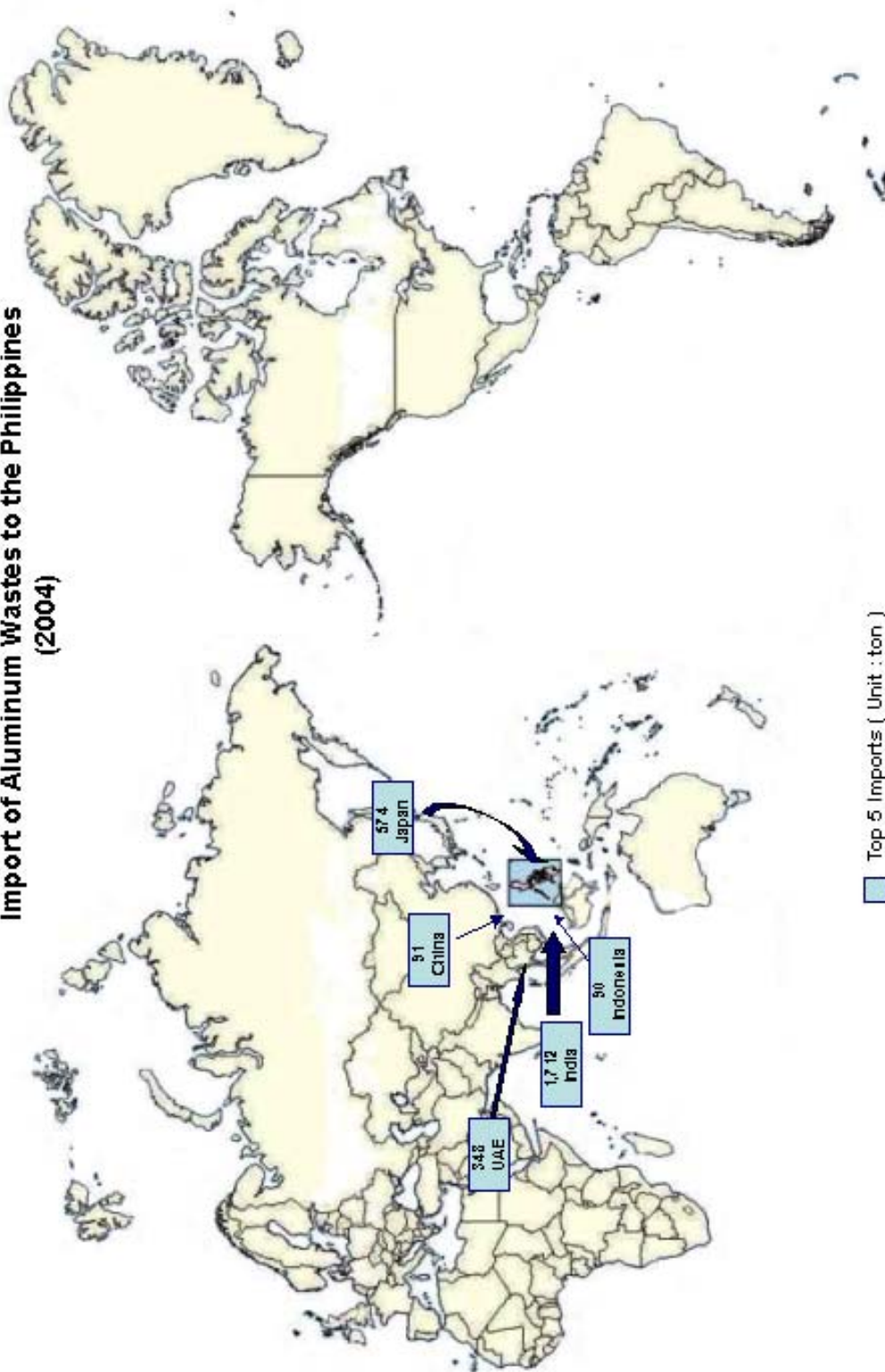
Figure 3.2.7 Trend of Aluminum Products Trade

Export of Aluminum Wastes from the Philippines (2004)

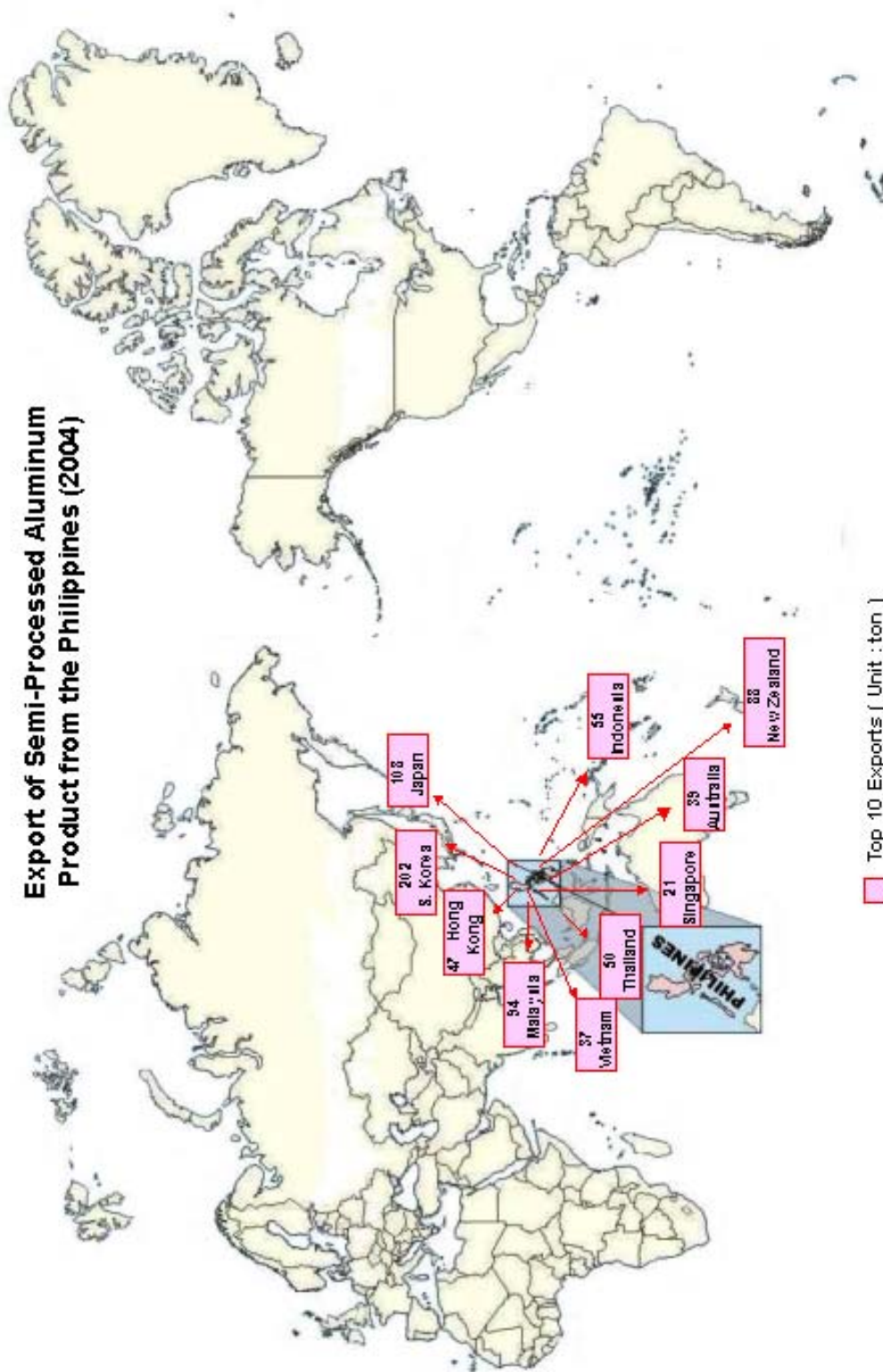


Top 10 Exports (Unit : ton)

Import of Aluminum Wastes to the Philippines (2004)

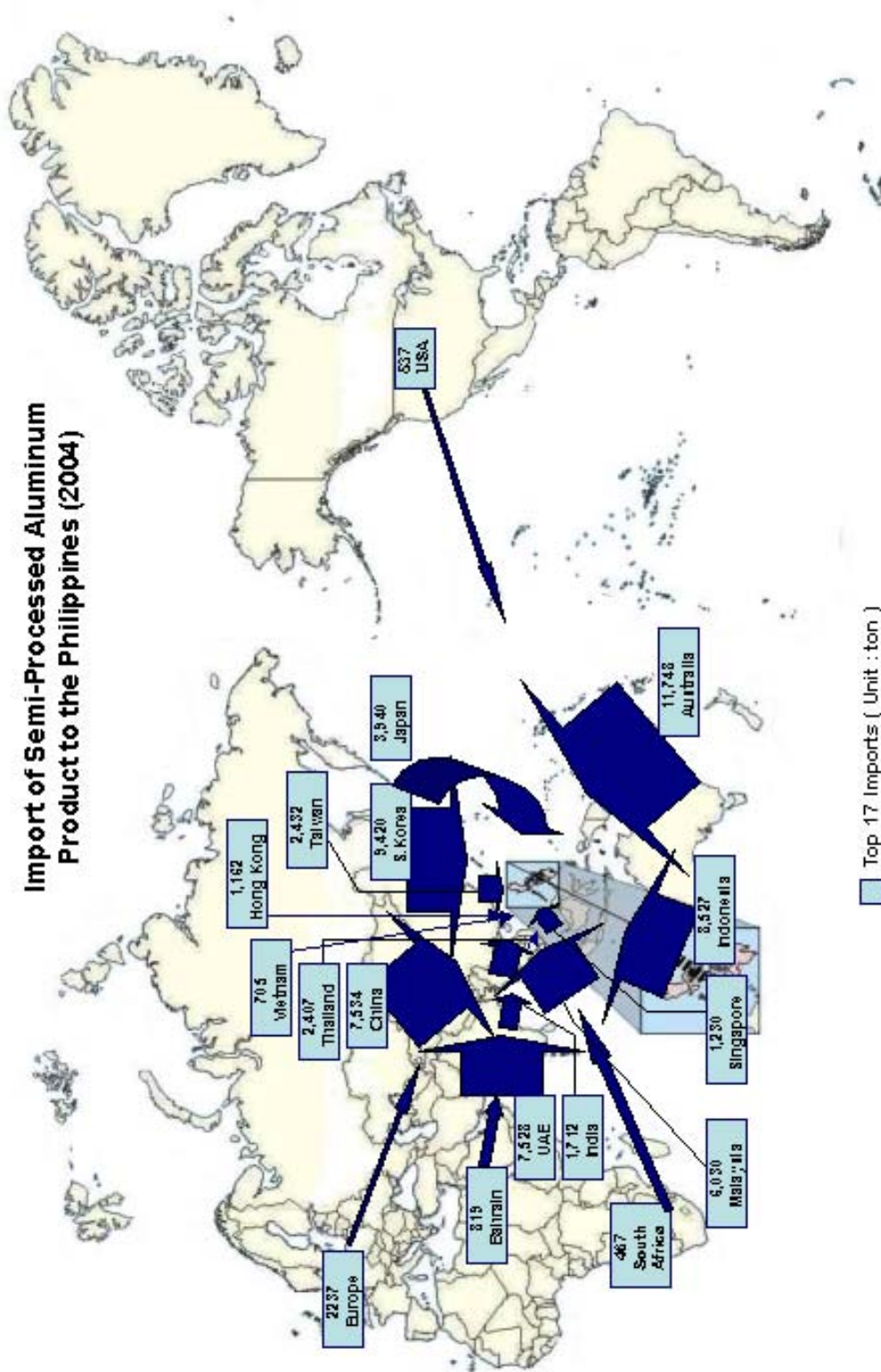


Export of Semi-Processed Aluminum Product from the Philippines (2004)



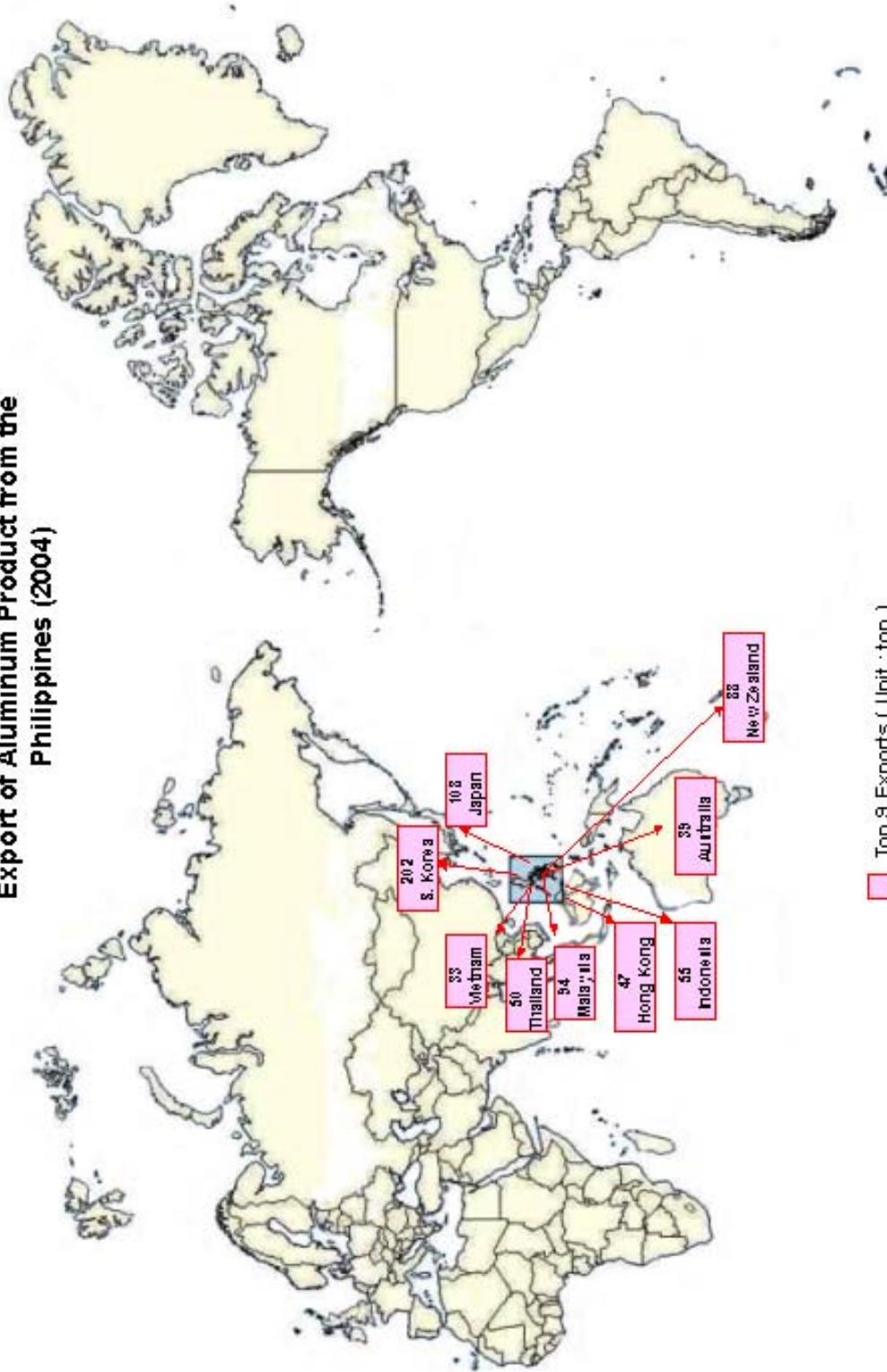
Top 10 Exports (Unit : ton)

Import of Semi-Processed Aluminum Product to the Philippines (2004)



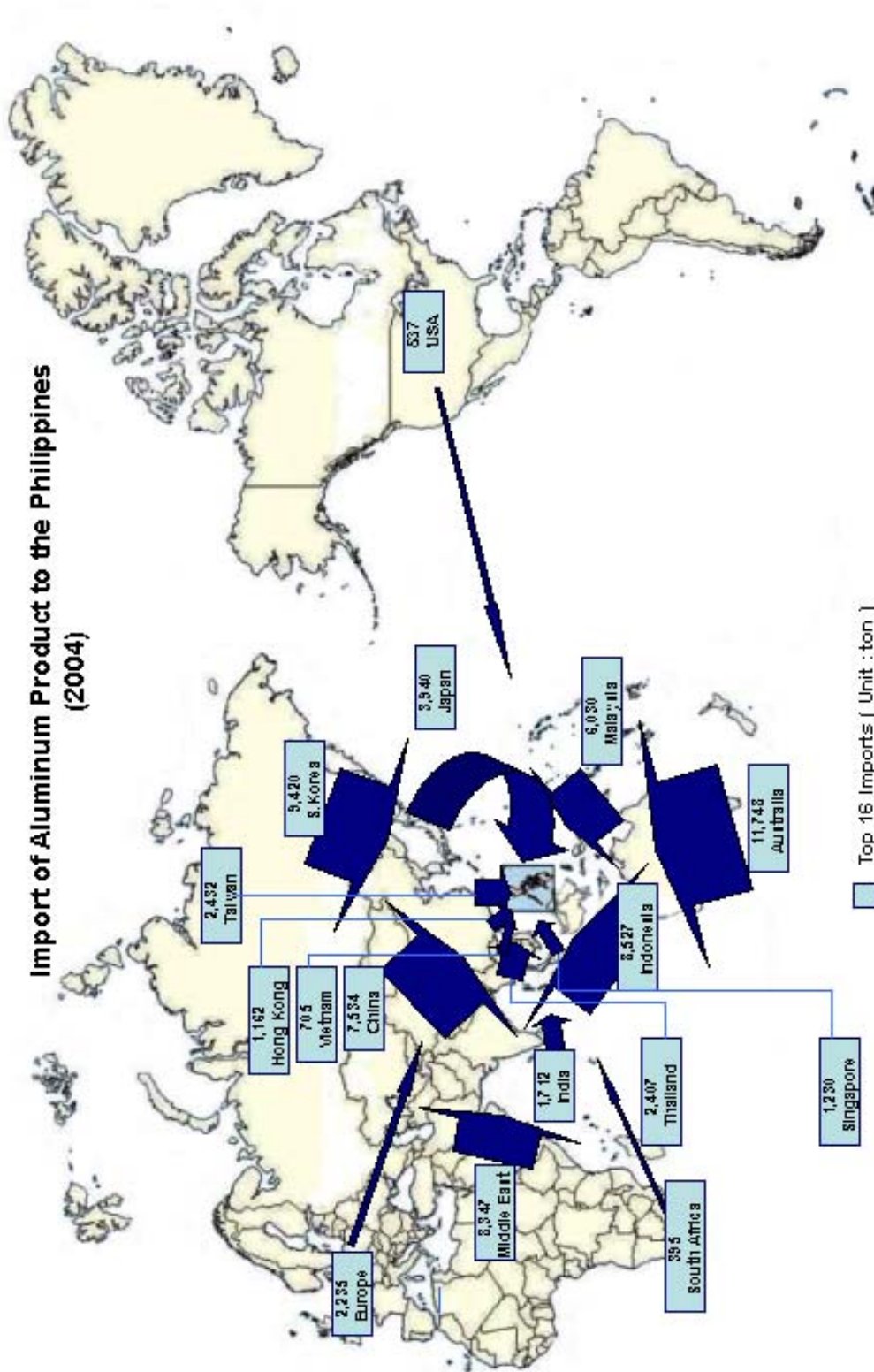
Top 17 Imports (Unit : ton)

Export of Aluminum Product from the Philippines (2004)



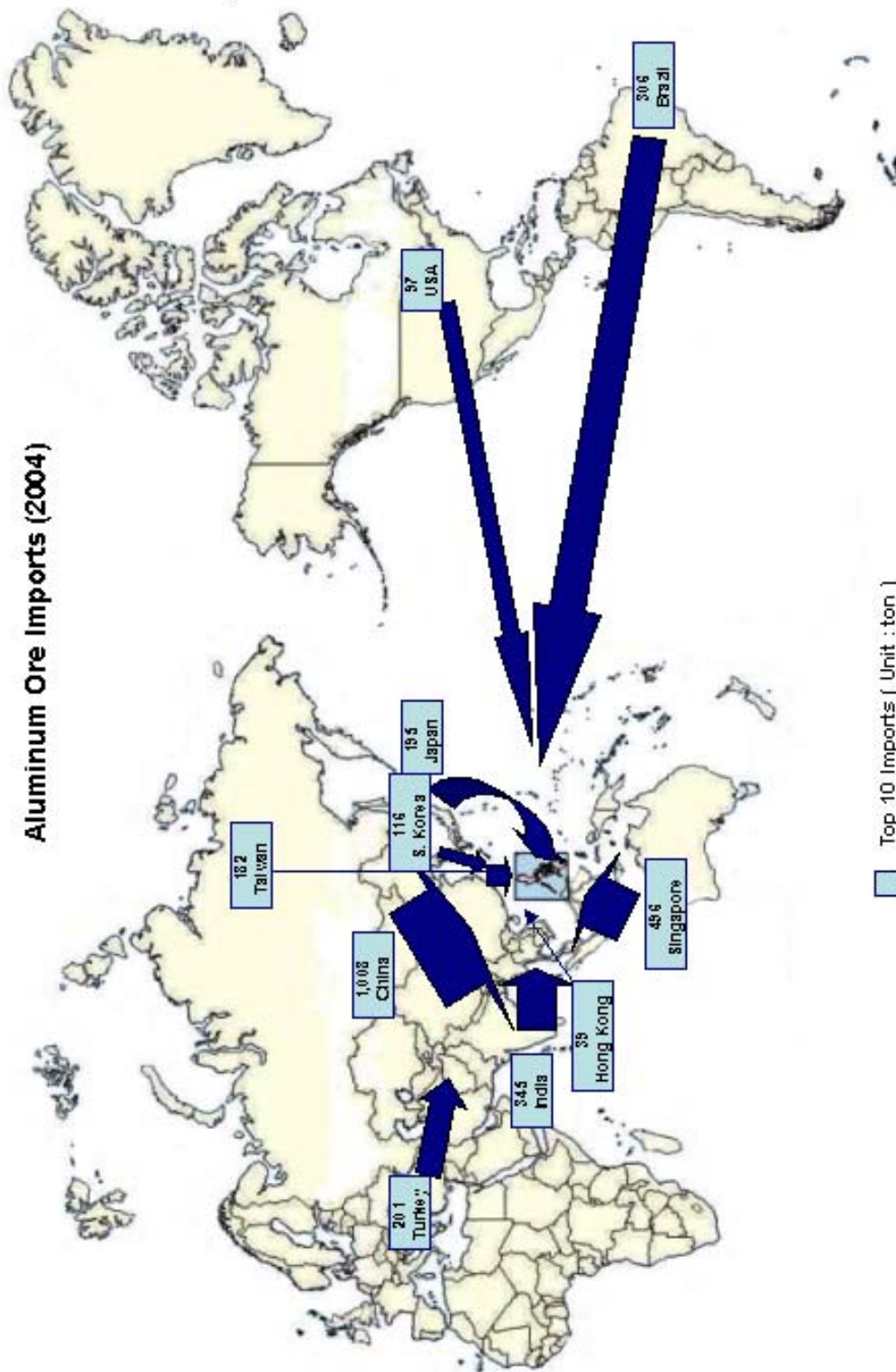
Top 9 Exports (Unit : ton)

Import of Aluminum Product to the Philippines (2004)



Top 16 Imports (Unit : ton)

Aluminum Ore Imports (2004)



Top 10 Imports (Unit : ten)

(2) Domestic Production, Consumption and Material Flow of Aluminum

The Figure below shows the estimated material flow of aluminum in the Philippines.

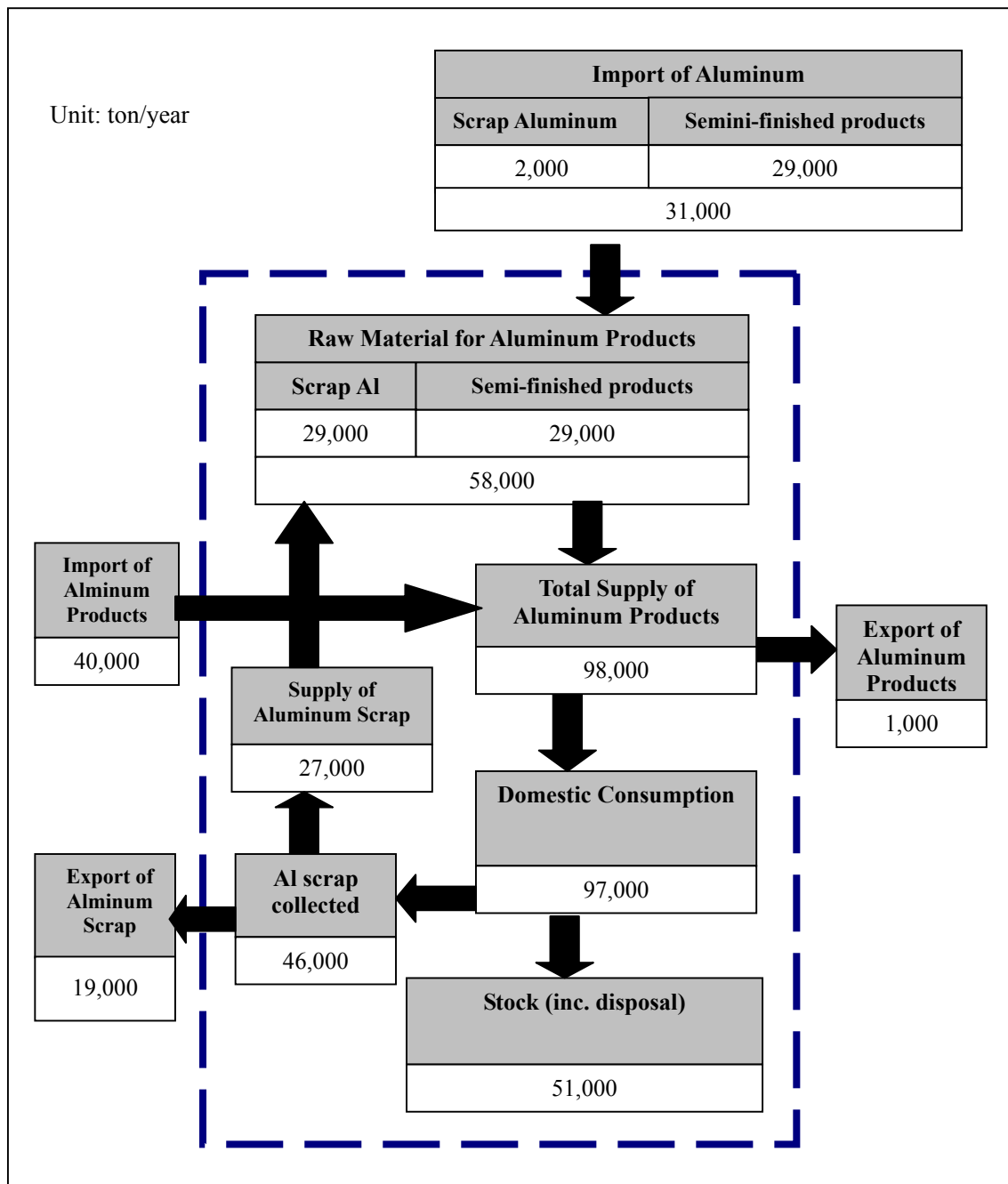


Figure 3.2.8 Estimated Material Flow of Aluminum (2004)

The annual aluminum production in 2004 is estimated 60 to 70 thousand tons, which has been drastically decreased from 300 thousand tons in 1997 as well as from 120 thousand tons in 2002 due to severe competition with import products.

The Philippines has no primary aluminum smelter and depends upon import of aluminum ingots

(approx. 30 thousand tons in 2004) and domestic procurement of aluminum scrap (estimated around 50 thousand tons, but about 20 thousand tons were exported in 2004). Import of finished aluminum product was 40 thousand tons in 2004 and Annual aluminum products consumption is approx. 1 to 1.1 million tons in 2004.

(3) Key Issues of Aluminum Scrap Recycling in the Philippines

The key issues in aluminum scrap recycling in the Philippines are identified as follows:

- Small-scale aluminum smelters, extruders, and product manufacturers and limited production and financial capacity to compete with import products.
- Dependence upon import of aluminum ingots and domestic procurement of aluminum scrap and instable factory operation.

3.2.4 Scrap Glass and Glass Manufacturers

(1) Import and Export of Glass Scrap and Glass/Glassware

In the Philippines, both import and export of scrap glass and cullet are small, which was less than 5 thousand tons in 2004.

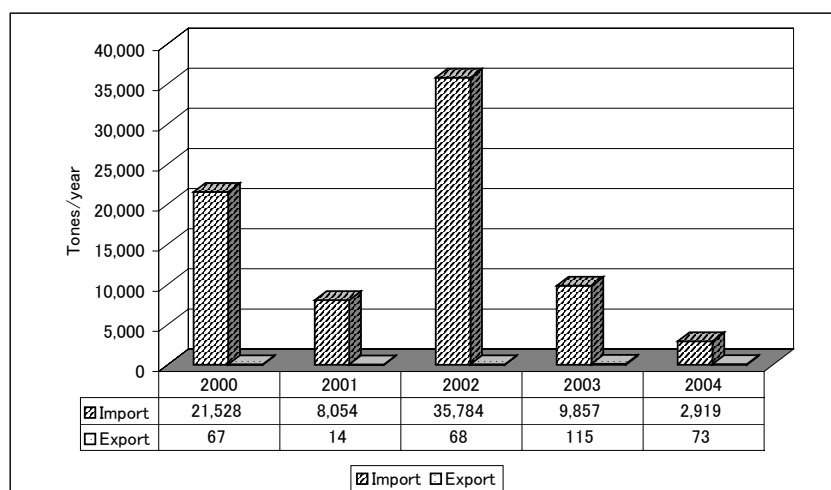
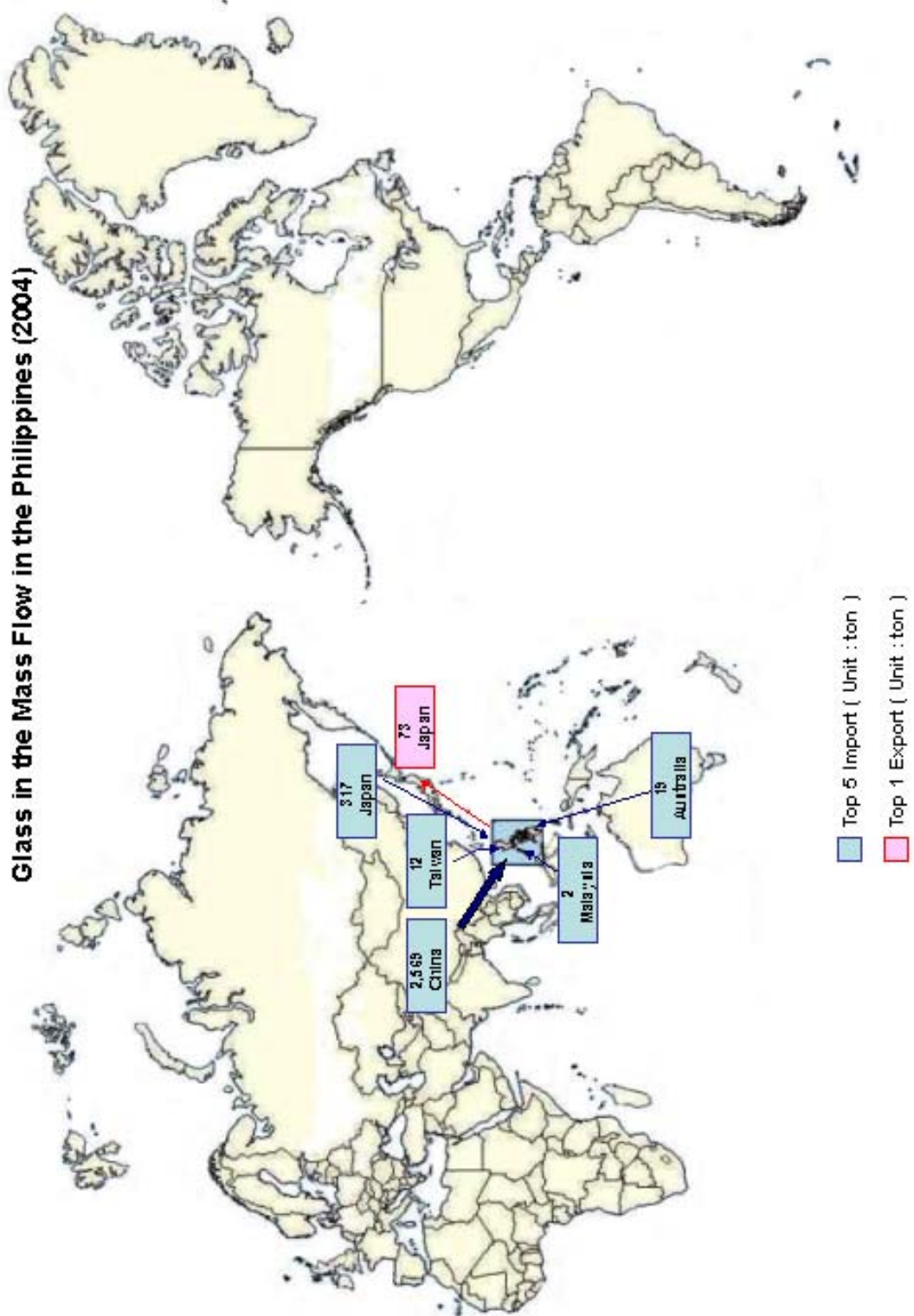


Figure 3.2.9 Trend of Glass Scrap Trade (2000-2004)

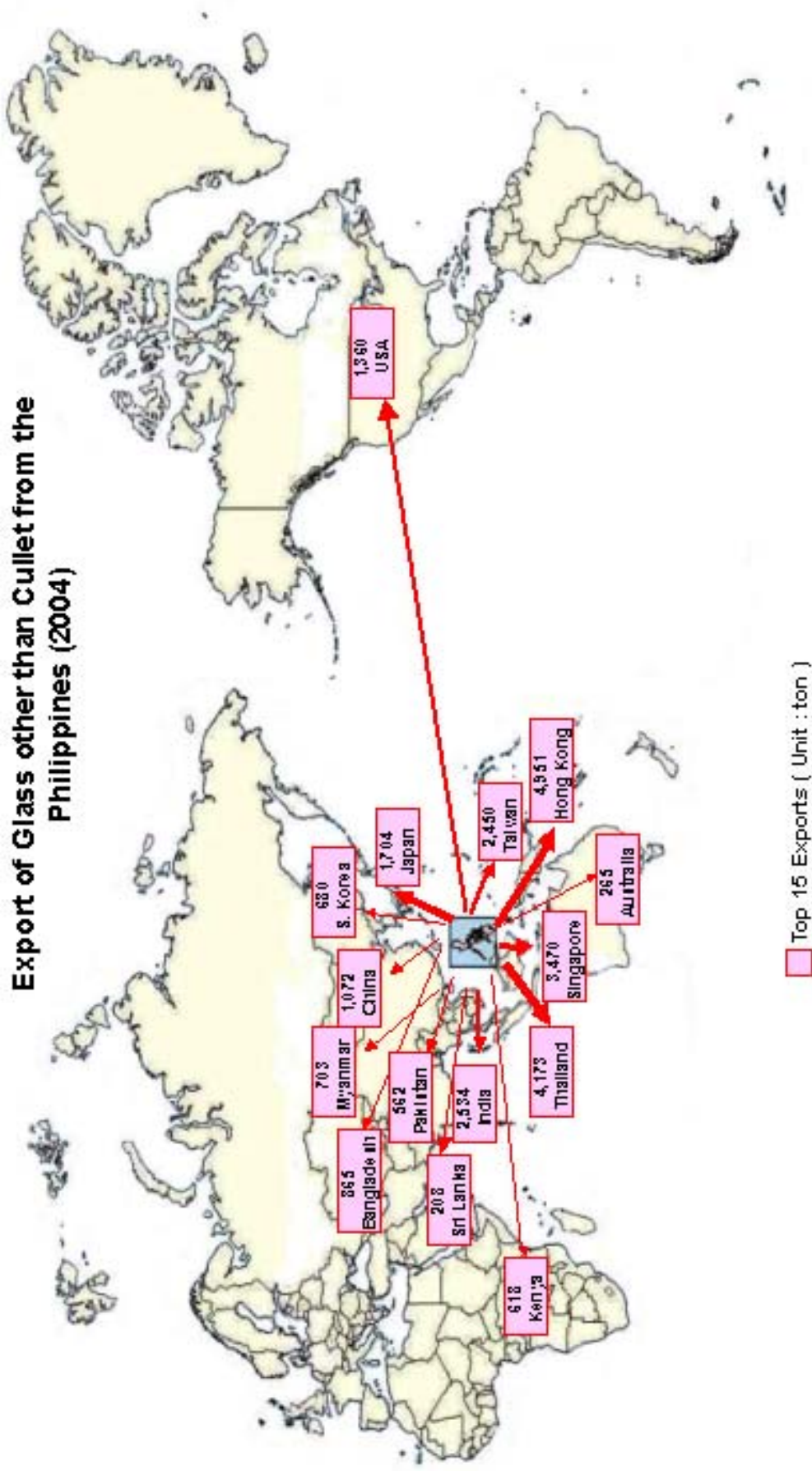
On the other hand, the import of glass was 47 thousand tons while its export was 32 thousand tons in 2004. Major country origins of glass import are China, Indonesia and Taiwan while major export destinations of glass are Malaysia, Hong Kong and Thailand.

In addition, the import of glassware was 152 thousand tons while its export was only 16 thousand tons in 2004. The major country origins of glassware import are similar with the case of glass import, i.e. China, Indonesia, and Taiwan.

Glass in the Mass Flow in the Philippines (2004)

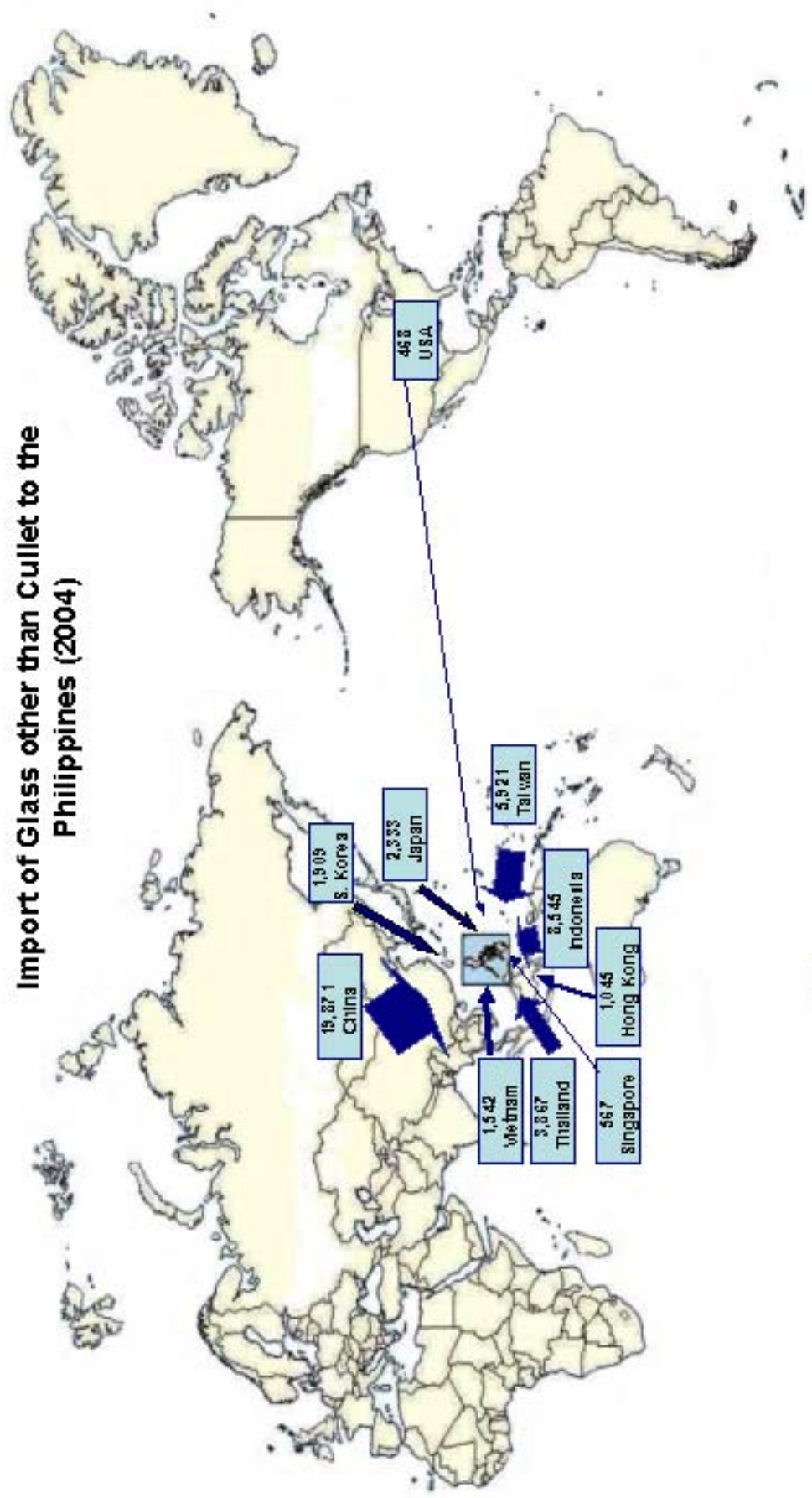


Export of Glass other than Cullet from the Philippines (2004)



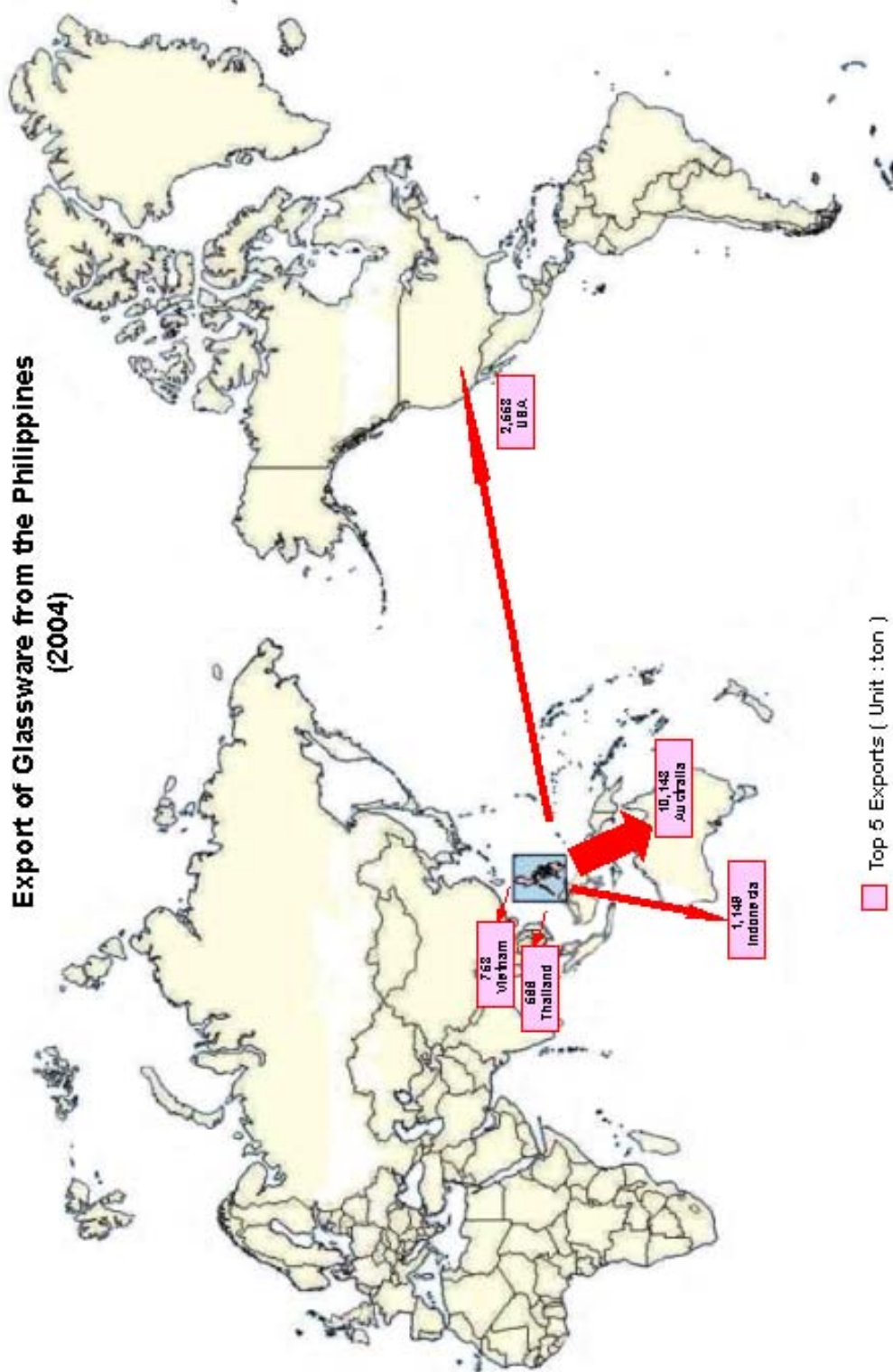
Top 15 Exports (Unit : ton)

Import of Glass other than Cullet to the Philippines (2004)



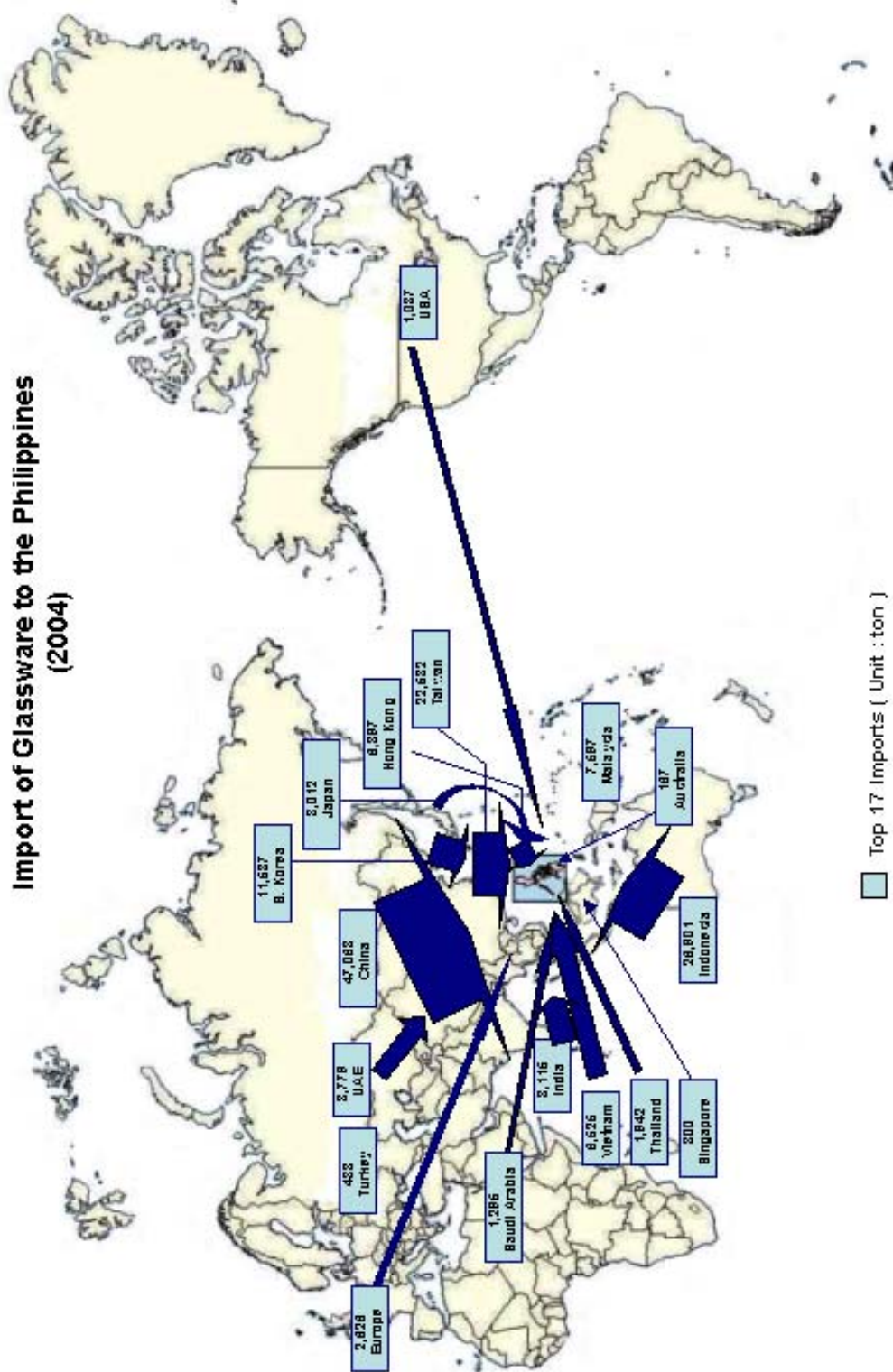
Top 10 Imports (Unit : ton)

Export of Glassware from the Philippines (2004)



Top 5 Exports (Unit : ton)

Import of Glassware to the Philippines (2004)



Top 17 Imports (Unit : ton)

(2) Domestic Production, Consumption and Material Flow of Glass Bottles

The Figure below shows the estimated material flow of glass in the Philippines.

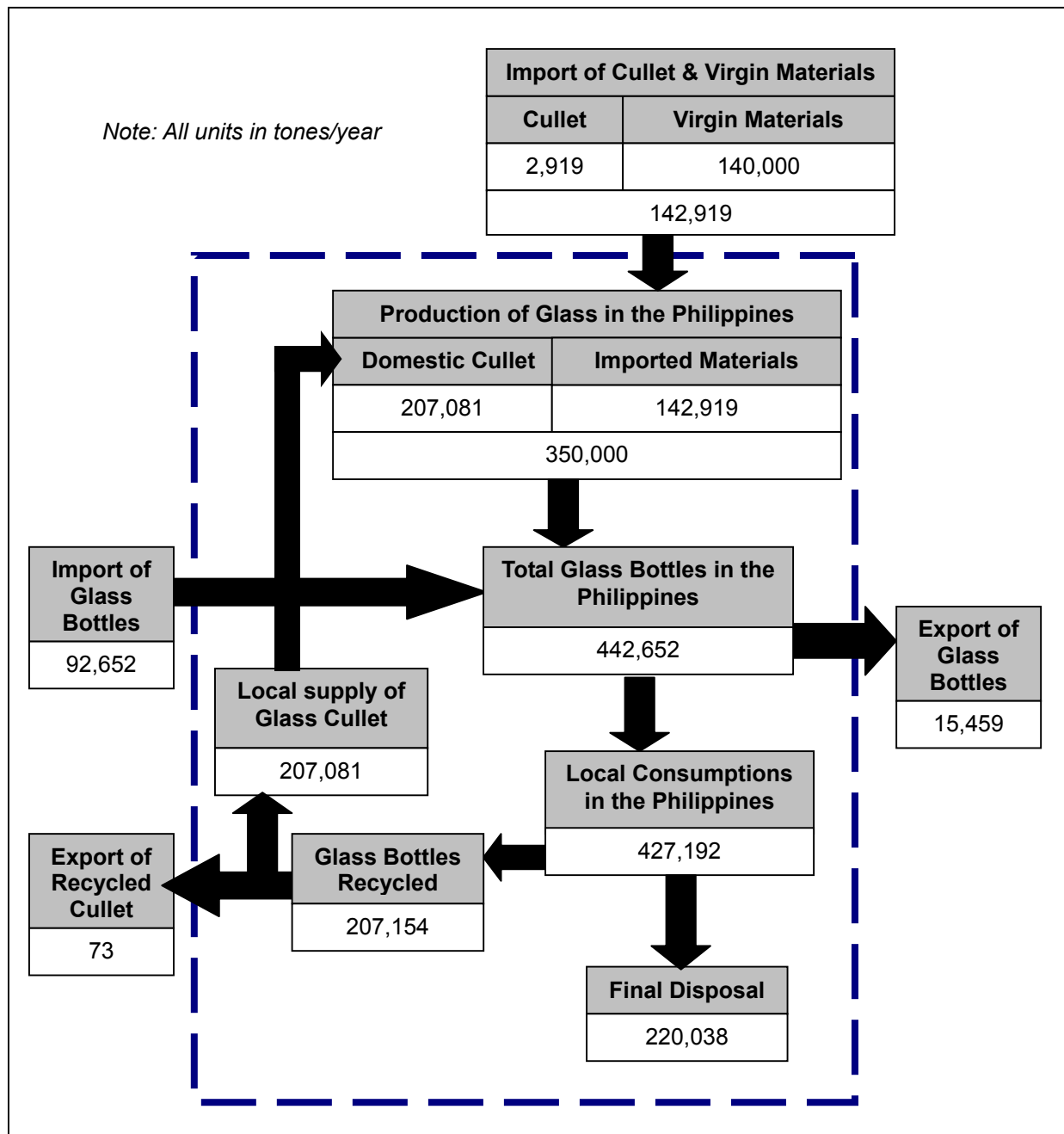


Figure 3.2.10 Estimated Material Flow of Glass (2004)

The annual glass bottle production in the Philippines was estimated as 350 thousand tons in 2004, of which 70 to 75% of the total production come from one big beverage company in the Philippines. The cullet use ratio is 60% for glass bottle production in 2004. Although it was formerly 80-90%, it was decreased due to limited supply of domestic cullet from local market.

(3) Key Issues of Aluminum Scrap Recycling in the Philippines

The key issues in glass scrap recycling in the Philippines are identified as follows:

- Difficulty in handling the scrap glass bottles and comparatively low price and low ratio of collection of non-returnable bottles
- Limited number of domestic users of scrap glass and high cost of transportation due to geographical concentration of glass bottle manufacturers
- Demand for the use of cullet will increase with the increased price of fuels in glass bottle manufacturers

3.2.5 Waste/Scrap Plastics and Plastic Industry

(1) Import and Export of Scrap Plastic and Plastic Products

In 2004, the import of scrap plastic was 15 thousand tons while its export was 44 thousand tons in 2004. Major country origins of scrap plastic export are Hong Kong and China.

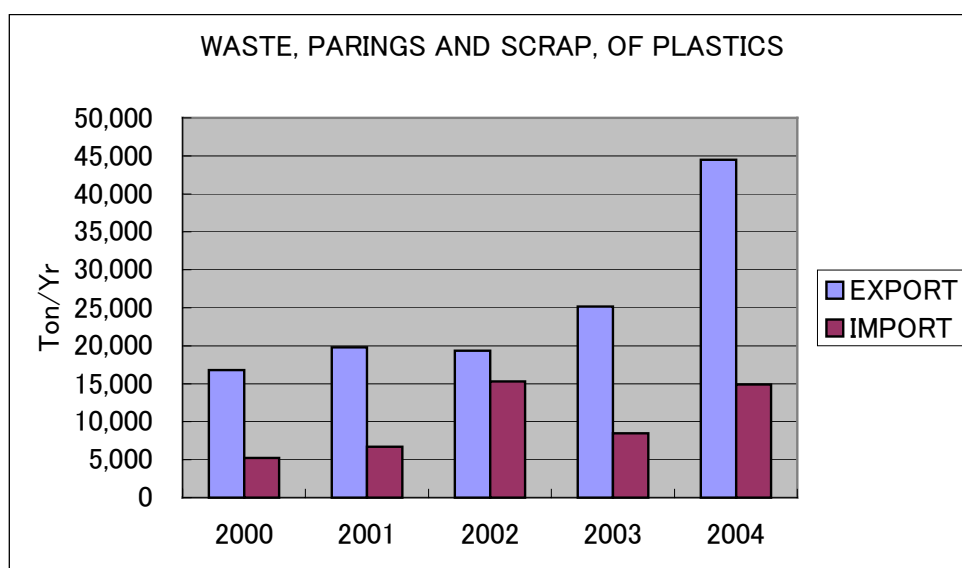


Figure 3.2.11 Trend of Scrap Plastic Trade (2000-2004)

Import of plastic resins was 567 thousand tons while its export was only 39 thousand tons in 2004. Major country origins of plastic resins import are Singapore, followed by South Korea, Taiwan, and Japan.

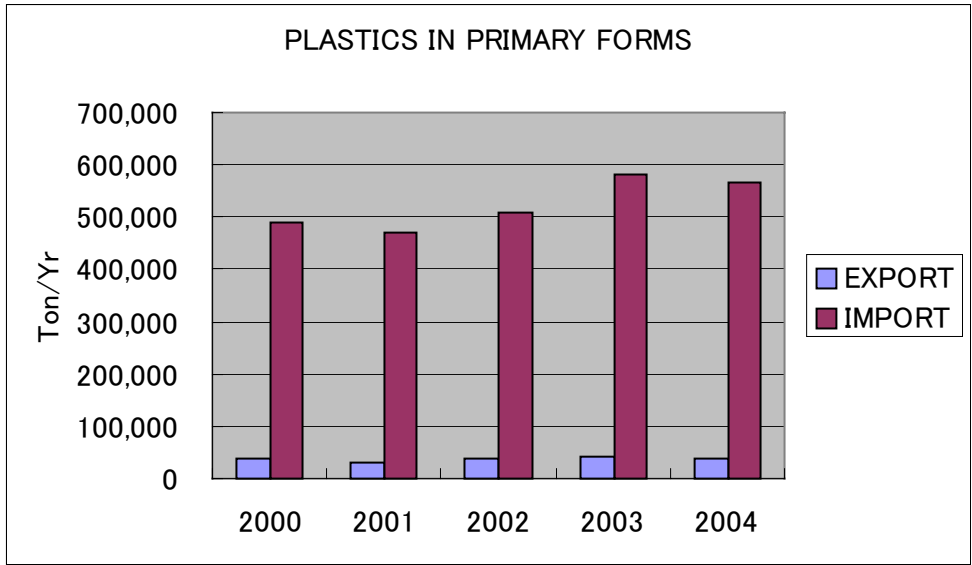


Figure 3.2.12 Trend of Plastic Resins Trade

On the other hand, the import of plastic products was 183 thousand tons while its export was only 40 thousand tons in 2004. Major country origins of plastic products import are China, and followed by Taiwan and Malaysia.

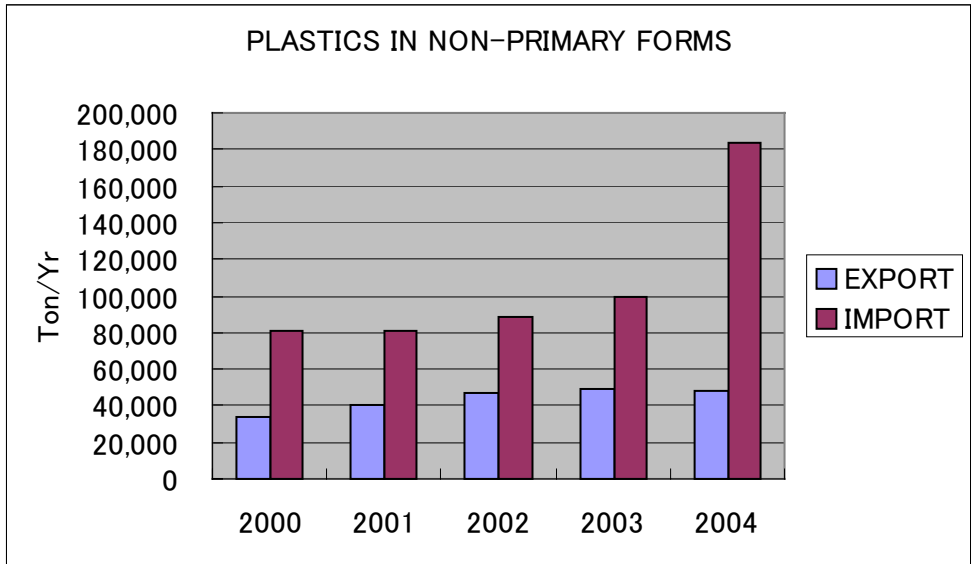
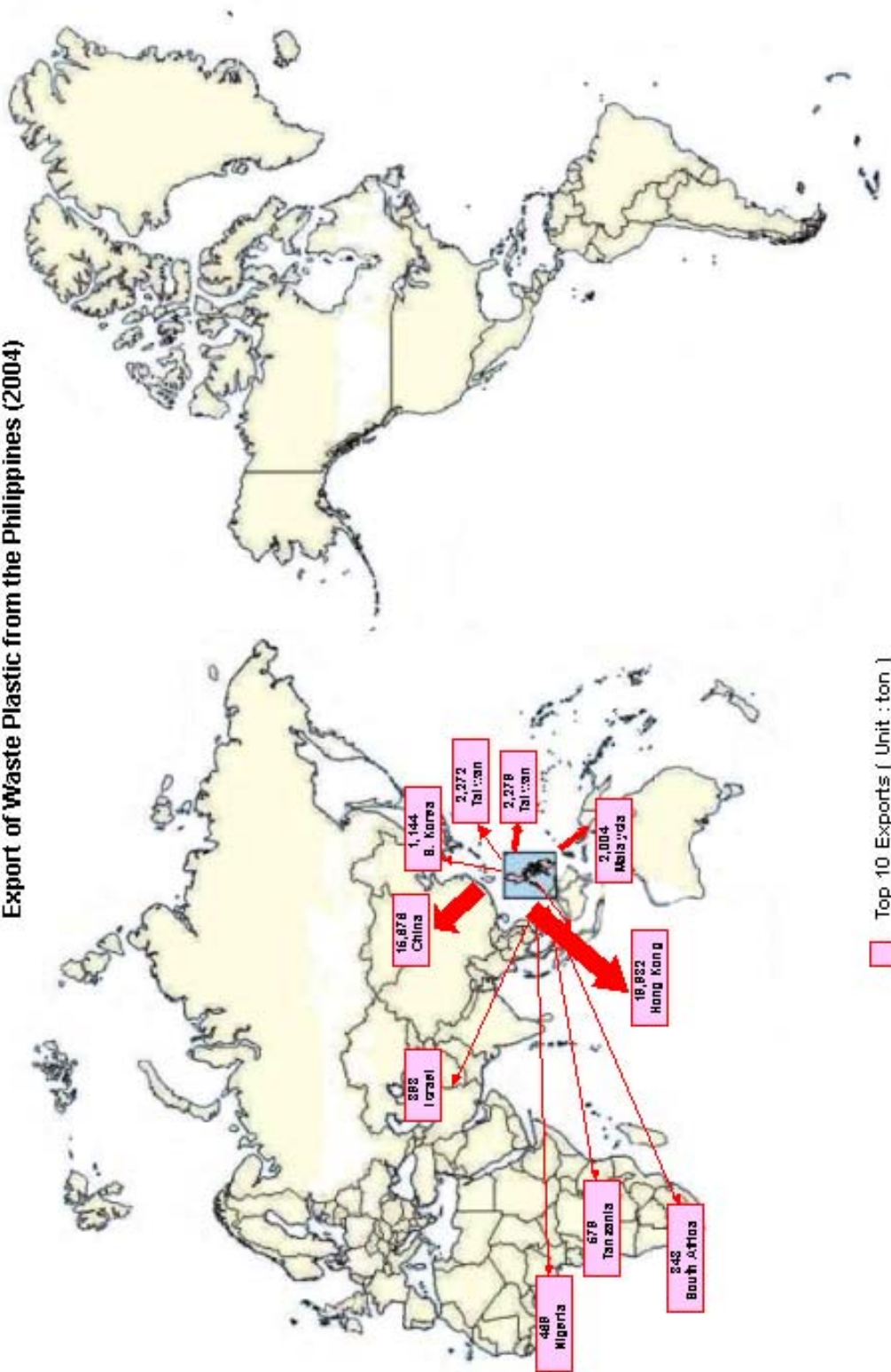
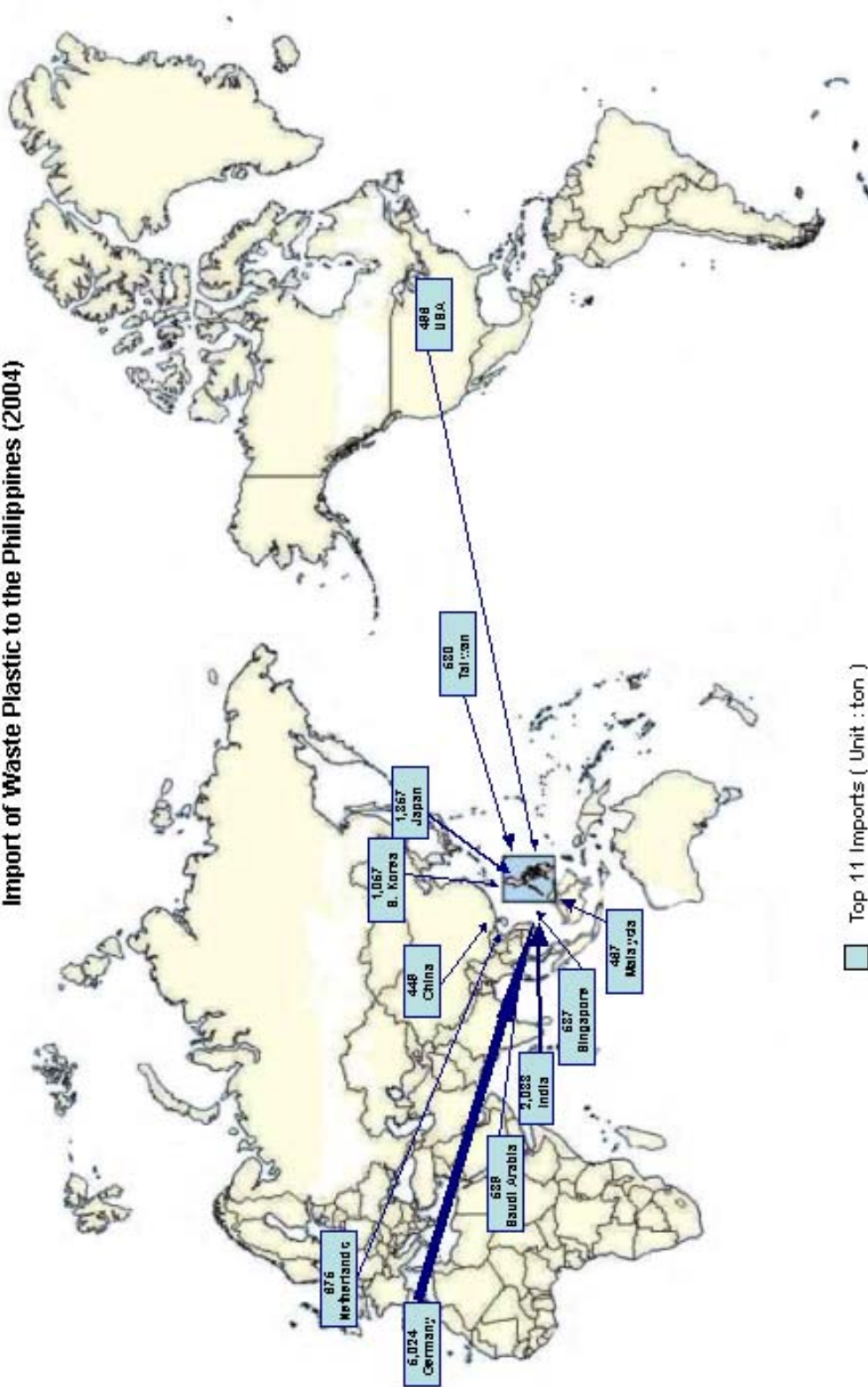


Figure 3.2.13 Trend of Plastic Products Trade

Export of Waste Plastic from the Philippines (2004)

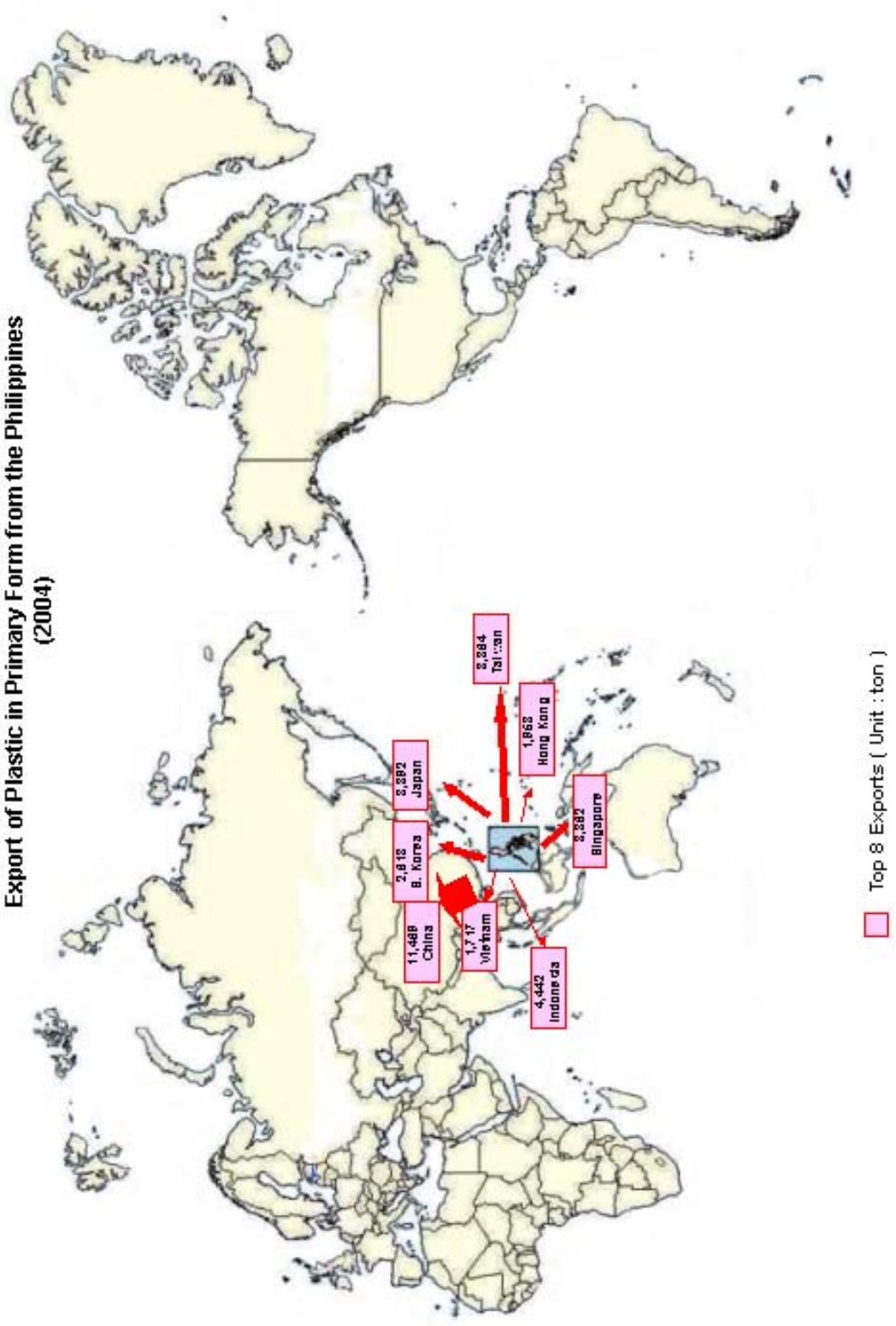


Import of Waste Plastic to the Philippines (2004)



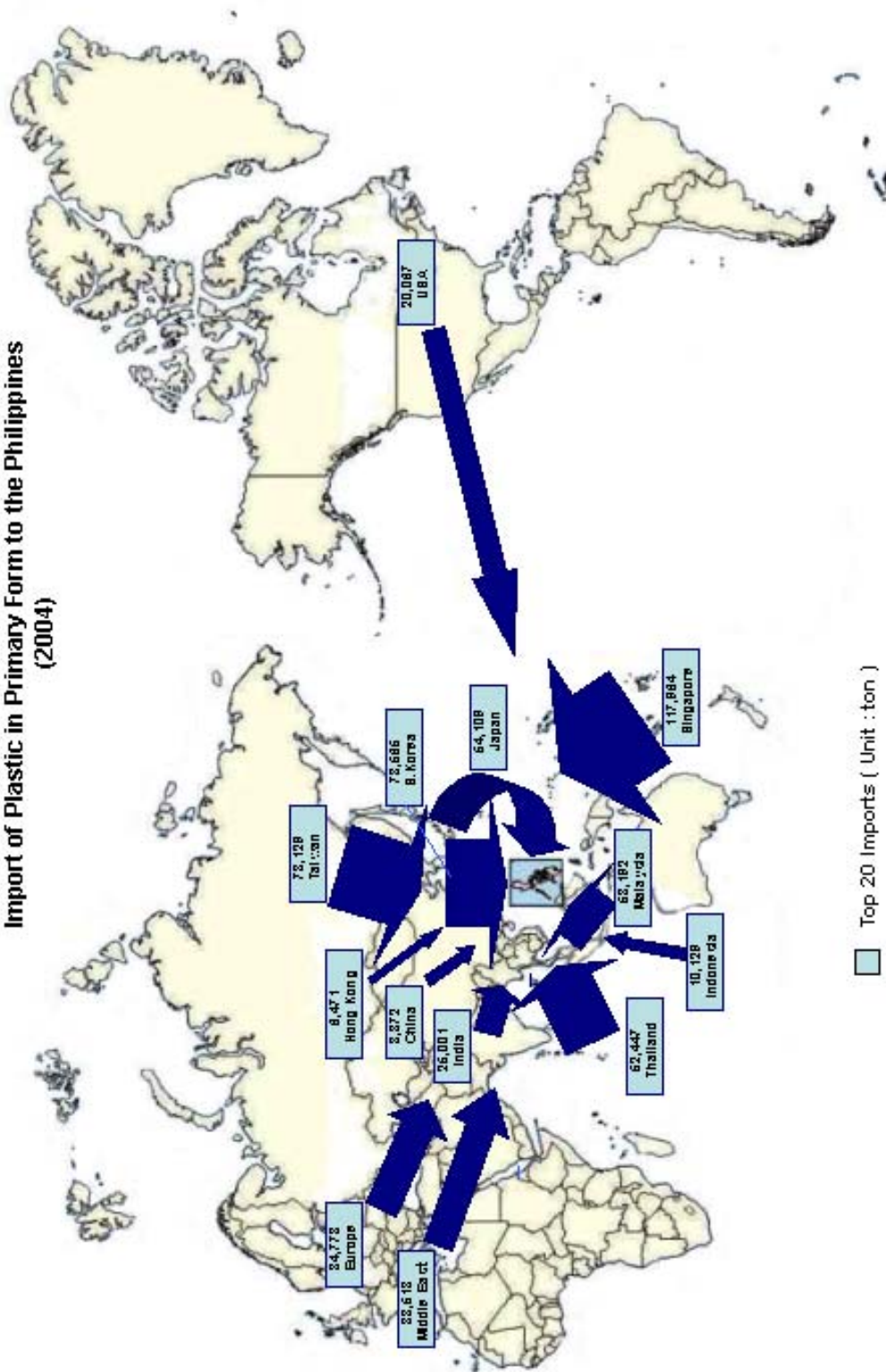
Top 11 Imports (Unit : ton)

Export of Plastic in Primary Form from the Philippines
(2004)



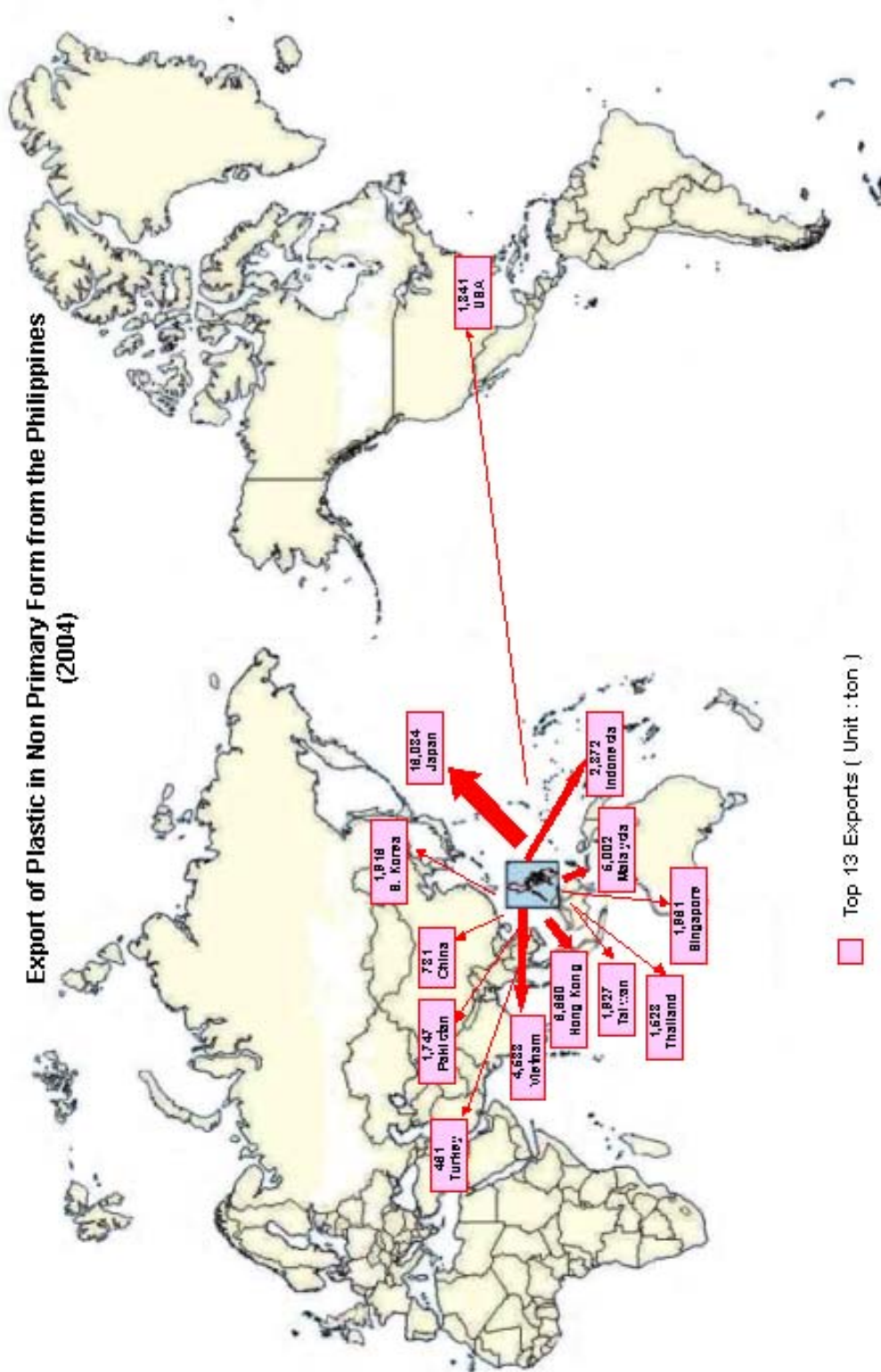
Top 8 Exports (Unit : ton)

**Import of Plastic in Primary Form to the Philippines
(2004)**



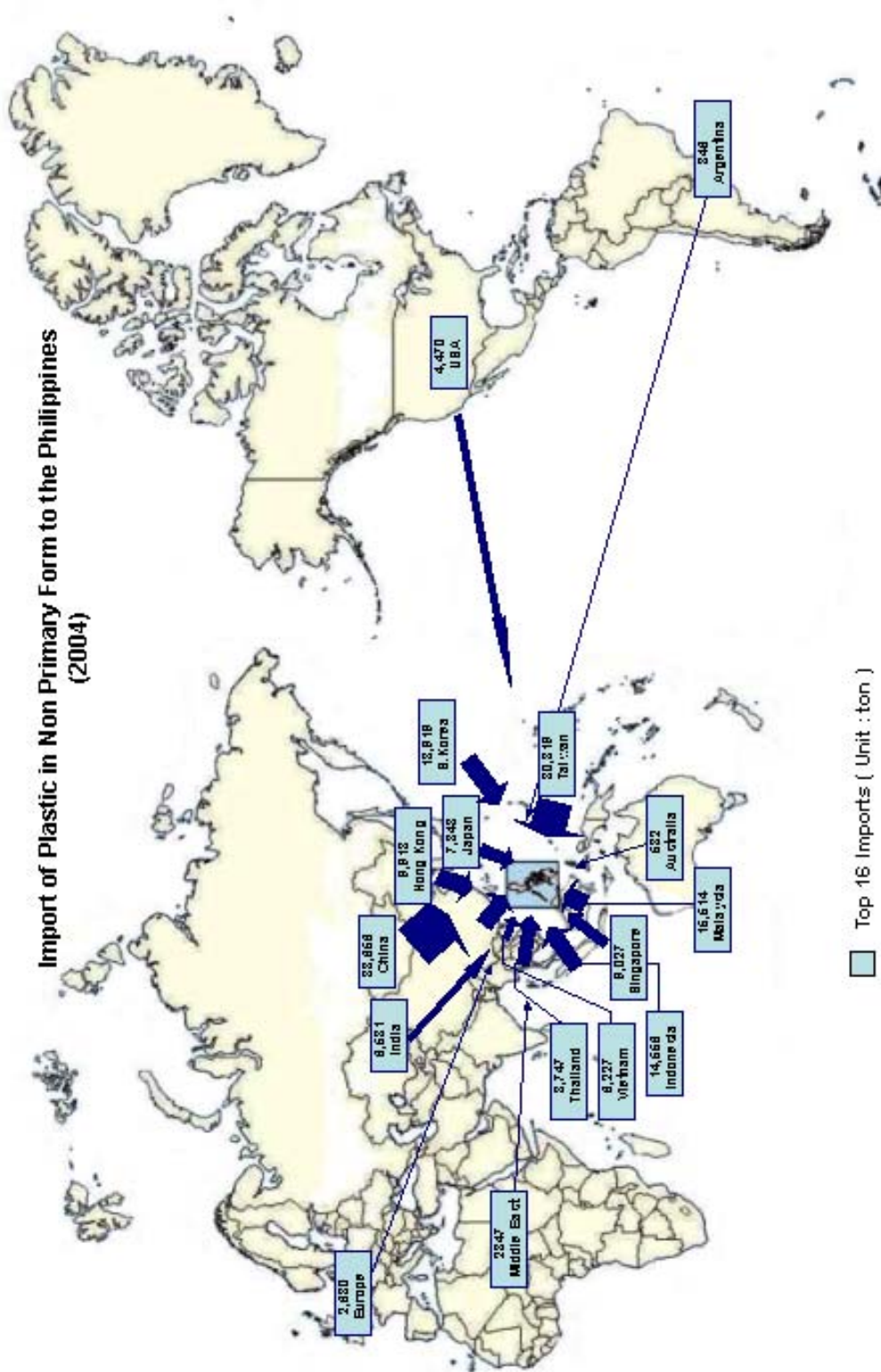
Top 20 Imports (Unit : ton)

**Export of Plastic in Non Primary Form from the Philippines
(2004)**



Top 13 Exports (Unit : ton)

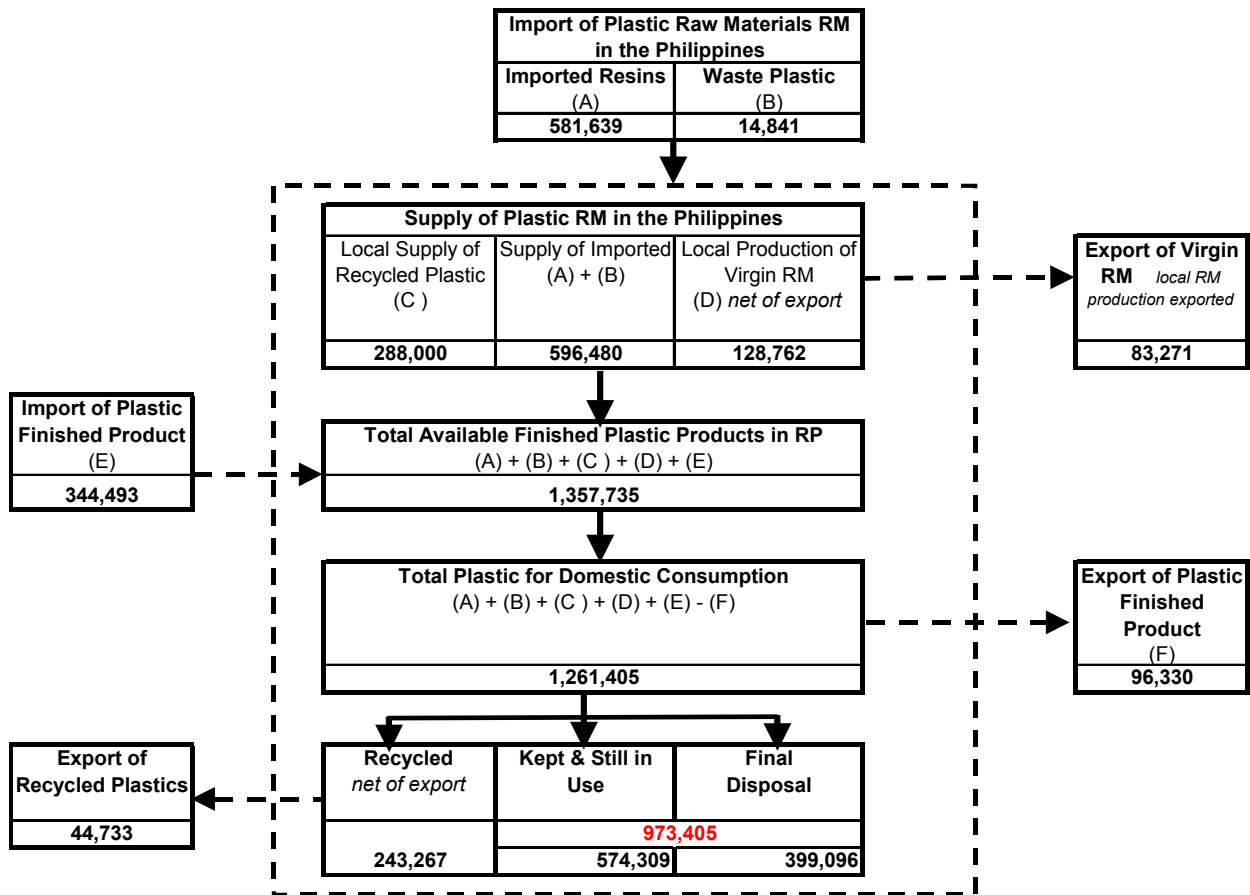
**Import of Plastic in Non Primary Form to the Philippines
(2004)**



□ Top 16 Imports (Unit : ton)

(2) Domestic Production, Consumption and Material Flow of Plastics

The Figure below shows the estimated material flow of plastics in the Philippines.



Source: National Statistics Office
Data on Recycling are PPIA estimates on MPRAI and Non-MPRAI operating capacities

Figure 3.2.14 Estimated Material Flow of Plastics (2004)

The annual plastic production in the Philippines was approximately 1 million tons in 2004. This domestic production largely depends upon imports of plastic resins and other semi-finished products due to no existence of ethylene plant (naphtha cracking plant)

The annual plastic consumption, on the other hand, reached about 1.3 million tons in 2004. In addition to the import of plastic resins, about 344 thousand tons of final plastic products were imported to meet the domestic demand in the Philippines in 2004.

(3) Key Issues of Scrap Plastic Recycling in the Philippines

The key issues in scrap plastic recycling in the Philippines are identified as follows:

- Low ratio of the use of scrap plastics. According to the estimation from the available data, the ratio of the use of scrap plastics for plastic production is very limited. (less than 10%)

- Strong dependence upon foreign procurement of plastic resins and products to meet the domestic demand.
- Low ratio of scrap plastic utilization for manufacturing plastic products.
- Difficulty in collecting high quality scrap plastic materials due to mixed discharge with other waste at generation sources.

3.2.6 Used Electric/Electronic Home Appliances and Recycling Industry

(1) Cellular Phone

Cellular Phone Services in the Philippines are mainly occupied by two major network providers, i.e. PLDT (Philippine Long Distance Telephone Company) and Globe Group. Introduction of the “Prepaid Card System” and “Short Message Service” in 1999 drastically increased the number of subscribers and exceeds the number of land-line subscribers in 2000, reaching 34 million in 2003 with the dissemination ratio of 42%.

In the Philippines, trade-in of used cellular phones is widely disseminated, in which the traded cellular phones are repaired or refurbished with spare parts for resale as second-hand ones. For those which cannot be sold as second-hand, recyclable and reusable parts are disassembled for resale in the market or traded with junk shops. Most of the non-recyclable materials are disposed with municipal solid waste.

As to the cellular phone batteries, most of the replacement batteries sold in the Philippines come from China. Different from the other electric/electronic appliances, no strict quality control has been carried out for cellular phone batteries. Therefore, the quality of batteries largely depends upon the consciousness of importers and producers.

In case the replacement batteries are found broken or defect, the wholesalers can send them back to China for exchange within the 6 months. On the other hand, the batteries that have already been expired of their guarantee period are currently sold at 3 PhP per kg while the used battery chargers are sold at 10 PhP per kg.

Cellular phone providers such as Nokia, Motorola, and Sony Ericsson also provide replacement services of genuine batteries at the price of 900 PhP per battery while non-genuine batteries widely sold in the market are much cheaper than the branded genuine batteries.

General subscribers of cellular phones in the Philippines seldom buy the branded genuine batteries for replacement. There are also imitated genuine batteries sold in the market, of which the durable period is about 1 year. Since some of the imitated batteries do not have capacitor control device for recharging, it can possible ignite or explode. In September 2006, there was a report on ignition of cellular phone batteries that are sold at 50 PhP on the street.

(2) Personal Computers

In the Philippines, about 90 thousand units of new computers are annually imported while 40 to 50 thousand second-hand computers are also imported, as shown in the table below.

Table 3.2.2 Number of New PCs Imported to the Philippines (2004)

Import Origins	PC		
	Desktop	Laptop	Total
Hong Kong	18,017	10,207	28,224
Singapore	14,096	315	14,411
Japan	11,791	158	11,949
China	8,216	3,577	11,793
USA	6,857	385	7,242
Malaysia	4,478	10	4,488
Korea	998	1,973	2,971
Ireland	2,588	12	2,600
Taiwan	1,296	41	1,337
Indonesia	1,319	3	1,322
Others	1,509	592	2,101
Total	71,165	17,273	88,438

Source: 2004 Importation data recorded by Bureau of Importation Services (BIS)

Table 3.2.3 Number of Used PCs Imported to the Philippines (2004)

Import Origins	PC		
	Desktop	Laptop	Total
Korea	16,520	0	16,520
Japan	13,339	1,014	14,353
USA	3,674	1,999	5,673
Australia	2,681	1,706	4,387
Canada	1,810	0	1,810
Singapore	343	0	343
Taiwan	7	0	7
Total	38,374	4,719	43,093

Source: 2004 Importation data recorded by Bureau of Importation Services (BIS)

The second-hand PCs sold in the Philippines are mostly imported from abroad while almost no domestically used PCs in the market. The imported used PCs are first check with the function and operation conditions for resale. As to those which cannot be resold due to malfunction, valuable materials are disassembled for selling to the recyclers or sent back to the origins of imports.

(3) Television

decreased in 2005 due to price increase and related VAT. However, in the mid and long term, there are still big potential market for TV, taking into account the current limited dissemination.

In addition, a large amount of second-hand TVs are imported from the major ports in the Philippines such as Manila, Batanagas, and Davao. About 60 to 70% of the imported TVs are from Japan. The imported TVs are adjusted with the voltage for resale by second-hand dealers. The TVs that cannot

be sold as second-hand due to its malfunction are disassembled for resale of valuable parts and materials.

(4) Refrigerators

Import of second-hand refrigerators are very limited in comparison with TVs. The imported second-hand refrigerators are refurbished through exchange or injection of refrigerant for resale. CFCs are still utilized as the replacement refrigerant for old-type refrigerators.

(5) Issues of Recycling Used Electric/Electronic Appliances

- a Potential health and environmental impacts arising from improper treatment and disposal of the used E-appliances
 - Environmental Impacts resulting from improper disposal non-recyclable materials such as cellphone batteries, printing circuits and refrigerant, and other potentially hazardous substances
 - Safety risk arising from improper adjustment or replacement of spare parts for resale
- b Identification of the use, disposal and treatment of used electric/electronic appliances
 - Due to complex distribution of second-hand appliances by informal dealers, it is very difficult to trace the process of use, disposal and treatment of used electric/electronic appliances in the Philippines.
- c Current used electric/electronic recycling system without consideration on appropriate safety and environmental protection.

Currently most E-items are traded as valuables commodities; however, most second-hand dealers and repair factories pay minimum attentions on safety or environmental protection.

Volume II: Master Plan and Action Plan

1. Definition of Recycling Industry in this Master Plan

The recycling industry to be discussed in this Master Plan is defined as the industries having the potential of recovering or recycling the materials under Category I (waste papers, metal scrap, glass bottles, waste plastics or Category II (cell phone batteries, used/surplus electric/electronic appliances represented by personal computers, TV sets, and refrigerators) in this Study for their industrial production of finished or semi-finished goods. Specifically, the following industries are categorized as recycling industries in this Master Plan:

- 1) Paper and pulp manufacturing industry
- 2) Iron & steel and non-ferrous metal smelters and metal products manufacturing industry
- 3) Glass and glass products manufacturing industry
- 4) Plastic resin and products manufacturing industry
- 5) Other industries having the potential of recovering or recycling the materials under Category I or II in this Study

By types of the recyclable materials under Category I and II, the potential recycling industries can be categorized as shown in the table below.

Table 2.1.1 Potential Recycling Industry by Types of Recyclable Materials

Type of Recyclable Material	Potential Recycling Industry (Receiving Industry of the materials)
Waste papers/Cardboards	<ul style="list-style-type: none"> ▪ Paper manufacturers (Recycled papers) ▪ Pulp molding manufacturers (Paper package, paper buffering materials) ▪ Paperboard manufacturers ▪ Cellulose fiber manufacturers (heat insulating materials in housing and building development)
Metal scrap	<ul style="list-style-type: none"> ▪ Iron and Steel industry (iron steel makers with electric furnace) ▪ Metal smelters (copper, aluminum, etc.)
Glass bottles and other glass materials	<ul style="list-style-type: none"> ▪ Bottling industry (for reuse of returnable glass bottles) ▪ Glass bottle manufacturers ▪ Glass cullet manufacturers ▪ Tiles, bricks and pavement materials manufacturers (use of cullet as raw material for their production)
Waste plastics	
PET bottle	<ul style="list-style-type: none"> ▪ PET resin manufacturers (PET flake manufacturers) ▪ Textile and garment industry (Work clothes, caps, work globes, blankets, carpets) ▪ Injection molded plastic manufacturers (pallets for transportation of goods, and others)
Styrofoam (food trays) and foam polystyrene	<ul style="list-style-type: none"> ▪ Recycled pellets/polystyrene beads manufacturers ▪ Other plastic products manufacturer (containers, packages, buffer materials)

Type of Recyclable Material	Potential Recycling Industry (Receiving Industry of the materials)	
Other waste plastics	<ul style="list-style-type: none"> ▪ PET resin manufacturers (PET flake manufacturers) ▪ Other plastic products manufacturer (containers, packages, buffer materials) 	
Used/surplus electric and electronic home appliances		
TV set	(Material composition and potential recycling industry)	
	Material	Potential recycling industry
	Glass	<ul style="list-style-type: none"> ▪ Cullet manufacturers ▪ Glass products manufacturers
	Plastic	<ul style="list-style-type: none"> ▪ Plastic industry
	Ferrous metal	<ul style="list-style-type: none"> ▪ Iron & steel industry
	Non-ferrous metal (copper, aluminum)	<ul style="list-style-type: none"> ▪ Non-ferrous metal smelters
* Plastic materials are divided into olefin, styrene, and vinyl chloride compounds.		
Cell phones and accessories	(Material composition and potential recycling industry)	
	Material	Potential recycling industry
	Ferrous metal	<ul style="list-style-type: none"> ▪ Iron & steel industry
	Non-ferrous metal (copper, aluminum, precious metals)	<ul style="list-style-type: none"> ▪ Non-ferrous metal smelters
Plastic	<ul style="list-style-type: none"> ▪ Plastic industry 	
Refrigerator	(Material composition and potential recycling industry)	
	Material	Potential recycling industry
	Ferrous metal	<ul style="list-style-type: none"> ▪ Iron & steel industry
	Plastic	<ul style="list-style-type: none"> ▪ Plastic industry
	Non-ferrous metal (copper, aluminum)	<ul style="list-style-type: none"> ▪ Non-ferrous metal smelters
* CFC used for refrigerant and heat insulation needs to be collected and properly destroyed in accordance with Montreal Protocol.		
Personal computer	(Material composition and potential recycling industry)	
	Material	Potential recycling industry
	Ferrous metal	<ul style="list-style-type: none"> ▪ Iron & steel industry
	Non-ferrous metal (copper, aluminum, precious metals)	<ul style="list-style-type: none"> ▪ Non-ferrous metal smelters
	Plastic	<ul style="list-style-type: none"> ▪ Plastic industry
	Glass	<ul style="list-style-type: none"> ▪ Cullet manufacturers

2. Necessity of the National Master Plan for Recycling Industry Development in the Philippines

2.1 Urgency of Waste Minimization and Proper SWM in the Philippines

According to the National Solid Waste Management Framework 2004, prepared by the National Solid Waste Management Commission (NSWMC), the Philippines is estimated to generate 19,700 tons of garbage daily in 2000 or about 7.2 million tons annually. It also projects that waste generation will increase up to more than 10 million tons annually by the year 2010.

As a national policy on SWM, the Ecological Solid Waste Management Act (RA9003) requires LGU to prepare the Local Government Solid Waste Management Plan (LG-SWM), in which **LGU should include its own implementation schedule of diverting at least 25% of all solid waste from waste disposal facilities through re-use, recycling, composting, and other resource recovery activities.**

According to the Study done by the Asian Development Bank in 2003, the total cost of solid waste management in Metro Manila, ranging from collection to final disposal, reached about 3.5 billion PhP (8.5 to 9 billion JPY) or 1,700 PhP (about 4,250 JPY) per ton of waste in 2001. Considering the required improvement of final disposal to sanitary landfill and reduction of waste by intermediate treatment, the cost of SWM is expected to further increase and bear heavily upon local budget. Although the estimation of ADB Study showed that approximately 2 million tons of SW was generated in Metro Manila alone in 2001, it also indicates that reduction of SW generation by 10% can save about 340 million PhP (850 million JPY) in terms of SWM cost. It clearly demonstrates the possible positive impacts of promoting recycling upon national as well as local budget.

Waste minimization is of great importance and urgency with respect to mitigation of heavy burden of national and local budget for SWM.

2.2 Big Potential of Resource Recovery, but Limited Utilization by Domestic Industries

Although the results of prior surveys on waste composition clearly show the big potential of resource recovery from SW, its utilization is still limited in the domestic industries potentially receiving it as raw material. The major limiting factors of recycling development in the Philippines include:

- Lack of proper segregation of recyclable/recoverable waste materials at sources of generation and low collection ratio and low quality of such materials as its result;
- Limited technological and financial capacity of domestic industries that can receive recyclables as raw materials and their outflow to international big market such as

China;

- Strong dependence of collection and trading of recyclable/recoverable materials upon price fluctuation based on market mechanism and unstable domestic supply of recyclables to the receiving industries as its result; and
- Fragmented information and network for optimizing the flow of recyclable/recoverable materials from generators to the final users.

2.3 Potential Socio-Economic Benefit of Recycling Industry Development

In the Philippines, many people has been earning its daily needs by so-called informal activities surrounding SWM such as primary collection of recyclable materials from generation sources, running of junkshops, and waste picking at final disposal sites. Many of them obtain their daily income from these activities at the risk of unsafe and unsanitary working conditions.

Development of recycling industry is expected to contribute to reformation and reemployment of such people involved in the informal SWM activities as the workers or employees of legitimate recycling industry so that they can work under safer and more sanitary conditions as well as under a certain social security.

In fact, the workers currently engaged in sorting and washing of recyclable materials at paper and plastic recycling factories in the Philippines are in much safer and sanitary conditions with a certain social security provided by the factory owners.

Promotion of recycling industry has a significant potential of increasing social welfare of the people currently engaged in the informal business activities.

3. Goals of the Master Plan for Recycling Industry Development in the Philippines

The Master Plan for Recycling Industry Development in the Philippines is formulated for the purpose of achieving the goals as shown below.

- 1) Waste minimization through establishment of collection and utilization system of recyclable resources based on the proper segregation of waste at sources of generation;
- 2) Development and promotion of the domestic industries contributing to maximizing the domestic use of recyclable materials for resource and energy saving;
- 3) Promotion of environmentally sound and sustainable utilization of recyclable resources
- 4) Reorganization and formalization of informal sector involved in recycling as the key players of promoting recycling industry in the Philippines

4. Current Status and Issues of Recycling Industry in the Philippines

The current status and issues of recycling industry in the Philippines are summarized as follows based on the result of various surveys conducted in the Study.

4.1 Stable Supply of Recyclable Materials from Domestic Sources in terms of Quantity and Quality

Stable supply of recyclable materials is the foundation for promotion and development of recycling industry. However, current domestic supply of recyclable materials is unstable in terms of quantity as well as quality in the Philippines. Unstable supply of recyclable materials in terms of quantity causes the dependence of domestic recycling industry upon import of such materials as well as disturbs their stable business operation. Unbalanced quality of domestic recyclable resources also causes lowering of productivity and efficiency of resource use of recycling industries. Removal and treatment of impurities and residues increases the total operation cost of recycling process and decreases the profitability of recycling business as a whole. The factors that causes instable supply of domestic recyclable resources in terms of quantity and quality are as follows:

4.1.1 Limited Practice of SW Segregation at Sources

In the Philippines, segregation of recyclable materials at sources is not sufficiently practiced, especially at households. In many cases, recyclable materials are discarded with other wastes (garbage including organic waste). Recyclable materials are picked up by the SW collectors or

scavengers at final disposal landfills though its quality is deteriorated and the amount of recoverable materials is also reduced due to contamination by impurities.

4.1.2 Insufficient Establishment of Segregated Waste Collection System

Although RA 9003 provides segregation of waste at sources, the current SW collection system is dominated by mixed collection. Therefore, collection of recyclable materials still depends largely on voluntary efforts of limited number of LGUs and Barangays in cooperation with the community-based organizations, NGOs, and various informal recycling players. The overall segregated waste collection system is not yet formalized in the Philippines.

4.1.3 Outflow of Domestic Recyclable Materials to Overseas

Due to outflow of domestically collected recyclable materials to the foreign countries with higher prices than the market in the Philippines, domestic recycling industry is forced to import their production materials at the higher prices to maintain its production. However, the Philippines recycling industry is currently in the disadvantageous position to compete with the other countries because of comparatively high cost of electricity, human resources, and so forth. It again increases the outflow of domestic recyclable materials to overseas and discourages domestic recycling industry in the Philippines.

4.1.4 Unconsolidated Information on the Quality and Quantity of Recyclable Materials Required by the Domestic Industry among the Recycling Players

In the Philippines, the requirement of the domestic recycling industry about the quality and quantity of recyclable materials is not properly sent to the sources of generation, collectors, and intermediate dealers such as materials recovery facilities (MRFs) and junkshops. It also makes it difficult for the recycling industry to achieve high efficiency production as well as production of high quality recycled materials and products.

4.2 Issues on Infrastructure for Recycling Industry Development

The Philippines has several serious issues to be solved in relation to the existing infrastructure for recycling industry development. These issues consequently weaken the international competitiveness of recycling industry due to comparative higher cost of production. The issues in relation to the existing infrastructure are as follows:

4.2.1 High Cost of Electricity

Electrical utility rate of the Philippines is the second highest after Japan in Asian countries and approximately twice as the price of Thailand and China. Such high price of electricity has serious impact upon the electricity-intensive recycling industry such as paper/pulp manufactures and steel

making industry with electrical furnace.

4.2.2 High Cost of Collection and Transportation of Recyclable Materials

Due to its archipelagic character of the country, sea transport is inevitable for collection and haulage of recyclable materials. However, due to high cost of sea transport between the islands, trading price of recyclable materials increases and impedes smooth distribution of recyclable materials within the country. As in the case of Japan, the efficient logistics or distribution system of recyclable materials is the key to development of domestic recycling industry. Establishment of the optimum distribution system of recyclable materials is one of the most critical issues to be solved by the Philippines government.

4.2.3 Pollution Control Cost of the Recycling Industry

Pollution control cost may also be another factor to discourage development of recycling industry by increasing the total cost of its production. Especially for the recyclers of waste papers and waste plastics, removal of impurities and residues is required to standardize the quality of input materials. The removed impurities and residues in the form of liquid and solid waste need to be properly treated in accordance with the relevant environment regulations. Such pollution control will also increase the total cost of production and discourage the development of recycling industry.

4.3 Sector-Wise Issues of Recycling Industry

The issues of domestic industry in the Philippines are summarized for each type of industry as shown in the table on next page.

Table 4.3.1 Specific Issues of Domestic Recycling Industry in the Philippines

Type of Industry	Issues			Technology and Product Development
	Procurement of Recyclable Materials		Recycling Cost	
	Quantity	Quality		
Paper & Pulp	<ul style="list-style-type: none"> Strong dependence upon import Difficulty in procurement from remote materials or islands due to high transportation cost 	<ul style="list-style-type: none"> Instable quality and high rate of impurities in domestic resources 	<ul style="list-style-type: none"> High cost of material procurement High cost of electricity High cost of pollution control (wastewater and sludge treatment) 	<ul style="list-style-type: none"> Production of low quality recycled paper (newspaper, cardboard, etc.) No production of recycled printing/photocopy paper Development of new utilization technology of waste paper is required (heat insulation materials and other building materials)
Metal (Ferrous & Non-Ferrous)	<ul style="list-style-type: none"> Large amount of scrap metal is exported Serious competition in buying price of scrap metal 	<ul style="list-style-type: none"> Condition of segregation is good due to difference in price among types of metal 	<ul style="list-style-type: none"> High cost of material procurement High cost of electricity (steel makers with electric furnace) 	<ul style="list-style-type: none"> Weak international competition capability of iron & steel industry Development and introduction of proper metal recovery technology (especially for precious metals)
Glass & Glass Products	<ul style="list-style-type: none"> Difficulty in procurement of materials due to high transportation cost and bulky character of scrap glass (glass bottles) 	<ul style="list-style-type: none"> Segregation and washing is required at cullet producers due to limited proper segregation and handling at sources and collection practice 	<ul style="list-style-type: none"> High cost of transportation is the biggest issue. Bulky character of glass products (especially bottles) also increases the cost of transportation. 	<ul style="list-style-type: none"> Cullet and glass bottle production is the major industry Development and introduction of new utilization and recovery technology is required (e.g. pavement materials, tiles and bricks)

Type of Industry	Issues			
	Procurement of Recyclable Materials		Recycling Cost	
	Quantity	Quality		
Plastic Industry	<ul style="list-style-type: none"> ▪ Large amount of scrap plastic is exported due to higher buying price. ▪ Some types of scrap plastic are not actively collected (film plastic, Styrofoam) 	<ul style="list-style-type: none"> ▪ Instable quality and high rate of impurities in domestic resources 	<ul style="list-style-type: none"> ▪ High cost of energy and electricity ▪ High cost of pollution control (wastewater and residue treatment) 	<p>Technology and Product Development</p> <ul style="list-style-type: none"> ▪ Production of semi-finished products (pellets, flakes) dominates plastic recycling. ▪ Finished products of recycled plastic are very limited. ▪ Linkage with textile, garment and plastic molding industry is required for development of new products and utilization.

5. Master Plan for Development of Recycling Industry in the Philippines

Based on identification of the current issues of recycling industry in the Philippines in the previous section, the Master Plan for Development of Recycling Industry in the Philippines is discussed here. This Master Plan clarifies the policies, measures and actions to be taken by the Government to further promote and develop recycling industry in the Philippines to achieve the minimization of SW as prescribed in RA 9003, as well as to realize the material cycle society by enrooting the concept of 3R (Reduce, Reuse, and Recycle) among all the sectors and people in the Philippines.

The national policies, measures, and actions discussed here are mainly focused on the following critical issues on development of recycling industry in the Philippines that are identified in the previous sections of this Master Plan, i.e.

- 1) Proper distribution of information on domestic recyclable materials and recycling industries among all the relevant players and stakeholders;
- 2) Establishment of local-based recycling system based on proper segregation at sources and strong sustainable linkage from the sources to the final receivers;
- 3) Introduction of policy incentives (financial and non-financial) to promote recycling industries and other supporting activities

5.1 Policies and Programmes on Proper Distribution of Information on Domestic Recyclable Materials and Recycling Industries

5.1.1 Background and Necessity of the Policies

Proper distribution of information on domestic recyclable materials and recycling industries is the foundation of creating the domestic market for recyclable materials in the Philippines. However, the current mechanism of information distribution in the Philippines still depends upon various informal communications among the recycling players while the information itself becomes fragmented, arbitrary and speculative among them. Due to this current situation, the Philippines is facing the difficulty in development of recycling industry for the following aspects:

- 1) Misperception and misunderstanding among the recycling players on the needs or required quantity and quality, price of recyclable materials by the domestic recycling industry, which causes the mixed disposal of a considerable amount of recyclable materials at landfills;

- 2) Difficulty in formulating the recycling plan at national as well as local level due to no available complete data on recyclable materials as well as recycling industries, which also discourages the private investment in recycling because of the uncertainty in relation to such information.

To address these 2 (two) key issues, the Master Plan formulates two sets of policy measures for the purpose of establishing proper distribution of information on recyclable materials and recycling industries, i.e.

- 1) Formulation and Enforcement of Recycling Guidelines for Specific Recycling Players (Generators, Collectors & Dealers, and Recycling Industry)
- 2) Establishment of Nation-Wide Recycling Information System

5.1.2 Formulation and Enforcement of Recycling Guidelines for Specific Recycling Players

The Recycling Guidelines are prepared for proper handling of recyclable materials at all levels of relevant players ranging from waste generators to collectors, various dealers (MRF, middleman, junkshop, and consolidators) and recycling industries that finally receive them to produce semi-finished or finished recycled products. The Recycling Guidelines have to be designed to meet specific needs and requirement of local recycling industry in terms of quantity and quality so that domestic use of recyclable materials can be maximized.

(1) Scope of Recycling Guidelines

The recycling guidelines are prepared for 3 categorized key recycling players, i.e.

- Waste Generators including household, business entities, institutions, and any other sources or source activities of waste generation;
- Dealers of recyclable materials including junkshops, MRFs, middleman, consolidators, and other agents dealing with recyclable materials; and
- Recycling Industry that finally receives recyclable materials to produce semi-finished or finished recycled products.

(2) Key Contents of Recycling Guidelines

The key contents to be included in the recycling guidelines for each of 3 categorized key players are as follows:

1) Recycling Guidelines for Waste Generators

(Key Contents)

- **Introduction**, in which the necessity of recycling must be well presented through clear explanation about the seriousness of solid waste management issues and scarcity of available natural resources in the Philippines. The importance of proper handling of recyclable materials such as separation at sources should also be better explained.
- **Handling method of recyclable materials**, in which the guidelines must clarify how the recyclable materials need to be handled to maximize their use as raw materials by the final users. The handling method includes how to separate, maintain the good quality of recyclable materials as well as how to increase efficiency of their transport from the sources to the final users, e.g. volume reduction at sources, proper baling, and so forth. The handling method must be specified for each type of recyclable materials in accordance with its unique characteristics. It also needs proper consideration on the existing recycling system in the relevant localities.

2) Recycling Guidelines for Dealers of Recyclable Materials

(Key Contents)

- **Introduction**, in which the important roles of the dealers of recyclable materials should be clearly stated. Such roles include efficient transfer of recyclable materials from the generation sources to the end-users, increasing the value of recyclable materials through primary processing, creation of job opportunities for socio-economically weak people through expansion of their business, contribution to realization of environmentally sustainable society through proper circulation of recyclable materials, and so forth.
- **Acceptance criteria for recyclable materials**, that specifies the standard for recyclable materials to be accepted by the dealers. Materials that are forbidden to transact should be specified under this criteria. Such materials include stolen items, items containing hazardous and/or toxic substances, and so forth.
- **Storage standard for recyclable materials**, which specifies how the collected recyclable materials are properly stored in the premises of dealers. The items to be specified include the height limit of stacking the collected materials at warehouse or storage, facility standard for warehouse or stockyard of materials, and so forth.
- **Guidelines for data management of recyclable materials handled by the dealers**, that specify how the daily transaction of recyclable materials should be recorded and kept at premises of the dealers.

- **Guidelines for primary processing of collected recyclable materials**, which provide the information about the primary processing technologies of recyclable materials to increase their value as raw materials. Such technologies include segregation, washing, bleaching, shredding, baling, dismantling, and so forth. The technological information also includes proper treatment of residues that are generated from primary processing of recyclable materials at the premises of the dealers. Occupational safety of the workers should also be addressed in the guidelines.

3) Recycling Guidelines for Recyclers

(Key Contents)

- **Introduction**, in which current conditions of recycling in the Philippines are clarified by items. The potential of recyclable materials generated in the Philippines should also be presented to show the potential market of recycling industry.
- **Material specific recycling guidelines**, in which the latest available information about recycling technologies are provided for each target recyclable material. Such information should also include pollution control measures required in the recycling process.
- **Facility and facility operation standard for recycling**, in which the basic requirement for the installation of recycling facilities, machinery, and equipment as well as their operations should be clarified.
- **Guidelines for data management of recyclable materials utilized by recyclers**, that specify how the daily operation of recyclers should be recorded and kept at their premises.

(3) Measures for Dissemination and Enforcement of Recycling Guidelines

The measures for dissemination of recycling guidelines are recommended as follows:

1) Distribution through various media

Recycling guidelines can be disseminated through various media including publication and distribution in the form of booklets, uploading at relevant government website, holding dissemination seminars, and so forth. These public relations activities have to be made under the initiative of the government working together with recycling industry that is expected to obtain the most benefit by their dissemination among all the recycling players.

2) Formalization of Recycling Guidelines under RA 9003

Following the dissemination activities above, the Philippines Government will formalize the recycling guidelines under RA 9003 so that the guidelines can complement the provision of RA

9003 regarding segregation of waste at sources as well as roles and responsibilities of various recycling players.

3) Adjustment of the Recycling Guidelines to local conditions of recycling activities

The contents of recycling guidelines need to be revised to meet the local conditions of recycling activities. Especially the guidelines for waste generators need to be reviewed and revised in view of local conditions of recycling activities. These national level guidelines should be used as the guidance for each local authority so that they can have their own guidelines.

4) Regular Updates of the Recycling Guidelines

The contents of recycling guidelines also need to be periodically updated in accordance with the development and dissemination of recycling technologies in the Philippines.

(4) Actions to be Taken by Stakeholders for Implementation of the Programme

The actions to be taken by each stakeholder for implementation of this programme are shown in the table below.

Table 5.1.1 Actions to be Taken by Each Stakeholder

Stakeholder	Required Actions
National Government (DTI-BOI, NSWMC)	<ol style="list-style-type: none"> 1. Dissemination of the national guidelines through various media <ul style="list-style-type: none"> ▪ Publication and distribution of PR materials ▪ Uploading of the guidelines on websites of the relevant government departments and agencies ▪ Holding of seminars and workshops in cooperation with business/industries for local governments ▪ Implementation of the guidelines within its premises (Government buildings, public facilities, etc.) 2. Legislation of the guidelines as the Implementation Rules and Regulations of RA9003 3. Revision and renewal of the guidelines <ul style="list-style-type: none"> ▪ Regular review of the guidelines based on the development and dissemination of relevant recycling technologies and systems 4. Financial support for development of local recycling system <ul style="list-style-type: none"> ▪ Provision of necessary facilities and equipment (collection vehicles, MRFs, processing machinery and equipment, etc.)
Local Government (Province, LGU, Barangay)	<ol style="list-style-type: none"> 1. Preparation of and dissemination of local recycling guidelines <ul style="list-style-type: none"> ▪ Adjustment of national recycling guidelines to local conditions of recycling ▪ Publication and distribution of PR materials for guidelines ▪ Holding of seminars and workshops in cooperation with locally available recycling business/industries for the local communities and residents ▪ Implementation of local guidelines within its premises (local government buildings, facilities, etc.) 2. Preparation and regular review of the local guidelines <ul style="list-style-type: none"> ▪ Preparation and regular review of the local guidelines based on the development and dissemination of relevant recycling technologies and systems at its localities

Stakeholder	Required Actions
	3. Establishing the local recycling system in accordance with the local guidelines to be prepared <ul style="list-style-type: none"> ▪ Establishment of recyclables collection/haulage system ▪ Networking with takers of recyclables (MRF, junkshop, consolidators, recyclers, exporters, etc.)
Business/industry	1. Dissemination of national guidelines through various media <ul style="list-style-type: none"> ▪ Technical/financial support for production of PR materials ▪ Technical/financial support for holding the seminars and workshops ▪ Uploading the guidelines on their website ▪ Implementation of the guidelines at their premises (offices, factories) ▪ Dissemination of the guidelines to the suppliers of recyclables (contracted junkshop, consolidators, collectors, dealers) 2. Preparation of regular review of national/local guidelines <ul style="list-style-type: none"> ▪ Provision of information about the requirement of the quantity, quality and price of recyclable materials from the end-user side 3. Establishing the local recycling system in accordance with the local guidelines to be prepared <ul style="list-style-type: none"> ▪ Provision of assurance on acceptance of collected recyclable materials as end-users by contract with local authorities or relevant organizations. ▪ Technical/financial support for establishment of local recycling system as end-users 4. Compliance with the recycling guidelines for recyclers 5. Examining and investigating the possibility of introducing new recycling technologies as the end-users of recyclables in accordance with the guidelines.
General Public	1. Implementation of the guidelines as the source of recyclable materials <ul style="list-style-type: none"> ▪ Proper segregation and discarding of recyclables in accordance with the guidelines at sources (household, workplace, public place, etc.) ▪ Voluntary support for collection of recyclable materials (community-based collection of recyclables, operation of MRFs, etc.) 2. Participation in the process of planning and establishing local recycling system (community leaders, etc).

(5) Implementation Schedule

The proposed implementation schedule of dissemination and enforcement of recycling guidelines for the next 5 years are as shown in the table below.

Table 5.1.2 Implementation Schedule of Recycling Guidelines

Activity	2007	2008	2009	2010	2011	2012
1. Preparation of Recycling Guidelines	■	■				
2. PR activities		■	■			
3. Formalization under 9003			■	■	■	■
4. Updates of Recycling Guidelines			■	■	■	■
5. Formulation of Local Recycling Guidelines			■	■	■	■

5.1.3 Establishment of Nation-Wide Recycling Information System

The objectives of the nation-wide recycling information system are:

- Promoting recycling business by indicating the potential market of recycling through provision of reliable and detail information on generation and utilization of recyclable materials;
- Contributing to formulation of national and local recycling plan through provision of proper information and data on the current flow of recyclable materials; and
- Providing reliable information on currently available recycling industry that can utilize recyclable resources as raw material, whereby contributing to establishment of the optimum recyclable resource utilization mechanism at local and national levels based on the partnership among relevant stakeholders.

(1) Basic Structure of the Nation-Wide Recycling Information System

The basic structure and contents of the nation-wide recycling information system are respectively as follows:

1) Information on Recyclable Materials

a Recyclable materials covered

The System will cover the recyclable materials targeted in the Study including:

- Waste/scrap papers
- Scrap metals (iron and aluminum)
- Scrap glass
- Scrap plastic
- Used electric and electronic home appliances (cellular phone batteries, personal computers, TV sets, and refrigerators)

Each of the above recyclable materials will be further divided into sub-categories depending upon the necessity of its use and types of recycling industry to be developed in the Philippines.

b Information and data to be collected

- Import and export of recyclable materials (amount and value by types and major ports)
- Final domestic consumptions of relevant materials and products (by types)
- Generation and collection of recyclable materials (by types, sources)
- Domestic consumption of recyclable materials (by types)

By collection of the above data and information, material flow of each recyclable material can be drawn in accordance with the figure shown below.

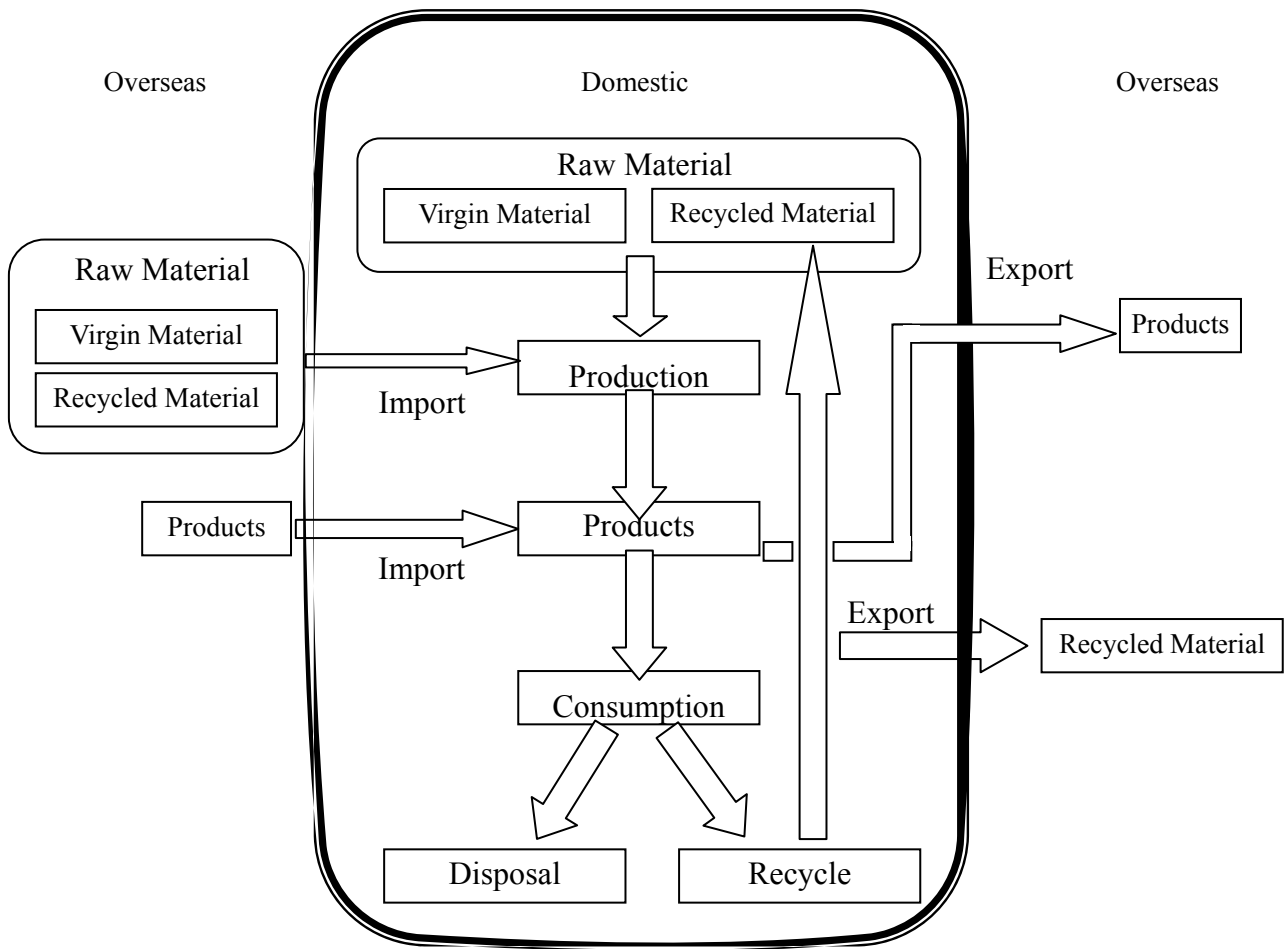


Figure 5.1.1 Typical Material Flow Diagram of Recyclable Materials

By completing the material flow diagram above, generation and consumption of recyclable materials in the Philippines can be identified in terms of their quantity as shown in the table below.

Table 5.1.3 Quantitative Indicator on Generation and Utilization of Recyclable Materials

Recyclable Item	Domestic recycling	Export	Final Disposal	Total Amount of Recyclable	Domestic Recycling Ratio	Recycling Potential
	(1)	(2)	(3)	(1) + (2) + (3)	(1)/((1) + (2) + (3))	(2) + (3)
Papers						
Metals						
Iron						
Aluminum						
Glass						
Plastics						
Used EEHA						
Cellular Phones						
PCs						
TVs						
Refrigerators						

Above table only targeted for domestically generated recyclable resources so that recyclable materials imported from overseas is not included. However, actual volume of recyclables utilized in the Philippines is the “domestic recyclables” plus “imported recyclable materials.”

The key to develop domestic recycling industry is to create the system in such way that recyclables “(2) exported” and “(3) final disposal” are brought into (1) domestic recycling.

In addition, recyclable materials mentioned in table above only indicate major categories. In actual system, it is necessary to identify the recyclables with smaller categories based on their types (e.g. papers can be further categorized as waste newspapers, magazines, cardboards, and so forth). It should be noted that the material flow includes products composed of different types of recyclables like in the case of used home appliances (e.g. TV is composed of metals, glass, plastics and others to be included in the material flow). For instance, the raw materials do not only come from plastic products distributed/comsumed/disposed domestically, but also other plastic containing products -- like home appliances, which are discarded and plastics are recovered from. This type of material flow can not be identified from statistics on plastics only so that it is also necessary to estimate the volume of products containing plastics which are discarded, and how much plastics are contained in such products, and/or how much plastics are recovered from the products.

2) Information on Recycling Industry

a Recycling industry covered

The industries covered in this system are:

- Importers and exporters of recyclable materials
- Domestic end-users of recyclable materials

The data on primary collectors and secondary dealers of recyclable materials are not subject to collection in this database because it is not necessary to capture the macro trend of recycling industry in the Philippines. In examining the recycling mechanism at micro level such as in a certain LGU, however, identification of the activities of such stakeholders will be required, taking into account the limited access to such end-users and exporters at local level and much dependence upon traders of recyclable materials.

b Information and data to be collected

The information and data to be collected from the above recycling industries are illustrated in the table below.

Table 5.1.4 Information and Data to be Collected from Recycling Industry

Types of Recyclers	Required Information and data
Importer/exporters	<ul style="list-style-type: none"> ▪ Address and contact information ▪ Types of recyclable materials handled ▪ Amount of export and import (by types) ▪ Price of the recyclable materials handled (by types) ▪ Import and export destination (by country and by types)
End-users	<ul style="list-style-type: none"> ▪ Address and contact information ▪ Type of industry (in accordance with PSIC) ▪ Manufacturing products profile ▪ Production/manufacturing process detail (Production capacity, amount, process yield, etc.) ▪ Types of recyclable materials used ▪ Amount of recyclable materials input for production (by types), ratio between domestically and foreign procurement of recycled materials, and virgin/recycled material ratio ▪ Buying price and conditions of recycled materials

(2) Development of Nation-Wide Recycling Information System

The nation-wide recycling information system will be developed and operated in accordance with the process illustrated below.

1) Identification of information/data sources and development of information/data collection system

Identification of the information/data sources is the key in the development of database. The information and data must be collected in the most efficient way, and from the most reliable sources. In this respect, we must first consider the current flow of recyclable materials. The current flow of recyclable materials in the Philippines can be estimated as illustrated in Figure 5.1.2 below.

Recyclable materials are generated from various sources such as households, offices, public and commercial facilities, industries and so forth, collected by primary collectors, and transferred to intermediate dealers like junkshops, MRFs, etc. and finally brought to end users or exporters. The materials not collected in the above process are disposed as waste at final disposal landfills.

To properly and efficiently capture the amount of recyclable materials collected and utilized in the Philippines, end-users and exporters must be targeted as the sources of information and data. Therefore, how to develop the information and data collection system from end-users and exporters is the key to track down the collection and utilization of recyclable materials.

The method of collecting data and information from these stakeholders is as follows:

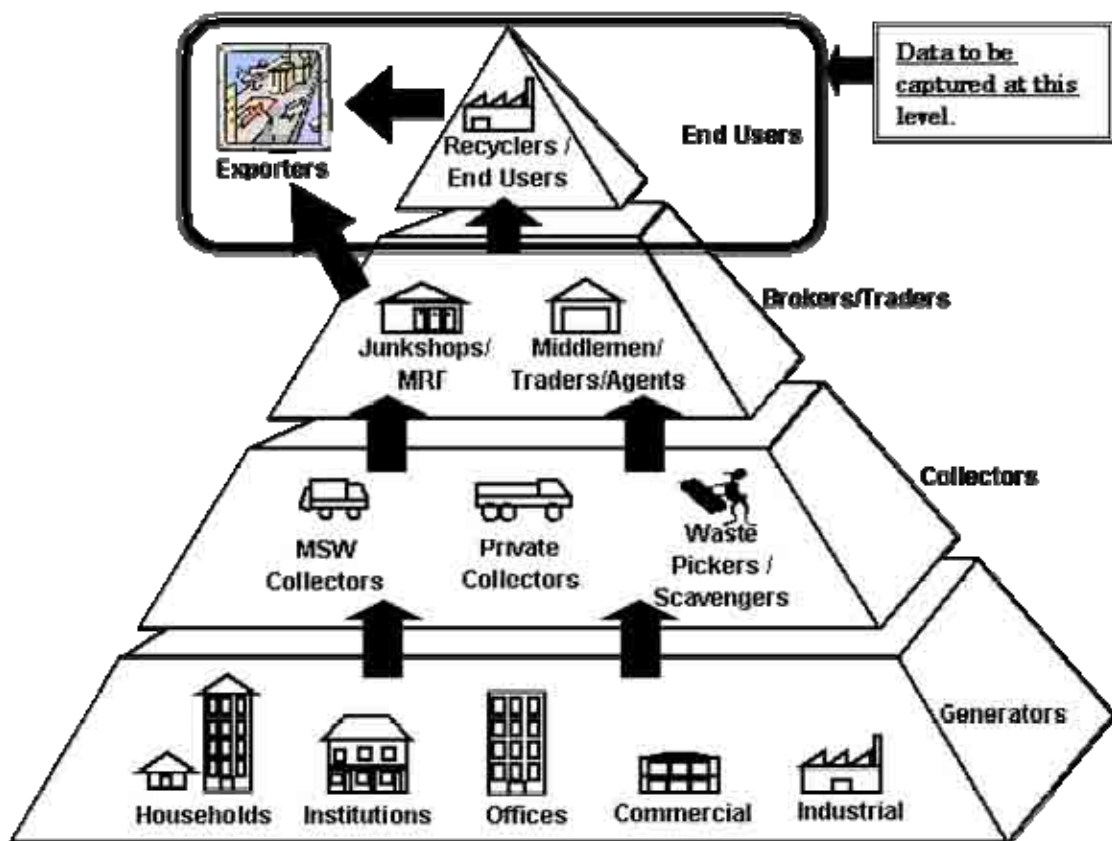


Figure 5.1.2 Basic Flow of Recyclable Materials in the Philippines

a Information/data collection from the end-users of recyclable materials

In developing information/data collection system from end-users, the role of industry groups and/or associations is of great importance. As the industry groups and associations have a good network of member companies, it should be utilized at its maximum to efficiently collect required information and data from individual recycling industries. For the industry groups and associations, it can be a good publicity to show their industries' recycling performance to the public.

In the case of the Philippines, a considerable number of industry associations and groups have been playing important roles in representing their member companies' interests and opinions. In this regard, industrial association is the most suitable focal point to collect information and data on the use of recyclable materials by their industries. The figure below illustrates the data collection system under the leading role by industry associations.

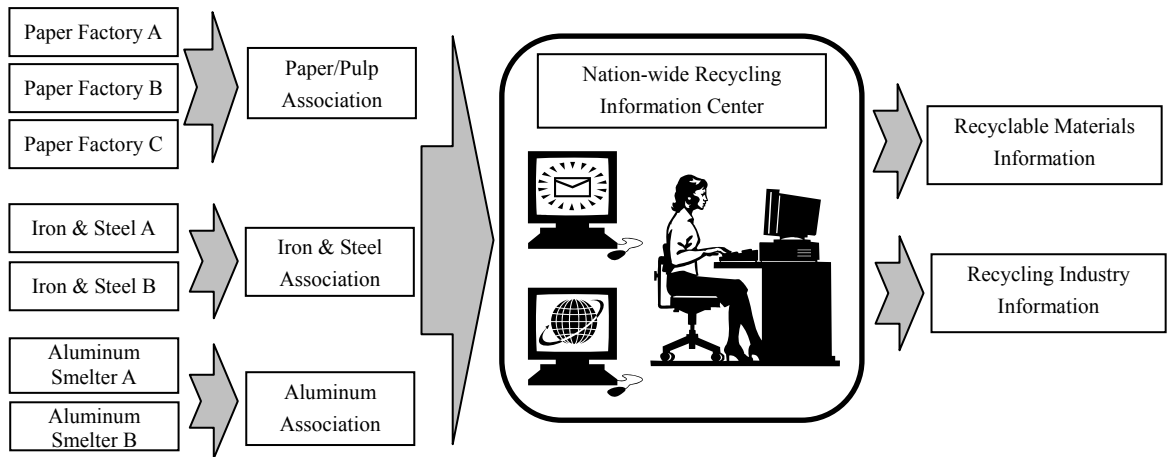


Figure 5.1.3 Outline of Information/Data Collection System from End-Users of Recyclables

b Information/data collection from exporters of recyclable materials

The recyclable materials collected from the sources are finally transferred to domestic end-users or exported through the hands of exporters. Therefore, the total amount of recyclable materials collected can be captured by properly identifying these two routes of recyclable materials. The export data of recyclable materials can be obtained either from exporters or custom offices dealing with export of recyclable materials. Accordingly, the information and data collection system on the exports of recyclable materials can be outlined as shown in the figure below.

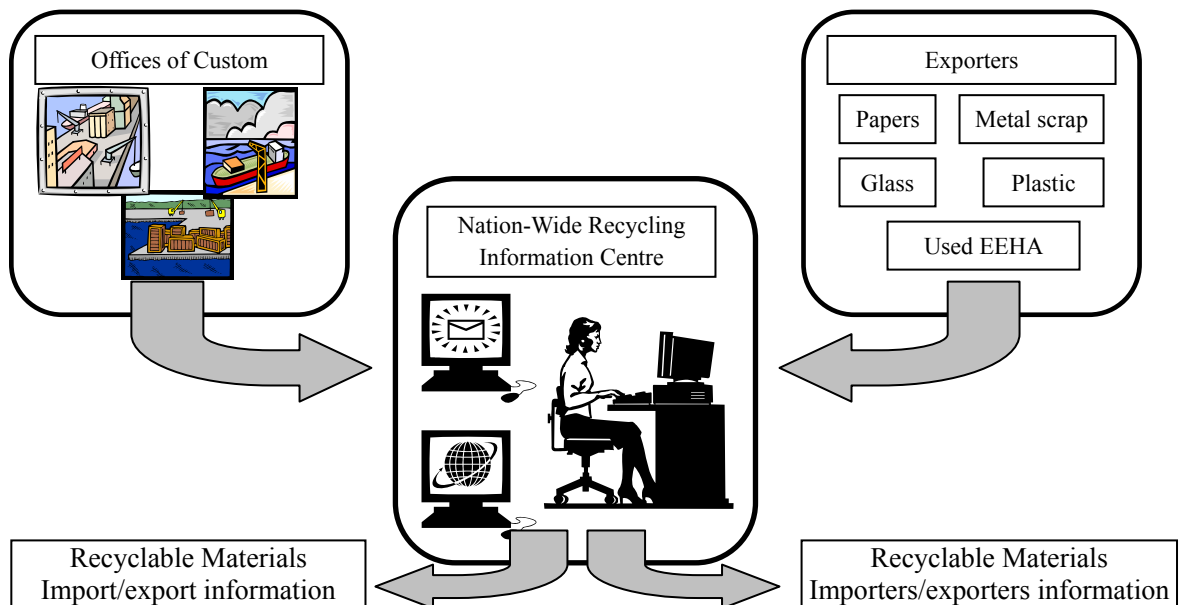


Figure 5.1.4 Outline of Information/Data Collection System from Importers/Exporters

2) Preparation of Reporting Forms for Information/Data Collection

To obtain accurate and useful information and data from the relevant sources, several sets of reporting forms need to be prepared by types of information/data sources. Provision of reporting guidelines/manuals as well as the short training programs may also be required to make sure proper reporting by the relevant sources.

In this case, the reporting forms need to be prepared for the following key information/data sources:

- End-users of recyclable materials (Recycling industry)
- Offices of customs dealing with import/export of recyclable materials
- Importers/exporters of recyclable materials

3) Mandatory Registration of Recycling Players and Information Provision

For proper collection of information and data, the Government should create a mechanism to obtain information from relevant recycling players on mandatory basis (such as upon renewal of business license). The relevant players include recycling industries that collect and treat recyclable materials. To realize this, a regulatory measure is necessary which mandate the recycling player to provide the information/data, which could be accomplished by a mandatory registration system for recycling players. This will permit necessary information and data can be available for the recycling information system.

Mandatory registration of recycling players will be appropriate to be carried out within the LGUs where the Barangays in the LGUs should be responsible for the registration. Simple and effective registration system should be prepared, with easy reporting format for the recycling players to provide necessary information as requested.

4) Periodical Update of Recycling Information

The recycling information needs to be regularly updated, preferably every year so that the government can always identify the latest status of recycling activities in the country. Therefore, the above information collection activities need to be annually carried out to update the recycling information.

(3) Dissemination Measures of Collected Recycling Information

Dissemination of recycling information will be made by the following measures:

1) Dissemination through media

The collected recycling information can be disseminated through various media, e.g. uploading the information at website of relevant government organizations, publication of recycling

information handbook, announcement of the key information through radio, TV and other media, and so forth.

As an output of the Study, the Fact Book of Recycling in the Philippines will be published in cooperation with BOI-DTI, NSWMC and other member organizations of Steering Committee of the Study. This is a good example of disseminating the recycling information to the public. It is also useful to disseminate the country's achievement of recycling activities as a country news topic in the broadcasting media by announcing the key figures on recycling such as recycling/recovery rate of solid waste, reduction or increase in the amount of waste disposed, etc. Announcement of the recycling achievement of specific materials such as waste papers, plastics may also encourage the relevant industry to utilize more recyclable materials.

2) Creation of Recycling Information Database

The collected recycling information can be processed into database so that it can be used for analysis of recycling business market, national and local level plans on SWM and recycling, and so forth. In the mid and long term future, the database may be connected with terminal computers in the relevant industry associations, exporters and the offices of customs that provide the information and data to the database. The figure below shows a possible future network of recycling information at nation-wide.

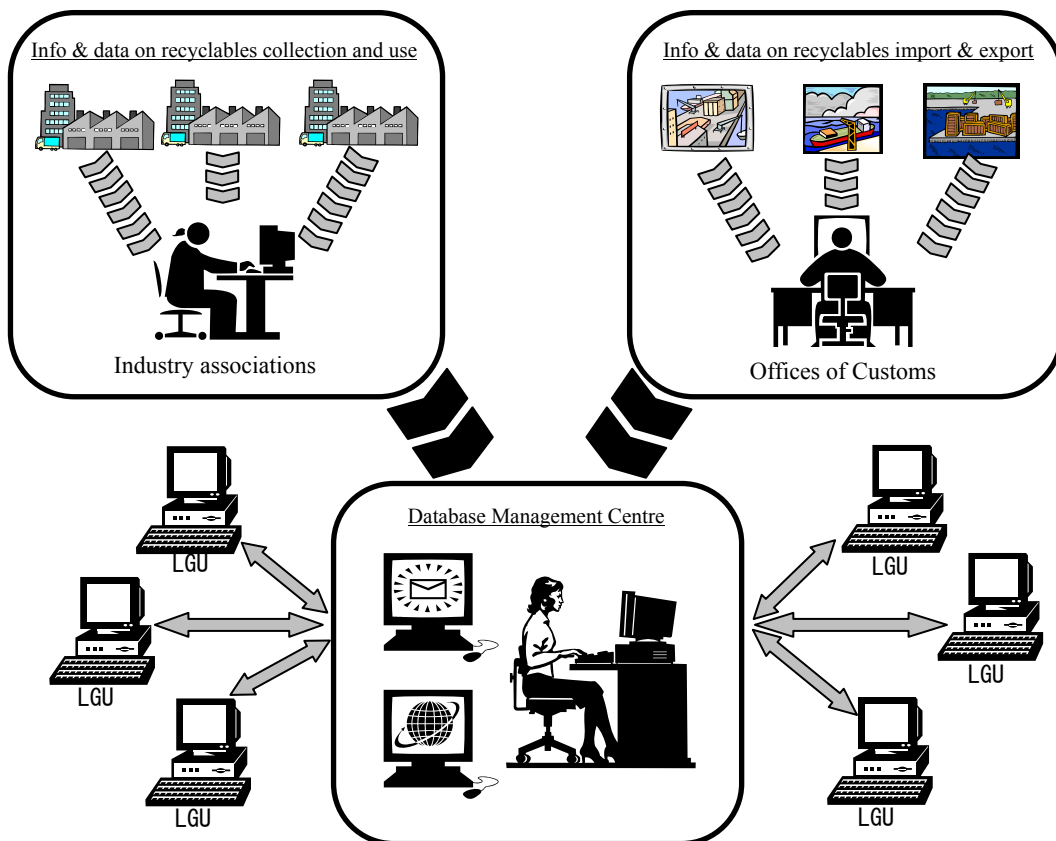


Figure 5.1.5 An Example of Possible Future Recycling Information Network

(4) Actions to be Taken by Stakeholders for Implementation of the Programme

The actions to be taken by each stakeholder for implementation of this programme are shown in the table below.

Table 5.1.5 Actions to be Taken by Each Stakeholder

Stakeholder	Required Actions
National Government (DTI-BOI, NSWMC)	<ol style="list-style-type: none"> 1. Collection of information and data on recyclable materials and recycling industries <ul style="list-style-type: none"> ▪ Legislation of mandatory registration of recycling industry (end-users and international traders of recyclable materials) and regular reporting (data provision) about recycling activities from them. ▪ Preparation of user-friendly guidelines and manual for reporting recycling activities by end-users and international traders of recyclables ▪ Establishment of data/information collection mechanism from end-users and international traders 2. Compilation and provision of recycling data and information <ul style="list-style-type: none"> ▪ Compilation of recycling data and information for public disclosure through publication of data book, announcement of the country's recycling achievement by various media. ▪ Analysis of data and information for policy making in relation to development of recycling market and industry. ▪ Provision of region or local-wise recycling data to help local governments develop their own recycling plan. 3. Establishment of recycling information/data network system <ul style="list-style-type: none"> ▪ Development of recycling information/database ▪ Networking with relevant stakeholders (Recyclers, LGUs, etc.) 4. Technical/financial assistance to the local governments <ul style="list-style-type: none"> ▪ Training of local government staff for collection of information and data ▪ Financial assistance for establishment of information/data network system
Local Government (Province, LGU, Barangay)	<ol style="list-style-type: none"> 1. Collection of information and data on recyclable materials and recycling industries at local level <ul style="list-style-type: none"> ▪ Establishment of data/information collection mechanism at local level. 2. Compilation and provision of local recycling data and information <ul style="list-style-type: none"> ▪ Compilation of local recycling data and information for public disclosure through publication of data book, announcement of local recycling achievement by various media. ▪ Analysis of data and information for formulation of local recycling plan and establishment of local recycling system 3. Establishment of recycling information/data network system <ul style="list-style-type: none"> ▪ Development of local recycling information/database ▪ Networking with National Government as well as local key stakeholders in recycling
Business/industry	<ol style="list-style-type: none"> 1. Collection of information and data on recyclable materials and recycling industries <ul style="list-style-type: none"> ▪ Registration and regular submission of recycling data and information to local government in accordance with the registration and reporting procedure provided by the National Government

Stakeholder	Required Actions
	<ul style="list-style-type: none"> ▪ Establishment of data/information collection system by types of recyclable materials under the leadership of sector-wise industry associations. <ol style="list-style-type: none"> 2. Compilation and provision of sector-wise recycling data and information <ul style="list-style-type: none"> ▪ Compilation of sector-wise recycling data and information for public disclosure through publication of data book, announcement of sector-wise recycling achievement by various media. ▪ Analysis of data and information for further development and enhancement of recycling by each sector 3. Establishment of recycling information/data network system <ul style="list-style-type: none"> ▪ Development of sector-wise recycling information/database ▪ Networking with National Government
General Public	<ol style="list-style-type: none"> 1. Proper understanding of the national and local situation of recycling 2. Active cooperation in collection of information and data on recycling

(5) Implementation Schedule

The proposed implementation schedule of establishing the nation-wide recycling information system for the next 5 years are as shown in the table below.

Table 5.1.6 Implementation Schedule of Nation-Wide Recycling Information System

Activity	2007	2008	2009	2010	2011	2012
1. Publication of 1 st Recycling Fact Book		■				
2. Collection of Information and Data		■■■■■				
3. Update of the Recycling Fact Book and Dissemination			■	■	■	■
4. Creation of Recycling Database		■■■■				
5. Building Recycling Information Network				■■■■■		

5.2 Policies and Programmes on Establishment of Local-Based Recycling System

5.2.1 Background and Necessity of the Policies

The overall recycling system has to be different among localities depending upon the conditions of socio-economic and industrial activities, consumption patterns, lifestyles, and so forth. Taking into such differences, each province and/or LGU will have their own unique recycling system. National policies on recycling industry development must properly consider the local uniqueness of socio-economic, cultural and industrial set-up for each province and LGU and support them building their own unique recycling system.

On the other hand, the government support is also required to complement the limited capacity of recycling industry at provincial as well as local level since recycling industry is not always available within or near its jurisdiction. This kind of shortage at provincial and local level has to be properly taken care of by the national government.

To realize local-based Recycling System with attention to these issues, the Master Plan sets the following policy measures to be taken by the National Government to support local authorities:

- 1) Provision of the Guidelines for Formulation of Provincial/Local Recycling Plan
- 2) Policy Support for Implementation of Provincial/Local Recycling Plan

5.2.2 Basic Procedure and Priority for Formulation of Local Recycling Plan

(1) Basic Unit of Local Recycling Plan

Although RA9003 requires that the ecological solid waste management plan should be formulated by each LGU, the basic unit of local recycling will be put at each province or region. It is because of the fact that Regional Ecology Center, which is established at each province or region level, will be the most suitable institutional base for formulating local recycling plan.

(2) Priority of Local Recycling Plan Formulation and Implementation among Regions

Every region differs in conditions of existing recycling industry, amount of recyclable materials, as well as urgency of waste minimization. In this respect, the priority for formulation and implementation of local recycling plan has to be determined considering such conditions of each region.

The Master Plan will put the priority of formulating and implementing local recycling plan upon major cities such as Metro Manila (National Capital Region: NCR), Metro Cebu, and Davao, where population is and socio-economic activities are concentrated. The necessary information and data on the amount of recyclable materials and recycling industry are also more available in the above cities than the others, so that they can start formulation and implementation of local recycling plan earlier than the others.

As to the other regions, the Regional Ecology Centers is expected to take the initial step for formulation of local recycling plan through identification of the amount of recyclable materials and recycling industry in their respect regions. Based on this identification, they will determine the scope of local recycling plan, in which what types of recyclables are treated within the regions and how they cooperate and coordinate with the other regions to complement with each other to maximize the use of regionally/locally available recyclable materials and industries.

5.2.3 Provision of the Guidelines for Formulation of Provincial/Local Recycling Plan

RA 9003 provided that provincial/local government is mandated to formulate local solid waste management plan, in which the recycling plan of SW occupies an important part. However, there is no specific guidance is provided for formulation of provincial/local recycling plan although the guidelines for SWM plan is available. The methodology of formulating recycling plan is also

properly guided to provincial/local authorities so that they can come up with the viable and implementable recycling plan. In this regard, the Master Plan provides the guidelines for formulation of provincial/local recycling plan in which the basic procedure for plan formulation is clarified.

(1) Basic Procedure for Formulation of Provincial/Local Recycling Plan

The local recycling plan will be formulated in accordance with the following steps:

STEP1:	Obtain commitment from policy making bodies or decision makers of local government
STEP2:	Formation of the Taskforce for Provincial/Local Recycling Plan
STEP3:	Assessment of Existing Situation on Recycling
STEP4:	Determination of Planning Framework
STEP5:	Planning the Local Recycling Mechanism (Separation at Sources, Collection, and Recycling)

Detail of each step is described below:

STEP1:	Obtain commitment from policy making bodies or decision makers of local government
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It can not be over emphasized the importance of obtaining the support/ commitment from the policy making body such as head or assembly of the local government when developing the “Provincial/local Recycling Plan.” To realize this, initiatives should be taken by the division/department that are responsible for SWM in its perspective jurisdiction. In order to obtain support or commitment from the policy making body, a proposal/explanatory document on the Provincial/Local Recycling Plan can be developed and submitted. The content of this proposal/explanatory document should include following:

- Objectives of the proposal/ explanatory document
- Background and necessity of developing the “Provincial/Local Recycling Plan”
- Content (draft) of “Provincial/Local Recycling Plan”
- Advantages of developing and implementing the “Provincial/Local Recycling Plan”
- Human and financial resources needed to establish the “Provincial/Local Recycling Plan”
- Approval of the proposal/explanatory document

STEP2:	Formation of the Taskforce for Local Recycling Plan
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A Task Force (TF) comprising representatives of the key stakeholders should be set up for formulation of Provincial/Local Recycling Plan. The authority may select a group to be appointed as the Task Force (TF). The criteria for their selection may include:

- Actively involved in SWM and recycling activities
- Have experience in recycling activities
- Have high potential in promoting recycling activities such as awareness raising and

- campaigns for source separation, etc.
- Have important role in recycling; e.g. collectors, junkshops, dealers, recycling factories, etc.

The local authority or any member of the TF may chair this TF, and the secretariat services are to be provided by the local authority. The main roles of TF will include:

- Identifying key SWM and recycling issues that are likely to affect Recycling Plan;
- Facilitating collection of information and data on current recycling activities;
- Identifying target areas/groups for recycling activities and selecting the most suitable for the recycling projects;
- Setting recycling targets;
- Promoting the understanding and practice of recycling among key stakeholders, and in target areas/groups;
- Reviewing performance of recycling activities in target areas/groups; and
- Recommending measures to improve recycling programs & activities.

STEP3: Assessment of Existing Situation on Recycling

In formulating the recycling plan, it is necessary that the existing conditions be established and examined. Information that is required includes the following:

- Stakeholders within the locality (e.g., recyclable collector, recycler, trader, manufacturer, etc.)
- Recyclable materials profile and their flow including waste amount generated within the locality

STEP3-1: Identification of Stakeholders

The list of stakeholders is essential in establishing a good recycling network in the locality. It may include:

- Province, LGUs, Barangays, and other local authorities
- Primary Collectors/ dealers, junkshops/ recycling industry, exporters
- NGOs/ CBOs
- Schools/universities/institutes of higher learning
- Other key players in recycling

The list of stakeholders should be compiled into the “Local Stakeholders Directory” and be published and updated periodically. The contents of the directories may include:

- Names and addresses of recycling players
- Types of activities engaged by each player, and recyclable items handled.

STEP3-2:	Recyclable materials profile and their flow including waste amount generated
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Recyclable materials profile and their flow should be identified to capture the most up-to-date conditions on stakeholders, and to establish the baseline information of recycling in the locality. The local authority needs to identify the recycling players and prepare the material flow within own area. This flow can be used to create new networking among stakeholders to strengthen recycling wheel.

In some cases, the information should be captured not only within the boundary of local jurisdiction, but include the surroundings and /or adjacent large-scale LGUs or provinces.

A local survey on recycling stakeholder may be required to identify recyclable profiles and their flow within the locality. The basic framework of that local survey will be as follows:

<Objectives>

- To identify and register all stakeholders operating within the locality
- To capture the amount and types of recyclable materials collected by stakeholders
- To capture information on the recycling activities by stakeholders

<Target Group>

- Recyclers and Manufacturers who accept recyclables
- Recycling Stations and Centers;
- Traders, Middleman and Junk Shops who deal in recyclables;
- Street Collectors;
- Manufacturing Factories;
- Commercial Establishments and Offices; and
- Households

<Data to be collected>

- Types amount and price of recyclable materials
- Buyers/sellers of recyclables
- Factors affecting recycling activities

<Procedure>

- Survey sheets by target group should be prepared.
- Survey may be carried out in two ways, i.e. face-to-face interview, and mailing surveys. To get good response from the target, face-to-face interview is preferred to ordinary mailing survey.

STEP4:	Determination of Planning Framework
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Once the assessment of current conditions of recycling is captured, the TF should decide the basic framework of the local recycling plan. The key items of the framework will include:

- Planning period
- Target Areas and Stakeholders in the locality
- Target Recyclable Materials

<Selecting the Target Areas and Stakeholders>

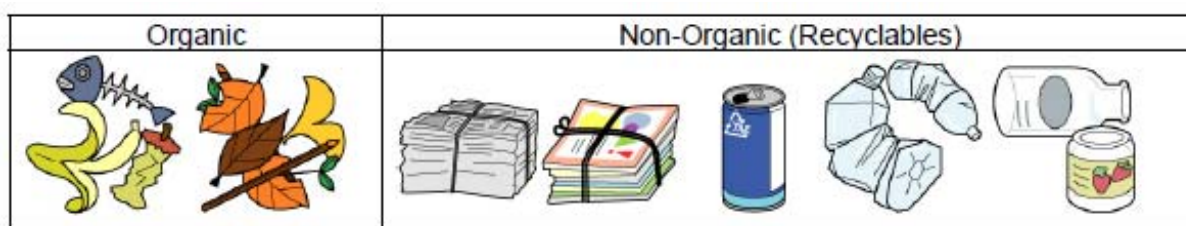
The TF will need to select the target areas or stakeholders for implementing the local recycling plan. The targets refer to two aspects; the spatial and the types of SW generators. The spatial aspect refers to the delineation of an area for implementing the Plan. The generators refer to the sources of waste, and the type of wastes selected to be separated at source. The target areas may be a residential area, a commercial area or an industrial area. The composition and the size of the area/groups need to be determined. Possible target groups are as listed below:

- Households
- Institutions (Government offices, schools, universities)
- Business entities (commercial and service establishments including offices, restaurants, hotels, hospitals, supermarkets and markets etc.)
- Community facilities (e.g. halls, parks)

<Selecting the Target Recyclable Materials>

Based on the information obtained through a local survey on recyclable materials, target recyclables in the local recycling plan should be determined. Generally, the wastes can be classified into 2 groups;

- Organic: Kitchen wastes, Garden wastes,
- Non-Organic (Recyclables): Paper, Aluminum cans, Plastic, Glass bottles, etc.



STEP5: Planning the Local Recycling Mechanism (Separation at Sources, Collection, and Recycling)

After the determination of the planning framework, TF will formulate the specific recycling mechanism starting from separation methods at generation sources, collection system, and selection of final destinations of collected recyclable materials, recycling industries or exporters.

STEP5-1: Separation of Recyclable Materials at Sources

The most basic way to segregate wastes is to classify wastes into two groups. However, the non-organic (recyclables) can be segregated further, based on the local conditions such as level of awareness or willingness among the target groups, policy of the local authority, and how recyclers are collecting recyclable items, etc. The table shows four levels of separation that may be considered. At the basic level, solid wastes are separated into two; the organics and the recyclables i.e. paper, plastics, glass, metals are collected and placed together separately from the usually wet organics. However, to avoid contamination (paper may get wet) and facilitate storage and measurement of quantity and determination of value of each type of recyclable, ideally each group of recyclable should be collected and stored separately.

Table 5.2.1 Examples of Alternatives of Separation Method

Category	2 Items Separated	3 Items Separated	4 Items Separated	5 Items Separated
Organic	Group1	Group1	Group1	Group1
Paper	Group2	Group2	Group2	Group2
Glass		Group3	Group3	Group3
Metals			Group4	Group4
Plastic			Group4	Group5

Based on availability and capacity of recyclers', non-organic recyclables can be further divided into sub-categories. The table below shows the sub-categories for each target item for further consideration.

Table 5.2.2 Sub-Category of Recyclables

Main Category	Sub-Categories
Paper	<ul style="list-style-type: none"> • Newspaper • Magazines & Books • Cardboard & Carton • Used White Paper (Office) • Mixed Paper • Others
Glass (Bottle)	<ul style="list-style-type: none"> • Clear (Flint) • Colored (Amber/Green) • Mixed Glass
Plastic	<ul style="list-style-type: none"> • PET Bottles • Other Plastic Containers • Plastic Sheets (bags, straps) • Foamed Plastics/Styrofoam • Other Plastics
Metals	<ul style="list-style-type: none"> • Aluminum Cans • Steel Cans • Non-Ferrous Metals

STEP5-2: Preparing & Storing Recyclables Prior to Collection

Once the types of recyclables to be separated are decided, and the level of separation is selected, it is important to ensure, as far as possible, that the separated recyclables meet the requirement of the collector/receiver, i.e., end users, and/or manufacturers. The requirement may include the types of recyclable materials that can be commingled and allowable contamination limits.

For example, some recyclers may require that colored and colorless glass bottles be separated before they are collected. Likewise, a cap or film label of PET bottles may be treated differently depending upon the end user. In storing recyclables for collection, different containers may be considered. They are:

- Bins (individual or communal)
- Plastic bags (reuse shopping bags or provide special bags for recyclables)
- Boxes (reuse cardboard boxes or provide special boxes for recyclables e.g. for paper)

STEP5-3: Selecting Collection Method of Recyclables

Collection of recyclables from the sources should be determined taking into account current waste collection system and capability of collectors, recyclers, etc. Generally, there are two types of collection methods;

- Door to Door Collection
- Station Collection

<Door-to-Door Collection>

Door-to-door collection is the collection system in which the collector goes around the target area and collects recyclables from house to house. This method is also referred to as “Curbside Collection”. Residents are required to separate recyclables from other wastes, and to place them into plastic bags (or bins) separately. They need only to bring recyclables to the front of their house or gate on collection day. The general scheme of door-to-door collection is as shown in the figure below.

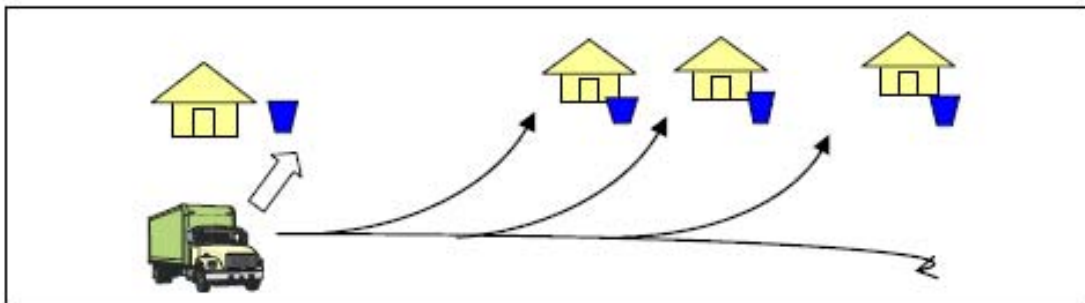


Figure 5.2.1 Image of Door-to-Door Collection

(Equipment)

There is little equipment and capital cost required. The recyclables may be stored in either waste bins or plastic bags. Bins and bags for recyclables may be of a different color from the one used for organics.

(Advantages)

- Residents do not need to go far to deposit their recyclable items.
- The government does not need to build a permanent collection place.

(Disadvantages)

- Recyclable collectors may incur higher costs for collection
- Residents need a place for storage of their waste within their houses until collection day.

<Station Collection>

Station collection is the collection system utilizing drop-off points set up within or near the target area. Residents are required to separate recyclables in the same way as door-to-door collection, and in addition are required to bring the recyclables to the drop-off points. The recyclables collector needs only to go to the drop-off points to collect recyclables.

The general scheme of station collection is as shown in the figure below.

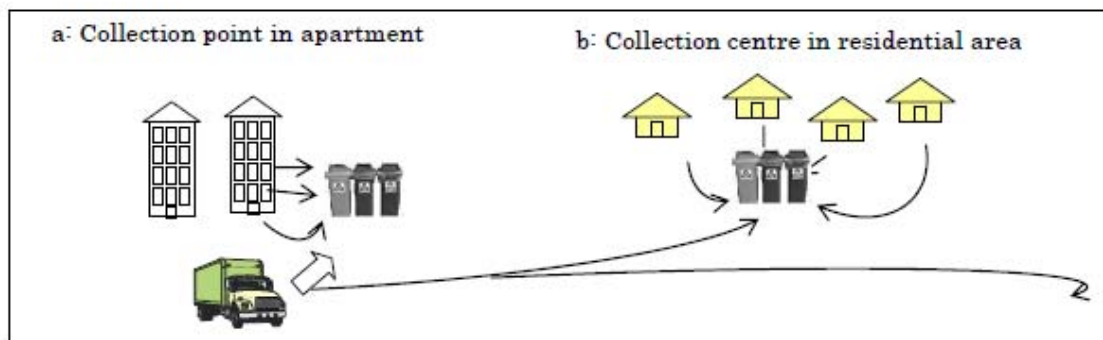


Figure 5.2.2 Image of Station Collection

(Equipment)

A station for collecting and storing recyclables brought in by generators needs to be set up. The design for such stations varies according to the needs of the area being served. Their location needs to be strategically selected to encourage the public to bring their recyclables. Some stations are manned at specific times while others are designed to receive recyclables through hoppers. These centers are provided with collection and/or storage receptacles. The size, type and number of containers are selected based on the number of residents covered, estimated amount of recyclables and collection frequency.

(Advantages)

- Saves on labor cost and time (for waste generator)
- Saves on labor cost and time (for recyclable collector)

(Disadvantages)

- Space and containers are needed for the station or drop-off centre
- The station needs to be manned especially if a “Buy-back” system is used
- Residents need to bring their recyclables to the station
- The station needs to be secure to prevent theft of valuable recyclables
- The station needs to be maintained so that it is clean and do not pose any hazards to the community

STEP5-4: Selecting Recyclable Collector

The role of the recyclable collector is important in ensuring the sustainable implementation of recycling plan. The criteria that may be considered in selecting a collector are shown below.

- Possess good track record of collection services (for SWM or recyclables)
- Have adequate vehicles and personnel
- Willing to take risk of fluctuating quantities of recyclables
- Willing to work closely with the local government
- Possess valid business license and commercial vehicle license

STEP5-5: Determining Frequency of Collection

Collection frequency should be decided based on the estimated collection amount of recyclables and availability of collectors and/or recyclers.

STEP5-6: Selecting Incentives

In the foregoing, it was mentioned that recyclables might be exchanged for incentives at collection stations. Incentives are not always required but are worth consideration as they may be effective to encourage people to join in recycling activities, particularly during the early stage. Incentives may be monetary or non-monetary in nature.

a) Monetary Incentives

Monetary incentives can be considered in various forms;

- Direct cash payout for the sales of recyclables, e.g., buy back campaign
- Subsidies for collection of unprofitable items to communities or to recycling agents

b) Non-monetary Incentives

Non-monetary incentives that can be considered are:

- Gifts such as coupons, car parking tickets, pens, bags, key chains that carry the relevant messages
- Award or publicity to media for areas that achieved high collection rate
- Returns to the community for expenditure saved on waste disposal to the landfill in terms of construction of community facilities such as landscaping, parks and other public amenities.

STEP5-7: Selecting Final Destinations of Collected Recyclable Materials

At the final stage, the local recycling plan must make sure the collected recyclable materials are properly transferred to their final destinations, namely end-users (recycling industry) or exporters. The Taskforce must properly identify the final destinations of collected recyclable materials inside or outside its jurisdiction if necessary so that the collected recyclables will not be transferred to final disposal landfills due to no buyers or users of such materials.

5.2.4 Policy Support for Formulation and Implementation of Local Recycling Plan

Possible recycling activities at regional and local level will be limited due to various technical as well as financial constraints. In this regard, policy support by national government is required for all levels of recycling activities at regional and local level.

The table below identifies the potentially required assistance by national government for formulation and implementation of local recycling plan at regional and local level.

Table 5.2.3 Types of Policy Support Required for Formulation and Implementation of Local Recycling Plan

Stages of Recycling	Types of Assistance Required
Segregation at Sources	(IEC) <ul style="list-style-type: none"> ▪ PR and IEC materials (posters, pamphlets, guidebooks) ▪ Trainers for segregation of recyclables (Equipment) <ul style="list-style-type: none"> ▪ Segregation bins, containers
Collection and haulage	(Facility and Equipment) <ul style="list-style-type: none"> ▪ Collection vehicles (trucks, push carts) ▪ Storage for recyclables (MRF) ▪ Primary processing machinery and equipment (sorting, shredding, washing, baling) (Procurement of recycling players) <ul style="list-style-type: none"> ▪ Primary collectors (Eco-aides) ▪ Junkshops, dealers, consolidators
Recycling	(Facility and Equipment) <ul style="list-style-type: none"> ▪ Recycling facility and machinery/equipment (Final users) <ul style="list-style-type: none"> ▪ Recyclers, exporters

Based on the review and evaluation of local recycling plans formulated, the national government is expected to identify the needs of assistance for their implementation and provide the assistance at its utmost possible.

5.2.5 Actions to be Taken by Stakeholders for Implementation of the Programme

The actions to be taken by each stakeholder for implementation of this programme are shown in the table below.

Table 5.2.4 Actions to be Taken by Each Stakeholder

Stakeholder	Required Actions
National Government (DTI-BOI, NSWMC)	<ol style="list-style-type: none"> 1. Dissemination of the guidelines for formulation of provincial/local recycling plan <ul style="list-style-type: none"> ▪ Publication and distribution of the guidelines to local governments ▪ Training of local government staff for formulation of provincial/local recycling plans 2. Technical/financial support for formulation of provincial/local recycling plan <ul style="list-style-type: none"> ▪ Formulation of model provincial/local recycling plan by types of localities (big, medium, small cities, rural areas, remote areas) under the national initiative. ▪ Financial support for formulation of provincial/local recycling plan. 3. Technical/financial support for implementation of provincial/local recycling plan (Segregation of recyclables at sources) <ul style="list-style-type: none"> ▪ PR materials (posters, pamphlets, guidebook, etc.) ▪ Training of trainers for segregation of recyclables at local level ▪ Procurement of segregation bins and containers

Stakeholder	Required Actions
	(Recyclable collections, storage and haulage) <ul style="list-style-type: none"> ▪ Procurement of recyclable collection vehicles (collection trucks, pushcarts, etc.) ▪ Financial assistance for establishment of MRF (Material Recovery Facility) ▪ Primary processing equipment of recyclables (sorting, crushing, shredding, baling, washing, etc.) (Recycling, manufacturing of recycled products) <ul style="list-style-type: none"> ▪ Financial assistance for development of recycling facilities ▪ Financial assistance for procurement of recycling equipment for producing semi-finished or finished recycled products
Local Government (Province, LGU, Barangay)	<ol style="list-style-type: none"> 1. Formulation of provincial/local recycling plan in accordance with the guidelines 2. Implementation of the provincial/local recycling plan 3. Periodical monitoring and evaluation of the plan implementation
Business/industry	<ol style="list-style-type: none"> 3. Participation in formulation of provincial/local recycling plan as end-users and/or final takers of recyclable materials collected. <ul style="list-style-type: none"> ▪ Provision of input to the plan in terms of the requirement for accepting the collected recyclables (quantity, quality, cost sharing, etc.) ▪ Definition of its own roles in implementation of the plan as end-users and/or final takers of collected recyclable materials 4. Participation in implementation of provincial/local recycling plan as end-users and/or final takers of recyclable materials collected. 5. Technical/financial assistance in implementing the provincial/local recycling plan <ul style="list-style-type: none"> ▪ Assistance in IEC (to general public, collectors, dealers, MRFs, consolidators for proper collection and treatment of collected recyclables in accordance with the acceptance criteria) ▪ Investment in construction of recycling facilities or equipment, depending upon the feasibility of provincial/local recycling plans.
General public	<ol style="list-style-type: none"> 1. Participation in formulation of provincial/local recycling plan <ul style="list-style-type: none"> ▪ Proper understanding of the provincial/local recycling plan ▪ Definition of its own roles in implementation of the plan as the sources of recyclable materials 2. Participation in implementation of the plan <ul style="list-style-type: none"> ▪ Compliance with segregation and discarding methods provided in the plan ▪ Voluntary participation in implementation of the plan (community-based collection, operation of MRFs, etc.)

5.2.6 Implementation Schedule of Establishment of Local-Based Recycling System

The proposed implementation schedule of establishing the local-based recycling system for the next 5 years are as shown in the table below.

Table 5.2.5 Implementation Schedule of Local-Based Recycling System

Activity	2007	2008	2009	2010	2011	2012
1. Preparation of Guidelines for formulation of local recycling plan	■	■				
2. Formulation of Local Recycling Plan		■	■	■	■	■
3. Provision of support for implementation of local recycling plan			■	■	■	■
4. Implementation of Local Recycling Plan			■	■	■	■
5. Monitoring and evaluation				■	■	■

5.3 Policies and programmes for provision of incentives (financial and non-financial) to promote recycling industries and other supporting activities

5.3.1 Background and Necessity of the Policies

Recognizing the significant roles and contributions of recycling industries in the Philippines in terms of efficient utilization of recyclable materials as well as reduction of solid waste by their production activities, the government will review and reform the current incentive mechanism so that the recycling activities can be further promoted.

On the other hand, recycling industries are currently facing common as well as different issues that hamper continuation and/or expansion of their recycling operations as mentioned earlier. The incentive policies and programmes must properly address these issues with different approach and incentive mechanisms based on the proper identification of such issues.

Taking the above conditions into account, the Master Plan establishes the policies and programmes for provision of incentives for promotion of recycling industries and other supporting activities.

5.3.2 Policies and Programmes for the economic incentives to recycling industries

(1) Current economic incentives to recycling industries

According to RA9003, an incentive scheme consistent with the provisions of EO 226, otherwise known as the Omnibus Investment Code of 1987, is provided to encourage LGUs, enterprises, or private entities including NGOs to develop or undertake an effective solid waste management. Incentives for the private sector to promote recycling include: (1) fiscal incentives such as tax/duty exemption and tax credit, (2) non-fiscal incentives such as simplified procedures for the importation of equipment, and (3) financial assistance programs by governmental financial institutions such as the Development Bank of the Philippines (DBP) and Land Bank of the Philippines (LBP). Table below summarizes the existing economic incentives.

Table 5.3.1 Summary of Existing Economic Incentives for Solid Waste Management

	Name of Incentive	Responsible Organization
(1) Fiscal incentives	<ul style="list-style-type: none"> ➤ Income Tax Holiday ➤ Duty Exemption on Imported Capital Equipment, Spare Parts, and Accessories ➤ Tax Credit on Raw Materials and Supplies 	Board of Investment (BOI)
(2) Non-fiscal incentives	<ul style="list-style-type: none"> ➤ Simplification of Customs Procedures ➤ Unrestricted Use of Consigned Equipment ➤ Employment of Foreign Nationals 	Board of Investment (BOI)
(3) Financial assistance programs	➤ Environmental Lending Program	Development Bank of the Philippines (DBP)
	➤ Countryside Lending Fund	Land Bank of the Philippines (LBP)

These incentives are not introduced for the implementation of RA9003, but Income Tax Holiday, Environmental Lending Program, and Country Lending Program have sub-programs for promoting waste minimization and recycling.

1) Fiscal Incentives

a Income Tax Holiday

Under the 2007 Investment Priorities Plan (IPP) of the BOI, recycling¹ facilities can enjoy income tax holiday (ITH). The eligible facilities are those integrated with manufacturing facilities to produce semi-finished or finished products using inputs of at least 50% recyclable materials from local or domestic sources.

When the ratio of locally sourced recyclable material to the total raw material is equal to or higher than 50%, the recycling facility will be qualified for application of ITH under 2 conditions: (1) ITH availment in accordance with the guidelines, if for domestic markets. (2) 100% ITH availment in accordance to export commitment, if the recycled product is for export. In order to enjoy the income tax holiday, a firm must be registered with BOI.

On the other hand, for the recycling facility that uses less than 50% of locally sourced recyclable material as compared to the total raw material, the income tax holiday rate of exemption is calculated based on the amount of recyclable materials used as follows:

$$\text{ITH rate of exemption (\%)} = \text{LSRM/TRM} * 100$$

where LSRM: Locally Sourced Recyclable Material

TRM: Total Raw Material

¹ Recycling refers to the treating of used or waste materials (i.e. biodegradable, non-biodegradable, recyclable and special) through a process of making them suitable for beneficial use and for other purposes, includes any process by which solid waste materials are transformed into new products in such a manner that the original products may lose their identity, and which may be used as raw materials for the production of other goods or services.

b Duty Exemption on Imported Capital Equipment, Spare Parts, and Accessories

A firm registered with BOI is entitled to the zero duty importation of capital equipment, spare parts, and accessories.

c Tax Credit on Raw Materials and Supplies

A tax credit equivalent to the national internal revenue taxes and duties paid on raw materials, supplies and semi-manufacture of export products and forming part will be granted to firms registered with BOI.

2) Non-fiscal Incentives

A firm registered with BOI may enjoy the following incentives:

- Employing foreign human resources in supervisory, technical or advisory positions for 5 years from the date of registration.
- Applying for simplified customs procedures for importation of equipment, spare parts, raw materials and supplies and exports of processed products.
- Importing consigned equipment for a period of 10 years from the date of registration, subject to posing of a re-export bond.

3) Financial Assistance Programs

a Environmental Lending Program

DBP's Environmental Lending Program is established especially for providing preferable financial loans to support environmental projects, which has been funded by various sources such as JBIC, World Bank, ADB, and KfW. Under the Environmental Lending Program, there is a sub-program for waste minimization and recycling. JBIC is the main funding source for projects under this category. The outline of the lending program is summarized in the table below.

Table 5.3.2 Summary of Environmental Lending Program for Waste Minimization and Recycling by DBP

Item	Description	Remark
Year of Start	Phase I: 1996 – 2001 Phase II: 2001 – 2006	
Original Funding	JBIC and KfW	JBIC funding: 5 billion Yen for Phase I and 20 billion Yen for Phase II
Eligibility	<ul style="list-style-type: none">• Private companies• LGUs• Government controlled corporations	No limit for capital size of private companies for eligibility

Item	Description	Remark
Conditions	80% of total costs are financed	Interest rates are defined according to funding source (JBIC or KfW)
Advantage of Loan (compared to regular commercial loans)	<ul style="list-style-type: none"> • Longer term (12-15 years) • Fixed interest rate • Longer grace period (3-5 years) 	Commercial loan terms are usually 5-7 years, with variable interest rate (every quarter) and grace period of 3 years.
Approved Loans for Recycling	Phase I: recycling of used oil Phase II: recycling of PET bottles to PET bottles	7 projects were approved during 2005 under “waste minimization and recycling.”

Although 20 billion Yen allocated for waste minimization and recycling projects provided by JBIC was all availed in Phase II, only one project had a recycling component. The project was proposed by a private beverage company and included the establishment of a PET bottles recycling facility. According to DBP staffs, the beverage company was collecting virgin PET bottles, but the quantity was not enough to economically run the facility. Therefore, it has started a campaign to collect PET bottles by asking school children to bring their used PET bottles in exchange for money; if the collected volume reaches a certain target, necessary rewards to the schools such as television is also provided by the company.

In the Phase I, a loan for used oil recycling facility was availed. Since the owner of the facility could not collect enough used oil domestically, it planned to import used oil from other countries. However, import of used oil is prohibited under RA6969 because they are categorized as hazardous wastes. Therefore, the DENR DAO 28 was issued to allow import of used oil except for tanker sludge if it does not show any trace of PCBs.

DBP staffs perceive that securing recyclable materials with sufficient quantity to run a recycling facility is a key factor for survival of recycling industry in the Philippines. Therefore, there is a necessity to establish a social infrastructure for collection of recyclable materials such as segregation of waste at source and deposit system for containers.

b Countryside Loan Fund

LBP’s Countryside Load Fund (CLF) is a wholesale credit facility to provide preferable financial loans to small and medium enterprises (SMEs), which has been funded by the World Bank. Investments in recycling activities may fall within the eligible projects under the CLF as environmental protection projects (wastewater treatment facility, bio-gas collection, etc.) and manufacturing activities that generate employment or export. The outline of the CLF is summarized in the table below.

Table 5.3.3 Summary of Countryside Loan Fund by LBP

Item	Description	Remark
Year of Start	Phase I: 1992 – 1996 Phase II: 1996 – 1999 Phase III: 1999 –	
Original Funding	World Bank	
Eligibility	<p><Direct Borrower></p> <ul style="list-style-type: none"> • Commercial banks • Rural banks • Thrift banks (stock savings & loan associations, saving & mortgage banks, private development banks) • Non-bank financial institutions (leasing/financing companies) <p><Sub-borrower></p> <ul style="list-style-type: none"> • Sole proprietorship • Partnership • Corporation (at least 70% Filipino-owned) • Cooperative/Association 	<p>For sub-borrowers, SME whose capital size is equal or less than 1 million pesos is eligible.</p> <p>Eligible projects located in Cebu City and NCR should be engaged in agriculture and agri-related activities.</p> <p>During 2005, loans have been accredited to 38 banks (15 commercial, 9 rural, 9 thrift, and 5 non-banks).</p>
Conditions	75% of total costs are financed	
Advantage of Loan (compared to regular commercial loans)	<ul style="list-style-type: none"> • Longer term (12-15 years) • Fixed interest rate 	CLF's grace period is 2 years, which is shorter than commercial loans.
Approved Loans for Recycling	<ul style="list-style-type: none"> • Biogas collection at a piggery in Tarlac • Production of handicraft from waste coconuts • Glass cullet recycling at a bottle manufacturing company in Laguna • Power generation from bagasse at a sugar mill in Pampanga 	

Up to present, a total of 2,333 projects under the CLF were funded with 25.56 billion PhP through conduit banks. Among these projects, the LBP has identified only 4 projects as recycling related projects.

(2) Issues to be addressed in provision of economic incentives

The current economic incentives well cover the needs of recycling industries in terms of capital investment as well as their recycling operations by making preferential finance and tax/duty incentives available to the investors and industrial entrepreneurs. On the other hand, it does not yet address the issues that the recycling industry is currently facing in their recycling operation such as the higher cost of electricity, collection and transportation of domestic recyclable materials, stable procurement of recyclable materials in terms of its quantity and quality, and comparative disadvantage in competing procurement of recyclable materials with in the international market due to higher cost of recycling operations.

Considering the above specific issues that the Philippines recycling industries are facing now, the following types of incentive schemes in need to be examined for their possible introduction and application.

Table 5.3.4 Potential Areas of Economic Incentives and their schemes for Promotion of Recycling Industry

Potential Areas	Possible Schemes of Economic Incentives
Energy and Electricity	<ul style="list-style-type: none"> ▪ Subsidized electricity rate to the recycling industries ▪ Tax incentives and preferential finance to the investment in private power generation facility ▪ Tax incentives and preferential finance to the investment in energy and power saving.
Collection and transportation of domestic recyclable materials	<ul style="list-style-type: none"> ▪ Tax incentives and preferential finance to the investment in distribution/logistic facilities of recyclable materials ▪ Tax incentives to the logistics expenses of recyclable materials ▪ Tax incentives and preferential finance to the investment in relocation and/or concentration of recycling industries in the strategic locations.
Quantity/quality assurance of recyclable materials	<ul style="list-style-type: none"> ▪ Tax incentives and preferential finance to the investment in primary processing machinery and equipment of recyclable materials (e.g. sorting, crushing, shredding, washing, baling, etc.) ▪ Tax incentives and preferential finance to the investment in storage facilities for recyclable materials
Domestic procurement of recyclable materials	<ul style="list-style-type: none"> ▪ Subsidized price application for domestic supply of recyclable materials ▪ Imposing of export duties upon recyclable materials ▪ Tightened/controlled tax policies for exporters of recyclable materials
Development of recycling industry	<ul style="list-style-type: none"> ▪ Subsidiaries/financial assistance or investment tax reduction/tax benefits on relocation of recycling industries ▪ Developing recycling industry complex (through funds from national government, financing/investment tax reduction.) ▪ Grant/subsidiaries/investment tax reduction for development of new recycling industry complex.

5.3.3 Development of Non-Economic Incentives in relation to Recycling

The focus of non-economic incentives should focus on development and expansion of the market for recycled products. Such non-financial incentives include:

- Government Initiative on Procurement of Recycled Products (Green Purchasing Initiative)
- Environmental Labeling (Green choice)
- Green Consumer Initiative (Guidelines for Selecting Recycled Products)

5.4 Policies for Enhancement of Institutional Mechanism to Promote Recycling Industries in the Philippines

The existing recycling performance of each particular recyclable material (papers, plastics, scrap iron, scrap aluminum and glass) in the Philippines is different due to various factors, especially the market demands and prices, as well as other technical aspects.

Detailed investigation was carried out to identify the issues and obstacles faced in the recycling industries in the Philippines through discussions and actual field surveys. Based on the analysis, strategies are developed to enhance the recycling performance of recyclable materials in the Philippines as a whole. These strategies focus on 3 key actions, namely:

- (1) To **strengthen** the existing **institutional frameworks** – identify issues and obstacles, establish intervention measures at the government level;
- (2) To **enhance** the existing **recycling system** by various recycling stakeholders – understand the current situation, develop specific approach to improve collection and processing of recyclable materials at the recycling player level; and
- (3) To **increase** the **recycling practices** by the waste generators – recognize the inadequacy, promote recycling practices and boost up the participation by awareness raising at the base level.

5.4.1 At Government Level - To Strengthen the Existing Institutional Frameworks

(1) Reinforce the Existing Institutional Setup

For NSWMC that develop and implement solid waste management policies/plans at national level, an institutional mechanism at provincial or local level is necessary to support its functions. In this regard, the **Recycling Unit should be formed to closely monitor the recycling activities** within the LGU areas, particularly dealing with the recycling players and associations. All recycling players within the LGU areas are required to register to the Recycling Unit directly or through any relevant associations such as Scrap Collectors Association or other business associations. In addition, this Recycling Unit plays role to **collect and update recycling information** from the recycling players and submit to the national focal point for further action, besides being the **focal point for any programs related to waste management and recycling at the local level**. The information to be collected includes information from waste generators, through NGOs or residents associations.

The reinforcement of this institutional setup aims to strengthen the data collection and management on waste and recycling as a whole, as well as to smoothen the institutional framework between the National and local levels.

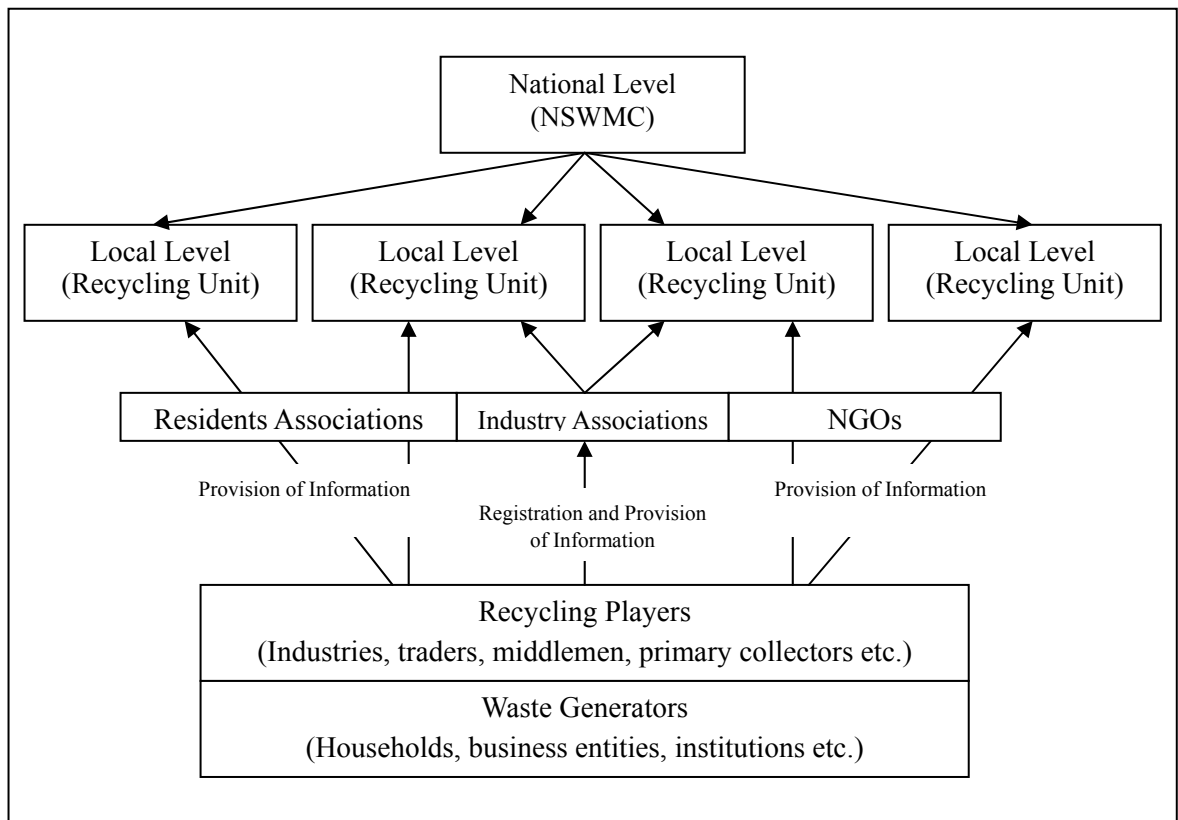


Figure 5.4.1 Recommended Institutional Set Up for Promoting Recycling

(2) Capacity Building

Capacity building to the officers of government agencies at National level as well as local level (LGU) should be carried out. The **capacity building programs** include not only training of government officers, but also other specific training targets such as **community leaders** for promotion of recycling, as well as top management of private entities.

5.4.2 At Recycling Player Level - To Enhance the Existing Recycling System

The current situation of recycling industry in the Philippines shows that some industries are relying on domestic supply of recyclable materials. Therefore, the recycling players should play important roles to increase the collection of recyclable materials in the domestic markets, by the following approaches:

- **Regular and close communication** between the Government and the recycling players through relevant associations, to discuss on updated issues and seek for countermeasures
- **Close collaboration** between the Government, the recycling players and other recycling stakeholders to implement recycling programs and activities
- **Partnership** between the Government and relevant recycling players to establish and

- operate the regional transfer stations for recyclables collection
- Establishment of more **localized recycling stations**, support eco-aide, provide more larger coverage areas to serve the community needs
 - **Promote collection** of various recyclable materials by the recycling collectors to the largest extend, following the determined market prices
 - **Sharing of recycling information** and experiences between the LGUs and the recycling players or any other authorized organization
 - **Provide guidance** to the middlemen, junkshops and traders, on proper operation of business especially proper handling of recyclable materials to ensure better quality of supply to the recycling industries (In accordance to Recycling Guidelines if applicable)

5.4.3 At Base Level - To Increase the Recycling Practices by the Waste Generators

Awareness and cooperation at the base level or waste generators are crucial in order to achieve better recycling performance and support the recycling system as a whole. Some strategies to increase the recycling practices by the waste generators are summarized as follows:

- Promote **segregation of the recyclable materials** from the wastes generated at source in accordance to Recycling Guideline (if applicable)
- Educate **proper handling of recyclable materials** at source to ensure better quality of the materials before collected or sold to the recyclable collectors (following the Recycling Guideline if applicable)
- Provide support or **partnership** with the NGOs, residential association or charity organizations to support and enhance participation at the recycling programs and activities organized
- Collect **information** in relation to **wastes and recycling** from the waste generators (such as households, business entities and institutions)
- **Educate the next generation** particularly the children on recycling practice at home through awareness programs

In summary, the strategies formulated for enhancement of the recycling performance as a whole can be categorized into 3 main focuses as summarized as follows:

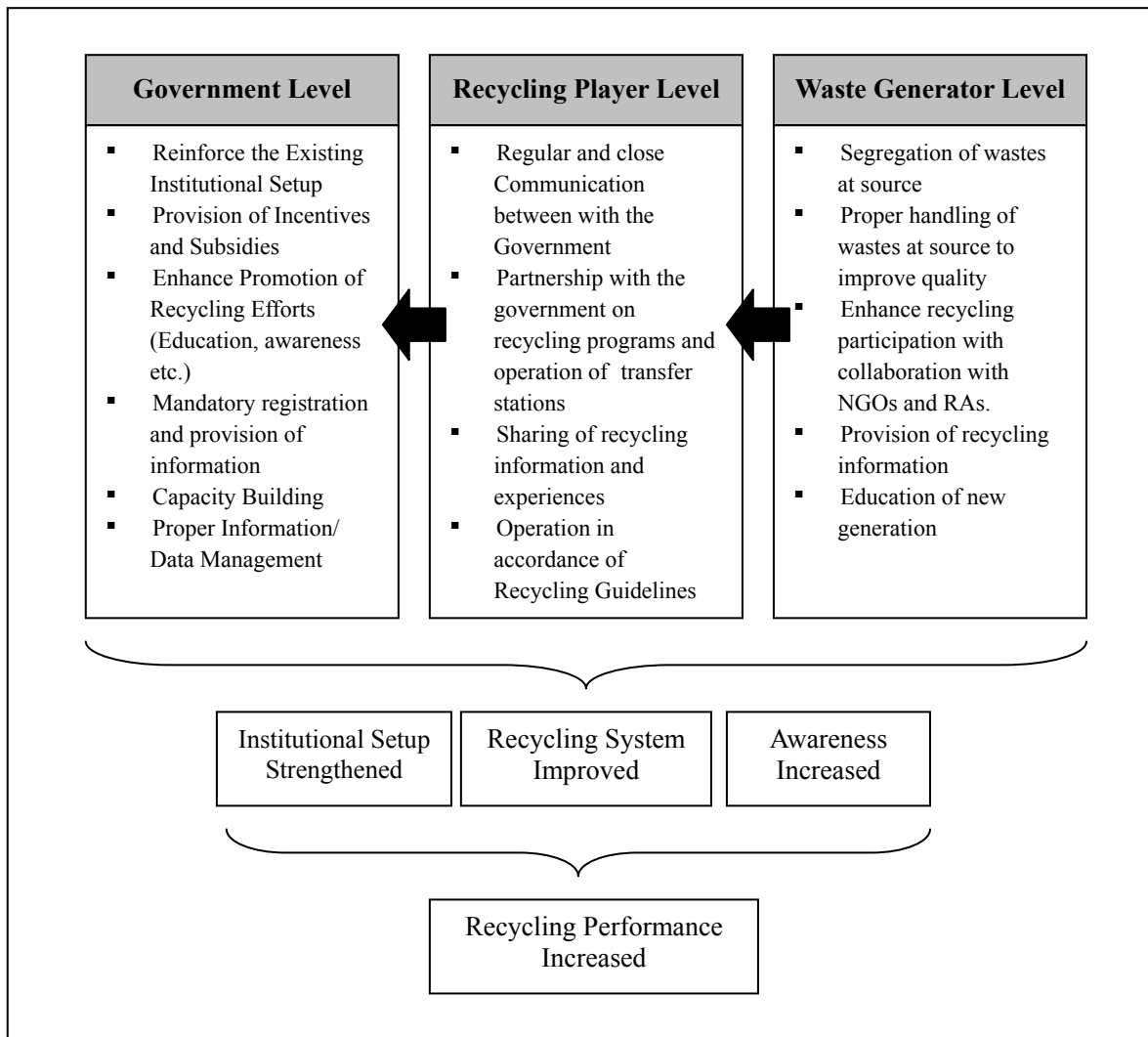


Figure 5.4.2 Basic Strategies for Increasing the Recycling Performance in the Philippines

5.4.4 Roles of Stakeholders in the Promotion of Recycling in the Philippines

The strategies in the Master Plan can be successfully implemented only if the key stakeholders are playing their respective roles in the promotion of recycling in the Philippines. The stakeholders are divided into 4 categories in general, i.e. (1) the waste generators which include the general public, the business entities and institutions such as offices, shops and education institutions etc., (2) the private recycling players which include the recyclable collectors, Eco-aides, traders, middlemen, waste contractors, recycling industries etc., (3) associations and organizations such as the NGOs, industrial associations, business chambers, and federations etc., and (4) the governments.

The responsibilities and roles of the stakeholders in promoting the recycling in the Philippines are summarized as follows:

(1) Waste Generators (Households, Business Entities, Institutions and Industries etc.)

1) Households

- Segregation and handling of recyclable materials at sources in accordance with the Recycling Guideline (if applicable)
- Actively participate and give supports to the recycling activities and programs organized
- Sharing of household information in relation to wastes and recycling
- Educating the particularly the children on recycling practice at home
- Practicing recycling at any premises away from home such as working places and public premises

2) Business Entities and Institutions

- Segregation and handling of recyclable materials at sources in accordance with the Recycling Guideline (if applicable)
- Actively participate and give supports to the recycling activities and programs organized
- Awareness raising among the workers on recycling
- Sharing information and raising awareness on recycling through the network such as business association

3) Industries and Retailers

- Participating and supporting recycling activities and programs organized
- Designing and manufacturing eco-friendly products with recyclable materials
- Implementing in-house recycling activities and having network with other recycling stakeholders
- Sharing industrial information related to waste and recycling to relevant associations or the Government
- Awareness raising among the workers on recycling
- Carrying out daily operation following the Recycling Guideline (if applicable)

(2) Private Recycling Players

1) Recycling players (Collectors, eco-aides, junkshops, traders, middlemen etc.)

- Register to the Scrap Collectors and Dealers Association, Barangay or LGUs

- Giving supports and cooperation in community-based activities and programs on the collection of recyclable materials
- Purchasing and selling recyclable materials at reasonable prices / controlled prices (if applicable)
- Carrying out daily operation following the Recycling Guideline (if applicable)
- Sharing of information with the associations / Barangays / LGUs

2) Recycling Industries (end-users)

- Accepting and utilizing recycled materials to the possible greatest extent
- Establishing sustainable networking with relevant recycling players
- Supporting recycling activities and other specific recycling programs organized by the Government and other stakeholders
- Providing industrial recycling information to the Government
- Providing constructive advice and opinions to the Government for decision making through the industrial associations
- Carrying out daily operation following the Recycling Guideline (if applicable)

(3) Organizations / Associations

1) Organizations (such as NGOs, CBOs and residents groups etc.)

- Leading recycling activities and bridging the community or the general public with relevant stakeholders, as well as the government agencies
- Awareness raising of general public on recycling
- Organizing recycling activities and implementing specific recycling programs for involvements of general public, recyclers and relevant stakeholders
- Providing information on relevant stakeholders and constructive advice to the government

2) Associations (such as industrial associations, business chambers and scrap collectors and dealers association etc.)

- a Bridging the industries with relevant stakeholders, as well as the government agencies
 - Compilation and provision of industrial information to the government
 - Providing constructive advice and opinions to the government for decision making

- Recognizing committed industries on recycling efforts and contributed towards recycling programs and activities
- b Leading role in awareness raising and promotion of recycling among the industries
- Organizing recycling activities including source separation of recyclables at industrial premises etc.

(4) Governments

1) National Government

- Formulation and promulgation of the national policy on waste recycling and development of recycling industries.
- Provision of incentives and other form of supports to promote recycling activities by various stakeholders.
- Play supervision role and promote recycling through information collection, data management and close coordination with the LGUs.
- Close inter-department or inter-ministry coordination and communication on matters related to SWM and recycling at national level (such as between BOI and NSWMC)

2) Local Government Units (LGUs) and Barangays

- Act as focal point on information collection and data update on SWM and recycling at local level.
- Provide supports in whatever possible ways to recycling activities and other programs implemented by private entities and communities at local level.
- Formulation and implement strategy plan or action plan on waste recycling at local level.
- Maintain good relationship and coordination among relevant stakeholders in establishing and maintaining the recycling network at local level.
- Sharing of experience and information exchange among the LGUs and Barangays.
- Joint implementation of awareness raising and recycling activities with other stakeholders such as general public.
- Recognition of committed recycling stakeholders such as private companies or even individual by award of appreciation on their contributions.
- Play advisory role, handle complains from stakeholders and provide solutions on recycling issues at local level.

6. Action Plan on Recycling Industry Development By Sectors

The Action Plan on Recycling Industry Development is formulated for each sector of recycling industries including:

- 1) Paper & Pulp Industry
- 2) Iron & Steel/Non-Ferrous Metal Industry
- 3) Glass & Glass Products Industry
- 4) Plastic Industry

The Action Plan for each sector consists of the following contents:

- 1) Current Status of Recycling Performance by the Industry
- 2) Issues on Promotion of Recycling
- 3) Actions to be taken by Recycling Industry

This Action Plan was prepared by the TWGs composed of representatives from corresponding industry associations and the JICA study team. The members of the TWGs are listed in the table below.

Table 5.4.1 Philippine Members of Technical Working Groups

Name	Affiliation
1. Pulp and Paper Industry	
Mr. Rolando Peña	PULPAPEL/ Trust International Paper Company
Ms. Geronima Domingo	PULPAPEL/ Noah's Paper Mills
Mr. Reynaldo Gomez	PULPAPEL/ Container Corporation of the Philippines
2. Iron and Non-ferrous metal Refining Industry	
Mr. Napoleon Tanganco	Philippine Metalcasting Association Inc.
Mr. Henry Tañedo	Tin Can Makers Association of the Philippines
Mr. Wellington Tong	Philippine Iron and Steel Institute
Mr. Aquino Dy	Scrap Collectors Recycling Association of the Philippines
Atty. Edilberto Ferrer	Consolidated Aluminum Smelter, Extruder and Kitchenware Manufacturers Association of the Philippines
3. Glass/glass products Manufacturing Industry	
Mr. Benjamin Gregorio	San Miguel Packaging Specialist Inc.
4. Plastics Industry	
Mr. Cripian Lao	Philippine Plastics Industry Association
Mr. Henry Gaw	Polysterene Packaging Council of the Philippines/ Packaging Institute of the Philippines
Ms. Carmencita Abelardo	PET Recycling Association of the Philippines
Mr. Benson Tang	Metro Plastics Recycling Association
5. E-Waste	
Mr. Antonio Daria	HMR Envirocycle Philippines
Ms. Ditas Malit	Philippine Appliance Industry Association

Name	Affiliation
Mr. Juan Chua	Computer Manufacturers, Dealers and Distributors Association of the Philippines
Ms. Orange Galindo	Association of Electronics and Semiconductors for Safety and Environmental Protection/ Intel Philippines

Under the initiative of each sector of recycling industry, this Action Plan is expected to be regularly reviewed and revised to further enhance its recycling performance.

6.1 Sector-by-Sector Priority of Recycling Industry Development

Each recyclable material and industry discussed in this Action Plan has its own unique potential and issues to overcome for its realization. Some of the recyclable materials and industries have larger potentials and prospective while the others have limited potentials or more difficult issues to solve for realizing the potential recycling market.

Based on the current conditions of recyclable materials and existing industries, the recycling potentials of each recyclable materials and industry are evaluated from the following viewpoints in the table below.

- Existing potential of recyclable materials (Stock of recyclable materials)
- Existing capacity of the industry receiving the recyclable materials

Following table shows the results of evaluation for each industry based on above perspectives.

Table 6.1.1 Evaluation of Recycling Potential by Sector

Recycling Industry	Availability of Materials	Capacity of Domestic Industry
Paper and Pulp	<ul style="list-style-type: none"> ▪ Many domestic sources still can be utilized. ▪ Many still goes to landfill. 	<ul style="list-style-type: none"> ▪ Still have enough room to accept domestic recyclable materials. ▪ New development may also be possible.
Metal scrap	<ul style="list-style-type: none"> ▪ Well collected, but most of them exported. 	<ul style="list-style-type: none"> ▪ Still have enough room, but weak competitive capacity in comparison with foreign industry (high production cost due to electricity and transportation of materials).
Glass bottles	<ul style="list-style-type: none"> ▪ Many still goes to landfill or not utilized for recycling. 	<ul style="list-style-type: none"> ▪ Still have room to accept domestic recyclable materials. ▪ New development may also be possible.
Plastic Industry	<ul style="list-style-type: none"> ▪ Many still goes to landfill 	<ul style="list-style-type: none"> ▪ Still have enough room to accept various domestic recyclable materials. ▪ Potential new development of industry may also be high.

From the table above, the plastic industry has the largest potential of recycling in the Philippines, followed by Paper and Pulp as well as glass industries. As to the metal scrap, promotion of domestic recycling will be difficult unless strong policy supports are provided to the relevant industry because the currently collected materials are largely exported to overseas due to limited competitive capacity of existing industry in the Philippines.

Considering the above potentials of recyclable materials and receiving industries, the sections below discusses the current status and issues of recyclable materials and their recycling with the required actions for their development by sector.

6.2 Paper & Pulp Industry

6.2.1 Current Status of Paper & Pulp Industry and Recycling

(1) Import and Export of Waste/Scrap Paper and Paper/Paper Products

In the year 2004, the import of waste/scrap paper was 380 thousand tons or 2.4 billion PhP in value (6.2 billion JPY) in the Philippines while its export was only about 7.5 thousand tons or 52 million PhP (135 million JPY). Major country origins of waste/scrap paper import are Australia, USA and Japan in 2004.

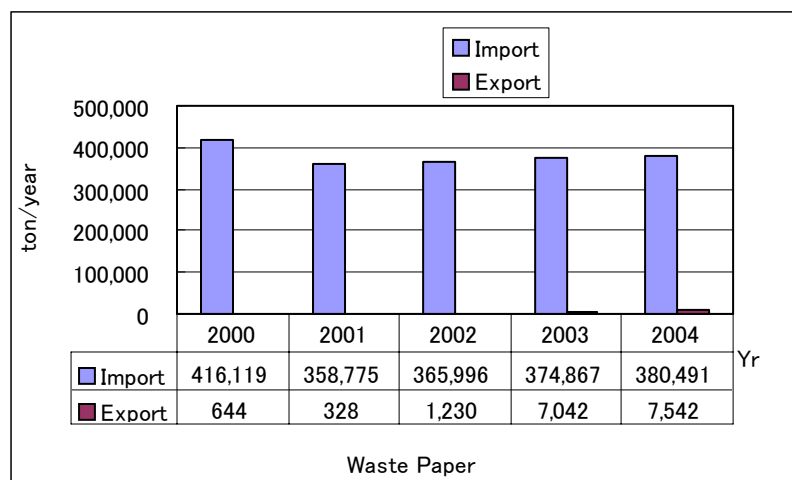


Figure 6.2.1 Trend of Waste/Scrap Paper Trade (2000-2004)

As to the international trade of paper and paper products, the import in the Philippines was 610 thousand tons or 21.7 billion PhP in value (56.4 JPY) in 2004 while its export was 137 thousand tons or 4.4 billion PhP (11.4 billion JPY). Major country origins of paper and paper products import are USA, occupying about 20% in 2004.

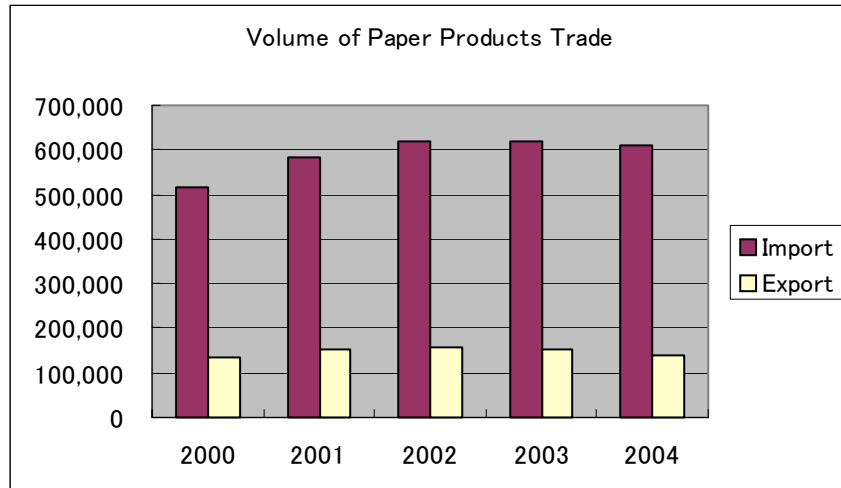


Figure 6.2.2 Trend of Paper/Paper Products Trade (2000-2004)

(2) Domestic Production, Consumption and Material Flow of Papers and Paper Products

The Figure 6.2.3 shows the estimated material flow of papers and paper products in the Philippines based on the data in 2004.

The material flow characterizes the production, consumption and recycling of paper and paper products in the Philippines as follows:

- The total annual consumption of paper and paper products in the Philippines reaches 1.5 to 1.6 million tons or 16 kg per capita annually, which is only one fifteenth of the consumption in Japan as well as one third of Thailand. Currently, approximately 70% of the total consumption is covered by domestic production of paper and paper products.
- The ratio between virgin pulp and waste paper in domestic production of paper and paper products is 4% and 96% respectively. Most of the pulp and paper industries use waste paper for their production.
- The ratio between domestic procurement and import of raw material for pulp and paper industry is 62% and 38% respectively.
- The percentage of waste paper collected for the total consumption of paper and paper products is estimated as approximately 41%.

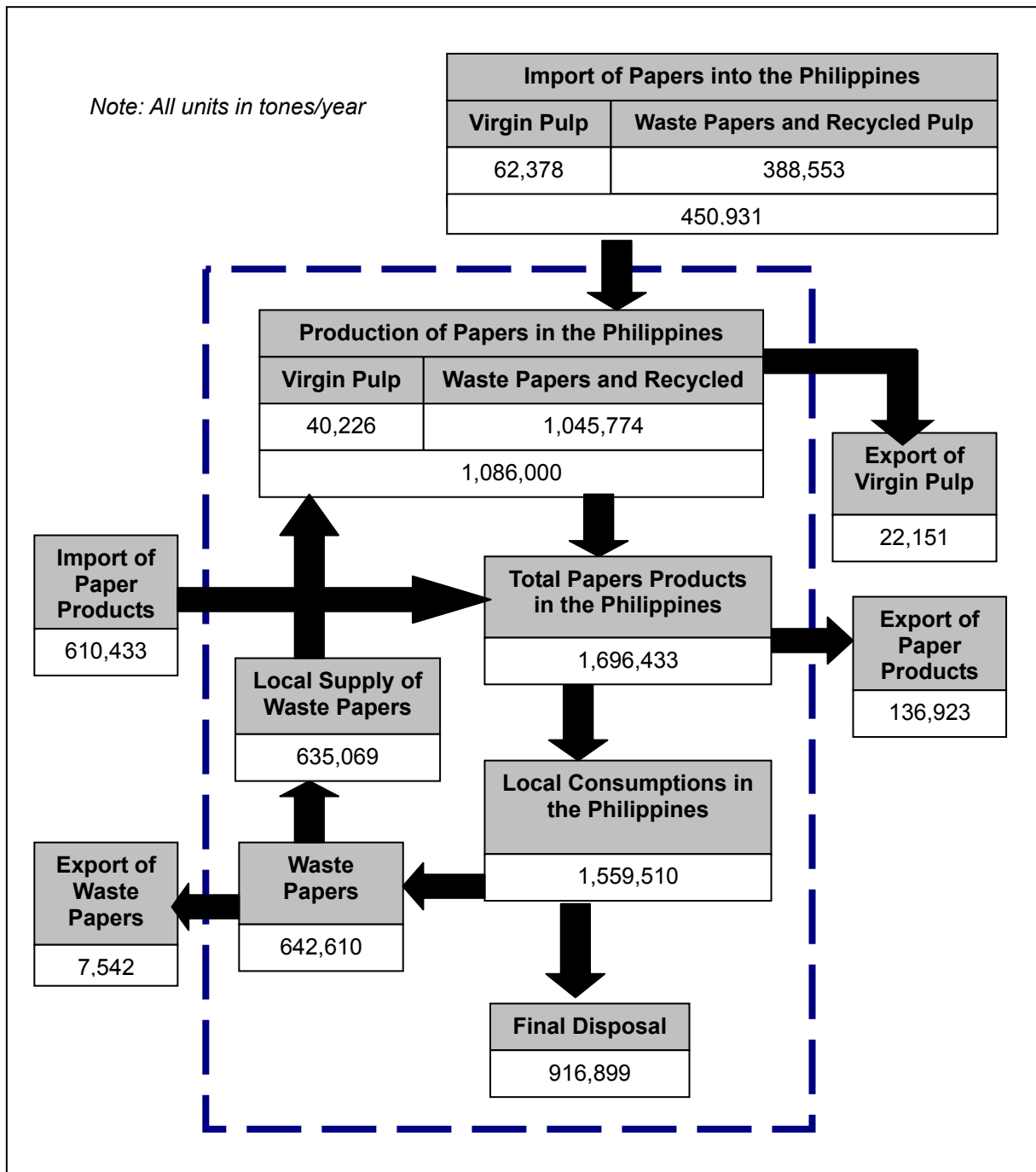


Figure 6.2.3 Estimated Material Flow of Papers and Paper Products (2004)

(3) Pulp and Paper Industry in the Philippines

1) Size of Pulp and Paper Industry

The annual domestic production of paper and paper products reached approximately 1.1 million tons in the Philippines in the year 2004, which is only about one thirtieth of Japan. The following table shows major products and their production of the pulp and paper industry in the Philippines (companies using virgin pulp as their main raw materials are excluded).

Table 6.2.1 Capacity and Production of Pulp and Paper Industry in the Philippines
(2002)

(companies producing paper products only)

	Company/Paper Mill	Daily Production (MT)	Capacity 1,000t/yr	Location	Product
1	Aclém Paper Mills	50	15	Manila	NP, WP, WG
2	Alliance Paper	7	2	NA	NP, P/W
3	Asia Paper Industrial Corp.	40	12	Quezon	P, W
4	Asgard Paper Mill	30	9	NA	M, L
5	Bataan 2020	80	24	Bataan	P, W
6	Chanmeco Paper	30	9	NA	CB/ M
7	Container Corp. of the Phil	40/65/160	79.5	Quezon	M, TL, NB
8	Dasmariñas Paper Mills	40	12	NA	NB, CTB
9	East Asia Paper Mfg. Corp.	20	6	Cavite	T
10	Fedco Paper Corp.	60/120/120	90	Laguna	P/W/CTB
11	Fiber Sorting, Inc.	10	3	Pampanga	CB, M
12	Fortuna Paper Mill	40	12	NA	LM
13	Globe Paper Mills	30	9	Manila	P/W,WR
14	Hansson Paper (Phils)	60	18	NA	P/W
15	Intercontinental Paper Industries	60	18	Laguna	P&W/M
16	Kimberly-Clark (Phils)	70	21	NA	T,SP
17	Liberty Paper Inc.	40	12	Bulacan	P/W,ML
18	Mayleen Paper	80	24	NA	P/W,ML
19	Oxford Paper	20	6	NA	P/W
20	Noahs Paper Mills Inc.	70	21	NA	P/W
21	Paper City Corp of the Phil	80	24	NA	CB/BB, P/W,CTB
22	Paperland/ Valley Pulp	10/15/15	12	Quezon	P/W/WR,NP
23	Polymart (Kingsley)	17	5	NA	P/W,WR
24	Paramount	20/30	15	NA	P&W/M
25	Rosario Paper	5	1.5	NA	T,P/W
26	Rural Development Corp.	30	9	NA	P/W
27	SCA Hygiene Products Corp.	20/30	15	Cavite	T,P/W
28	Sunrise Paper	50	15	NA	M,L
29	Third Wind	20	6	NA	T
30	Trans-National Paper Corp	70	21	Cavite	CTB,ML
31	Tri-Asia Paper Mill Inc.	50	15	NA	M,TL,NB
32	Trust International Paper Corp.	300/350	195	Pampanga	NS,BP
33	United Pulp & Paper Co.	150/450	180	Bulacan	M,L,SKP
34	Vanson Paper Industrial	40	12	NA	P/W,CB
	TOTAL	3094	928		
	Number of Mills (34)				

(Companies producing paper products and pulp)

Company/Paper Mill	Daily Production (MT)	Capacity 1,000t/yr	Location	Product
New PICOP	230	75	Surigao del Sur	NS, TBP, LM
Central Azucarera de Bais Baggase	920	13	NA	P/W

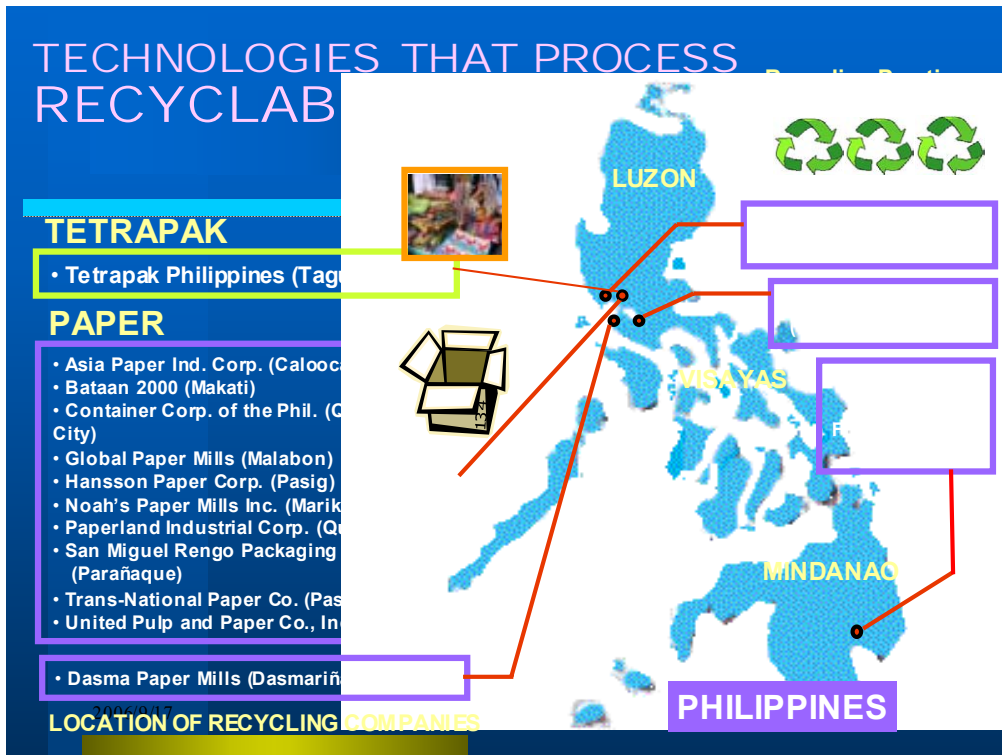
Note: WR-wrapping, NP-newspaper, P-printing, W-writing, M-medium, L-liner, CB-chipboard, NB-newsboard, TBP-telephone book paper, CTB-coated board, LM-liner medium, T-tissue, SP-special paper, NS-newsprint, BP-book paper, SKP-sack paper, ML-medium line

Source: Pulp and Paper Manufactures Association (PULPAPEL)

Capacities of the largest paper mills such as Trust International Paper Corp. and United Pulp & Paper Co. are about 200,000 t/yr, which is not considered as “large”. Among smaller mills, some produce only several thousands tons per year.

2) Location of Pulp and Paper Industry

In the Philippines, most of paper and paper product manufacturers are located in Metro Manila or CALABARZON area except for a few ones in Mindanao. Therefore, most of the domestic demand for papers comes from CALABARZON area. The following figure shows locations of major pulp and paper mills in the Philippines.



Source: National Solid Waste Management Commission

Figure 6.2.4 Major Pulp and Paper Mills in the Philippines

According to the interviews with paper manufactures, about 60% of waste paper collected comes from the Metro Manila and the CALABARZON area. The rest comes from Northern Luzon, Cebu (Visayas), Mindanao, and waste papers generated in these areas are unlikely to be transported to paper mills around the Metro Manila because of lack of proper collection systems and high transportation costs, which results in low utilization of waste papers. Quality and price of domestically generated waste paper are equivalent to those of imported waste paper. Therefore, if there is more supply of domestically generated waste paper, the pulp and paper industry in the Philippines can reduce import of waste paper.

3) Characteristics of Pulp and Paper Industry

The pulp and paper industry in the Philippines maybe characterized as the industry utilizing waste paper and recycled pulp. There is no pulp and paper manufacture in the Philippines that uses virgin pulp to produce their products except paper used for bank notes. There is also no manufactures that produce papers for copying and printing; all the demands are met by imports. According to the interview surveys to various paper manufacturers, the roughly estimated cost structure of paper manufacturers is as shown in the table below.

Table 6.2.2 Estimated Cost Structure of Paper Manufacturing in the Philippines

Item	Percentage to the total cost
Raw material cost	47%
Electricity cost	26%
Fuel cost	13%
Manpower cost	5%
Others	9%

Although the percentage of raw material cost is the highest, occupying about a half of the total production cost, energy cost (electricity + fuel) is also high in paper manufacturers. In the case of writing paper manufacturers, the unit production cost is about 700 to 800 PhP per kg with virgin pulp while it reaches 1,300 PhP per kg with waste papers as raw material. This is mainly due to higher consumption of electricity for deinking process applied for waste papers.

Electricity cost of the Philippines is higher than the other ASEAN countries while the fuel cost also increases with the price increase of crude oil. To save energy cost for production, the paper manufacturers made operational productivity improvement efforts such as speeding up of pulpers, ceasing operation of low-efficiency machineries, and so forth. The United Pulp & Paper Corporation installed a biomass-fired private power generator of 25 thousand KW capacities to save power cost. The average power consumption in paper and pulp industry is 1,200 KW per ton of paper produced. Although many of the Japanese pulp and paper industry installs cogeneration system for use of power and heat in the production process, some of the big pulp and paper manufacturers in the Philippines also starts to install such cogeneration system to save the total energy cost.

6.2.2 Current Issues of Promotion of Paper Recycling in the Philippines

The following sections summarize current issues in the promotion of paper recycling industry in the Philippines based on the trend of the pulp and paper industry that is the end-user of waste paper.

(1) Procurement of Raw Materials (Waste Paper)

The following two points would be identified as issues for the waste paper recycling industry.

1) Increase in domestic supply ratio of recyclable materials through the improvement of waste paper collection

The Philippines depend about 40% of raw materials for paper production on imported waste paper (about 390,000 t/yr). On the other hand, about 960,000 tons of paper and paper products consumption is estimated to be uncollected. Since this amount includes books and magazines that are used or stay in the market for a long time, it is unlikely that all of them are disposed of landfills. However, the areas distant from the end-users of waste paper (i.e. pulp and paper mills) cannot help disposing of waste paper because waste paper is not collected or taken by anyone if collected due to high transportation costs and unstable supply. The areas like Northern Luzon and Visayas (Cebu) are facing such conditions; it is necessary to take measures to reduce transportation costs from generators to end-users of waste paper.

For example, it costs about 3.3 PhP (8.5 JPY) per kg to transport waste paper in a container by ship (tramp ship), which is six to eight times as much as the transportation costs (1 - 1.5 JPY/kg) for waste paper to be shipped from Japan to China. Since paper manufactures using waste paper buy white paper at 11 to 14 PhP/kg at the high end and mixed paper at 2.4 to 3.5 PhP/kg at the low end, the 3.3PhP/kg seems extremely heavy cost burden.

To overcome such issue, introducing measures to improve the efficiency of marine transport in which foreign investment is regulated and which enjoy oligopoly situation, which would contribute to the reduction of transportation costs. At the same time, it is necessary to promote locating manufactures that use waste paper as raw materials to the areas where waste paper generation is stable and its collection is feasible. However, it should be noted that the reason why many of pulp and paper manufactures are located in the Metro Manila and its surroundings is because there are also companies processing the paper and paper products to the final products are located in these areas. Amount of waste paper supply itself cannot be a determining factor for paper manufactures to be able to establish in the said area; other factors such as existence of demands for and actual consumption of recycled paper and its products should be considered. In this sense, paper mills manufacturing the final products such as sanitary paper (tissue paper and toilet paper) can be established if there is a stable supply of waste paper. However, it is difficult to promote locating paper manufactures whose products need the final users such as newspaper and book publishers.

There is a limited number of paper manufactures whose annual production exceeds several hundreds of tons in the Philippines. These large paper manufactures cannot help depending their raw materials on imported waste paper which can be a stable supply for their stable operation and

production. Taking this situation into account, it is very difficult to locate large-scale paper mills in the areas other than the Metro Manila and its surroundings.

2) Quality Improvement of Domestically Generated Waste Paper

One another issue for domestically generated waste paper is its quality. Especially in the Philippines where electricity price and fuel costs are higher than in adjacent countries, it is important to minimize the production costs of paper and paper products. In this sense, reduction of costs for pretreatment of waste papers such as removing foreign materials and washing contributes to that purpose, which is necessary for enhancing corporate competitiveness. Therefore, separate sorting and collection of waste paper pays off in terms of supply of high quality recyclable materials. In practice, paper manufactures, including SMEs and LEs, set higher prices for well-sorted waste papers. One should note that stable supply of waste paper is prerequisite for stable operation of paper mills; therefore, a certain scale of waste paper separation and collection systems can enjoy its merit.

(2) Reduction of Production Costs in the Pulp and Paper Industry Utilizing Waste Paper

Reduction of production costs is a crucial issue for the pulp and paper industry utilizing waste paper in the Philippines since they are fighting against foreign competitors regardless of market location (international or domestic). As stated above, because the electricity and fuel prices in the Philippines are relatively higher than in other countries, saving energy and materials is an important issue.

Given that the customs duty is going to be reduced or eliminated according to the conclusion of free trade agreement (FTA), competition at the both international and domestic markets is expected to be harder. The Philippine paper manufactures are required to take prompt actions to improve production efficiency.

(3) Technology and Product Development for the Promotion of Waste Paper Utilization

The most pressing issue for the pulp and paper industry in the Philippines is the improvement of production efficiency and saving of energy and materials. In a short-run, the development and dissemination of energy and material saving technologies at the plant operation stage is most needed in the Philippines.

Since the Philippines depend their copying and printing paper on import, introduction of production technology for quality paper using waste paper is most expected in future. However, not only in the Philippines but also in other countries, people tend to think non-white copying or printing paper has lower quality. Changing people's awareness should be tackled first before technology transfer, and a market for recycled paper should be created.

6.2.3 Action Plan for the Development of Paper Recycling Industry

Based on the identification of current situation and issues of waste paper recycling, the TWG on Paper Recycling has prepared an action plan for the development of paper recycling industry. The

actions are listed by stakeholder such as governments, industries, and general public.

Table 6.2.3 Action Plan for the Development of Paper Recycling Industry

Stakeholder	Actions to be taken
Government	<p>1. Short term actions (1 to 3 years from now)</p> <p>[IEC Activity]</p> <ul style="list-style-type: none"> • Identification and publicizing current status (quantitative and including geographical information) of waste paper and paper recycling industry in the Philippines • Campaign on waste paper separation and collection targeting waste paper generators (dissemination of the recycling guideline) • Promotion of recycled products (eco-label, green purchasing/procurement) <p>[Preparation of Industrial Infrastructure Development Plan]</p> <ul style="list-style-type: none"> • Formulation of measures for improvement of distribution efficiency of recyclable materials • Examination of locating recycling industry in the areas other than Metro Manila and its surroundings and preparation of a plan to attract recycling industry <p>[Examination of Incentives]</p> <ul style="list-style-type: none"> • Development of a hub for distribution of recyclable materials • Locating new recycling industries • Investments in energy/material-saving for recycling industry • Development of recycling technology and new products using recycled materials <p>2. Medium-term actions (3 to 5 years from now)</p> <p>[IEC activities]</p> <ul style="list-style-type: none"> • Continuation of the short-term action <p>[Implementation of Industrial Infrastructure Development Plan]</p> <ul style="list-style-type: none"> • Development of a hub for distribution of recyclable materials • Implementation of a model project for improvement of distribution efficiency • Locating new recycling industries <p>[Reform and Introduction of Incentives]</p> <ul style="list-style-type: none"> • Reform and introduction of incentives based on the examination of the above actions
Industry (Pulp and Paper)	<p>1. Short term actions (1 to 3 years from now)</p> <ul style="list-style-type: none"> • Examination of measures to improve production efficiency by changing operation, energy efficiency and resource efficiency • Guidance and campaign for stable supply of domestically generated recyclable materials in terms of quantity and quality to stakeholders (junkshops, dealers, generators) • Campaign for promotion of use of recycled products <p>2. Medium-term actions (3 to 5 years from now)</p> <ul style="list-style-type: none"> • Implementation and monitoring of operation improvement • Improvement of domestically generated recyclable materials in terms of quantity and quality • Examination of a possibility of capital investments • Development of new technology and products (high value-added products)
General public	<p>1. Short term actions (1 to 3 years from now)</p> <ul style="list-style-type: none"> • Understanding of material recycling and recycled products • Voluntary implementation of waste separation • Purchase giving preference to recycled products

6.3 Iron & Steel/Non-Ferrous Metal Industry

6.3.1 Current Status of Iron & Steel/Non-Ferrous Metal Industry and Recycling

(1) Import and Export of Iron Scrap and Iron/Steel Products

In 2004, the import of scrap iron was only about 23 thousand tons while its export was 882 thousand tons. Major country origins of iron scrap export are Taiwan, Thailand, and Singapore.

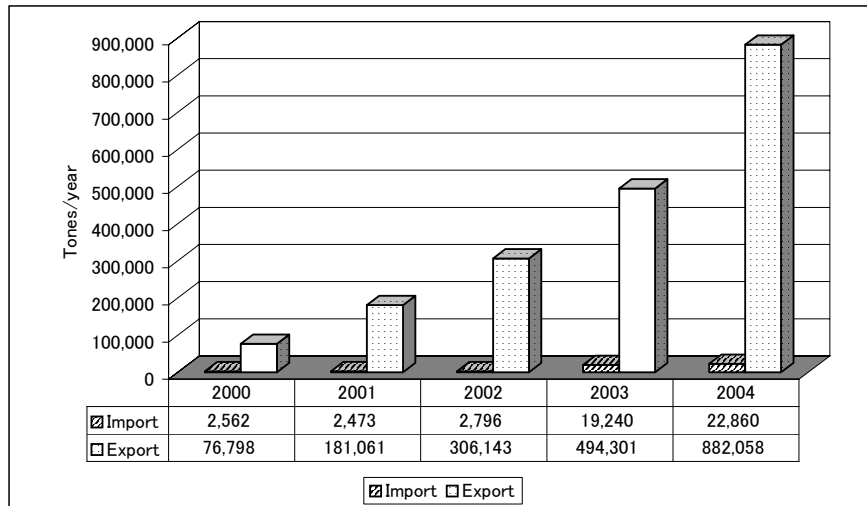


Figure 6.3.1 Trend of Iron Scrap Trade (2000-2004)

As to the trade of iron and steel products, the import was about 2.8 million tons in 2004 while its export was only about 100 thousand tons. Major country origins of iron and steel product import are Russia (about 40% of total import), followed by Japan, China and Ukraine. Import of semi-finished products such as billets occupies 1/3, while the remaining are finished products. Most of semi-finished products come from Russia and Ukraine while the finished ones are imported from various countries.

(2) Domestic Production, Consumption and Material Flow of Iron and Steel

The Figure 6.3.2 shows the estimated material flow of iron and steel in the Philippines.

The annual production of crude steel in the Philippines was about 400 thousand tons in 2004, which only occupied 3% of the total production in ASEAN countries. The total production also drastically decreased from 1 million tons in 1997. All the steel making operations are currently carried out at electric furnace.

The annual production of steel products, on the other hand reached 1.9 million tons in 2004, which is much bigger than crude steel. However, due to limited domestic procurement of raw material (billet), totally about 1 million tons of ingots, billets and other semi-finished products were imported also in 2004.

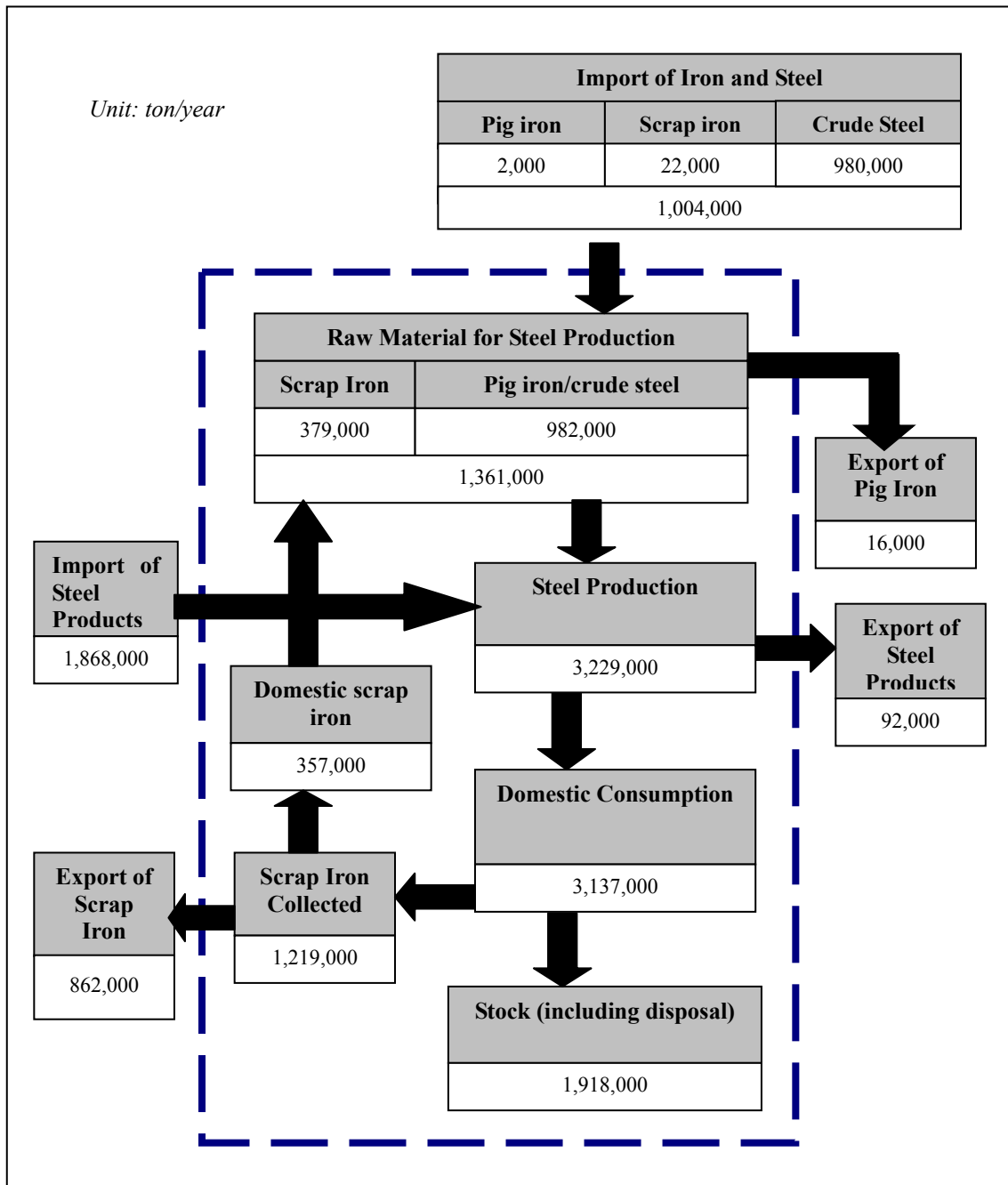


Figure 6.3.2 Estimated Material Flow of Iron and Steel (2004)

In addition, because of the limited production capacity of iron & steel products in the Philippines, approximately 1.8 million tons were also imported in 2004 to meet the domestic demand.

The annual consumption of steel products was about 3.7 million tons in the Philippines in 2004. In terms of per capita consumption, it only reached 37kg per year, which is much smaller than neighboring countries. About 60% of the total consumption is for construction while the consumption of high-grade steel products (for cars and home appliances) is limited and depends upon import.

In the Philippines, the export of iron scrap has been drastically increasing due to shut down of large domestic billet makers, increase of iron scrap price resulting from the increasing demand in China,

and increase in generation of scrap iron with the reconstruction and demolition of the buildings since 2002.

(3) Iron and Steel Industry in the Philippines

Crude steel production in the Philippines reached about one million tons in 1997, but many iron and steel factories such as the National Steel Corporation has been closed due to the Asian economic crisis. Since then the production has not been recovered and has been declined to 400,000 tons in 2004, which comprises only about 3 % of the total production in the ASEAN countries.

Steel making in the Philippines is limited to electric furnace operation using iron scraps. There are three types of plants; one is to produce semi-finished products of billet through steel making from imported iron scraps with the electric furnace, another is to produce steel bar, section steel, and nails from billet (hot rolling mill), and the other is to produce steel plate from steel bar and flat steel (cold rolling mill). In addition, there are galvanizing factories and factories processing steel pipes, which are all in small scale.

Crude steel production is currently all made in electric furnace with the annual production of about 400 thousand tons in 2004. Since late 1990s, when some of the steel making factories had been closed, annually 1 to 1.4 million tons of billet has been imported for producing steel products. Production of hot-rolled steel products ranges from 1.3 to 1.8 million tons annually while 1 to 1.3 million tons are imported. The apparent consumption of steel products is estimated between 3 and 3.7 million tons in annually in the Philippines.

According to interviews with iron and steel manufactures, cheap billet has been imported from CIS (Countries of Independent States) countries such as Russia and Ukraine, which makes domestic electric furnace plants exposed to severe price competition. These CIS countries have a large amount of iron scrap accumulation; because their consumption of steel is low, they export billet to Asian countries.

Apparent consumption volume of iron and steel product is 3 to 3.7 million tons. Per capita consumption in 2004 stayed only at 37kg level –smaller than neighboring countries. Approximately 60 % is for construction materials such as reinforcing bar, section steel, hot dip galvanized products, while demand for higher quality steel, such as for automobiles and electronics, remained low. These high quality steels are 100% imported.

Table 6.3.1 Production of Iron and Steel Industry in the Philippines (Unit: ton)

	2000	2001	2002	2003	2004
Crude Steel Products	426,000	N.A.	550,000	500,000	400,000
Billet (by Electric Furnace)	426,000	N.A.	467,000	425,000	400,000
Steel for Castings	-	N.A.	83,000	75,000	-
Hot-rolled Steel Products	1,405,000	N.A.	1,632,000	1,770,000	1,265,000
Sections	200,000	N.A.	377,000	415,000	270,000
Bars	1,185,000	N.A.	1,255,000	1,355,000	995,000
Wire Rods	20,000	N.A.	-	-	-
Cold-rolled Products	220,000	N.A.	240,000	230,000	155,000
Cold-rolled Sheets & Strips	220,000	N.A.	240,000	230,000	150,000

	2000	2001	2002	2003	2004
(Carbon Steels)					
Coated Sheets & Strips	510,000	N.A.	533,000	484,000	404,000
Galvanized Sheets	350,000	N.A.	283,000	243,000	283,000
Others	160,000	N.A.	250,000	241,000	121,000
Pipes & Tubes	132,000	N.A.	193,000	210,000	102,000
Seamless Pipes & Tubes	N.A.	N.A.	-	-	-
Welded Pipes & Tubes	N.A.	N.A.	193,000	210,000	102,000
Finished Steel Products					
Sections	20,000	N.A.	377,000	415,000	27,000
Bars	1,185,000	N.A.	1,255,000	1,355,000	995,000
Wire Rods	20,000	N.A.	-	-	-
Cold-rolled Sheets & Strips	220,000	N.A.	240,000	230,000	155,000
Cold-rolled Electrical Sheets	-	N.A.	-	-	-
Galvanized Sheets	290,000	N.A.	283,000	243,000	283,000
Tinplates	-	N.A.	-	-	-
Other Metallic-coated Sheets	60,000	N.A.	250,000	241,000	121,000
Pipes & Tubes	132,000	N.A.	193,000	210,000	102,000
Finished Steel Products Total	2,107,000	N.A.	2,598,000	2,694,000	1,926,000

Source: SEAIISI (South East Asia Iron and Steel Institute)

Table 6.3.2 Import of Raw Materials for Steel-making, Pre-products, and Flat Rolled Products (Unit: ton)

	2000	2001	2002	2003	2004
Iron Products	3,000				2,060
Pig Iron	3,000	N.A.	-	-	2,060
Ingots & Semi Finished Products	1,104,000	-	1,216,000	1,405,000	980,000
Billet	1,104,000	N.A.	1,216,000	1,405,000	980,000
Hot-rolled Steel Products	969,000	-	1,335,000	1,093,000	1,045,385
Rails & Accessories	1,000	N.A.	-	-	735
Steel Sheet Piles	11,000	N.A.	-	-	5,904
Sections	96,000	N.A.	127,000	110,000	122,778
Bars	40,000	N.A.	-	-	35,975
Wire Rods	256,000	N.A.	394,000	295,000	3,111,587
Plates	-	N.A.	-	-	94,088
Hot-rolled Sheets & Strips	565,000	N.A.	814,000	688,000	474,318
Cold-rolled Products	321,000	N.A.	425,000	380,000	442,118
Cold-rolled Sheets & Strips	321,000	N.A.	425,000	380,000	438,329
Cold-rolled Electrical Sheets	-	N.A.	-	-	3,789
Coated Sheets & Strips	346,000	N.A.	298,000	304,000	322,043
Galvanized Sheets	53,000	N.A.	-	-	78,148
Tinplates	153,000	N.A.	212,000	220,000	237,260
Others	140,000	N.A.	36,000	84,000	6,635
Pipes & Tubes	-	N.A.	45,000	45,000	58,399
Seamless Pipes & Tubes	-	N.A.	-	-	31,551
Welded Pipes & Tubes	-	N.A.	45,000	45,000	26,848
Cold finished & cold Formed	19,000	N.A.	N.A.	N.A.	N.A.
Cold Drawn Bars	1,000	N.A.	-	-	-
Steel Wires	18,000	N.A.	17,000	15,000	16,453
TOTAL IRON & STEEL PRODUCTS	2,762,000	N.A.	3,360,000	3,242,000	2,866,515

Source: SEAIISI (South East Asia Iron and Steel Institute)

There is no steel integrated manufacturer in the Philippines while there is only one sintering factory of iron-ore in Mindanao. On the other hand, there had been 12 billet manufactures with electric furnaces with the total annual production capacity of 1.3 million tons, but many of them were closed or stopped their operations after Asian Crisis and only 5 of them are currently in operation. Due to closure of the above billet makers, its domestic supply has been drastically decreased with the increase of its import from overseas. However, there are 60 rolling mills in the Philippines with the total production capacity of 6 million tons annually. Due to the concentration of billet makers and rolling mills in Metro Manila and surroundings as well as middle Luzon, transportation of metal scrap is difficult in terms of cost especially from outside Luzon.

(4) Issues for Recycling of Iron Scrap and Iron and Steel Industry in the Philippines

The following sections summarize current issues in the promotion of iron scrap recycling industry in the Philippines based on the trend of the iron and steel industry who is the end-user of iron scraps.

1) Iron Scrap with High Value as Resources

Because of the high market value, most of the iron scraps in the Philippines are likely to be collected. On the other hand, about 70% of the collected iron scraps is exported, and domestic utilization remain at about 30% of the total collection. The major reasons for that is the price of iron scraps is higher in overseas markets such as China. Iron and steel industry in the Philippines has fallen behind in the competition of iron scrap as raw materials.

Outflow of a large amount of iron scraps from the Philippines pressured the iron and steel industry, and many factories were forced to close, stop or lower the operation. In 2006, the Philippine Association of Iron and Steel Manufactures sent a letter to the Ministry of Trade and Industry asking the government to take measures to prevent the outflow of domestically collected iron scraps such as guiding dealers of iron scraps. While trade liberalization is getting to a major trend in the ASEAN and the Asian region, it is difficult for the government of the Philippines to take measures of protecting its own industry; therefore, the request from the Association has not been realized yet. Annual production of crude steel has been declined to 400,000 tons from one million tons in the past, and this trend cannot be stopped by the existing competitiveness of the domestic iron and steel industry.

2) Iron and Steel Industry in the Philippines and Limitation of Iron Scrap Recycling

Production of crude steel has been exposed to severe price competition for purchasing iron scraps as well as selling their products such as crude steel and billet against foreign companies. Unless the existing market conditions change, it is extremely difficult to develop the iron and steel industry in the Philippines.

In addition, higher electricity prices and transportation costs compared to other countries further put a hurdle to the international competition.

On the other hand, it is said that the steel-making industry such as rolling mills using crude steel and

billets as raw materials in the Philippines has the production capacity of six million tons. Their industry scale is large, and they occupy about 50 to 60 % of the needs for steel making in the country. From the point of view to promote the iron and steel industry as a whole, the promotion of growth of the steel-making industry, which has competitiveness, should be prioritized.

It is true that the current market price of iron scrap has been largely influenced by the expansion of the construction demands in China. Therefore, forecasting the future demands for iron scraps will be an important issue, and the government should pay attention to how to maintain the ratio of domestic production of crude steel and billets in the future. Utilization of domestically generated iron scraps should be examined from the viewpoint of macro policy on the iron and scrap industry.

(5) Action Plan for the Development of Iron Scrap Recycling Industry

Based on the identification of current situation and issues of iron scrap recycling, the TWG on Iron Scrap Recycling has prepared an action plan for the development of iron scrap recycling industry. The actions are listed by stakeholder such as government, industry, and general public.

Table 6.3.3 Action Plan for the Development of Iron Scrap Recycling Industry

Stakeholder	Actions to be taken
Government	1. Short term actions (1 to 3 years from now) [IEC Activity] <ul style="list-style-type: none"> • Identification and publicizing current status (quantitative and including geographical information) of iron scrap and its recycling industry in the Philippines • Campaign on iron scrap separation and collection targeting iron scrap generators (dissemination of the recycling guideline) [Preparation of Industrial Infrastructure Development Plan] <ul style="list-style-type: none"> • Formulation of measures for the development of iron and steel industry for the medium to long time span • Examination of measures to improve efficiency of distribution of recyclable materials [Examination of Incentives] <ul style="list-style-type: none"> • Investments in energy/material-saving for recycling industry
	2. Medium-term actions (3 to 5 years from now) [IEC activities] <ul style="list-style-type: none"> • Continuation of the short-term action [Implementation of Industrial Infrastructure Development Plan] <ul style="list-style-type: none"> • Target setting for recycling of iron scrap based on the measures to develop the iron and steel industry and implementation of the relevant measures to achieve the targets • Development of a hub for distribution of recyclable materials [Reform and Introduction of Incentives] <ul style="list-style-type: none"> • Reform and introduction of incentives based on the examination of the above actions
Industry (Iron and Steel)	1. Short term actions (1 to 3 years from now) <ul style="list-style-type: none"> • Examination of measures to improve production efficiency by changing operation, energy efficiency and resource efficiency • Examination of improvement of production efficiency by capital investments (plant renewal)

Stakeholder	Actions to be taken
	2. Medium-term actions (3 to 5 years from now) <ul style="list-style-type: none"> • Implementation and monitoring of operation improvement • Modernization and efficiency improvement of the production by the capital investments
General public	1. Short term actions (1 to 3 years from now) <ul style="list-style-type: none"> • Understanding of material recycling and recycled products • Voluntary implementation of waste separation

6.3.2 Aluminum Scraps and Aluminum Industry

(1) Import and Export of Aluminum Scrap and Aluminum Products

In 2004, the import of scrap aluminum was only about 1.2 thousand tons while its export was 19 thousand tons. Major country origins of scrap aluminum export are Malaysia, Korea, China, and Japan.

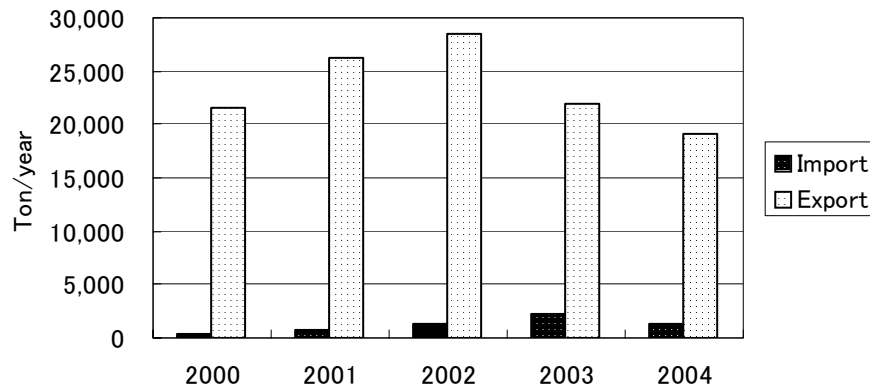


Figure 6.3.3 Trend of Aluminum Scrap Trade (2000-2004)

As for the aluminum products, the import (inc. semi-finished ones) was more or less 70 thousand annually during 2000-2004 while its export was less than one thousand tons in 2004. Major country origins of aluminum products import are Australia, followed by Korea, Indonesia and China.

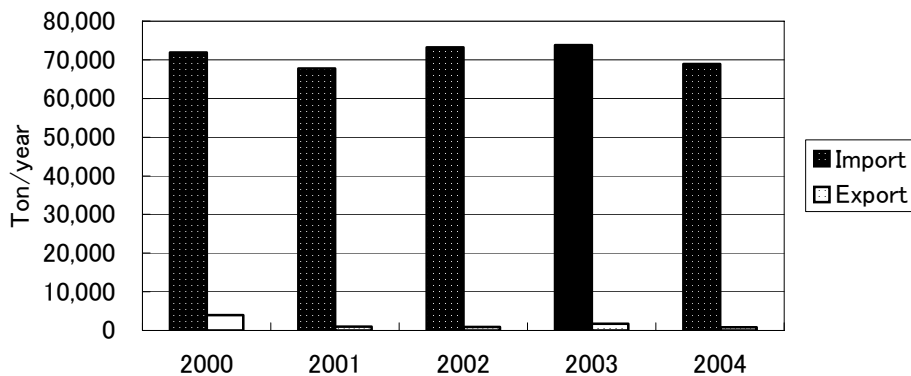


Figure 6.3.4 Trend of Aluminum Products Trade

(2) Domestic Production, Consumption and Material Flow of Aluminum

The Figure 6.3.5 shows the estimated material flow of aluminum in the Philippines.

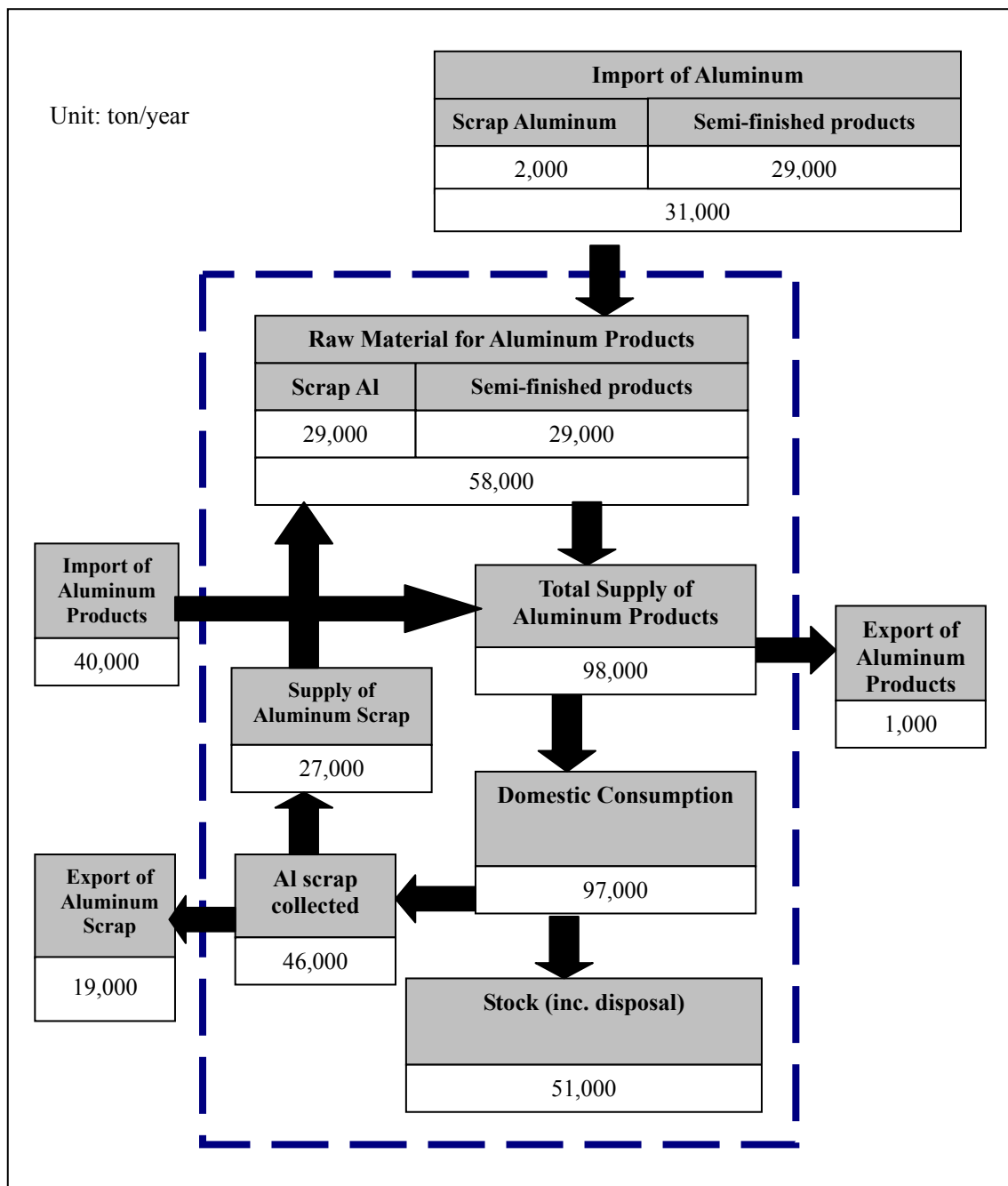


Figure 6.3.5 Estimated Material Flow of Aluminum (2004)

Current aluminum production is estimated as 60 to 70 thousand tons, drastic decrease from 300 thousand tons in 1997, 120 thousand tons in 2002 due to severe competition with import products.

No primary aluminum smelter and dependence upon import of aluminum ingots (approx. 30 thousand tons in 2004) and domestic procurement aluminum scrap (estimated around 50 thousand tons, but about 20 thousand tons were exported in 2004).

(3) Aluminum Products Manufacturing Industry

The Philippines was once one of major non-ferrous metal producers in the Asian countries. However, non-ferrous metal mining and smelting industry, except chromium, have declined in recent years. Currently, there is no primary aluminum smelter in the Philippines, and no new secondary aluminum smelters have been constructed after the Reynolds Philippine -- a comprehensive aluminum process factory, left Philippines.

Therefore, all aluminum new ingot and unwrought are imported from overseas. The amount is ranging between 25 to 34 thousand tons per year. In addition, approximately 10 thousand tons of plates, sheets and strips, 15 thousand tons of aluminum foil, and 5.5 to 10 thousand ton of aluminum coil are imported. Aluminum coil is used as the raw material for aluminum can. Philippines' total import of aluminum ingot, unwrought and semi-final product is around 70 thousand tons.

The imported ingot and alloy undergo extrusion, casting, die-cast and forging in six aluminum process factories. Currently, there are six aluminum process factories in the Philippines. Their production has been in decreasing trend since there is less price competitiveness against products from neighboring countries including China. Therefore the production of processed aluminum products greatly dropped.

On the other hand, the import of aluminum scrap is only 1 to 2 thousand tons, whereas the amount of export reaches 20 to 28 thousand tons per year. According to the interview survey, the aluminum kitchenware manufacturing industry is using locally generated aluminum scrap as the raw material. The amount of raw material in the industry, aluminum scrap, is between 30 and 35 thousand ton. It can be assumed that the aluminum scrap is utilized only in the kitchenware manufacturing industry, which gives the estimation of total amount the aluminum scrap generated in the Philippines -- 50 to 60 thousand tons.

In contrast, a survey conducted by the MIRDC in 2002 revealed that the aluminum processing and casting industry were very active in late 1990s and early 2000s, reaching 110 thousand tons in 2002. Since then the production has been in decline. The 2002 statistics shows the Philippine imported only 30 thousand tons of the ingot and unwrought of aluminum. In addition, the Philippines exported approximately 30 thousand tons of aluminum scrap in 2002.

Based on these data and information, the aluminum scraps generated by the industries, household, restaurants and commercial entities might exceed above estimated values, meaning it might reach around one hundred thousand tons.

1) Aluminum kitchenware manufacturing industry

Consolidate Aluminum Smelter, Extruder & Kitchenware Manufacturing Association (CASEKMA) is the industry circle of Aluminum kitchenware manufacturing companies. Current number of member companies is forty and there are more than one hundred non-member companies in the Metro Manila area.

Presently the industry is experiencing hardships from shortage of raw material of aluminum scrap and increase of import of cheap products from China and India. Fifteen CASEKMA member companies went bankruptcy between 2001 and 2002. Average operation rate in 2005 was 68%. In fact one of the member companies operated only three days in a week because of the shortage of the aluminum scrap.

In a factory, the aluminum scarp is melted by melting furnace and refined by refining furnace. In the process of refining of the scrap, aluminum dross is removed twice. Then reclaimed aluminum ingot was cast.

There are two kinds of aluminum kitchenware products, the products manufactured by sand molding and the other type of product manufactured by pressing. Table shows the consumption of aluminum scrap in the industry. The total consumption of member and non-member factories in 2005 was 31,250 tons. Approximately 19,500 tons lacked for operation in full capacity.

2) Aluminum can manufacturing factory

San Miguel Yamamura Ball Corporation in Cavite province, that produces 330 ml aluminum cans, is the only manufacturer of aluminum can in the Philippines. The annual capacity of body part is 620 million pieces, or equivalent of approximately 7.5 thousand tons per year. The aluminum coil, raw material for the can, is imported from Korea and Australia. The aluminum scrap generation rate in the factory is 8% of which all the scrap is returned to the aluminum coil suppliers. Besides, ALCOA CSI Philippines affiliated company of Alcoa, which is the world largest aluminum producer, manufactures several kinds of aluminum closures of the bottles.

(4) Issues of Aluminum Scrap Recycling

The following sections summarize current issues in the promotion of aluminum scrap recycling industry in the Philippines based on the trend of the aluminum industry that is the end-user of aluminum scraps.

1) Aluminum Scrap with High Value as Resource and High Collection Rate

Aluminum scraps have higher market value than iron scraps, and it is likely that they are collected to the maximum extent in the Philippines. While about 40 % of the collected aluminum scraps is exported overseas, the rest is recycled in the Philippines. This is because the price of aluminum scraps is higher in the foreign markets and because there is a limited number of aluminum plants that can conduct the secondary aluminum smelting.

2) Limitation of Aluminum Industry and Aluminum Scrap Recycling

In the Philippines, there is no primary aluminum smelter, and only a limited number of secondary aluminum smelters, which are small, conduct production of utensils. As in the case of the iron scrap recycling industry, the aluminum scrap recycling industry has been exposed to price competition against imported aluminum goods.

Although the scale of the aluminum industry is small, its position should be discussed not only from the viewpoint of repeated utilization of resources but also from the macro viewpoint of industrial policy.

(5) Action Plan for the Development of Aluminum Scrap Recycling Industry

Based on the identification of current situation and issues of aluminum scrap recycling, the TWG on Aluminum Scrap Recycling has prepared an action plan for the development of aluminum scrap recycling industry. The actions are listed by stakeholder such as government, industry, and general public.

Table 6.3.4 Action Plan for the Development of Aluminum Scrap Recycling Industry

Stakeholder	Actions to be taken
Government	<p>1. Short term actions (1 to 3 years from now) [IEC Activity]</p> <ul style="list-style-type: none"> • Identification and publicizing current status (quantitative and including geographical information) of aluminum scrap and its recycling industry in the Philippines • Campaign on iron scrap separation and collection targeting waste aluminum scrap generators (dissemination of the recycling guideline) <p>[Preparation of Industrial Infrastructure Development Plan]</p> <ul style="list-style-type: none"> • Formulation of measures for the development of non-ferrous metal industry for the medium to long time span • Examination of measures to improve efficiency of distribution of recyclable materials <p>[Examination of Incentives]</p> <ul style="list-style-type: none"> • Investments in energy/material-saving for recycling industry <p>2. Medium-term actions (3 to 5 years from now) [IEC activities]</p> <ul style="list-style-type: none"> • Continuation of the short-term action <p>[Implementation of Industrial Infrastructure Development Plan]</p> <ul style="list-style-type: none"> • Target setting for recycling of aluminum scrap based on the measures to develop the aluminum industry and implementation of the relevant measures to achieve the targets • Development of a hub for distribution of recyclable materials <p>[Reform and Introduction of Incentives]</p> <ul style="list-style-type: none"> • Reform and introduction of incentives based on the examination of the above actions
Industry (Aluminum Smelting)	<p>1. Short term actions (1 to 3 years from now)</p> <ul style="list-style-type: none"> • Examination of measures to improve production efficiency by changing operation, energy efficiency and resource efficiency • Examination of improvement of production efficiency by capital investments (plant renewal) <p>2. Medium-term actions (3 to 5 years from now)</p> <ul style="list-style-type: none"> • Implementation and monitoring of operation improvement • Modernization and efficiency improvement of the production by the capital investments
General public	<p>1. Short term actions (1 to 3 years from now)</p> <ul style="list-style-type: none"> • Understanding of material recycling and recycled products • Voluntary implementation of waste separation

6.4 Glass & Glass Products Industry

6.4.1 Current Status of Glass & Glass Products Industry and Recycling

(1) Import and Export of Glass Scrap and Glass/Glassware

In the Philippines, both import and export of scrap glass and cullet are small, which was less than 5 thousand tons in 2004.

On the other hand, the import of glass was 47 thousand tons while its export was 32 thousand tons in 2004. Major country origins of glass import are China, Indonesia and Taiwan while major export destinations of glass are Malaysia, Hong Kong and Thailand.

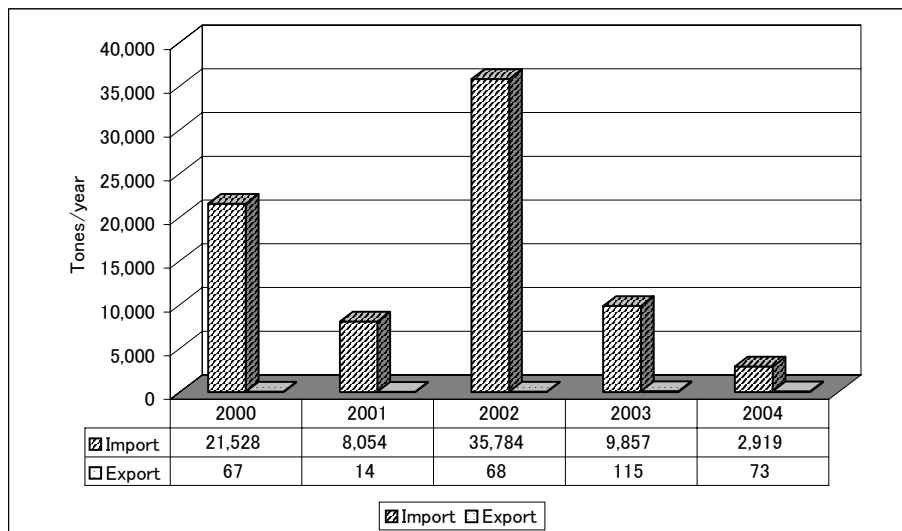


Figure 6.4.1 Trend of Glass Scrap Trade (2000-2004)

In addition, the import of glassware was 152 thousand tons while its export was only 16 thousand tons in 2004. The major country origins of glassware import are similar with the case of glass import, i.e. China, Indonesia, and Taiwan.

(2) Domestic Production, Consumption and Material Flow of Glass Bottles

The Figure 6.4.2 shows the estimated material flow of glass in the Philippines.

The annual glass bottle production in the Philippines was estimated as 350 thousand tons in 2004, of which 70 to 75% of the total production come from one big beverage company in the Philippines. The cullet use ratio is 60% for glass bottle production in 2004. Although it was formerly 80-90%, it was decreased due to limited supply of domestic cullet from local market

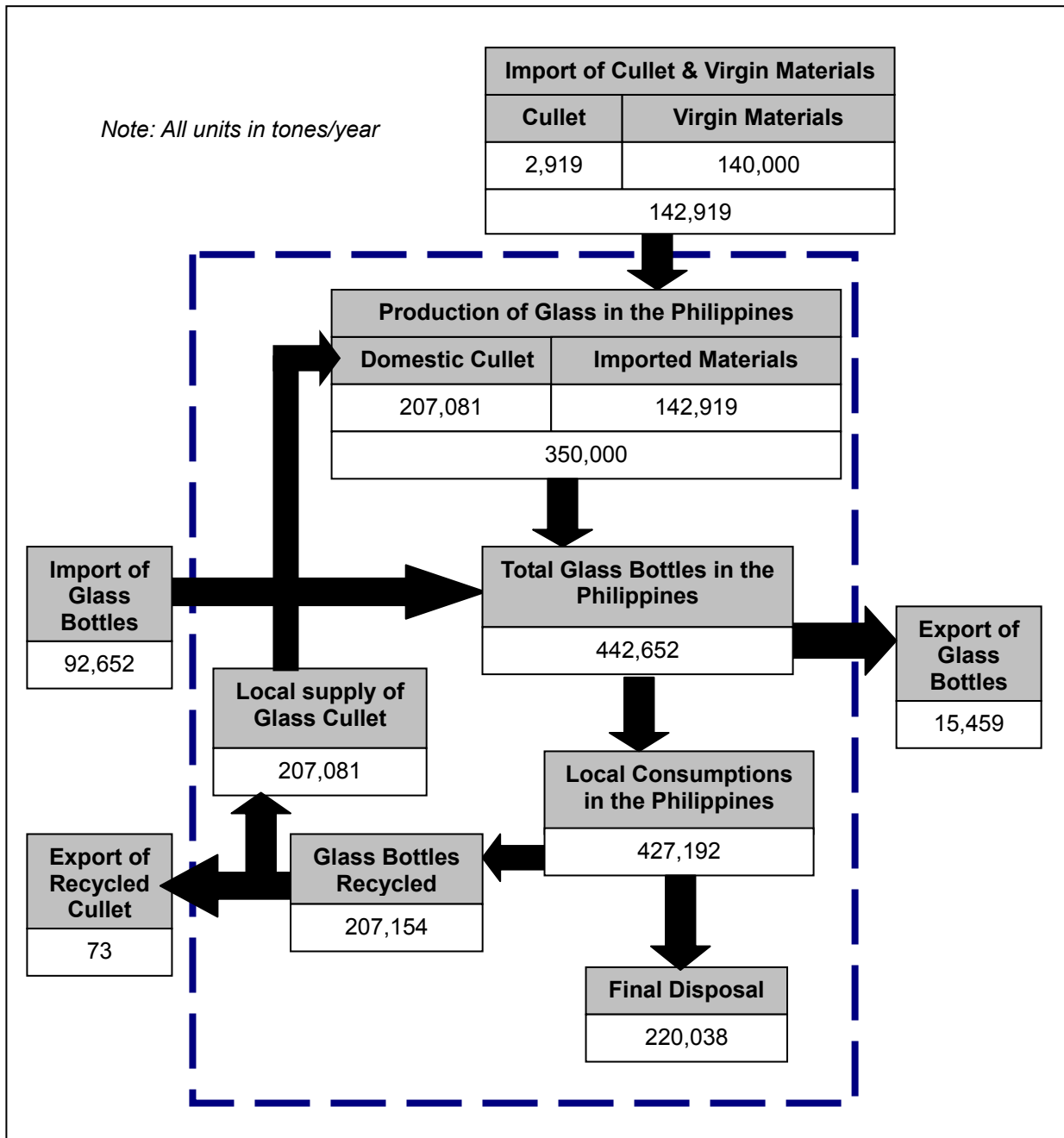


Figure 6.4.2 Estimated Material Flow of Glass (2004)

(3) Glass Bottle Industry

Major glass products in the Philippine are flat glass and glass bottles. Figure 6.4.3 shows the location of glass product manufactures in the Philippines.



Source: National Solid Waste Management Commission

Figure 6.4.3 Location of Glass Product Manufacturers in the Philippines

1) Glass bottles

The largest glass bottle producer is the San Miguel Packaging Specialist, Inc (SMPS) that has four glass bottle factories nationwide and has total production of 775 ton per day. The total production of the glass bottles in the Philippines is estimated to be 310-330 thousand tons per year. In the meantime, amount of import of glass and cullet varied widely ranging from 3 to 35 thousand tons in the period of 2000-2004. Volume of export, on the contrary, was very limited.

2) San Miguel Yamamura Asia (SMYA)

San Miguel Yamamura Asia Corp. is a member of San Miguel Packaging Specialist Inc. and manufacturing glass bottles. SMYA Cavite plant currently employs 260 workers and produces many kinds of glass bottles (20-1,000 ml). Product yield is 93-95%. Reasons for reject of the bottle products are broken of bottles, interfusion of foreign materials and air bubbles. Energy cost rate in the total cost is ranging between 25 and 30 %. The company is experiencing hardships for the cost increase from increasing crude oil price.

SMYA is now constructing a new US\$61 million glass bottle plant in Cavite. After completion in September 2006, the production capacity would increase to 1,025 ton per day. The cullet is not currently supplied with sufficient quantities so they plan to use imported cullet. The energy cost makes up between 25-30 % of total cost.

Cullet utilization have once been reached to 80 – 90 % but failed to 60 % for following reasons:

- Returnable bottles, such as beer bottle, are re-used many times (Average re-use rate is twenty cycles)

- Recycle route is not established for wine bottles, etc.
- Junk shops and waste dealers do not collect used glass bottles since waste glasses are heavy and the prices are not high.

Table 6.4.1 Volume of Import of cullet and glass waste in the Philippines

(Unit: ton/year)

		2000	2001	2002	2003	2004
Import	Cullet and other waste and scrap of glass	21,529	8,054	35,784	9,857	2,919
Export	Cullet and other waste and scrap of glass	67	14	68	115	73

Source: National Statistics Office

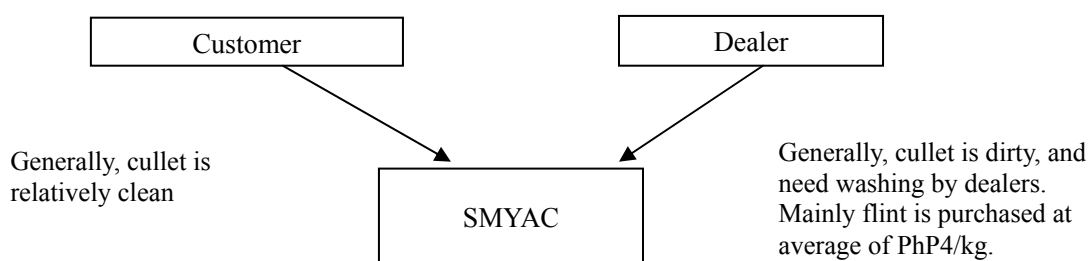


Figure 6.4.4 Flow of Cullet of SMYA

The used glass bottles collected in the restaurants, liquor shops and canteens are often returned in cases and have few damages/spots. It is presumed that these bottles are being returned to bottling companies and re-used again.

The junk shops purchased a great deal have used glass collected from household, dumping site of the waste and MRFs. The junk shops have different prices for specific types of used glass bottles, for example for Coke, local beer, imported beer, local brandy, soy source, and so on. Therefore, a quite large amount of used glass bottle from household and MRFs are believed to be re-used in the bottling companies.

Table 6.4.2 Glass Bottle Productions by San Miguel Packaging Specialist Group

	Place	Capacity (ton/day)	Number of lines	Name of company
Philippine	Manila	250	6	Manila Glass Plant
	Cavite	200	3	Premium Packaging International
	Cavite	180 (250)	3 -	San Miguel Yamamura Asia
	Cebu	145	3	Mandaue Glass
	Total	775 (1,025)		
Overseas	Vietnam (Haiphon)	130	2	
	China	120	2	

Source: San Miguel Packaging Specialist, Inc.

The cullet used in the Cebu plant (of SMPS) is sent from Manila as cullet collected locally does not meet the enough quantity.

6.4.2 Current Issues of Scrap Glass Recycling in the Philippines

The following sections summarize current issues in the promotion of glass scrap recycling industry in the Philippines based on the trend of the glass industry who is the end-user of glass bottles.

1) Improvement of Glass Scrap Collection Rate

As it can be seen in Figure 6.4.2, more than half of the glass bottles consumed annually are not collected. Although the uncollected glass bottles include those reused by consumers and recycled informally, there are many cases in which glass bottles are not collected. This is because there are glass bottles that cannot be recycled such as wine bottles and because the collection of glass bottles as glass cullet does not make any business sense due to difficulty in handling (volumes and danger from possible break) and high transportation costs. Efforts are necessary to overcome these difficulties and increase collection and recycling ratios of glass bottles.

2) Limited Usage and Users

Under the environment that one company produces most (about 80%) of the glass bottles in the country, the development of glass bottle recycling industry is largely influenced by such company's performance. Development of new users (locating a glass bottle manufacturing company) and new use could be one of the mid to long-term challenges.

6.4.3 Action Plan for the Development of Glass Recycling Industry

Based on the identification of current situation and issues of glass scrap recycling, the TWG on Glass Scrap Recycling has prepared an action plan for the development of glass scrap recycling industry. The actions are listed by stakeholder such as government, industry, and general public.

Table 6.4.3 Action Plan for the Development of Glass Scrap Recycling Industry

Stakeholder	Actions to be Taken
Government	1. Short term actions (1 to 3 years from now) [IEC Activity] <ul style="list-style-type: none"> • Identification and publicizing current status (quantitative and including geographical information) of glass scrap and its recycling industry in the Philippines • Campaign on iron scrap separation and collection targeting glass scrap generators (dissemination of the recycling guideline) [Preparation of Industrial Infrastructure Development Plan] <ul style="list-style-type: none"> • Formulation of measures for improvement of distribution efficiency of recyclable materials • Examination of locating recycling industry in the areas other than Metro Manila and its surroundings and preparation of a plan to attract recycling industry

Stakeholder	Actions to be Taken
	<p>[Examination of Incentives]</p> <ul style="list-style-type: none"> • Development of a hub for distribution of recyclable materials • Technology contributing to the increase in transportation efficiency • Locating new recycling industries • Investments in energy/material-saving for recycling industry • Development of recycling technology and new products using recycled materials (technology to recycle glass bottles that are not currently recycled such as wine bottles, development of new usage other than production of glass bottles) <p>2. Medium-term actions (3 to 5 years from now)</p> <p>[IEC activities]</p> <ul style="list-style-type: none"> • Continuation of the short-term action <p>[Implementation of Industrial Infrastructure Development Plan]</p> <ul style="list-style-type: none"> • Development of a hub for distribution of recyclable materials • Implementation of model projects for improving efficiency of distribution • Locating recycling industry <p>[Reform and Introduction of Incentives]</p> <ul style="list-style-type: none"> • Reform and introduction of incentives based on the examination of the above actions
Industry (Glass Bottle Recycling)	<p>1. Short term actions (1 to 3 years from now)</p> <ul style="list-style-type: none"> • Examination of measures to improve production efficiency by changing operation, energy efficiency and resource efficiency • Guidance and campaign on stabilizing quantity and quality of domestically collected recyclables to relevant stakeholders • Campaign for the promotion of recycled products <p>2. Medium-term actions (3 to 5 years from now)</p> <ul style="list-style-type: none"> • Implementation and monitoring of operation improvement • Improvement of quantity and quality of domestically collected recyclable resources • Examination of a possibility of new capital investments (modernization) • Examination of a possibility of locating new recycling industry • Development of technology and products (high value added products)
General public	<p>1. Short term actions (1 to 3 years from now)</p> <ul style="list-style-type: none"> • Understanding of material recycling and recycled products • Voluntary implementation of waste separation • Giving preference to purchasing recycled products

6.5 Plastic Industry

6.5.1 Current Status of Plastic Industry and Recycling

(1) Import and Export of Scrap Plastic and Plastic Products

In 2004, the import of scrap plastic was 15 thousand tons while its export was 44 thousand tons in 2004. Major country origins of scrap plastic export are Hong Kong and China.

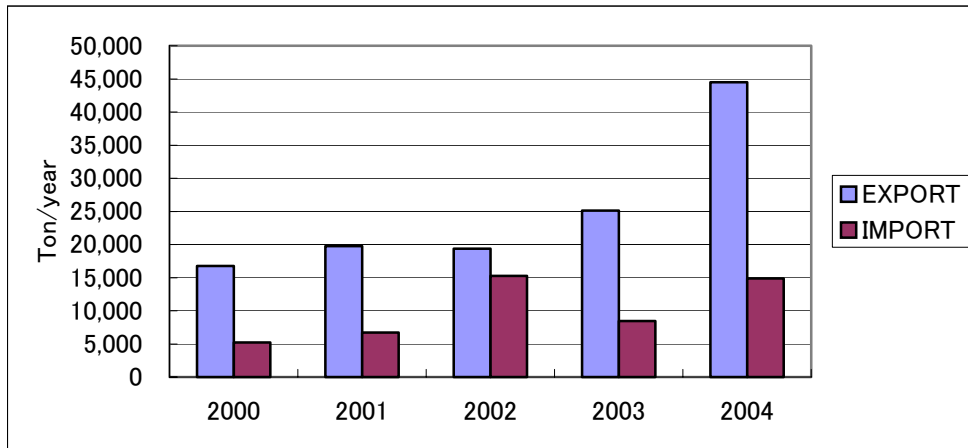


Figure 6.5.1 Trend of Scrap Plastic Trade (2000-2004)

Import of plastic resins was 567 thousand tons while its export was only 39 thousand tons in 2004. Major country origins of plastic resins import are Singapore, followed by Korea, Taiwan, and Japan.

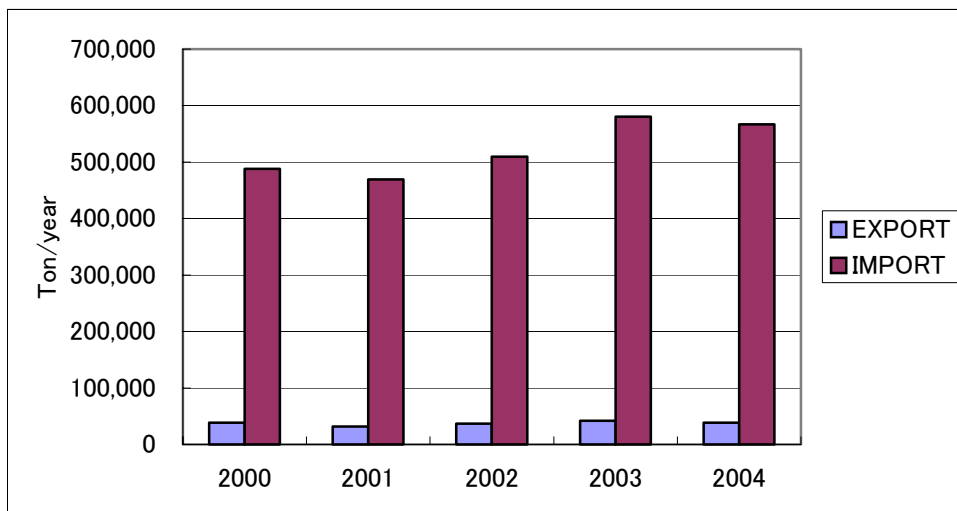


Figure 6.5.2 Trend of Plastic Resins Trade

On the other hand, the import of plastic products was 183 thousand tons while its export was only 40 thousand tons in 2004. Major country origins of plastic products import are China, and followed by Taiwan and Malaysia.

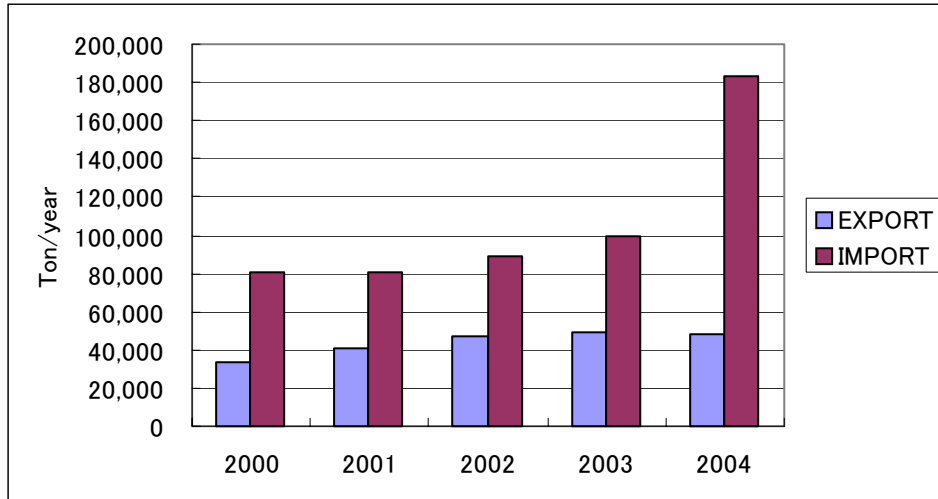


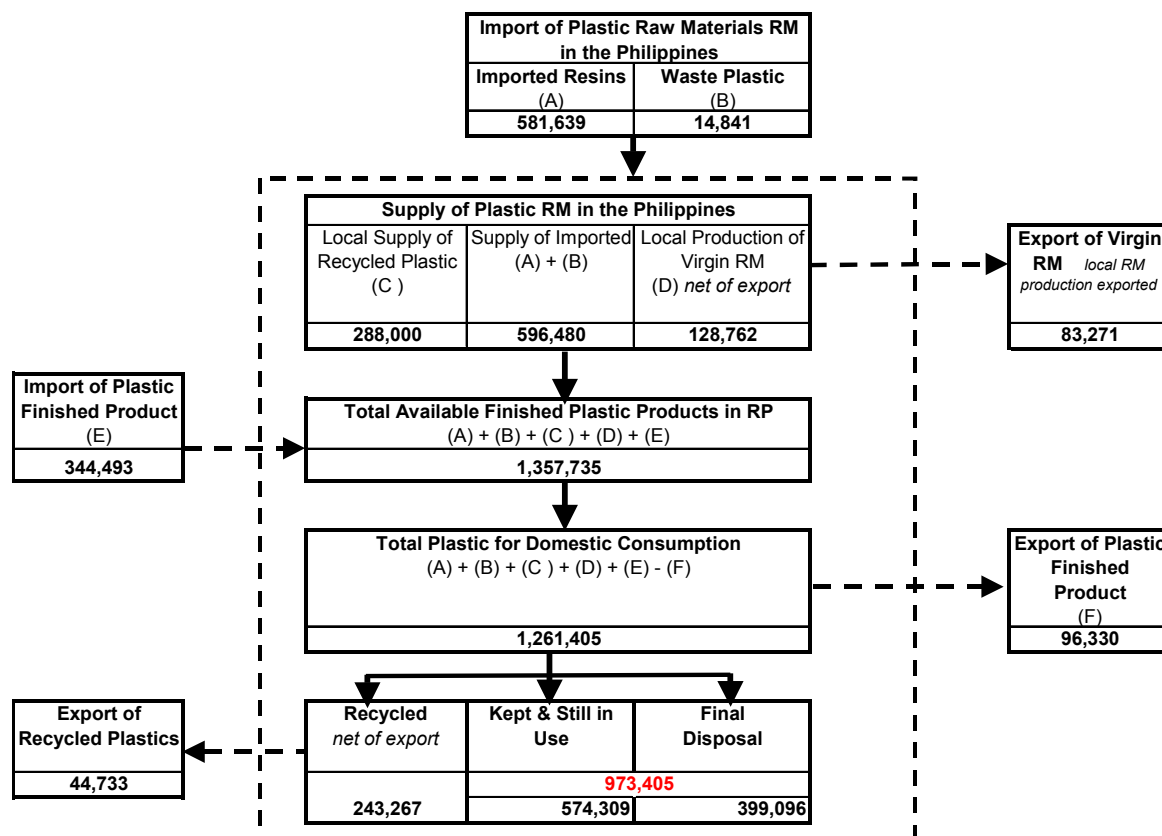
Figure 6.5.3 Trend of Plastic Products Trade

(2) Domestic Production, Consumption and Material Flow of Plastics

The Figure below shows the estimated material flow of plastics in the Philippines.

The annual plastic production in the Philippines was approximately 600 thousand tons in 2004. This domestic production largely depends upon imports of plastic resins and other semi-finished products due to no existence of ethylene plant (naphtha cracking plant)

The annual plastic consumption, on the other hand, reached about 700 thousand tons in 2004. In addition to the import of plastic resins, about 183 thousand tons of final plastic products were imported to meet the domestic demand in the Philippines in 2004.



Source: National Statistics Office
Data on Recycling are PPIA estimates on MPRAI and Non-MPRAI operating capacities

Figure 6.5.4 Estimated Material Flow of Plastics (2004)

(3) Plastic Resin and Final Products Manufacturing Industry

In many Southeast Asian countries, Naphtha cracking and Ethylene plants were constructed as national policy in 1980s and 1990s, although those Naphtha cracking or Ethylene plant has not realized in the Philippines yet. The industry totally relies on import for Olefin, which is the original raw material of the resin.

The Philippine plastic industry also produces Polystyrene and Polyvinyl chloride. However the industry import about half of raw material of these resins from foreign countries. The plastics resin is vulnerable to tough international competition. The products rely on domestic consumption. In addition, the CEPT² became effective within the AFTA member countries since 2003. Competition in the AFTA has gotten tough in recent years.

According to statistics in the period of 2000 to 2004 provided by the Philippine Plastic Industry Association, annual production of PE was between 220 - 310 thousand tons, PP 180- 270 thousand tons, PVC 80 – 100 thousand tons, PS 40 - 60thousand tons. Demand forecast estimates the

² Common Effective Preferential Tariff

demand of PE and PP will increase to 300 thousand tons. The current consumption is 220 thousand ton for PE and 18 thousand ton for PP.

In the meantime, the import of waste plastics is ranging from 5 to 15 thousand tons per year and the export was between 50 and 80 thousand tons per year.

Table 6.5.1 Production of Plastic Resin and Consumption of Final Plastic Products (2000- 2004)

(Unit: ton/year)

		Raw material	2001	2002	2003	2004
Production	Polyethylene (PE)	Domestic	64,000	86,899	84,625	34,508
		Imported	160,604	192,703	227,239	187,702
		Total	224,604	279,602	311,864	222,210
	Polypropylene (PP)	Domestic	127,000	150,825	119,043	63,620
		Imported	98,750	116,826	127,354	120,301
		Total	225,750	267,651	246,397	183,921
	Polyvinyl-chloride (PVC)	Domestic	68,500	86,415	89,000	79,873
		Imported	14,500	15,205	16,774	12,810
		Total	83,000	101,620	105,774	92,683
	Polystyrene (PS)	Domestic	34,200	34,200	25,428	34,032
		Imported	7,133	20,528	33,600	23,815
		Total	41,333	54,728	59,028	57,847
		Total		574,687	703,601	723,063
Import of finished Plastic Products			556,755	613,721	688,362	764,825
Total consumption of finished plastics products			1,131,442	1,317,332	1,411,425	1,321,486
Share of domestic production (%)			51	53	51	42

Source: PPIA

Table 6.5.2 Import and export of plastic raw material (Primary form)

(Unit: ton/year)

		2000	2001	2002	2003	2004
Import	Polyethylene (PE)	211,015	171,543	215,539	261,941	191,245
	Polypropylene (PP)	95,788	100,363	80,128	93,778	102,843
	Polystyrene (PS)	35,527	35,395	34,688	41,622	42,248
	Polyvinyl-chloride (PVC)	18,825	19,062	20,680	18,639	21,915
	PET	9,154	13,365	14,882	18,348	22,811
	Others	123,059	136,459	158,942	154,780	199,577
	Total	493,788	476,187	524,859	589,780	581,639
Export	Polyethylene (PE)	4,544	3,312	4,133	2,761	3,125
	Polypropylene (PP)	6,755	3,994	3,250	3,364	3,220
	Polystyrene (PS)	2,999	1,922	2,231	1,851	1,541
	Polyvinyl-chloride (PVC)	15,268	9,905	13,616	13,270	6,516
	PET	24	0	0	793	778
	Others	25,709	32,371	23,230	44,915	68,091
	Total	55,299	51,504	56,207	66,954	83,271

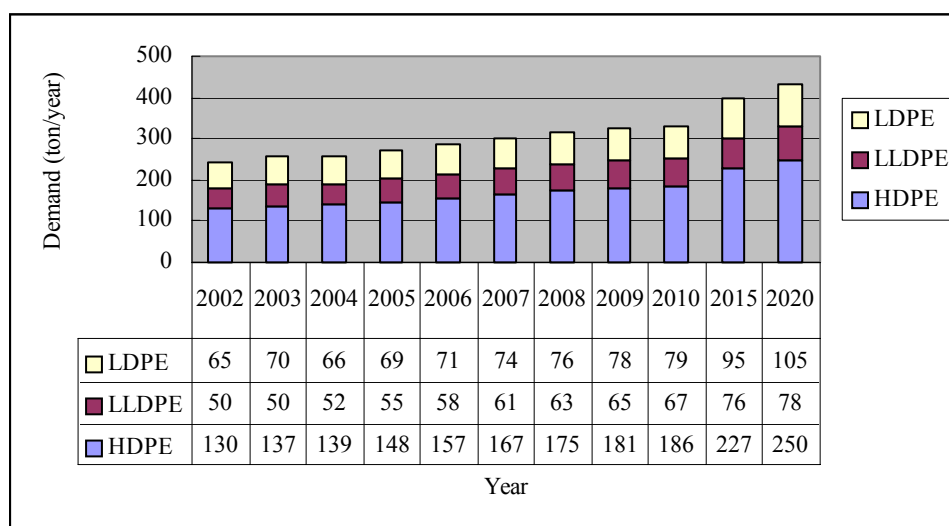
Source: National Statistic Office

Table 6.5.3 Import and Export of Waste Plastics

(Unit: ton/year)

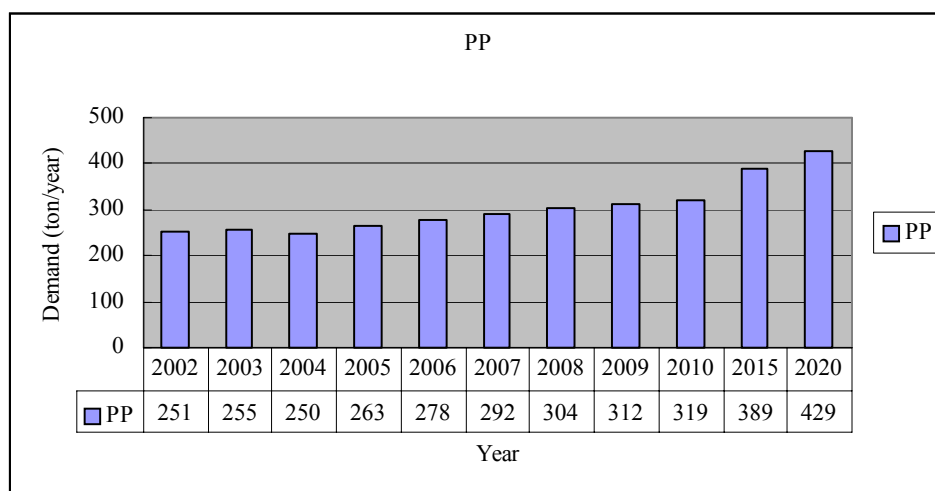
		2000	2001	2002	2003	2004
Import	Polyethylene (PE)	112	237	3,516	582	1,136
	Polypropylene (PP)	283	149	365	580	185
	Polystyrene (PS)	204	29	29	17	360
	Polyvinyl-chloride (PVC)	4,276	5,951	9,384	6,502	6,928
	Others	366	336	1,996	790	6,791
	Total	5,240	6,699	15,289	8,471	14,900
Export	Polyethylene (PE)	466	467	1,128	2,215	4,613
	Polypropylene (PP)	471	1,046	150	48	890
	Polystyrene (PS)	7,550	7,568	5,323	3,685	8,101
	Polyvinyl-chloride (PVC)	166	739	262	796	286
	Others	8,131	1,367	12,518	18,400	30,485
	Total	16,785	19,780	19,380	25,144	44,476

Source: National Statistic Office



Source: PPIA (Philippine Plastic Industry Association)

Figure 6.5.5 Forecast of Polyethylene (PE) demand



Source: PPIA (Philippine Plastic Industry Association)

Figure 6.5.6 Forecast of Polypropylene (PP) demand

1) Polyethylene (PE) & Polypropylene (PP)

There are three companies producing Polyethylene and Polypropylene as shown in table 19. Even though the capacity of these plants is not so small, productions of Polyethylene and Polypropylene in 2003 in those plants combined were only 84 thousand ton and 119 thousand tons, respectively. The reasons for such a low operation rate is slowing down of domestic demand and high price of raw material resin.

Main destinations for those compounds are Korea, Singapore and Thailand, which account for around 50% of the export. Main usage, or about 50% of usage, of PE and PP resin are film for packaging of foods.

Table 6.5.4 Capacities of Polyethylene and Polypropylene in the Philippines
(Unit: thousand ton/year)

Company	Product	Capacity
Bataan Polyethylene	PE	250
JG Summit	PE	180
	PP	180
Petrocorp	PP	225

Source: Philippines Business Handbook

2) Polyvinyl Chloride (PVC)

There is only one company manufacturing polyvinyl chloride, and the production was 89 thousand tons in 2004. The company dominates domestic market with market share of around 90%, which is quite higher than other petrochemical products. However supply of Vinyl Chloride Monomer (VCM), which is the raw material of the Polyvinyl Chloride, relies on the import from foreign countries. Exportation in large quantity cannot be expected.

Table 6.5.5 Production, import and export and demand of Polyvinyl Chloride resin
(Unit: thousand ton)

			2001	2002	2003	2004	2005
Resin	Production	Multipurpose Products	82.4	93.0	100.8	82.4	82.0
	Import	Multipurpose Products	8.9	10.5	8.7	9.3	6.5
		Special products	3.2	4.2	2.7	6.1	2.7
		Sum	12.2	14.7	11.4	15.4	9.2
	Export	Multipurpose Products	2.0	7.4	8.7	1.0	0.1
	Demand (A)		92.5	100.3	103.5	96.9	91.2
Final product	Import (B)		20.4	19.7	19.5	20.2	27.8
Total demand	(A)+(B)		112.9	120.0	123.5	117.1	119.0

Source: Philippines Business Handbook

3) Polystyrene (PS)

The Philippines has three manufacturing companies for Polystyrene. However, at this moment, only CHERMREZ (D&L) continues to produce the Polystyrene resin. Total domestic production is around 30-34 thousand ton per year. Just as the other plastic resin, the industry relies on import for the supply of the raw material, styrene monomer. In addition, due to its small-scale operation in international market, competition with foreign countries has become very hard. In terms of engineering plastics like ABS resin, there is no domestic production in the Philippine.

4) Overall Conditions of Plastic Resin Industry in the Philippines

In the meantime, plastics processing industry has approximately 200 local companies. Local Chinese is dominant of the industry.

Plastics resin industry has a structure relying on domestic consumption. Followings are issues identified during interview and literature surveys.

- Naphtha cracking project has not been realized yet. Thus, all raw materials, including olefins, are imported, which raise the cost for raw materials. The products have little competitiveness so that there is almost no export.
- Capacity of PE and PE plant is between 180 and 250 thousand ton per year, which is not small. However operation rate stays only at 50% or so in recent years. Moreover the plant often stops its operation because of low domestic demand.
- Polystyrene companies rely on import for supply of raw material, styrene monomer.

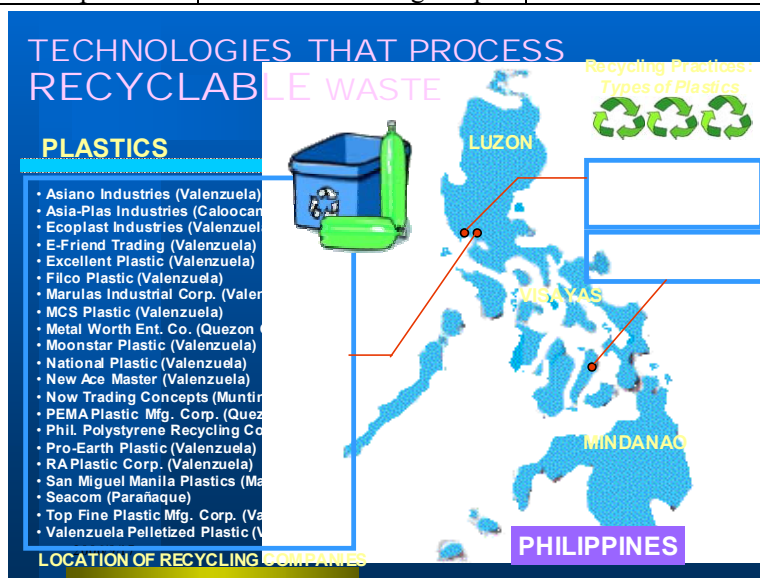
5) Plastic Recyclers

According to the directory of PPIA, the following 27 plastic recyclers are listed, of which 11 recyclers only deal with sorting while the remaining 16 recyclers carry out primary processing of scrap plastics. Most of these plastic recyclers are concentrated at Valenzuela, the north of Metro Manila. (See Figure 6.5.7).

The types of scrap plastics collected and received by the recyclers are as follows

Types	Examples
PET	Containers for soft drinks and mineral water, cosmetic bottles
HDPE	Containers/bottles for milk, juice, shampoo, cooking oil, etc.
LDPE	Wrapping for food, book covers
PVC	Plastic bags, wrapping for food, computer covers, etc.
PP	Caps of bottles/containers, plastic straws, transparent disposable cups, etc.
PS	Disposable kitchen utensils (spoons, cutlery, cups, food trays, etc.)

Asiano Industries	MCS Plastic	Phil.Polystyrene Recycling Corp.
Asia-Plas Industries	Metal Worth Ent.Co.	Pro-Earth Plastic
Ecoplast Industries	Moonstar Plastic	RA Plastic Corp
E-Friend Trading	National Plastic	San Miguel Manila Plastics
Excellent Plastic	New Ace Master	Seacom
Filico Plastic	Now Trading Concepts	Top Fine Plastic Mfg.Corp.
Marulas Industrial Corp.	PEMA Plastic Mfg.Corp.	Valenzuela Pelletized Plastic



Source: National Solid Waste Management Commission

Figure 6.5.7 Location of major waste plastic recyclers in the Philippines

Among the scrap plastic recyclers, operations of the 2 typical primary processing factories, Top Fine Plastic and Eco-plast Industries are outlined below.

Top Fine Plastic (TFP) is the pioneering recycler that has carried out plastic recycling in the Philippines since 1970s. TFP segregates the collected plastic into PP, LDPE, HDPE, PET and so forth although it does not deal with scrap plastic of ABS and d-Phenol resins. The segregated scrap plastics are processed into pellets while it also produces recycled plastic bags. 90% of collected scrap plastic comes from local sources while the remaining 10% is imported. TFP contracts with about 25 to 30 junk shops and dealers for collection of scrap plastics.

The amount of scrap plastic collected by TFP ranges from 250 to 300 tons monthly, which is in short of its production capacity. The current operation ratio of the factory is 60 to 70%. TFP currently hires 150 employees while 70 to 75% of the production cost comes from procurement of raw materials, scrap plastics.

Ecoplast Industries produces 500 to 600 tons of scrap plastics monthly with the employees of 110. The table below shows the aggregated production and business data of TFP and Ecoplast Industries.

Plastic	Production ratio	Prices to buy	Selling to
HDPE	20% to 25%	PhP23 – 24/kg	100% Hong Kong or China
PP	50%	PhP18 – 19/kg	50% domestic use, 50% export
HIPS	15%	PhP22 – 23/kg	100% Hong Kong or China
PET	15%	PhP25 – 26/kg	100% Hong Kong or China
PET (dirty)		PhP18 – 20/kg	-do-

6.5.2 Current Issues of Plastic Scrap Recycling in the Philippines

The following sections summarize current issues in the promotion of plastic scrap recycling industry in the Philippines based on the trend of the plastics industry who is the end-user of plastic scraps.

(1) Improvement of Collection Rate of Plastic Scraps

While market value of plastics is rising due to increase in oil prices, the collection rate of plastics still stay in low in the Philippines. It is necessary to enhance a potential of plastic recycling industry by securing quality plastics in an efficient manner through the promotion of separation and collection of plastic scrap.

(2) Limited Use of Plastic Scrap by Domestic Industry

Most of the waste plastics domestically collected and processed is still exported overseas. On the other hand, the domestic plastic industry in the Philippines still depends on imported plastics. It is necessary to make efforts to enhance the utilization rate of recyclable resources at the plastic manufacturing industry.

(3) Development of Plastic Recycling Industry

Although there are many plastic recycling industries in the Metro Manila, the coverage of the plastic recycling industry in the other areas is still limited. Since plastic recycling industry does not required large-scale facilities, there exists a possibility of expansion of the plastic recycling industry.

(4) Development of Recycled Products

Most of the plastic recycling industry in the Philippines focuses the production of pre-products. There is a large room to develop and expand final products made from recycled plastics, which should be promoted as a challenge for the mid to long term.

6.5.3 Action Plan for the Development of Plastic Recycling Industry

Based on the identification of current situation and issues of plastic scrap recycling, the Technical Working Group on Plastic Scrap Recycling has prepared an action plan for the development of plastic scrap recycling industry. The actions are listed by stakeholder such as government, industry, and general public.

Table 6.5.6 Action Plan for the Development of Plastic Scrap Recycling Industry

Stakeholder	Actions to be taken
Government	<p>1. Short term actions (1 to 3 years from now)</p> <p>[IEC Activity]</p> <ul style="list-style-type: none"> • Identification and publicizing current status (quantitative and including geographical information) of plastic scrap and its recycling industry in the Philippines • Campaign on iron scrap separation and collection targeting waste plastic generators (dissemination of the recycling guideline) • Promotion of use of recycled products (eco-label, green purchasing/procurement) <p>[Preparation of Industrial Infrastructure Development Plan]</p> <ul style="list-style-type: none"> • Formulation of measures for improvement of distribution efficiency of recyclable materials • Examination of locating recycling industry in the areas other than Metro Manila and its surroundings and preparation of a plan to attract recycling industry <p>[Examination of Incentives]</p> <ul style="list-style-type: none"> • Development of a hub for distribution of recyclable materials • Locating new recycling industries • Investments in energy/material-saving for recycling industry • Development of recycling technology and new products using recycled materials (product development) <p>2. Medium-term actions (3 to 5 years from now)</p> <p>[IEC activities]</p> <ul style="list-style-type: none"> • Continuation of the short-term action <p>[Implementation of Industrial Infrastructure Development Plan]</p> <ul style="list-style-type: none"> • Development of a hub for distribution of recyclable materials • Implementation of model projects for improving efficiency of distribution • Locating recycling industry <p>[Reform and Introduction of Incentives]</p> <ul style="list-style-type: none"> • Reform and introduction of incentives based on the examination of the above actions
Industry (Plastic)	<p>1. Short term actions (1 to 3 years from now)</p> <ul style="list-style-type: none"> • Examination of measures to improve production efficiency by changing operation, energy efficiency and resource efficiency • Guidance and campaign on stabilizing quantity and quality of domestically collected recyclables to relevant stakeholders • Promotion of use of pre-products by domestic industries • Campaign for the promotion of recycled products <p>2. Medium-term actions (3 to 5 years from now)</p> <ul style="list-style-type: none"> • Implementation and monitoring of operation improvement • Improvement of quantity and quality of domestically collected recyclable resources • Examination of a possibility of new capital investments (modernization) • Examination of a possibility of locating new recycling industry • Development of technology and products (high value added products)
General public	<p>1. Short term actions (1 to 3 years from now)</p> <ul style="list-style-type: none"> • Understanding of material recycling and recycled products • Voluntary implementation of waste separation • Giving preference to purchasing recycled products

6.6 Used Electric/Electronic Home Appliances and E-Waste Recycling

6.6.1 Used Electric/Electronic Home Appliances and Recycling Industry

(1) Cellular Phone

Cellular Phone Services in the Philippines are mainly occupied by two major network providers, i.e. PLDT (Philippine Long Distance Telephone Company) and Globe Group. Introduction of the “Prepaid Card System” and “Short Message Service” in 1999 drastically increased the number of subscribers and exceeds the number of land-line subscribers in 2000, reaching 34 million in 2003 with the dissemination ratio of 42%.

In the Philippines, trade-in of used cellular phones is widely disseminated, in which the traded cellular phones are repaired or refurbished with spare parts for resale as second-hand ones. For those which cannot be sold as second-hand, recyclable and reusable parts are disassembled for resale in the market or traded with junk shops. Most of the non-recyclable materials are disposed with municipal solid waste.

As to the cellular phone batteries, most of the replacement batteries sold in the Philippines come from China. Different from the other electric/electronic appliances, no strict quality control has been carried out for cellular phone batteries. Therefore, the quality of batteries largely depends upon the consciousness of importers and producers.

In case the replacement batteries are found broken or defect, the wholesalers can send them back to China for exchange within the 6 months. On the other hand, the batteries that have already been expired of their guarantee period are currently sold at 3 PHP per kg while the used battery chargers are sold at 10 PHP per kg.

Cellular phone providers such as Nokia, Motorola, and Sony Ericsson also provide replacement services of genuine batteries at the price of 900 PHP per battery while non-genuine batteries widely sold in the market are much cheaper than the branded genuine batteries.

General subscribers of cellular phones in the Philippines seldom buy the branded genuine batteries for replacement. There are also imitated genuine batteries sold in the market, of which the durable period is about 1 year. Since some of the imitated batteries do not have capacitor control device for recharging, it can possible ignite or explode. In September 2006, there was a report on ignition of cellular phone batteries that are sold at 50 PHP on the street.

(2) Personal Computer

In the Philippines, about 90 thousand units of new computers are annually imported while 40 to 50 thousand second-hand computers are also imported, as shown in the table below.

Table 6.6.1 Number of New PCs Imported to the Philippines (2004)

Import Origins	PC		
	Desktop	Laptop	Total
Hong Kong	18,017	10,207	28,224
Singapore	14,096	315	14,411
Japan	11,791	158	11,949
China	8,216	3,577	11,793
USA	6,857	385	7,242
Malaysia	4,478	10	4,488
Korea	998	1,973	2,971
Ireland	2,588	12	2,600
Taiwan	1,296	41	1,337
Indonesia	1,319	3	1,322
Others	1,509	592	2,101
Total	71,165	17,273	88,438

Source: 2004 Importation data recorded by Bureau of Importation Services (BIS)

Table 6.6.2 Number of Used PCs Imported to the Philippines (2004)

Import Origins	PC		
	Desktop	Laptop	Total
Korea	16,520	0	16,520
Japan	13,339	1,014	14,353
USA	3,674	1,999	5,673
Australia	2,681	1,706	4,387
Canada	1,810	0	1,810
Singapore	343	0	343
Taiwan	7	0	7
Total	38,374	4,719	43,093

Source: 2004 Importation data recorded by Bureau of Importation Services (BIS)

The second-hand PCs sold in the Philippines are mostly imported from abroad while almost no domestically used PCs in the market. The imported used PCs are first check with the function and operation conditions for resale. As to those which cannot be resold due to malfunction, valuable materials are disassembled for selling to the recyclers or sent back to the origins of imports.

(3) Television

Although the domestic market for television has been kept increasing until 2004, it has been slightly decreased in 2005 due to price increase and related VAT. However, in the mid and long term, there are still big potential market for TV, taking into account the current limited dissemination.

In addition, a large amount of second-hand TVs are imported from the major ports in the Philippines such as Manila, Batanagas, and Davao. About 60 to 70% of the imported TVs are from Japan. The imported TVs are adjusted with the voltage for resale by second-hand dealers. The TVs that cannot be sold as second-hand due to its malfunction are disassembled for resale of valuable parts and materials.

(4) Refrigerators

Import of second-hand refrigerators are very limited in comparison with TVs. The imported second-hand refrigerators are refurbished through exchange or injection of refrigerant for resale. CFCs are still utilized as the replacement refrigerant for old-type refrigerators.

6.6.2 Collection, Recycling and Disposal of Used Electric/Electronic Appliances

(1) Centralized collection and disposal

Surplus dealers with nationwide coverage generally practice centralized collection and disposal, particularly within Metro Manila and adjacent provinces. While Cebu and Davao e-shops mentioned return of defective units back to suppliers outside the region, a good number of units can be assumed to stay within the island/ city. Some Binondo-based (Chinese) main offices hesitate to divulge how they dispose of the collected e-waste from their branches; others have direct connections with e-waste recyclers abroad.

Members of the HMR Group of companies such as Save on Surplus (S.O.S.) and Uniz Econo usually sell their e-waste to local recyclers, particularly HMR Envirocycle located in Sta. Rosa Laguna, also a member of the HMR network. Envirocycle basically engages in dismantling e-items and ties-up with recyclers for plastics (Polytrader Plastic Products in Laguna) and metal components (Philippine Recyclers, Inc. in Bulacan). For residual e-waste, these mainly involve mechanical/physical processing i.e. cutting, for exportation to specialized recyclers mostly in Korea, and some from Japan, Australia and Malaysia. Circuit boards and picture tubes are exported as a whole to Korea.

Table 6.6.3 Price List of E-waste and Other Recyclables

Item	Description	Selling Unit Price (PhP)
TV	Whole units, non-working	2,000/ truck 25 – 500/pc
Ref	Whole units, non-working	700/pc
Cell phone batteries	Whole unit	3-5/ pc
Picture tube	Whole working unit	150/ pc
Picture tube	Whole non-working unit	50/ pc
CRT	Per kg	8/kg
Circuit boards	Per piece – “digital”	50/pc
Motherboards, video/sound cards etc	Bulk per kg for precious metals recovery	2,500/kg
Copper wires	Bulk	80-100/kg
Electrical wires	Bulk	4-8/kg 20-40/kg
Copper scraps	Bulk	225-300kg
Other metals	Per kg – Ref casing, etc Per kg - “lata” – tin	18-22/ kg 75/ kg
Hard plastic	Per kg Per kg – Ref /TV casings, etc	5-8/kg 18-20/kg

(2) Recyclables Collection Events

Since 2002, the Philippine Business for the Environment (PBE) has spearheaded waste markets, dubbed as Recyclables Collection Events (RCEs), geared not just for traditional junk materials but also for e-waste. Private groups and individuals are encouraged to bring their waste either for trade or donation to accredited recyclers of each type of waste present during the event. This year has seen replications of the RCE, usually done annually during Earth Day, by local government units of Quezon City, Marikina City, La Trinidad Benguet, Cebu City, and Surigao, Cagayan de Oro and Davao in Mindanao. These were also in cooperation with local business groups and chambers of commerce. During RCEs handled by PBE, the secretariat in-charge made sure that there should only be one invited/assigned recycler/buyer per type of recyclable to avoid possible conflicts that may rise in the process. These buyers usually have facilities in Bulacan, Laguna or Cavite. In the La Trinidad, Cebu and Davao events, multiple buyers/ local recyclers were tapped (not based in Luzon/ Metro Manila) so it can probably be assumed that the waste collected stayed within their immediate area of jurisdiction/ Cebu island/ Mindanao.

From September to December this year, PBE is hosting monthly RCEs in Makati and Muntinlupa, in cooperation with the local Environmental Sanitation Centers and Materials Recovery Facilities. One RCE held in Muntinlupa last Oct. 20 was visited for this study. The manager of the MRF in Muntinlupa shared that usually their MRF accommodates 10-11 tons of recyclables in a month, but in the past three months, there has been an observed reduction of this volume to 6-7 tons per month. They have attributed this to RCEs as well as an increase in a number of small junkshops in the area; locals have seen that this could be a viable business. He mentioned that HMR Envirocycle helps locals to set up junkshops to increase collection efficiency and recovery volume particularly of non-traditional waste.

(3) Disposal of cell phone batteries

Given its high consumption volume and distribution, cell phone battery disposal and recycling proves to be problematic since there is no known recycler of cell phone batteries in the entire Philippines. Even during the RCEs, cell phone batteries brought are collected by a lead-acid battery recycler based in Bulacan, however they admitted that they have no processing facility and these are just stored.

There have been efforts by local industry leaders to collect cell phone units and batteries. According to an article in PBE's Business and Environment magazine (Vol.8, No.1, 2003) Nokia launched "The Future is in Your Hands" back in mid-2000, wherein bins were set up in Nokia Care Centers in Metro Manila, Metro Cebu and Davao. Collected units and batteries were then sent to Citiraya Industries, a Singapore-based recycling firm. To date, there are 120 bins across the Asia Pacific region. Sony Ericsson also has phased out the use of nickel cadmium batteries in their mobile phones.

6.6.3 Issues of Recycling Used Electric/Electronic Appliances

Based on the current recycling of used electric/electronic appliances in the Philippines, the major issues are outlined as follows:

(1) Identification of the use, disposal and treatment of used electric/electronic appliances

Due to complex distribution of second-hand appliances by informal dealers, it is very difficult to trace the process of use, disposal and treatment of used electric/electronic appliances in the Philippines. It also makes it difficult to identify the potential recycling market scale of electric/electronic appliances, that may disturb proper recycling policies and programmes for such E-appliances in the future, when a large number of used ones are generated.

In this regard, the current stock of new and used electric/electronic appliances must be properly identified for future projection of E-waste in terms of quantity as well as types.

(2) Potential health and environmental impacts arising from improper treatment and disposal of the used E-appliances

Currently in the Philippines, most of the used e-appliances are imported from abroad while there is no rules, regulations or standards for their proper treatment, which may result in arising of the following potential negative impacts upon human health and environment.

1) Environmental Impacts resulting from improper disposal non-recyclable materials such as cellphone batteries, printing circuits and refrigerant, and other potentially hazardous substances

2) Safety risk arising from improper adjustment or replacement of spare parts for resale

Although there is no significant amount of used E-appliances generated in the Philippines, the amount will increase in the near future, taking into account the dissemination of E-appliances with economic growth and ratio of second-hand ones held by users. Therefore, it is important to prepare the future E-waste recycling policies and programmes based on accurate identification and estimation of the current stock of E-appliances.

In addition, the existing second-hand dealers and repair factories should be normalized in terms of its safety and environment protection, as well as utilized at its utmost to maximize the available resources for proper E-waste recycling with the minimum incremental investment in the Philippines.

6.6.4 Action Plan for E-Waste Recycling

Based on the current status and issues of E-waste recycling, the actions to be taken by each stakeholder for further development of E-waste recycling are shown in the table below.

Table 6.6.4 Action Plan for E-Waste Recycling

Stakeholder	Actions
Government	<p>1. Short-term actions (1 to 3 years) (Establishment of laws and regulations)</p> <ul style="list-style-type: none"> ▪ Rules and regulations for handling, resale and import/export of second-hand electric/electronic appliances ▪ Rules and regulations for handling of hazardous substances in second-hand electric/electronic appliances <p>(IEC)</p> <ul style="list-style-type: none"> ▪ Collection and dissemination of the information and data on the stock and disposal of the used/second-hand electric/electronic appliances ▪ Identification of dealers, repair shops, disassemblers, and recyclers of used/second-hand electric/electronic appliances ▪ Application of rules and regulations to the relevant stakeholders <p>2. Mid-term actions (3 to 5 years) (IEC)</p> <ul style="list-style-type: none"> ▪ Continuation of the short-term actions <p>(Development of E-waste recycling industry)</p> <ul style="list-style-type: none"> ▪ Formulation of national recycling policy on E-waste ▪ Implementation of E-waste recycling model projects ▪ Development of E-waste recycling industrial area ▪ Establishment of E-waste recycling industry
Industry (Electric/electronic appliance manufacturers)	<p>1. Short-term actions (1 to 3 years)</p> <ul style="list-style-type: none"> ▪ Provision of data on production and sales of electric/electronic appliances ▪ Provision of other information required for proper E-waste recycling. ▪ Examination for application of EPR for proper E-waste recycling <p>2. Mid-term actions (3 to 5 years)</p> <ul style="list-style-type: none"> ▪ Campaign for collection and recycling of E-waste ▪ Implementation of model collection and recycling of E-waste under the initiative of industrial group
Industry (Second-hand dealers, and recyclers)	<p>1. Short-term actions (1 to 3 years)</p> <ul style="list-style-type: none"> ▪ Formal registration as dealers ▪ Participation in formulation of rules and regulations ▪ Compliance with the rules and regulations <p>2. Mid-term actions (3 to 5 years)</p> <ul style="list-style-type: none"> ▪ Implementation of model collection and recycling of E-waste in cooperation with industries and citizen
General public	<p>1. Short and mid-term actions (1 to 5 years)</p> <ul style="list-style-type: none"> ▪ Proper understanding and implementation on handling of E-waste