Options for Solid Waste Management for Metro Manila, Philippines

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ABSTRACT

The Government of the Philippines has considered the solid waste crisis as an urgent national concern. Since devolution Local Government Units, especially in Metro Manila, have had difficulties in coping with the collection of large volume of solid waste generated in the metropolis. The existing landfills and dumpsites are also rapidly reaching their maximum capacities.

This study examines and evaluates the existing institutional arrangements in Metro Manila and other countries in the ASEAN for the purpose of generating recommendations for the improvement of solid waste management service delivery in Metro Manila.

A framework for evaluation of the institutional arrangements was developed which addresses the following questions: How is solid waste management service treated: is it public or private good/service? What are the roles of the different participants in the solid waste management service delivery chain? What are the operating arrangements in the delivery of solid waste management services? How do the institutional arrangements measure up to the criteria of efficiency, effectiveness, and equity?

This framework was used to assess, by survey, arrangements in case studies in the major metropolitan areas of five ASEAN countries (Singapore, Bangkok, Jakarta, Kuala Lumpur and Metro Manila).

The results of these case studies were used to generate the institutional options for solid waste management for Metro Manila. The research concluded that the appropriate arrangement for Metro Manila is the joint public-private provision of solid waste management services using contracting, franchising, licensing and community arrangements. Contracting and community arrangements have the most advantages in terms of attaining the objectives of efficiency, effectiveness and equity. Franchising and licensing have limited applications because of equity considerations.

This study also generated suggestions for institutional reform for effective solid waste management in Metro Manila: the "do-nothing" or status quo option; individual LGUs to be given collection, recycling, transfer and disposal responsibilities and fiscal autonomy in revenue generation; creation of commissions among LGUs and; creation of a single-purpose Metro Solid Waste Authority. Among the options, the creation of one or more commissions among LGUs appears to be the most feasible option at this point in time as it achieves economies of scale and allows possibilities for building managerial and operational competence among LGUs without loss of local autonomy.

In all arrangements, the role of the public sector is critical in the development, negotiation, management, monitoring and enforcement of public-private agreements, and for equity purposes. Whatever arrangement eventuates, government agencies need to implement training and capacity building in SWM.

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TABLE OF CONTENTS

List of Tables and Figures **Page**

List of Abbreviations

ABC	- Association of Barangay Councils
APT	- Asset Privatisation Trust
ASEAN	- Association of Southeast Asian Nations
BLGD	- Bureau of Local Government Development
BLGS	- Bureau of Local Government Supervision
BMA	- Bangkok Metropolitan Authority
BOT	- Build, Operate, and Transfer
BOO	- Build, Own, and Operate
BOOT	- Build, Own, Operate, and Transfer
BTO	- Build, Transfer, and Operate
CBD	- Central Business District
CBO	- Community-Based Organizations
CBR	- Crude Birth Rate
CDR	- Crude Death Rate
CSD	- Corporate Services Division (Bangkok)
CSD	- Contract Services Division (Petaling Jaya)
DBM	- Department of Budget and Management
DBP	- Development Bank of the Philippines
DECS	- Department of Education, Culture and Sports
DENR	- Department of Environment and Natural Resources
DEPW	- Department of Engineering and Public Works
DES	- Department of Environmental Sciences
DILG	- Department of Interior and Local Government
DOH	- Department of Health
DLG	- Department of Local Government
DPC	- Department of Public Cleansing
DPWH	- Department of Public Works and Highways
DTI	- Department of Trade and Industry
ECC	- Environmental Compliance Certificate
EED	- Environmental Engineering Division
EHD	- Environment Health Department
EIA	- Environmental Impact Assessment
EIS	- Environmental Impact Assessment System

EMB	- Environmental Management Bureau
EPHD	- Environmental Public Health Division
EPMD	- Environmental Policy and Management Division
ESC	- Environmental Sanitation Center
ESD	- Engineering Services Department
GDD	- Garbage Disposal Division
GDP	- Gross Domestic Product
GOCC	- Government-Owned and -Controlled Corporation
GNP	- Gross National Product
HUD	- Housing and Urban Development
IACEP	- Inter-Agency Committee on Environmental Protection
ICMA	- International City Management Association
ILO	- International Labour Organization
INSWMSF	- Integrated National Solid Waste Management System Framework
JICA	- Japan International Cooperation Agency
LDPO	- Local Development Planning Office
LGA	- Local Government Academy
LGU	- Local Government Unit
LLDA	- Laguna Lake Development Authority
MAPSA	- Makati Assistance for Public Safety Authority
MMC	- Metro Manila Commission
MMDA	- Metro Manila Development Authority
MOE	- Ministry of the Environment
NCR	- National Capital Region
NEDA	- National Economic and Development Authority
NEPC	- National Environmental Protection Council
NGO	- Non-Government Organization
NIMBY	- "not in my backyard"
NSCB	- National Statistical Coordination Board
NSWMA	- National Solid Waste Management Association
OECD	- Organization for Economic Cooperation and Development
OPDS	- Office of Project Development Services
PCD	- Pollution Control Department
PCSD	- Public Cleansing Service Division
PIA	- Philippine Information Agency

PNP	- Philippine National Police
PO	- People 's Organization
PMO	- Project Management Office
PMS	- Presidential Management Staff
PSSD	- Philippine Strategy for Sustainable Development
PTFWM	- Presidential Task Force on Waste Management
SOE	- State-Owned Enterprise
SSD	- Support Services Division
SWM	- Solid Waste Management Service Development and Delivery
SWMD	- Solid Waste Management Division
TPD	- Tonnes per day
UMP	- Urban Management Programme
UN	- United Nations
UNDP	- United Nations Development Programme
UNCHS	- United Nations Centre for Human Settlements
USAID	- United States Agency for International Development
WHO	- World Health Organization

Chapter I
INTRODUCTION

1.1 Background

The Philippine Government is faced with the challenge of providing for urban infrastructure against a background of constrained economic growth, heavy debt servicing, financial austerity, high population growth and rapid urbanization. The scarcity of financial resources for infrastructure development and the lack of priority accorded solid waste management have resulted in a poor quality of service delivery, especially in Metro Manila.

The consequences of inadequate waste collection and disposal, such as air pollution, degradation of water bodies, increased incidence of water-borne and respiratory diseases mean that solving the problem of waste management takes on some urgency. In 1987, having recognized solid waste problems in Metro Manila as a national concern, the President created the Presidential Task Force on Waste Management (PTFWM). The PTFWM, an interagency body, was tasked initially to review all the relevant and existing proposals and programmes and come up with a consolidated solid waste management plan.

With the implementation of the Local Government Code in 1992, solid waste collection and disposal became the responsibility of the local government units (LGUs). The code was expected to improve the delivery of basic services, including solid waste management.

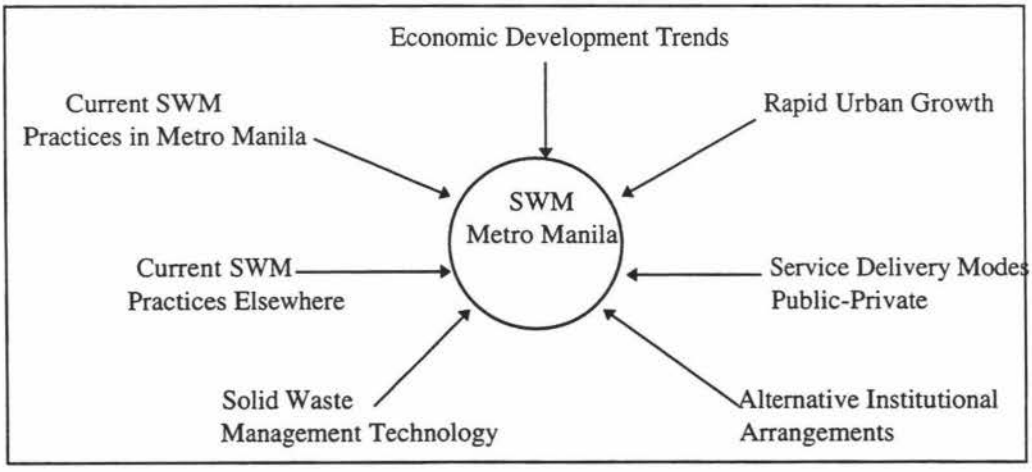
Despite the achievements of the PTFWM and LGUs, solid waste management remains underfunded and the inherent financial, technical, and administrative problems faced by LGUs limit their ability to respond. Subsequently, the government began to seek the participation of potential partners in public provision: the private sector and community organizations.

Realizing the potential of the private sector and community to contribute to solid waste management service development and delivery (SWM), the government has looked into possible partnerships with both sectors. The Integrated National Solid Waste Management System Framework (INSWMSF) has identified areas where new partnership ventures may be forged.

In rethinking institutional arrangements in SWM, it is important to consider the strengths and weaknesses of existing arrangements to determine where improvement is called for and where existing arrangements might best be abandoned.

A range of issues has important bearing on SWM in the mega-cities in Asia such as Metro Manila (Figure 1-1). Development and economic trends in the country determine how resources are allocated for SWM, and hence affect the quality of service delivery. Increasing urban growth at a fast rate places a strain on solid waste management administrators in terms of providing effective and efficient collection services and adequate and environmentally-sound waste disposal services to rapidly increasing population. How people and service providers regard SWM (whether a private or public good/service) also has bearing on solid waste management as it tends to shape the kind of institutional arrangement through which such goods or services are provided. Alternative institutional arrangements also have an impact on the quality of performance of SWM as such arrangements reflect the principles and practices underpinning them.The use of appropriate and adequate technology in SWM also affects the manner by which solid wastes are collected and disposed. Current solid waste management practices in other countries also affect the SWM operations locally as the country endeavors to compete in the global market. Finally, current SWM practices in Metro Manila have significant bearing on the quality of service delivery.

Figure 1-1 Range of Issues to be Addressed in SWM



1.2 Thesis Aim and Objectives

This thesis aims to contribute to the identification of appropriate institutional arrangements for the management of solid waste in Metro Manila by pursuing the following objectives:

- Describe the existing and current status of solid waste management system in Metro Manila;
- Identify the impediments to effective solid waste management;
- Identify the roles of participants and the existing institutional arrangements in solid waste management in Metro Manila; and
- Evaluate the institutional arrangements against the criteria of effectiveness, efficiency, and equity.

The possible means by which these objectives are pursued is through a survey of existing arrangements for solid waste management in Metro Manila among LGUs, and a comparison of these results with a similar survey of arrangements in major metropolitan areas elsewhere in Asia.

1.3 Thesis Outline and Methodology

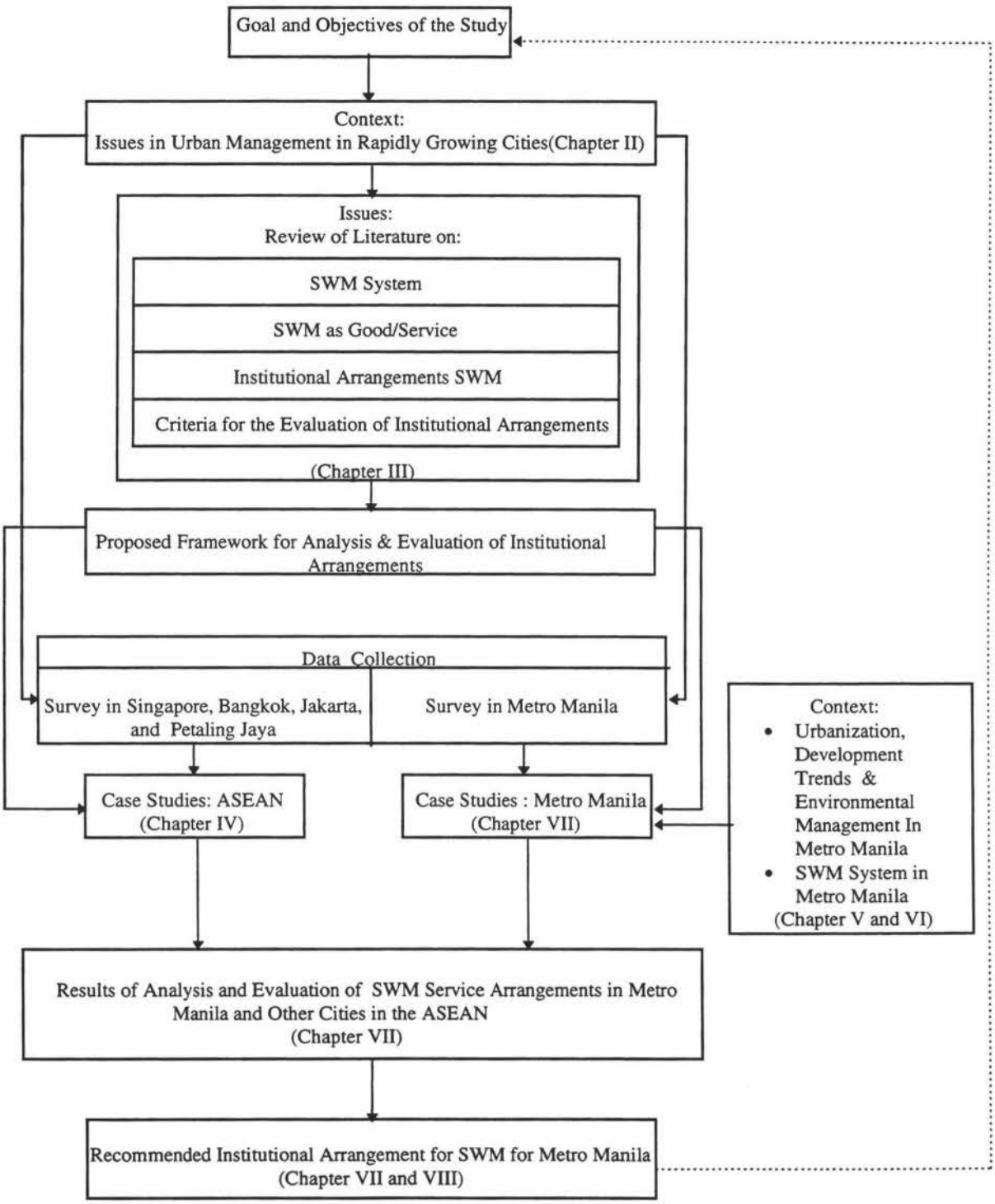
Thesis Outline

Figure 1-2 illustrates how chapters of this thesis are connected with one another leading to the attainment of research objectives which have been presented in the previous section.

Chapter II provides a background on urban management in rapidly growing cities in Asia by explaining the process, historical influences, trends, issues and factors underlying urbanization, and the consequences of urbanization and the challenge they pose to governments in providing basic urban services.

Chapter III focuses the discussion of urban services on solid waste management, including the functional components of SWM system. The chapter also discusses alternative arrangements to government provision of urban services in general, and solid waste management services in particular. Chapter III also includes a discussion on the criteria for evaluating alternative

Figure 1-2 Research Design



institutional arrangements, and concludes by outlining the framework for analysis of solid waste management for Metro Manila.

Chapter IV presents the practices, operations and institutional arrangements for solid waste management service delivery in Singapore, Petaling Jaya, and Bangkok. The results of this analysis contribute to the generation of options for solid waste management for Metro Manila, considered in Chapter VII.

Chapter V discusses the range of factors influencing solid waste management in Metro Manila: historical influences, urbanization, economic performance, environmental management context and the sustainability imperatives.

Chapter VI describes the existing system, regulatory and organizational framework of solid waste management. This serves as a springboard to the examination/analysis of institutional arrangements in Metro Manila which is done in the next chapter.

Chapter VII examines the existing institutional arrangements in the delivery of solid waste management services in Metro Manila. In the analysis and evaluation of the existing institutional arrangements, the framework proposed in Chapter III was also applied. Finally, Chapter VII tries to integrate the results of the analysis done for the ASEAN case studies (in Chapter IV) with Metro Manila's. Accordingly, institutional arrangements recommended for Metro Manila were generated and discussed.

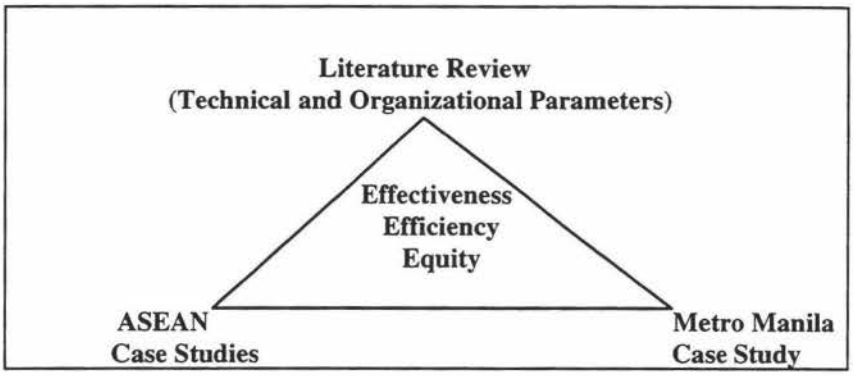
The last chapter reviews the findings of the thesis, makes recommendations for the improvement of the solid waste management system in Metro Manila, and concludes by suggesting areas for future research.

Methodology

This study utilizes case studies. Yin (1981) defines a case study as an empirical inquiry that investigates a contemporary phenomenon within its real life context. The case study method is an ideal research strategy when the researcher intends to cover contextual conditions relevant to his/her study. From the point of view of the present research, the case study method can cope with the technically distinctive situation in which there are many variables of interest. It draws on multiple sources of evidence, though these data might converge by means of triangulation. Figure

1-3 shows triangulation of data in this thesis. With triangulation, multiple sources of evidence essentially provide multiple measures of the same phenomenon (Patton, 1987). It was found in one review that case studies using multiple sources of evidence were of a greater quality than those that relied on a single source of information (Yin, Bateman & Moore, 1983).

Figure 1-3 Triangulation of Data



To generate the needed information in this research, surveys were conducted and government reports, copies of official communications from relevant agencies, and consultants' reports were examined. Personal communication with the relevant agencies was undertaken when necessary.

Major metropolitan areas of four countries (Singapore, Thailand, Indonesia and Malaysia) in Asia and Metro Manila in the Philippines were surveyed. Singapore, Bangkok, Jakarta and Kuala Lumpur were selected for survey on the basis of their high population densities and their economic status. Information was gathered from each city by means of a questionnaire directed to the major agency responsible for solid waste management. The agencies were identified with the assistance of the relevant embassies in Wellington.

Embassy officials were also consulted with regard to the content and structure of the questionnaires. Information was sought on organizational structures, solid waste generation, collection, transfer and disposal activities and facilities (quantities, types of wastes, sources, etc.), institutional arrangements adopted for service delivery, human resources and funding, charging systems, capital investment and long-term planning.

A survey was conducted in all cities and municipalities in Metro Manila and the Metropolitan Manila Development Authority (MMDA). Each city or municipality was given one questionnaire

containing the same questions as those contained in the ASEAN survey. Questions about accountability and relationship with other agencies in the SWM were also included.

Since the surveys could not be conducted face-to-face, there were some difficulties in gathering the appropriate information limiting the findings of this study.

The study was not able to include the private contractors because of the difficulty in identifying them. Hence, the results reflect the perspectives of government agencies only, and information on activities of the private sector were based on the information given by these agencies.

Chapter II
URBAN MANAGEMENT IN RAPIDLY GROWING CITIES

The difficulties of providing infrastructure services in Asia are linked to the history of urbanization and, particularly, the emergence of megacities. The physical and environmental challenges faced by these cities are contingent on the institutional arrangements for physical development, commerce and administration. Resolving environmental problems cannot be addressed without an understanding of their root cause, in this case the continuing pressure from urbanization. Proposals to address and manage environmental issues cannot be considered independently of the country's history and consequent arrangement for government provision of public services.

This chapter discusses the process of urbanization and the issues it raises in the development of Asian countries. The discussion describes the roots of urban primacy in Southeast Asia, the forces underlying urbanization and, particularly, population concentration in major metropolitan areas.

2.1 Urbanization

2.1.1 History of Urbanization in Southeast Asia

Urban development in Southeast Asia has gone through four different phases. The first, which dates from the third century B.C., was one of indigenous urbanization. Three types of city developed during this phase, each exercising different functions: administrative, sacred and coastal (McGee, 1967). The sacred city, typically located in the interior, was often the capital. It possessed an elaborate religious structure, functioned to redistribute agricultural products gathered from the farmer as tax, and spread the monarch's absolute power throughout the country. Technological innovations necessary for market functions were hindered by monarchs on the basis of whim and religious bias. The sacred cities were closed societies with limited human interaction (Reed, 1976).

The administrative cities functioned within a hierarchy: imperial capital, provincial or vassal capital and regional centres. These were centres of political power, tax collection, and administrators appointed by the monarch. Sacred and administrative cities declined if they lost the monarch's patronage or were occupied by alien rulers.

Coastal cities were developed by merchants who depended for their prosperity mainly on trade. Their political systems represented many different groups. Market functions were based on the principle of a free market society and technological innovation was encouraged to facilitate this (Reed, 1976).

During colonial times, coastal cities were reinforced while sacred cities collapsed because of their parasitic character. The temple-based Angkor City complex of Cambodia (802-1220) is a good illustration of this (Dutt, 1994).

The second phase of Asian urbanization was associated with colonization from the 16th century. This era generated a port-based, export-oriented urban economy, existing largely for the benefit of the manufacturing and mercantile needs of the European colonial power. Europeans saw Southeast Asia's potential as a source of raw materials for industrial development (Dixon, 1991). Most of the Asian countries had one large city, invariably at a riverine or coastal location for ease of communications and transportation, to perform the main urban functions. These included the export of raw materials and housing the military and administrators. The functions of the colonized countries were controlled through these cities. They grew as capitals and because of their processing and exporting activities, outstripping and dominating other cities. As a result, the relationship between these large cities and other cities changed rapidly, with the former increasing in resources, power and commercial stature and growing much faster as result.

Colonial rule also influenced the region's cultural, socio-economic and political systems. The urban structures absorbed colonial cultures (McGee, 1967). A large number of these colonial cities have grown to be primate cities, the pivotal role of which can be gauged by the proportion of urban population they contain (McGee, 1971). Capitalist economic systems were established in the region, particularly in the primate cities where the market and industrial structures were most active. Beyond these centres of power and administration, urban development tended to be restrained by the colonial powers (Dutt et al., 1994).

The third phase was that of extended pre-industrial urbanization, a prelude to the modern era. The promotion of economic modernization, the shaking off of the colonial legacy, and the emergence of productive urban areas characterized this phase (Rigg, 1991).

Except for a few countries in Southeast Asia, industrialization lagged behind other developing regions (Ginsburg et al., 1991). Singapore is fully industrialized while Malaysia, Thailand, and the Philippines have started to industrialize and are in the final stages of the third phase of Asian urbanization. The

dominance of market economy and rapid economic growth have made places like Bangkok, Jakarta, Kuala Lumpur and Manila into "progressive" cities characterised by sky-scrapers, hotels, impressive administrative buildings, and sophisticated transport infrastructure.

Decolonization of Southeast Asian countries involved the restructuring of urban areas such that their economies shifted from dependence on primary exports to dependence on processed exports. This favoured the already advantaged colonial capitals because of their skilled work force, infrastructures, and access to resources. They were further favoured by trade and communication advantages, and the fact that the economies of most countries in the region depended heavily on the exports which typically flowed through them (Dutt et al., 1994).

Industrial-based urbanization, which is the fourth phase of urbanization in Asia, began in Singapore in the 1990s while the other countries in the region will enter this phase by the 21st century (Dutt et al., 1994). This phase is characterized by the use of high technology devices and production of goods out of capital-intensive enterprises. The old town business district has been modernized and a strong office-based Central Business District (CBD) has been established. A large number of households live in multi-storied, garden-like new towns filled with facilities for daily needs and connected by efficient mass transport systems with the CBD.

2.1.2 Urbanization in Fast Growing Cities in Developing Countries in Asia: Issues, Trends, and Patterns

Urbanization refers to the rise in the proportion of the total population of a nation living in urban places. It denotes the changing balance between rural and urban populations brought about by the migration of people from rural to urban areas, and by differences in the rates of natural increase of the population in the two areas (Pernia, 1993).

Based on world standards, Asia as a whole has low levels of urbanization (Table 2-1). Southeast Asia has a slightly higher level of urbanization (29 %) compared with South Asia. Projections suggest that by the year 2010, most countries in the ASEAN region will still be below the 50 per cent urbanization mark, although this excludes Malaysia, the Philippines and Singapore.

The smaller Asian countries have generally urbanized faster than the bigger ones. China, India and Indonesia are projected to be more rural than urban by the year 2010 (Pernia 1993). The projections point to the likelihood that urbanization in the region will increase slowly rather than rapidly.

However, the acceleration of industrialization in Indonesia, Malaysia, the Philippines, and Thailand will see urbanization grow more rapidly in those countries than in less industrialized countries (like Myanmar, Vietnam, Laos and Cambodia).

Table 2-1 Level of Urbanization and Annual Change (Percentage)

Region/Country	Level of Urbanization				Average Annual Change		
	1950	1970	1990	2010	1950-1970	1970-1990	1990-2010
Southeast Asia	**14.6**	**19.9**	**29.2**	**42.6**	**1.5**	**1.9**	**1.9**
Cambodia	10.2	11.7	11.6	19.7	0.7	0.0	2.7
Indonesia	12.4	17.1	28.8	44.5	1.6	2.6	2.2
Lao People's Democratic Republic	7.2	9.6	18.6	32.6	1.4	3.4	2.8
Malaysia	20.4	27.0	43.0	58.4	1.4	2.4	1.5
Philippines	27.1	33.0	42.7	55.7	1.0	1.3	1.3
Singapore	100.0	100.0	100.0	100.0	0.0	0.0	0.0
Thailand	10.5	13.3	22.2	36.6	1.2	2.6	2.5
Vietnam	11.6	18.3	19.9	27.4	2.3	0.4	1.6
South Asia	**15.8**	**19.0**	**24.9**	**34.6**	**0.9**	**1.4**	**1.6**
East Asia	**11.6**	**19.3**	**29.1**	**44.7**	**2.6**	**2.1**	**2.2**
Asia	**13.6**	**19.3**	**27.4**	**39.8**	**1.7**	**1.8**	**1.9**
World Total	29.3	36.6	43.1	52.8	1.1	0.8	1.0
More Developed Regions	54.3	66.6	72.7	79.1	1.0	0.4	0.4
Less Developed Regions	17.0	24.7	34.3	46.8	1.9	1.7	1.6

Sources: United Nations (1993); and ADB (1989, 1992)

2.2 Factors Underlying Urbanization

2.2.1 Population Growth

There are three elements that cause the growth of urban areas: natural increase, rural-to-urban migration and reclassification. Among these, rural-to-urban migration and natural increase are the main causes of the rapid growth of urban populations in developing countries.

The fertility rate, the crude birth rate (CBR) and the crude death rate (CDR) have declined in the Southeast Asian Region over the last three decades. They are projected to gradually decline by the turn of the century (Table 2-2) and will continue to do so until the year 2020. Greater natural increase entails greater urban growth because urban population is not only increased by new births but the expansion of the rural population also generates a continuous "rural push". The "rural push" factor has been caused not by technological modernization in agriculture but by high rates of natural increase. The resulting rural unemployment and under-employment "pushes" surplus agricultural labourers and residents from rural areas to the cities where relatively better opportunities exist (Dutt, 1994).

Future projections indicate that the rate of natural increase will decline before the turn of the century and that the rate of migration will increase. Urban growth rates will then become far more dependent on migration and the process of industrialization and the economic growth it sustains. This means that the large numbers of population moving to the urban areas will add to the growing urban population and compound existing problems of poverty, unemployment and underemployment, inadequate infrastructure and social services, and environmental degradation.

Table 2-2 Fertility, Crude Birth Rate (CBR), and Crude Death Rate (CDR)) in the World, Asia, and Southeast Asia

Country	1960-1970	1970-1980	1980-1990	1990-2000	2000-2010	2010-2020
			Fertility			
World	4.93	4.15	3.53	3.21	2.87	2.48
Asia	5.69	4.55	3.59	3.11	2.64	2.22
Southeast Asia	5.84	5.03	3.83	3.02	2.45	2.15
			CBR			
World	34.6	29.5	27.1	25.6	22.1	19.1
Asia	39.0	32.3	28.0	25.6	20.7	17.3
Southeast Asia	41.8	36.3	30.9	25.6	20.8	17.8
			CDR			
World	14.4	11.7	10.2	9.0	8.2	7.7
Asia	15.9	11.6	10.0	8.2	7.4	7.1
Southeast Asia	17.5	13.6	10.4	8.3	7.2	6.9

Source: United Nations, 1989

2.2.2 Industrialization and Urbanization

Mutual links between continued urbanization and industrial development compound the economic and social dominance of cities or the areas of relatively limited urbanization in Asia.

The specialization of labour is fundamental to industrialization, the very existence of a large urban population sustaining industrial progress (Rondinelli, 1983). The main cities in the Southeast Asian region possess the most established educational institutions thereby producing population of high technical and managerial qualifications.

Accelerated industrialization "pulls" people from the rural areas toward the urban centres where they avail of educational and training opportunities in the city, and later serve the need of growing industries and meet their demand for low cost unskilled or semi-skilled labour (Dutt, 1994).

The availability of a concentrated market is perhaps one of the strongest incentives to further industrialization. Cities in developing countries contribute to economic growth and social transformation by providing economies of scale and proximity that allow industry and commerce to

flourish and create jobs (Rondinelli, 1983). The presence of industries and markets in the cities further induces migration and reinforce the process of urbanization.

Perhaps one of the most striking examples of urban-centred location in developing countries is the tendency of banking and other financial institutions to concentrate in the large metropolitan cities. Cities play the role of engines of growth. Investment returns are high in cities with increased productivity and high employment opportunities (Dutt, 1994). Countries in Southeast Asia are seen as ideal locations for investment from developed countries because of the supply of cheap labour, which can be complemented with managerial and technical skills. This investment further fuels industrialization.

The availability and concentration of managerial and entrepreneurial talent is one of the most important factors in furthering economic development while enhancing the prospects for new enterprise (De Dios, 1980).

To sum up the foregoing discussion, industrialization and continuing urbanization mutually and strongly reinforce each other that their continued interaction and the effects arising therefrom seem to be in a vicious cycle. The factors associated with industrialization, such as infrastructure, capital and investment, skilled labour, and the entrepreneurial environment induce rural-urban migration. On the other hand, the continuing migration to the urban area also induces growth because demand for market goods also increase thereby driving industrialization further.

2.3 Urban Primacy and the Emergence of Mega-Cities

2.3.1 Urban Primacy

Urban primacy is a particular form of urbanization in which urban population and economic activity are heavily concentrated in one or a few large cities. A measure of urban primacy is the percentage of a country's urban population (or total population) residing in the largest urban agglomeration, known as its primate city.

Primacy is common in a developing countries since the primate cities have played a dominant role, first, as colonial enclaves and, later, as centres for industrialization (Pernia, 1992). Primate cities tend to offer better employment opportunities and provide higher wage levels than other cities. They offer

all the advantages of urbanization generally, and reinforce these relative to other cities. Political, financial, and administrative power is usually concentrated in the primate cities. These characteristics reinforce the attraction of primate cities drawing population not just from the countryside but also from smaller cities (Cheema 1993).

Table 2-3 shows the nature of urban primacy in Southeast Asia. Thailand has an exceptionally high primacy ratio (21.4). Bangkok plays a pivotal role as the gateway to foreign contact and the centre of national entrepreneurship, generating at least 50% of the country's GDP (Dutt, 1994).

In the Philippines, the primacy ratio in 1990 was 9.2 . Manila is the national capital, the seat of the central government, the home of the head offices of major national and international corporations and banks, and the centre of the country's educational and research institutions, medical facilities and cultural activities. Manila's primacy was strengthened when the country's economic policy shifted from export promotion to import substitution. Its broadened industrial base included textiles, publishing, printing and food (U.N. 1986).

Table 2-3 Urban Primacy in Selected Asian Countries

Countries	Cities	Population	Primacy Ratio
Myanmar	Rangoon	2,458,712[a]	4.2
	Mandalay	532,895[a]	
Cambodia	Phnom Penh	800,000[b]	17.8
	Battambang	45,000[c]	
Indonesia	Jakarta	7,885,519[d]	3.9
	Surabaya	2,345,000[d]	
Laos	Vientiane	178,203[d]	1.8
	Savannakhet	96,652[d]	
Malaysia	Kuala Lumpur	1,209,800[e]	4.1
	Ipoh	293,849[f]	
Philippines	Manila	7,832,000[g]	9.2
	Davao	850,000[g]	
Thailand	Bangkok	5,876,000[g]	21.4
	Nonthaburi[1]	227,492[e]	
Vietnam	Ho Chi Minh City	4,075,700[h]	1.9
	Hanoi	2,095,000[h]	

Sources: United Nations, 1990; Encyclopaedia Britannica, 1993
Primacy Ratio: Capital City/the Second Largest City
Census Years: a=1983, b=1989, c=1987, d=1985, e=1989, f=1980, g=1990, and h=1992

The concentration of commercial and industrial activity in a country's capital city is a response to the need to be near the international gateway and the national agencies that furnish the required industrial licenses, foreign exchange allocations, credit, tax privileges, and other incentives. Excessive regulation and centralization of functions by the national governments contribute to spatial concentration (Mills 1992). More often than not, infrastructure policy favours the national capital (David 1983; Solon 1992). The spatial bias of infrastructure investments reinforces the primacy of the national capital. Location in the metropolis has been considered even more important for foreign investment (Fuchs and Pernia 1987; Herrin and Pernia 1987). On the demand side, import substitutes find their main market among urban residents of the capital city.

2.3.2 "Mega-Cities" and their Implications

Many primate cities in Asia have emerged as mega-cities. The United Nations (U.N.) defines a mega-city as an urban agglomeration with 8 million or more inhabitants (United Nations, 1991).

In Southeast Asia, Jakarta and Manila became mega-cities in 1990. The expansion of Manila and Bangkok peaked during the 1990s (at 5.2% and 2.4% population growth per annum, respectively) while Jakarta peaked in the 1980s at 4.4% per annum.

There are various viewpoints presented as regards megacities' productivity. Lipton (1977) and Todaro and Stillkind (1981) note an "urban bias" in many social and economic policies, thus, leading to excessive urban-rural migration, often to the most favoured capital city. On the other hand, Vining (1985), noting the statistical association between increasing primacy and faster economic growth, contends that the concentration of investment and population growth in the core region is the most efficient route to increased production. Data from China support the view that returns on investments are higher in metropolitan areas than in small towns or rural areas (Kim 1990).

Shanghai and Tokyo had already become mega-cities by 1960 (Pernia, 1993). Beijing reached the U.N. mark to qualify as a mega-city status in 1970 (Table 2-4).

Urban primacy and the emergence of mega-cities can also lead to agglomeration diseconomies, and concentrate a host of social, economic and environmental problems (Schteingart, 1989). The rapid and uncontrolled growth of urban population gives rise to highly charged problems of poverty, unemployment and underemployment, infrastructure and housing deficiencies, and environmental degradation.

According to the UN Centre for Human Settlements (UNCHS) in its Global Report on Human Settlements, about 30% of the developing world's urban population did not have access to safe water supplies in 1986 (UNCHS 1987). Of the developing world's urban population 40% do not have access to proper sanitation; over 50% in the case of Asia (Devas & Rakodi, 1993).

Table 2-4 Population Size (in million) of Urban Agglomerations in Asia (with 8 million+ residents in 2000)

Agglomeration	Country	1950	1970	1990	2000
East Asia					
Beijing	China	3.9	8.1	10.8	14.0
Shanghai	China	5.3	11.2	13.4	17.0
Tianjin	China	2.4	5.2	9.4	12.7
Seoul	Republic ofKorea	1.0	5.3	11.0	12.7
Southeast Asia					
Jakarta	Indonesia	2.0	3.9	9.3	13.7
Manila	Philippines	1.5	3.5	8.5	11.8
Bangkok	Thailand	1.4	3.1	7.2	10.3
South Asia					
Dhaka	Bangladesh	0.4	1.5	6.6	12.2
Bangalore	India	0.8	1.6	5.0	8.2
Bombay	India	2.9	5.8	11.2	15.4
Calcutta	India	4.4	6.9	11.8	15.7
New Delhi	India	1.4	3.5	8.8	13.2
Karachi	Pakistan	1.0	3.1	7.7	11.7

Source: United Nations, 1991

In many cities of the developing world, 40%-50% of the population lived in slums and informal settlements in the 1980s (UNCHS 1987). While not all informal settlements provide unsatisfactory living conditions, they are usually inadequately served with infrastructure. Extremely high population densities, while not proof of unsatisfactory housing conditions, usually indicate an inadequate supply of housing (Devas & Rakodi, 1993).

Apart from housing, other services lag. For most large cities in the developing world, only a quarter to a half of solid waste is collected by municipal authorities (UNCHS, 1987). Uncollected wastes, more often than not, end up on open ground or water courses, posing health risks to the residents. Waste disposal is also becoming a serious problem. Concentrations of industrial activities and of people seeking employment in large cities have overwhelmed local governments' capacity to dispose of waste and control pollution. Between 75% and 95% of all water-borne pollution in Indonesia's cities, for example, is caused by unsanitary disposal of human waste. Less than one-third of the urban population in Indonesia has access to safe disposal of human waste (World Bank, 1984). About 80% of nearly 2,500 metric tons of solid waste generated everyday in Bangkok is collected but more than half of that is merely left to decompose (United Nations, 1987). Apparently, governments in mega-

cities throughout the developing world find it increasingly difficult to cope with industrial, commercial and household waste disposal.

Other problems arising from the emergence of megacities are well documented: Bangkok's problems of flooding and subsidence; Jakarta's serious problems of water supply, encroaching salinity and appropriate corridors for expansion (Douglass 1988); the poor condition of road networks causing severe congestion as the volume of traffic grows; public transport systems disintegrating through overcrowding and lack of investment (Devas & Rakodi, 1993).

In summary, the provision of basic urban services has not kept pace with the rapid increase of urban population in developing nations. A vast majority of the urban poor do not have adequate access to such services as housing, urban transport, water supply, and public health services. Despite cities' contributions to the output and income of developing countries, rapid population growth and uncontrolled industrial development are degrading urban environments and placing strains on natural resources, thus, undermining sustainable and equitable development (Cheema 1993).

2.4 The Challenge of Urban Management

The challenge of urban management is to respond effectively to the problems and issues that have arisen as a result of uncontrolled and rapid urbanization within the context of limited resources for doing so.

2.4.1 Provision of Urban Shelter, Services, and Infrastructure

Almost without exception programmes for the supply of urban services fall far short of the needs of the people in Asia. The current rates of urban growth greatly exceed the growth in resources available for service provision, with the result that there has been serious and continuous deterioration in urban infrastructure. Governments have struggled to create sufficient financial and administrative capacity to meet the demand for shelter and urban services of growing populations.

There is a high degree of interdependence between urban services (in the form of water and sanitation services, roads and electricity supply), yet each is usually separately managed by an autonomous agency. Furthermore, these services require very large-scale capital investment at the outset and significant consequential operating and maintenance costs which make cost recovery difficult.

According to Devas and Rakodi (1993), cost recovery affects both capital investment and operating policies. It has tended to separate service agencies from all-purpose local administrations. Electricity installations are usually established on a commercial basis by the use of meter and charging systems for the purposes of covering operating costs and recovering the cost of capital. Electricity undertakings are usually financially self-sufficient as a result.

Devas and Rakodi (1993) also note that water supply is influenced by the perception of water as a natural resource which, it can be argued, should be freely available. It is also argued that water is such an essential of human life that nobody should be deprived of supply. These perspectives have led supply authorities to subsidise water charges where public funds are available. As the managing institutions are not obliged to recover costs directly from the consumers, there has been a tendency for the subsidy to increase, at least in gross terms. As a result, water authorities, faced with the need to make major capital investments in order to meet increased demand, struggle to secure development finance. National governments tend not to have sufficient resources and loan agencies do not see conventional local authorities as a sound investment. To overcome this problem many water authorities have been established as separate entities in recent years, required to apply charging systems which, in the long term, will convert them into viable commercial operations. However, it is not uncommon for strong political and consumer pressures to inhibit this transition (Devas & Rakodi 1993).

The adoption of user charging systems is not only justified economically, but it also encourages conservation. While everybody is entitled to the benefits of water supply, the responsibility of conserving has to be borne by the beneficiaries to ensure long run availability.

The operations and maintenance of infrastructure services funded from general taxation suffer because of pressure to restrain costs. Severely underfunding maintenance accelerates asset deterioration and brings forward capital replacement which agencies struggle to finance (Devas & Rakodi 1993). The result is a vicious cycle of deteriorating infrastructure and a growing affordability gap for restoration and expansion.

The very large investments required to provide and maintain adequate urban infrastructure and services may require governments in developing countries to find mechanisms to increase the participation of the private sector. This may also facilitate the application of technologies that are innovative, low-cost, and simple to use and maintain (Cheema, 1993).

Jeong-Sik Lee (1989) argues, in a case study of South Korea, that appropriate criteria for urban service allocation by urban size should be delineated. He adds that alternative mechanisms such as public-private partnerships and contracting systems should be explored to ensure efficient provision of services. Finally, he recommends that the responsibility for providing urban services be decentralized to municipal governments.

2.4.2 The Role of the Informal Sector in Urban Management

In the 1950s and 1960s, planning was seen to be the key to economic growth and "modernisation". In most developing countries, national planning agencies produced development plans, recommending large-scale investment in industry and agriculture. Investment in infrastructure tended to be seen as unproductive (Devas & Rakodi 1993).

Much of the industrial development of that period tended to be capital intensive, with the result that not many jobs were created. The emergence of the 'informal sector' became inevitable in the same period as industrial development was booming.

The informal sector is dynamic and productive and can contribute much to economic development (ILO, 1972). The main strength of the urban informal sector is its ability to generate employment opportunities. Other advantages are that it uses technology appropriate to the resource base of the communities, and produces jobs at lower cost (Ahmed 1989).

The need to provide an appropriate framework to build on the crucial role of the urban informal sector poses a challenge to urban management and development and an opportunity, perhaps, for dealing with infrastructure issues.

2.4.3 Strengthening the Urban Institutional Capacities

The effectiveness of urban policies and programs depends largely on the quality of institutions responsible for planning and implementing them. The components of urban institutional capacity in a country are horizontal and vertical co-ordination among relevant agencies, delineation of responsibilities and functions among the agencies, the technical and human relations skills of the agencies to perform their tasks, and decentralization of planning and management authority to urban local governments (Cheema 1993).

The private sector is playing a growing role in service provision. Poor management, lack of competition, and corruption have all contributed to reducing the quality of services provided by the public sector in developing countries. In recent years, there has been a strong trend towards the privatization of state-owned industries, and the contracting out of public services to the private sector. Other models, too, are being adopted, such as joint ventures, public/private co-operation agreements, and the re-establishment of public sector agencies as commercial undertakings (Roth, 1987). Regulatory policies need to become more flexible so that the private sector can participate on its own or in collaboration with the public sector, and thus reduce constraints to management associated with central bureaucracy.

2.4.4 Improving Financial Structure and Management

There are several revenue-raising instruments available to improve the resource base of municipal governments (Davey 1983; Prakash 1988; Rondinelli and Cheema 1988; Cheema 1989). User charges have been identified as important for financing the capital costs of urban facilities as well as for the maintenance and operating expenditures for urban infrastructure and services. The role of user charges, however, needs to be examined within the context of:

- investment requirements, levels of savings, and estimated operating and maintenance requirements; and
- affordability by various income groups and the political administrative capability of urban local governments to ensure the collection of user charges (Cheema 1993).

User charges are not easy to implement. Some services, such as street cleaning and fire and ambulance services, should be available to all without requiring individual payment. Others should be available to all, even those who cannot afford to pay their full costs, because of the benefits to the urban population as a whole. These include preventive health care and reticulated water supply, for example. Difficult decisions about funding out of general revenues or through cross subsidies then arise, as well as issues of waste, where services are communal or where there is no price mechanism to ration consumption (Devas and Rakodi 1993).

Local taxes are also a critical revenue raising instrument. Locally collected revenue derives from a variety of sources. These include property taxes, income taxes, consumption-based taxes, automobile taxes, and entertainment taxes, among others. Effective resource generation requires, however, that municipal authorities be authorized to levy taxes that are presently reserved for central or provincial

government, and that their tax administration capacity, including property assessment procedures, be strengthened (Cheema, 1993).

Tax sharing is an important instrument for transferring financial resources from central to municipal governments. In delineating tax sharing arrangements among the municipalities, the need to reduce interregional disparities, to provide incentives for local resource mobilization, and to equalize infrastructure and services among various urban regions should be considered (Cheema 1993).

Revenue for recurrent expenditure may be channelled from central government by way of government grants. These tend to appeal to central government because of their extreme flexibility. However, more often than not, central government involvement makes it harder for the local government to budget (Devas & Rakodi, 1993). When grants are a major share of revenue, the municipal government's financial autonomy is often weakened. Subsidies, loans and investment of equity capital are also among the means by which the centre allocates resources to the municipal government .

Improved financial planning and resource management have to go hand in hand with improved revenue generation. In implementing resource mobilization programs, administrative capacities and political support are also crucial. Training of personnel, particularly accountants and financial managers, improved wage scales, and widening career opportunities are important for resource mobilization policies to succeed (Cheema, 1993).

The objectives of efficiency and effectiveness in urban management and service delivery in the countries of the Southeast Asian region have become more urgent as industrialization progresses. Options for effective urban management, therefore, need to be explored so that while development efforts continue to be pursued, the quality of urban service delivery is not unduly jeopardised especially in public sanitation and environmental health.

2.5 Conclusion

Experience has shown that solutions for effective urban management cannot be transferred wholesale from one context to another. In the search for appropriate approaches to, and institutional arrangements for effective urban management in developing countries, it is important to take into consideration their historical roots and links among the factors that affect urban administration: the process of urbanization; urban primacy and the emergence of megacities; issues in urban management; and policies adopted by governments in addressing these issues.

Urbanization is inevitable. It acts as a catalyst for the countries' physical, economic and social change. Rapid urban growth has undesirable social and environmental consequences which pose a huge challenge to urban development administrators and service providers. For this reason, attempts were made by governments to resort to new policies to cope with the demands of urbanization.

Urban management reform is needed to effectively respond to the problems arising from uncontrolled and rapid urbanization. It aims at improving performance in the areas of municipal finance, infrastructure services and the environment, and in building up institutional capacity of urban government/management institutions. However, it necessitates well developed public administration, effective co-ordination among participants and complex systems of co-operation to carry out the reforms (Pugh, 1995). Partnerships between the public, the non-government/private and informal sectors need to be developed and improved. Clarifying the roles of the public, private and informal sectors in these emerging arrangements requires the resulting systems to be transparent and accountable in order to promote efficiency, effectiveness and equity in public service delivery.

Chapter III

ALTERNATIVES TO PUBLIC PROVISION OF URBAN SERVICES

This chapter examines the prospects for institutional reform to enhance solid waste management to cope with the growing needs of highly urbanized areas. The nature of solid waste and the solid waste collection, transfer, materials recovery and disposal processes are first described. Different institutional arrangements are also presented, and their respective strengths and weaknesses discussed in the light of the nature of public goods. Finally, a set of criteria against which different institutional models can be evaluated is presented.

3.1 Solid Waste Management System

3.1.1 Basic Concepts on Solid Waste

Solid wastes are all wastes arising from human, animal and industrial activities that are normally solid in nature and discarded or thrown away as useless or unwanted. They are normally classified into degradable (biodegradable) and non-degradable, including recyclables. Degradable wastes are normally organic products of natural raw materials and can be decomposed by natural processes. Non-degradable wastes, on the other hand, are the products of synthetic raw materials which usually require special treatment/process before disposal to minimize or eliminate adverse impacts on the receiving environment (Tchobanoglous et al., 1977).

Since the rate of generation of solid wastes reflects the lifestyle of the generating populace, the character and amounts of various components in the solid waste stream will vary from place to place. The traditional and generally acceptable categories of solid wastes are:

- domestic
- commercial
- industrial
- due to construction and demolition
- agricultural
- institutional

Domestic and *commercial wastes* are often considered as urban wastes. These include garbage materials which result from food preparation, both in the home and in commercial establishments (restaurants, hotels, etc.), and also the rubbish which comes from residences and commercial establishments. Garbage generally consists of decomposable materials while the rubbish is either slowly decomposable or non-biodegradable (Hagerty et al., 1973).

Industrial wastes are organic and inorganic residues, hazardous materials, hazardous and toxic chemicals, and wood and paper. Generally, the character of the refuse produced in any manufacturing or processing operation will depend very much on the mechanics of that particular manufacturing operation (Hagerty et al., 1973).

Agricultural wastes are small and large animal wastes (e.g., manure), process residues, fertilizers and erodible soils. The increasing loss of agricultural land to urbanization has produced a significant problem of waste disposal in the agricultural industry today (Hagerty et al., 1973).

Construction and *demolition wastes* include discarded building materials which are generated during the construction of new structures and materials that are generated by demolition of existing structures. This sort of waste material is in large part non-degradable and, except for the wood waste, will decompose very little over time (Hagerty et al, 1973).

Institutional wastes are those materials produced in hospitals, schools, prisons, and other large facilities for great numbers of persons. In general, these wastes are similar to domestic and commercial types but contain slightly larger amounts of paper and cloth (Hagerty et al., 1973).

3.1.2 Functional Elements of Solid Waste Management

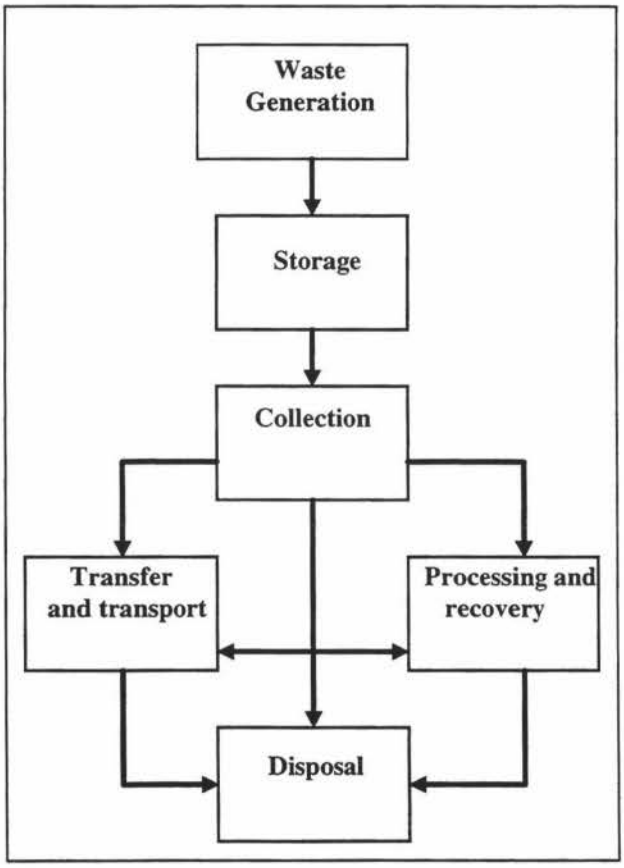
Solid waste management is a discipline associated with the control of the generation, storage, collection, transfer and transport, processing, and disposal of solid wastes in accordance with the best principles of public health, economics, engineering, conservation, aesthetic and other environmental considerations. It covers all administrative, financial, legal, planning and engineering functions involved in the whole spectrum of solutions to problems associated with solid wastes (Tchobanoglous, 1977).

The problems associated with the management of solid wastes in modern society are complex because of the quantity and diverse nature of the wastes, logistical issues associated with the development of

sprawling urban areas, funding limitations for public services in many large cities, and the impacts of technology, among others (Tchobanoglous, 1977). Hence, if solid waste management is to be accomplished in an efficient and orderly manner, the fundamental aspects and relationships involved has to be identified and understood clearly.

There are six identifiable functional elements associated with solid waste management (Figure 3-1): waste generation; storage; collection; transfer and transport; processing and recovery; and disposal (Tchobanoglous, 1977).

Figure 3-1 Simplified Diagram Showing the Interrelationships of the Functional Elements in a Solid Waste Management System



Source: Tchobanoglous, et al., 1977

Waste Generation

Waste generation encompasses those activities in which materials are identified as no longer being of value and are either thrown away or accumulated for disposal. Among the six elements of waste generation, this is the most difficult to control. The amount of waste generated depends on the level of economic activity. All activities that lead to the identification and understanding of the sources,

amounts, nature, type and characteristics of solid wastes are covered by waste generation (Tchobanoglous, 1977).

In general, consumers' preferences dictate the rate, volume and type of waste generated by its originators. The following factors affect waste generation:

- The state of the national economy. As economic standards rise, there is a corresponding increase in quantity and change in the quality of wastes.
- Life-style of people. This is reflected in the product marketing techniques. The perceptible shift in consumer preferences for pre-packaged food stuffs, the increases in the use of paper lined with plastics for packaging and the use of disposable diapers are a few examples.
- Demographic profile of the population. The number of persons per household, the size and type of dwellings, age and religion are among the demographic information that affect the rate, volume and type of waste generated.
- The extent that the three R's (reduce, reuse, recycle) of waste management are carried out. The behaviour and attitudes of people affect their patterns of consumption. Where the people are concerned about the wastes they generate and the effects these have on the environment, they are more inclined to reduce their waste to a minimal level.
- The presence of pets and animals induce a particular type of waste generation.
- Seasonal variations affect consumer preferences and behaviour.
- The presence and nature of laws and ordinances governing waste management influences the waste generation patterns.

Onsite Storage

Urban wastes are visible heterogeneous wastes that are generated in the areas where people live and where there is limited storage space. These wastes cannot be tolerated for long on individual premises because of their biodegradability, hence they must be disposed of as soon as possible after they are generated. For this reason, the wastes must be stored prior to collection for the purposes of aesthetics, public health and economics (Tchobanoglous, 1977). The factors to be considered in the on-site storage of waste are: the type of container to be used; container location; public health and aesthetics; and collection method used.

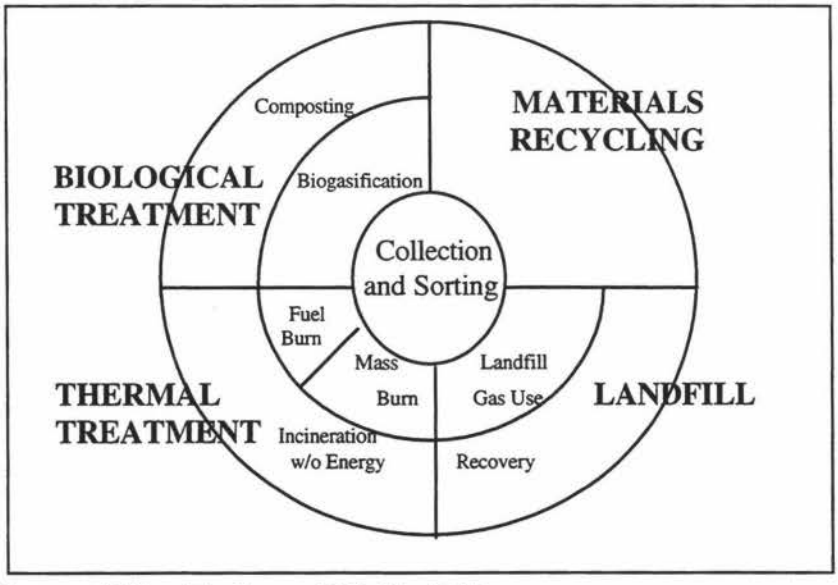
Collection

Collection involves the gathering of the solid wastes, and hauling them to transfer stations, processing and recovery stations, or to final disposal sites. Collection lies at the very core of an integrated waste management system (Figure 3-2). It is in the way that waste materials are collected determines which waste management options (e.g., material recycling, biological treatment, etc.) can be used to realize both economically-sound and environmentally-sustainable outcomes (White, et al., 1995).

The importance of waste collection in the whole waste management system lies in its being the contact point between the waste generators (specially households and commercial establishments) and the waste management system itself which indicates whether the system is effective or not. The household-waste-collector link needs to be a customer-supplier relationship in the total quality sense (Oakland, 1989).

Households need to have their solid waste collected with a minimum of inconvenience while the collector needs to receive the waste in a condition that suits their treatment methods. In this relationship, there is a need to strike a balance between competing needs (White et al., 1995). Usually, collection is provided under various management arrangements, ranging from municipal services to franchised services conducted under various forms of contracts (Tchobanoglous, 1977).

Figure 3-2 The Elements of Integrated Waste Management



Source: White, Franke, and Hindle, 1995

Transfer and Transport

When the location of the final disposal site is at a distance from the points of collection, it is often more economical to transfer the collected wastes into larger transport vehicles (such as large container trucks, rail cars, or barges) before transporting them to the final disposal site. In this system, relatively smaller collection vehicles carry the wastes to transfer station where the wastes are loaded into much larger transport vehicles (Tchobanoglous, 1977). Transfer stations are sites for the temporary storage of garbage and trash. They are located centrally in order that pick-up vehicles can dump their loads without having to make long trips to unload at landfills (Neal & Schubel, 1987).

Transfer stations are found to improve transportation efficiency. The standard vehicles instead of spending time on long, unproductive runs, can spend more time picking up more municipal garbage and trash (Neal & Schubel, 1987).

A properly designed transfer and transport system normally reduces the overall cost of collection and transport of wastes from on-site storage to final disposal sites (Tchobanoglous, 1977).

Processing and Recovery

The functional element of processing and recovery includes separation operations such as size reduction, density separation using air classifiers and magnetic separation, and the use of all other techniques, equipment and facilities both to improve the efficiency of the other functional elements and to recover or produce usable materials, conversion products, or energy from solid wastes. The selection of any recovery process is a function of economics: cost of separation versus value of the recovered-materials products (Tchobanoglous, 1977).

Disposal

The final step in solid waste management is disposal. Disposal is the ultimate fate of all solid wastes, whether they are residential wastes collected and transported directly to a landfill site, semi-solid wastes (sludge) from municipal and industrial treatment plants, incineration residue, compost or other substances from the various solid waste processing plants that are of no further use to society. In selecting the final disposal method, the nature, amount, and characteristics of the waste materials must be taken into consideration to prevent or minimize secondary environmental problems. The most

widely accepted final disposal method is sanitary landfill (Tchobanoglous, 1977). Landfilling is also considered the simplest, and in many areas the cheapest, of disposal methods (White et al., 1995).

Finnveden (1993) views landfilling as a treatment process rather than a method of final disposal. He explained that solid wastes of various composition constitute the majority of the inputs, with some energy to run the process. The process involves the decomposition of part of the landfilled waste. Outputs of the process are the final stabilized solid waste, along with the gaseous and aqueous products of decomposed materials in the form of landfill gas and leachate, respectively. As in all processes, process effectiveness and the amounts and quality of products depend on the inputs and the way that the process is run and controlled. In landfilling, what comes out of a landfill depends on the quantity and composition of the waste deposited, and the way that the landfill is operated.

In the next section, a discussion on the attributes of goods and services and what comprises public goods and services is made which serves as a background to the discussion of the nature of solid waste management as a service in an urban environment.

3.2 Public Goods and Services

A question arises on what part of the SWM system is a public service and which responsibility rests solely with a government agency. To answer this, it is important to consider the nature of public goods and services.

Whether or not a particular good or service is private or public stems from the relative "exclusion" and "jointness" of consumption. All goods and services have the characteristic of exclusion if the potential user of the goods can be excluded from their use by the potential supplier (Savas, 1987). The condition of exclusion establishes an exchange relationship between the buyer and the seller (Stein, 1990). The absence of exclusion can bring about externalities "when the actions of one individual for which no fee can be charged or no recompense collected" (Heilbrun, 1987:122). The air we breathe can be viewed as a good supplied by nature, so exclusion is difficult to attain. A view of a building--whether seen as a "good" or a "bad"--is supplied by the efforts of others and is not subject to exclusion in normal circumstances. Air, noise, and water pollution are "bads" that an individual cannot exclude or avoid except at a cost; conversely, an individual cannot be excluded from receiving a good when the pollution level is reduced. When goods are not excludable, entrepreneurs cannot recoup their investments in resources, capital or labour through the market (Olson,1965).

Jointness of consumption or "nonrivalry" of a good or service is exhibited when one person's consumption does not diminish the consumption of that particular good by another person (Stein, 1990; Donahue, 1989).

Most joint consumption goods do exhibit the trait of subtractibility. This occurs when one additional person's consumption of a good subtracts from any other person's consumption or benefit from consumption of that good. The level, or threshold, at which subtractibility increases is defined as congestion and can radically affect the provision of goods and services (Stein,1990).

Goods for which exclusion is feasible and which possess a significant degree of subtractability are defined as *private* and can be produced by private markets. Private goods are consumed individually and cannot be obtained by the user without the assent of the supplier, which is usually obtained by making payment.

Goods characterized by joint, nonsubtractable usage and nonexclusion are defined as *public* or *collective* goods (Stein, 1990). Since they are used jointly, it is impossible to exclude anyone from their use, which means that people generally will not pay for them without coercion.

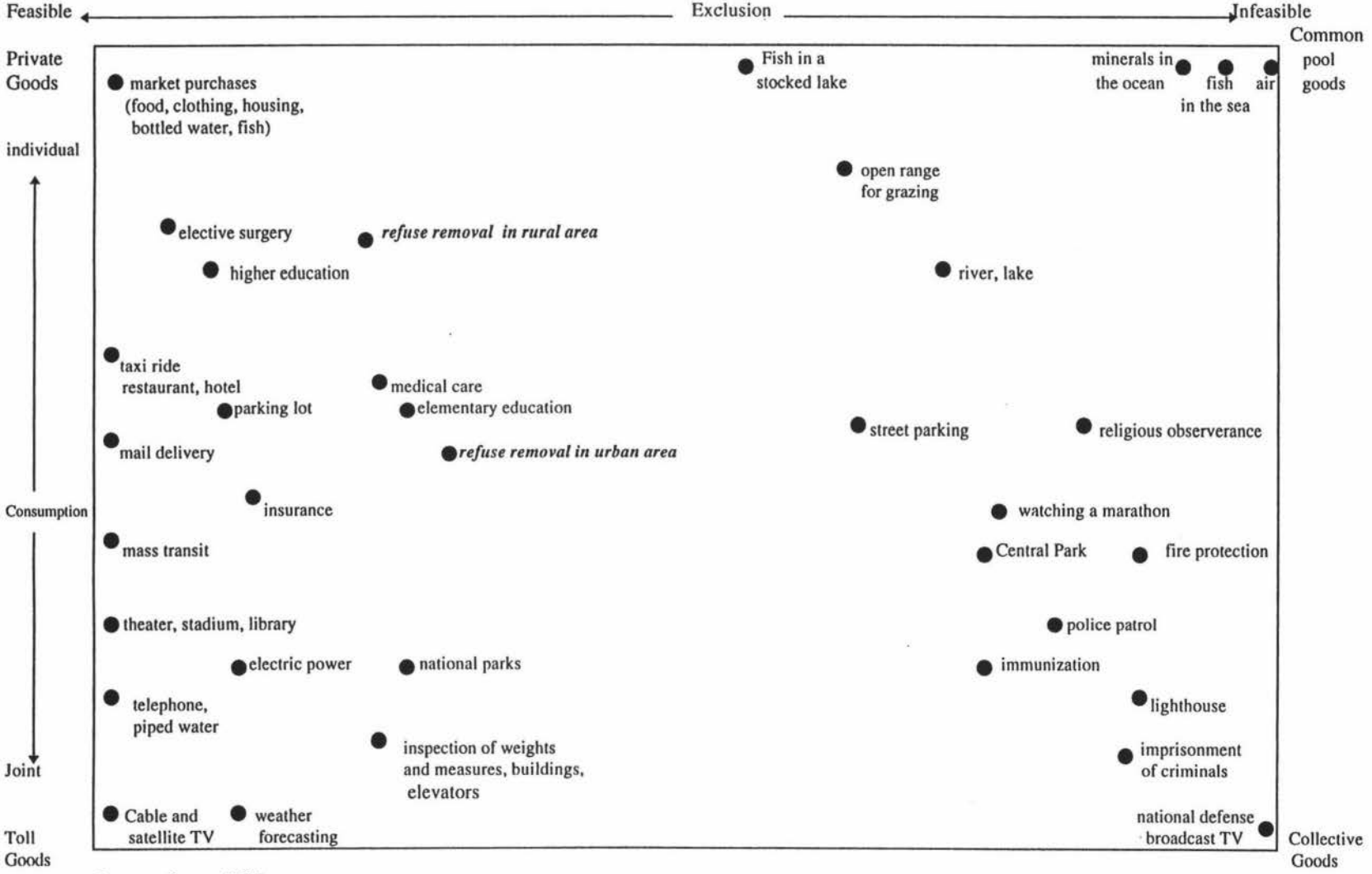
Between the two extremes of private and collective goods are *toll* goods and *common property resources or common-pool goods* (Ostrom and Ostrom, 1977).

Toll goods are used jointly, but the users must pay; those who do not pay are excluded from enjoying the use of the goods (e.g., cable TV, movies, libraries, etc.). Special problems arise, as in a theatre, where the conduct of one user may detract from the enjoyment of other users. The value of the goods depends both upon the quality of the good produced and upon the way it is used by others.

Common property resources are consumed individually and it may be impossible to prevent anyone from taking them freely. However, use by any one user precludes use of some fixed quantity of a good by other users. For example, a tonne of fish caught by a fisherman precludes another fisherman from taking those same fish. There is no basis for excluding fishermen from access to fish in the ocean. However, once taken, fish can be dealt with as a private good.

Figure 3-3 illustrates the exclusion and consumption properties of various goods according to Savas (1987). The arrangement of the services in such continuum reflects the willingness of the consumers to

Figure 3-3 Exclusion and Consumption Properties of Various Goods and Services ("Pure" Goods Shown at the Four Corners).



Source: Savas, 1987

pay for such services. Savas considers refuse removal in a rural area more of a private service while that in an urban area more of a toll service.

There may be serious resource allocation and equity problems encountered with respect to the management and production of public goods. If a public good is supplied by nature or the efforts of other individuals, each individual will be free to take advantage of the good since he cannot be excluded from its use or enjoyment. People are inclined to act as "free riders", taking advantage of whatever is freely available so long as rules of voluntary choice apply (Savas, 1987). Individuals furthering their own interest will fail to take sufficient account of the interest of others and the joint good is bound to deteriorate. The likely short-run consequence is that voluntary efforts will fail to supply a satisfactory level of public goods.

If exclusion is not feasible, market institutions are bound to lack incentive to supply goods and services. In the supply of public goods and services, this leads to some form of collective action in which sanctions can be used to deal with the "free riding" problem, compelling each individual to pay his share of the cost of production (Savas, 1987). Patterns of organization that can mobilize coercive sanctions are necessary to make this possible, and may include government regulation (Wunsch, 1991). In many instances the collective contribution is effected through taxation in order to ensure continued supply of the goods (Savas, 1987).

Compensating for externalities is a challenge in the supply of public goods. In the case of negative externalities (such as pollution), this might be through the implementation of general performance bonds or regulation established at the level of broader constituency for the industry concerned, by taxes, environmental charges or charges levied on those producing the spill-over sufficient to repair any damage, etc. (Wunsch, 1991).

The number of collective goods has grown in the recent decades. Savas (1987) points out the reasons for this:

- Individuals create collective goods by transforming private goods, thereby shifting the burden of payment onto collective shoulders. For example, the person throwing garbage into the street rather than subscribing to a refuse collection service eschews the private good called waste collection and creates a need for the collective good called street cleaning.
- The basic nature of some goods has changed, either because of changing technology that affects their exclusion and consumption characteristics or because of changed conditions. A good example

of this shift is the migration of fire protection from private good to collective good due to urbanization.

- Some have been created by the need to conserve or preserve common pool goods whose scarcity has only been recognized recently. For example, air and water pollution control and the negotiation and enforcement of international agreements concerning common pool goods (including endangered species).

Societies may decide that certain private and toll goods, such as food, education, housing and others, are essential, and that their consumption should be encouraged regardless of the consumer's ability to pay. These are called *worthy* or *merit* goods. The society, acting through government, provides certain private or toll goods completely or partly at collective expense because everyone benefits to some degree when these goods are consumed (positive externalities). Their consumption may be considered partly joint- for example, education benefits not only the individual but also the entire economy through increased productivity. Another reason why a shift in the nature of goods from being private and toll goods to collective goods occurs is essentially for the promotion of social stability: every citizen that lacks a private good so that he has unfulfilled need will become alienated from the larger society and will be a potential threat to social order. Hence, providing such private goods at collective expense is justified to minimize possible conflicts and public unrest (Savas, 1987).

The collective political decision to supply and encourage the consumption of certain worthy goods regardless of the consumer's ability or willingness to pay results in subsidies to private individuals and enterprises, and often in direct production by government.

Subsidizing, underpricing or giving away merit goods tend to increase public expenditures to an unsustainable level. Like common-pool goods, merit goods are subject to waste, thoughtless consumption and possible exhaustion because consumers have the incentive to appropriate more of these goods than what they really need. This calls for a consistent approach to the definition of public goods and a tendency, recently, to a more precise definition.

The problems in providing collective, common pool and merit goods may be reduced if appropriate roles for the government and the private sector are determined.

Solid Waste Management as a Public Good

Solid waste management is a service for which local government is responsible. Often, the service exhibits the following attributes:

- nonexclusivity
- nonrivalry and
- essentiality.

It is a nonexclusive service because once it is provided to a section of a community, it benefits the overall public welfare, not only the residents that are specifically serviced (Donahue, 1989). The service is also nonrivaled because any resident can enjoy the benefits of the service without decreasing the benefit to anyone else ((Donahue, 1989). Moreover, it is not feasible to exclude those who do not pay from the benefits of the service, as public cleanliness and safe disposal of wastes increase the health of the entire population and the environment (with savings elsewhere) (Roth, 1987). Having the attributes of being nonexclusive, nonrivaled and essential, solid waste management is placed within the public domain as a public good.

There are many activities within the overall purview of solid waste management and they vary in the extent to which they are public goods.

Street sweeping is considered a public good as it benefits the public at large and not any specific individual. As a public good, it is expected that the costs for public cleansing are to be covered through the general revenues of local government. Safe disposal of all collected waste within a sanitary landfill is also a public good since it benefits no specific individual but needs to be done for environmental protection purposes which benefit the public at large. Being a public good, sanitary landfill is expected to be covered through general revenues (Cointreau-Levine, 1992).

Refuse collection from private establishments or individual households can be treated like a private good (even though it may, in part, be a public good), depending on the education and culture of the residents. In communities wherein residents have been educated to become concerned about public cleanliness and aware of the limited resources (or efficiencies) of government, door-to-door collection service to households, institutions, and industrial/commercial establishments can be considered as a private good since those being serviced are willing to pay. However, in communities where the

residents have not been similarly educated or have low incomes, it is expected that there will be resistance to direct user charges and a tendency to do clandestine dumping (Cointreau-Levine, 1992).

Resource recovery or recycling is considered a public good as this has been perceived as an important element of sustainable development from which everyone benefits. Foreign exchange is saved, natural resources are conserved and waste disposal costs are minimized through recycling. While recycling can possibly lower the material and energy costs of industries through the use of recovered materials, it is seldom accomplished to an optimum level when left purely to market forces. Therefore, recycling can be labelled a "merit good" (Donahue, 1989; Roth, 1987).

Figure 3-4 provides a framework for categorizing various activities of solid waste management which are pure public goods, private goods, toll goods and common-pool goods.

Although solid waste management is considered a collective and essential (merit) good, the production and delivery of service may be done through different institutional arrangements which will be discussed in the next sections.

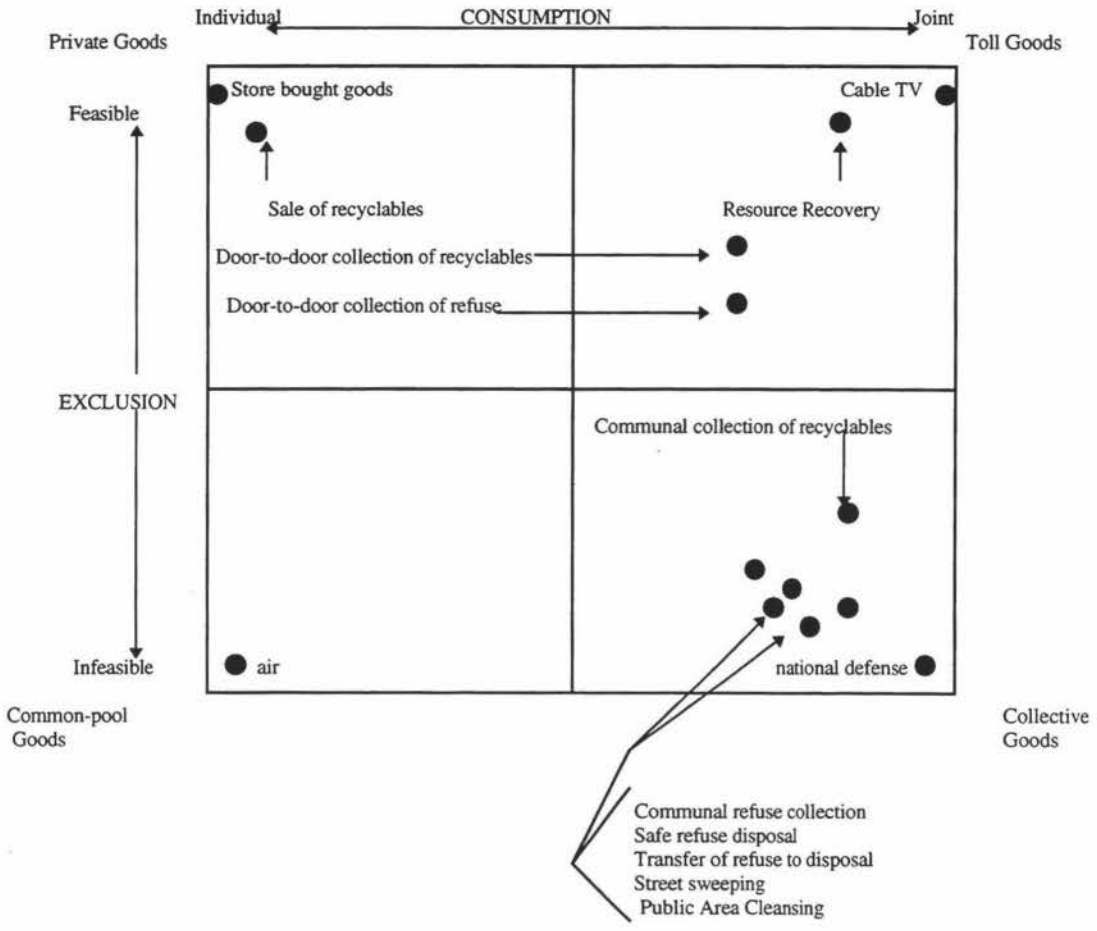
3.3 Basic Participants In Service Delivery

Savas (1987) identifies the three basic participants in the delivery of a good or service: the consumer, the producer, and the "arranger" or provider.

The consumer may be an individual, a household, every resident in a defined geographic area, or a group of individuals engaged in similar or different activities (e.g., residential households, business community, industries, etc.).

The producer is the agent that actually and directly performs the work or delivers the service to the consumer. The producer may be a unit of government (local, county, state, or federal), a multipurpose or unifunctional special district created by state or local law, a voluntary association of citizens (e.g., Boy Scout troop, etc.) a private firm, non-profit agency, or in some instances, the consumer (e.g., an individual who hauls his or her trash to the town dump).

Figure 3-4 Public Versus Private Goods in Solid Waste Management



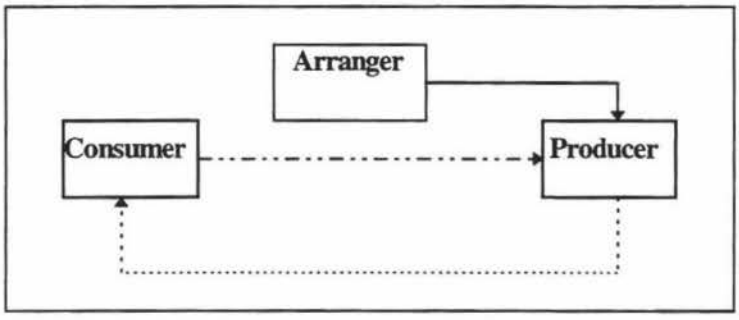
Source: Cointreau-Levine, 1992

The service provider is the agent who assigns the service producer to the recipient or selects the producer who will serve the consumer. The service arranger can be the municipality where the recipient of the service is located, the national government, a voluntary association, the service consumers themselves or the private sector.

On the supply side, the arranger can be viewed as the collective unit that articulates the demand for collective goods. Thus, the arranger must have the authority to levy and collect assessments based on rules usually established by majority vote. On the demand side, the arranger must establish procedures to decide what services to provide, on what level they are to be provided, and the level of expenditures to be made in providing such services (in the absence of unanimous agreement among all members of the collective unit).

Figure 3-5 illustrates the relationship of the three service participants indicating the flows of authorization, of service delivery, and of payment.

Figure 3-5 Relationship Between, Consumer, Producer and Arranger



Source : Savas, 1987

Note: Where the arranger selects, assigns, and authorizes the producer (———); the producer delivers the service to the consumer (.....) ; and the consumer pays the producer directly for the service (- - - - - - - - - -) in this example.

3.4 Alternative Arrangements for Providing Public Goods and Services

Once roles in solid waste management are distinguished, different arrangements take shape for service delivery. As mentioned earlier, governments may not necessarily produce SWM services. There are various arrangements where the government facilitates or arranges the production of services by the private sector. There are also cases when state-owned enterprises (SOEs), rather than government bureaus, produce public services.

3.4.1 State-Owned Enterprise: Government As Arranger and Producer

In this arrangement, the government acts as both service arranger and service producer (Figure 3-6, A). Where there is a user charge imposed for the government service, the schematic relationship slightly changes (Figure 3-6, B). State-owned, nationalized or municipal public enterprises are among the examples where the government acts as both service arranger and producer.

In Bandung, Indonesia, a municipal public enterprise called the PDK is governed by a board which reports to the mayor. The Mayor appoints the board of directors (Fernandez, 1993). The PDK is a corporate body created by the government charged with solid waste management tasks and granted the power to collect tariffs. Local governments have considered the formation of public enterprises in

order to promote efficient delivery of urban services. Public enterprises are expected to earn all of their revenue from user charges. Compared to government agencies, public enterprises have been found to have greater flexibility in pricing and personnel management, and greater financial accountability that result in more efficient service delivery (Rondinelli, 1990,p.52).

What is a State-Owned Enterprise?

Aharoni (1986) identifies three distinguishing characteristics of SOEs:

- They are owned by the government;
- They are engaged in the production of goods and services for sale;
- Sales revenues of SOEs bear some relationship to cost.

What distinguishes SOEs from other parts of the public sector is their business-like character. While other government bodies depend on periodic budgetary grants for their operations, SOEs typically rely on revenues generated from the sale of goods and services. They specialize in the production of goods and services that can be readily sold. Moreover, SOEs make it relatively easy to ensure payment (to charge for service and to exclude those who do not pay).

Common features of SOEs in many countries are:

- SOEs are frequently created to meet redistributive objectives--for example, to favour certain consumers, regions, or sectors--and commercial objectives (e.g., state-owned power corporations while generating revenues by marketing electricity at a price in a region subsidizes power generation in another region).
- SOEs are also typically given special privileges, including both rights and resources. Rights include legal monopoly, relief from regulation or implicit guarantees. Resources include the use of rivers, land, or even inputs like capital and energy at well below competitive market prices (McAvoy et al., 1989).

McAvoy et al.(1989) point out that as a result of these privileges, an invisible surplus is created which he terms as the "available pot" which can be used for redistribution without the enterprise incurring losses.

The Advantages of SOEs

Niskanen (1971, p.15) defines bureau as "non-profit organizations which are financed, at least in part, by a periodic government appropriation or grant". In non-profit organizations, neither managers nor owners can appropriate the difference between costs and revenues as personal income. Compared with bureaus, SOEs specialize in the production of output for sale, relying on revenues from sales to finance their operations.

SOEs have some advantages over bureaus for the production of public goods and services:

- the sale of output makes it easier for those inside and outside the firm to monitor the performance of managers. There is less need to depend on the restrictive procedural constraints--such as civil service regulations, budgetary controls and operating procedures--that limit managerial flexibility and tend to distort resource allocation (Walsh 1978).
- SOEs allow less involvement of politicians in public sector activities. Reducing political interference, more often than not, leads to increased efficiency (McAvoy et al., 1989).
- SOEs allow politicians to meet voter demands with a minimum of budgetary expenditure, an important consideration in the creation of SOEs at the state and local levels in the United States, where politicians have been confronted by constitutional limits on public borrowing Walsh (1978).
- SOEs may be favoured by managers and employees because the creation of a public enterprise can result in increased salaries and greater financial independence (Aharoni, 1986).
- Pecuniary compensation in SOEs tends to be higher than in the rest of the public sector--where monitoring is more difficult--and lower than in the private sector--where monitoring is easier (Walsh, 1978; Aharoni 1986).

SOEs also have advantages in the delivery of public goods and services compared with private enterprise:

- SOEs can avoid problems caused by government opportunism in the form of increased regulation or taxes on private firms. Government opportunism is likely to be counter-productive particularly in situations when production requires a firm-specific capital (making asset owners vulnerable to expropriation) and the intricacy of regulation compels the firm to resort to non-productive schemes in order to evade regulation and monitoring of firm's compliance (McAvoy et al., 1989). In other words, public enterprises are more like to be established when the risk of costly government

intervention is high. Factors that increase this risk include capital intensity and asset specificity, lack of competition, difficulty in defining outputs or allocating costs, and frequent turnovers in political parties.

- SOEs are more favoured than private enterprises for meeting distributional objectives. SOEs may have to meet various non-commercial objectives including employment generation, among others (Vogelsang, 1990). SOEs have been used as a device for reducing income inequality through the provision of necessities at subsidized prices. Regional economic development is expected to be promoted and geographic disparity alleviated by locating SOEs in underdeveloped areas (Feinstein, 1986).
- SOEs are instrumental in overcoming difficulties in assigning property rights. This is by virtue of the government's unique position as owner of newly created or identified property rights, its monopoly on the legitimate use of force, and its ability to exert its ownership or control over activities when it deems that such control will be in the national interest (Mascarenhas, 1982).
- SOEs readily respond to ideological demands. Vernon (1981) cites the example of government confiscation of the property of an enemy during wartime or of native collaborators, which was the case with Renault in France and with much of Austria's industrial establishment.

A number of other advantages have been attributed to SOEs:

- SOEs encouraged broad social responsibility and responsiveness to the public interest;
- SOEs helped create stable investment and employment patterns;
- SOEs provided models for improved industrial relations;
- SOEs were essential for production in sectors characterized by extended time horizons and great perceived risk, as in nuclear power generation;
- SOEs could beneficially replace private natural monopolies, producing higher output at lower prices, with the utilities as an example;
- SOEs provided irreplaceable means of direction and control in defense-related industry;
- SOEs could successfully stimulate sectoral competition, as shown by the cases of Renault and Credit Lyonnais in France, etc.;
- SOEs were potent instruments of decolonization, given the desire of nationalist political elite to radically reduce foreign corporate ownership within the private sector, as in the early post-independence periods in Algeria, Indonesia and Ghana (Streeten, 1983).

The Disadvantages of SOEs

The World Bank has surveyed the financial performance of SOEs world-wide and found that rates of return on investment ranged from negative to about 10% (Shirley, 1983). SOE managers are likely to deviate from profit maximization to a greater extent than their private counterparts for the following reasons:

- From an institutional point of view, politicians tend to use SOEs to achieve political ends --e.g., appointing loyalists to managerial positions; setting prices to satisfy certain interest groups; and using SOEs for employment generation or regional development. The multiplicity of and conflict between objectives often precludes satisfactory performance on any one of them. Efficiency losses tend to persist largely because politicians are rarely voted out of office for reasons of poorly performing SOEs.
- The problem of multiple objectives is aggravated by the problem of "plural principals", i.e., the ownership of SOEs is either diffused or poorly allocated. Shareholders of SOEs are not usually well specified, hence, many government agencies attempt to perform the ownership function. They place conflicting demands on SOEs and interfere in their operations to the point where they become an extended part of the government bureaucracy rather than commercial entities.
- As a consequence of the multiplicity of objectives and plurality of principals, public agents tend to be unable, or at times reluctant, to devise and implement efficient monitoring and incentive mechanisms. In particular, civil servants tend to be procedure rather than outcome oriented, to be interventionist (in the day-to-day operational decision-making of SOEs), and to possess skills less suited for promoting business-like behaviour.
- SOEs tend to operate, by and large, in sheltered markets. These may be naturally sheltered, as in decreasing cost industries, or protected by policy. They usually escape the discipline of the financial market because they have access to government funds and credit from the banking system and abroad, often at preferential rates (Galal, 1991).
- SOEs' inefficiencies are manifest in their wasteful application of resources. SOEs make large and growing claims on the government budget which are financed by higher taxes or greater borrowing from domestic and foreign sources, and divert funds from more profitable investments. The overstaffing of state corporations is also a symptom of misallocation of resources (Feinstein, 1986).
- SOEs have not fared much better as investors and marketers. They may have failed to adequately assess consumer demand inasmuch as the type of product or level of service is already ordained. They are unlikely to be competent at forecasting future cash flows from entry into new markets.

Thus, investment analysis of new projects proceeds on an inadequate knowledge base (Feinstein, 1986).

3.4.2 Private Sector Provision of Public Goods

Various institutional arrangements have been developed as alternatives for government management of public services. The role of the private sector in the production and delivery of public services has become increasingly important as new ways and approaches have been explored to revolutionize public service.

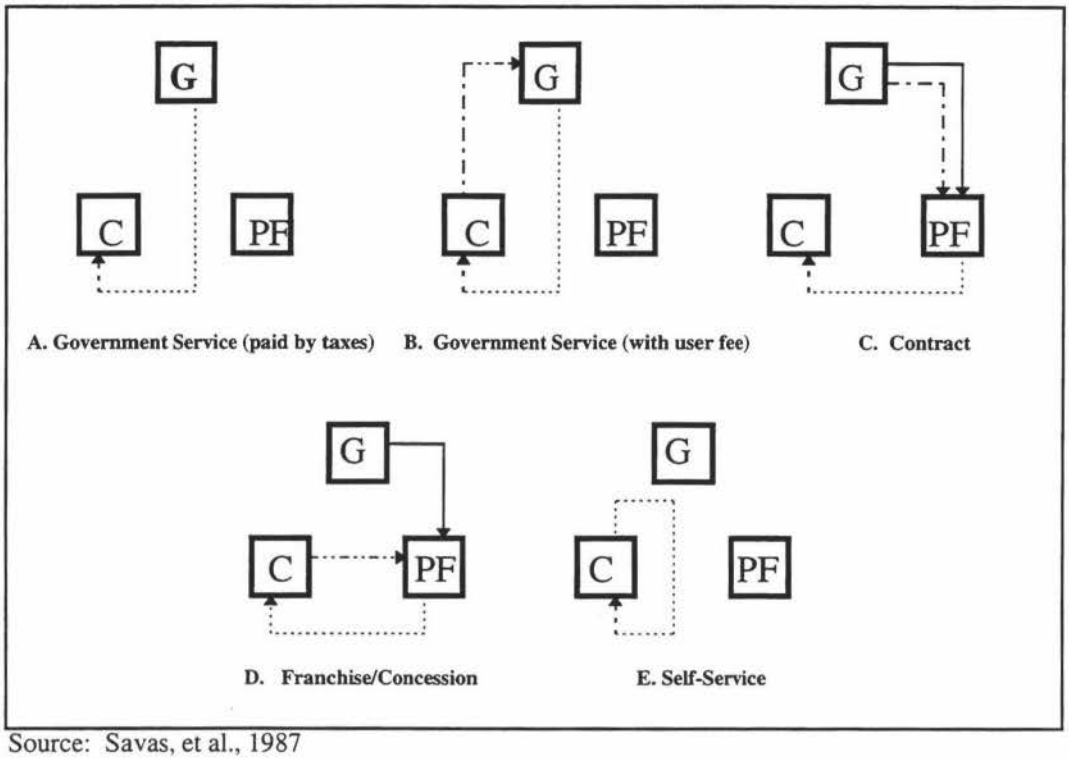
3.4.2.1 Contracting Out

This is the most common form of private provision of a public good. Contracting out is defined as the delivery of public services through the issuance of contracts to private firms instead of direct provision by a government agency (Bendick 1984). The government hires or subsidizes a private company to provide the needed service to all or a segment of the population. In this arrangement, the private organization is the producer and government is the arranger, which pays the producer (Figure 3-6, C) (Savas, 1987). The government acts as a co-ordinator of service delivery, confining its duties to financing, monitoring, and regulating while private firms operate and maintain the service system (Nolan, 1986).

In the provision of solid waste management services, for example, the government agency, being the service arranger, awards a finite-term contract to a private firm (service provider) or firms for delivery of solid waste collection service, street sweeping, collection of recyclables, transfer station operation, disposal site operation, or fleet maintenance. The equipment is usually owned by the firm or contractor. The contract award is made after a competitive procurement process (Cointreau-Levine, 1992) or on the basis of negotiation (negotiated contract, in cases when only one bid is submitted or when an existing contract is renewed) (Fernandez, 1993).

In the local governments of industrialized nations, solid waste collection has emerged as having the most extensive private contracting service. In the United States the institutional features of public agencies may undermine garbage-collection efficiency.

Figure 3-6 Different Service Models, Showing Flow of Authorization (———→), Payment (- - - - - - →), and Service Delivery (. . . . . →) Between Government (G), Private Firm (PF), and Consumer (C)



Source: Savas, et al., 1987

The National Solid Waste Management Association (NSWMA) has found that private trash haulers use smaller, more efficient pick up crews that serve more households per hour and make more runs per day than their public counterparts. Contractors also achieve lower rates of worker absenteeism, 7.9% compared to 13.4 % for municipal employees. Lastly, private firms perform better vehicle maintenance and invest in larger capacity trucks than those operated by the city (NSWMA, 1991).

Studies conducted in 317 cities in England and Wales and in 126 cities in Canada have shown that costs of solid waste collection service were 22% to 41% less, respectively, with a private contractor providing refuse collection than in cities with a public monopoly (Donahue, 1989).

In the United States, about thirty-five percent of local governments contract with private firms for residential garbage collection (NSWMA, 1991). In a 1977 study of the savings from contracting out, the U.S. Department of Housing and Urban Development (HUD) found that the costs of municipal services were 42 percent higher than those of private firms. The higher pay and benefits received by public employees accounted for 29% of the difference (Stevens, 1977).

Developing countries have also experimented with contracting out solid waste collection. Even when only a small portion of the city is served under private contract, significant efficiencies may be achieved due to "contestability of market" principles, whereby the government monopoly over service delivery is contested (Cointreau-Levine, 1992).

In the Ivory Coast, a French subsidiary is under contract to collect garbage in the capital city, but its performance is mixed: wealthy neighbourhoods receive prompt daily service while slum areas are neglected because their physical structure restricts access by the company's large trucks (Lewis and Miller, 1986). A refuse company (SOTEMA) in Togo collects more than 284,000 tons of garbage annually and manufactures its own equipment under license (ICMA, 1989). In Adana, Turkey, two private firms haul 75 percent of the garbage generated in the city. Although the city does not award contracts competitively, private sector costs are almost three times lower than those of the municipality, primarily due to greater managerial discipline over labour (Bartone et al., 1990).

The World Bank has analyzed the solid waste contracting experience of four cities in Latin America: Buenos Aires, Caracas, Santiago and Sao Paolo. The municipal departments tendered bids for exclusive provision of specific services in well-defined city districts. The contract periods were sufficiently long for firms to recover their investments in truck fleets and equipment, payment was tied to performance (i.e., tons of refuse collected) and adjusted for cost increases. The overall findings supported the experience of industrialized countries that competitive bidding and well-specified enforceable contracts of sufficient length can increase the efficiency of solid waste service delivery (Bartone et al., 1990).

There are problems in contracting out. For example, in Indonesia, contracts cannot exceed one year because the local legislative assembly reviews the municipal budget on an annual basis and funds cannot be committed for contract payment in advance of approval. Because the trash haulers need at least a five-year contract in order to depreciate capital, they cannot invest in environmentally sound collection vehicles since the contract period is too short (Cointreau-Levine 1992).

In competitive bidding, incumbent contractors have a considerable advantage over competitors, since they already own the relevant assets, have the specialized staff and are better informed about operating costs. As a result, competition is reduced, and inefficiency may result (Boston, 1995).

Another problem with contracting is defining and monitoring desired output. Poor monitoring risks pecuniary opportunism by contractors (Gordon, 1994). In Jakarta, the absence of monitoring results in

clandestine dumping of garbage at nearby illegal sites in order to avoid the long haul (Cointreau-Levine 1992).

3.4.2.2 Franchising

Franchising is another basis for service provision. A franchise is an exclusive or non-exclusive license to a private firm to provide a particular service within a specified geographical area (ICMA, 1982:4). It differs from contracting. First, the franchisee is generally paid directly by citizens for services rendered rather than being paid by the government out of general tax revenues (Savas, 1987). Second, citizens are able to save money under a franchising arrangement by not purchasing the service. They are left with the options of either to reduce their consumption or provide the service themselves. In contracting out, on the other hand, citizens do not have these options as they have already paid for the service through taxes (Boston, 1995).

In franchising, the government arranges for service provision while the private organization produces it (Figure 3-6, D). The franchise itself is a regulatory power whereby the government defines the level and (possibly) the cost of the service to be provided by the private vendor. The government delegates responsibility for financing, production, and distribution to the private vendor (Stein, 1990).

In franchising, the government awards a finite-term zonal monopoly to a private firm for delivery of solid waste collection service, usually after a competitive qualification process. Typically, the private firm puts down a performance bond to the government and pays a license fee for covering the government's costs of monitoring. The firm recovers directly by charging the households and establishments it serves. Government controls the tariffs charged to consumers through either development of adequate competition and control of price collusion or price regulation.

Franchising is popular in the USA, particularly with regard to collection from large generators of wastes, such as big commercial establishments (i.e., hotels, malls, etc.) and large industries (Cointreau-Levine, 1992).

Franchising is also applicable in developing countries, especially where households and establishments are sufficiently concerned about public cleanliness to cooperate with the franchisee. (Cointreau-Levine, 1992).

There are two main advantages to franchising: First, it requires most citizens to pay for the service depending on how they choose to utilize it, which brings about rationing of demand through price mechanism; Second, the holder is compelled to pay the government for a franchise. This raises government revenues while reducing government expenditures (Boston, 1995).

The franchise holder also incurs expenses in billing and collecting (Boston, 1995). This makes transaction costs higher than in contracting out. In solid waste management, the cost of billing (including costs of non-payment and late payment) is estimated to amount to 10% of the total cost to the consumer service, which is one of the reasons why franchising does not usually result as low a cost as contracting (Donahue, 1989; Stevens, 1980). Another disadvantage of franchising is that the government may be compelled to consider the need for direct subsidies to low-income members of society who are incapable of paying for the service on their own (Boston, 1995).

3.4.2.3 Licensing

Under licensing, the government allows (but does not require) one or more private firms to provide the service to citizens. Where there is only one license holder in an area, this is almost identical to franchising. Under a licensing arrangement, the number of firms requiring regulation and their identities are known and controlled by the licensing authorities. The license is usually associated with a variety of restrictions and regulations concerning the private firms' activities. All the firms are informed of all these regulations and have their compliance regularly monitored as part of the licensing and license renewal process under the threat of license cancellation for failure to comply (Boston, 1995).

Licensing agreements may contain performance standard specification, methods of judging performance, penalties for delays or non-performance, risk assignment, insurance requirements, dispute resolution, standards for worker safety and health protection, and environmental protection standards (Seader, 1989).

One requirement for an effective licensing arrangement is that competition is not limited. Where this condition is not satisfied, licensees may collaborate to raise the market price (Boston, 1995).

3.4.2.4 Concession

Through this scheme, the government may award a concession to a private firm to set up a facility which utilizes the government owned resource--refuse. The concession may enable the private firm to recycle materials (e.g., paper, plastic, metal, glass); to recover resources (e.g., compost, heat, electricity); or to provide transfer or disposal services. In some cases, the private firm may maintain ownership and operation of the facility indefinitely. In other cases, the private firm may transfer ownership of the facility to the government after a specified period of private ownership and operation.

Under concession arrangements, the private sector may finance and own solid waste management facilities for sufficient time to depreciate investments and provide a reasonable return to equity investors. The government grants access to a specified quantity and quality of solid waste and provides some form of "tipping fee". In situations where the government is the only purchaser of the output of the concession, it normally enters into a binding long-term agreement to purchase on a "take or pay" basis (Augenblick & Custer, 1990).

Long-term ownership by the private sector is one way of avoiding the problems that are associated with the "build and sell" arrangements. Concession arrangements involve building, owning, and operating facilities through long-term contractual agreement: Build, Own, Operate and Transfer (BOOT) and Build, Own and Operate (BOO).

BOOT arrangement involves the private sector in building, owning, operating and, after a pre-specified number of years, transferring infrastructure. This arrangement provides a means for the private sector to finance the establishment of facilities which will eventually be transferred to government (Cointreau-Levine, 1992). A central premise of this scheme is that government financial resources are too scarce to meet the huge capital needs of the economy, hence the need for private investments in this area (DMJM International et al., 1995). This kind of arrangement may favour governments but few have been able to implement the BOOT arrangement. In many developing countries, private companies are not keen on risking investment money on large scale projects on a long-term basis (Cointreau-Levine, 1992).

BOOT agreements require meticulously developed specifications. They have to outline the regular maintenance which the private sector must provide to the facilities as well as the final condition in which the facilities must be handed over to the local government. Without such specifications, it is

possible that by the time a facility is transferred to the government, it is already unserviceable (Augenblick & Custer, 1990; Cointreau-Levine, 1992).

BOO is a type of partnership between the public and private sector whereby the private firm is authorized to build, own and operate the asset/service (Schuttenbelt & Lorentzen, 1994). Also called "turnkey contracting", BOO has become a popular means of financing major resource recovery projects in the USA, where about half of the waste-to-energy plants are privately-owned (Hilgendorff, 1989).

However, in some countries this arrangement is less favoured. Cointreau-Levine (1992) observes that the BOO scheme is less popular in developing countries because the private sector does not eventually transfer ownership of facilities to the government.

In Buenos Aires, Argentina, a co-operative operates a composting operation on a site provided by the government. The government pays a small tipping fee for the waste which the co-operative receives. To assist the co-operative with marketing, the government encouraged privately owned trucking companies hauling fresh produce into the city to return to the agricultural area via the compost plant, and thus return to the farms with compost (Cointreau-Levine, 1992). This success story demonstrates that BOO scheme is feasible where community-based organizations can be tapped to operate and manage government-owned facilities.

3.4.2.5 Community Arrangements

Self-help or co-production programs involve individuals, neighbourhood groups or community associations in undertaking actions that eventually reduce the level of government activity that would otherwise be required to fulfil service demands. In this arrangement (Figure 3-6, E), the citizens who produce the service also benefit from it (Stein, 1990).

Self-help activities involve citizens organized by location (neighbourhood or community), by common need (e.g., senior citizens), and by affinity (e.g., private voluntary organizations). Self-help can be used in the following ways:

- to enhance or complement services traditionally offered by the local government (e.g., neighbourhood watch programs support police crime prevention activities);

- to replace or supplement reduced services (e.g., impacts of reduced level of government services resulting from budget cutbacks could be mitigated by allowing self-help groups to contribute their labour while equipment and materials are provided to them by the government); and
- to initiate new services (ICMA, 1989).

Self-help groups manifest different forms and approaches, namely, non-profit corporations; member, producer, worker co-operatives; associations; or land and building trusts. Self-help initiatives can be integrated with other forms of service delivery (ICMA, 1989).

The self-help approach could be an effective alternative for public service delivery as the involvement of the local communities is solicited. Through this approach, costs to the government in service provision can be reduced, service effectiveness increased and the use of available resources maximized, contributing to a high level of efficiency in service delivery.

In some countries, community participation in smaller districts (such as *Kampung* in Indonesia, *barangay* in the Philippines, *chonaikai* in Japan, and ban in the Republic of Korea) and sharing values of community self-help or mutual co-operation (e.g., *gotong royong* in Indonesia) may directly contribute to solid waste management. In some cities in Indonesia, for example, communities hire street sweepers and waste collectors, and pay for their services independently. The resulting savings in collection can be realized by the SWM authorities (Fernandez, 1993).

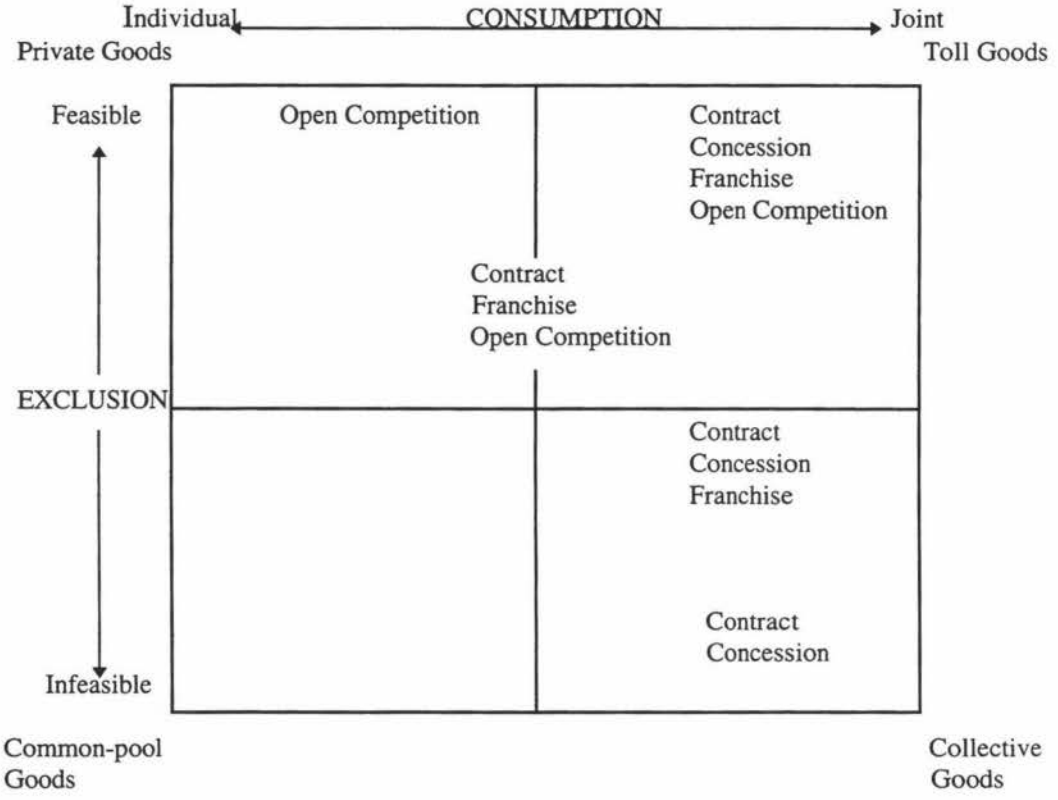
Also in Indonesia, city managers commonly work with the local leader of low income neighbourhoods to organize community efforts for self-delivery of waste to a communal depot or to hire and manage neighbourhood workers who provide door-to-door collection by pushcarts. The local leader collects fees from residents to cover the neighbourhood costs (e.g., salaries, supplies and equipment replacement). The cities participate by sending trucks to pick up the portable roll-on containers and transport them to landfills for discharge (Listyanwan & Damanhuri, 1991; Whitehead et al., 1990).

In Cairo, Egypt, an informal sector solid waste collection arrangement has been in existence since last century. The private collectors are part of a single community, known traditionally as the Zabbaleen. The Zabbaleens work closely with another community, known as *Wahis*, which had originally purchased the long-term rights to refuse from various buildings in the area. The Zabbaleens have always provided collection service to residents of upper income neighbourhoods, free-of-charge. In return, they are given the opportunity to recover and recycle the materials present in the wastes. The Zabbaleens generate incomes by selling recovered papers, plastics, glasses, and metals to the

manufacturing plants for recycling. They use the organic wastes as pig feed. Fees were paid to the *Wahis* for access to the wastes from these upper-income neighbourhoods (Extension of Technical and Advisory Services to the Zabbaleen Gameya Phase II, 1988).

Figure 3-7 links the activities of solid waste management to the different arrangements involving the private sector.

Figure 3-7 Public Sector Arrangements in Solid Waste Management



Source: Cointreau-Levine, 1992

3.5 Criteria for Evaluating Arrangements

3.5.1 Efficiency, Effectiveness, and Competition

Tomlinson (1986) distinguishes two types of efficiency at the micro-economic level. Market or allocative efficiency is concerned with the distribution of products produced (e.g., how many cars and cakes and who should get them?). Allocative efficiency results when the market allocates according to ability to pay. Efficiency will be achieved if people are economically rational and if nothing impedes

their exchange. People will trade until a balance is reached where no one could be made better off without making someone worse off (Goldsmith, 1996).

Internal or managerial efficiency is concerned with producing goods and services at the lowest possible cost (Tomkins, 1987). It is also called production efficiency as it reflects how well an organization uses its resources (Ott & Haltley, 1991). Efficiency, therefore, reflects the relationship between resources (inputs) used and outputs produced. An efficient activity maximises output for a given input or minimises input for a given output. Efficiency measures take the form of output/input ratios (productivity) and expenditure/output ratios (unit cost) (OECD 1995). This is one of the criteria for assessing SWM as adopted in this thesis.

Performance indicators that can be used to measure efficiency are:

- Productivity as measured by both labour productivity (used in this thesis) ;
- Financial ratios of profitability, such as the ratios of stocks to sale, debtors to sale and sales to fixed assets or proportion of labour costs in total expenditure and value-added per employee (Ott and Haltley, 1991).

Effectiveness indicates how well a programme or activity is achieving its stated objectives. It also reflects the relationship between the intended and actual outcomes (e.g., the extent to which the condition of hospital patients improves as result of treatment, OECD 1995). In determining effectiveness, the interests of stakeholders with different expectations and competing interests have to be considered (Tomkins, 1987). A generalised measure of effectiveness is used in this thesis, being the total value of waste collected per thousand population.

A determinant of efficiency (and effectiveness) is competition. The degree of competition permitted by a given institutional arrangement will influence how efficiently the service is supplied (Savas, 1987). In a competitive environment, agencies must perform efficiently in order to make a profit and to maintain their position in the market place. This is particularly so where the competitive environment is well developed. In the USA , for example, there are more than 10,000 private firms involved in municipal solid waste service. More than 80% of the nation's solid waste is collected by private firms (NSWMA, 1991).

Competition means that the consumer has a choice. In a competitive environment, customers who have a choice will seek out producers who will tailor their services to satisfy their different needs. In the

absence of competition, citizens are denied their right to choose one alternative over another and hence their preferences cannot be used to shape the service (Savas, 1987).

In determining how well (efficiently and/or effectively) solid waste management services are delivered in a given area, it must be borne in mind that there are various external and internal factors that affect the efficiency and effectiveness of institutions providing/supplying such services. External factors which are beyond the influence and control of the solid waste management authorities or managers include:

- the geographical size and characteristics of a given area;
- the size of population;
- population density;
- population growth rates; and
- gross domestic product (GDP)/head.

The geographical size and physical characteristics of the service area influence movement from one point to another and the ease or difficulty associated with it, and thereby affecting the condition of vehicles and equipment as well as the time needed to complete collection and disposal of waste. Extra costs in terms of additional personnel, maintenance and repair of capital equipment are needed in larger service areas and those that have poor roads and sloping terrain.

The size of population may bring about opportunities for economies of scale in terms of lower ratio of cost of overheads to cost of operation, a greater volume of refuse to be processed, lower utilization of capital/manpower (better utilization of labor and capital equipment), and increased scale of operation because of economies in the procurement of materials (through quantity discounts).

Higher population densities may bring about opportunities for operational economies in collection. The higher the density, the more efficient would be the utilization of capital and labor (maximized capital and labor utilization). However, this benefit can be outweighed by diseconomies of density, such as congestion.

Population growth rates affect the delivery of solid waste management services. In areas where growth rate is fast, it may be difficult to align infrastructure and equipment allocation. Planning

for development and investment in solid waste management is difficult, and can impose financial problems as an increasing population requires more budget resources to meet the demand for services.

Gross domestic product (GDP) per person influences the consumption patterns of the people. The higher the GDP per person, the greater the consumption, which leads to more production of waste. Increased production of waste means that more resources would be needed to dispose of the waste.

Internal factors, on the other hand, refer to those under the control of management which include, but are not limited to the following:

- institutional arrangements or mode of service arrangement;
- organizational design;
- investment;
- quality of staff;
- relationships among agencies involved; and
- flow of information.

The way institutional arrangements or mode of service arrangements are designed indicate the nature and degree of responsibilities, accountabilities and transparency among the participants. The more accountable and transparent the system, the more likely it is to be efficient and effective.

Organizational design has to do with hiring people with appropriate skills, efficiently managing equipment, an appropriate ratio of administrative to operational staff, and providing adequate benefits, training, and incentives to workers. Investing in appropriate technologies in solid waste management will also bring about increased operational efficiency.

Relationships among the participating agencies/sectors affect the delivery of solid waste management services. The more integrated and co-ordinated their efforts, the more likely it is the whole system will be effective.

Planners and managers need information to be able to plan effectively and appropriately align resources to the prioritized activities and projects. Relevant information includes current demographic,

social and economic characteristics of urban residents, trends in the urban economy, land use changes, status of implementation of ongoing operations and programmes, evaluation of the impact of policies, plans and programmes, and public views about proposals.

Performance indicators that can be used to measure efficiency in solid waste collection include:

- amount of waste collected (in tonnes, etc.) per employee;
- amount of waste collected (in tonnes, etc.) per operative

Effectiveness of solid waste collection may be determined through the following measures:

- ratio of the amount of waste collected (in tonnes, etc.) to every 1000 people;
- ratio of the amount of waste collected (in tonnes, etc.) to amount of waste generated;
- amount of waste collected (in tonnes, etc.) per land area; among others.

3.5.2 Social Equity

The principle that development costs and benefits should be fairly distributed among all members of society is widely held (Devas & Rakodi,1993). However, there is no consensus on what is meant by a "fair distribution". Since the reality of inequality of incomes and wealth is a given, the definition given to the term "equity" often implies some form of redistribution.

Devas & Rakodi (1993) identify four different equity criteria:

- the equal opportunity principle requires that there should be no discrimination according to race, gender, class, income, disability or other characteristics;
- horizontal equity which requires that all members of society have equal access to public services;
- vertical equity, which requires that those who have greater wealth and income should contribute more towards the costs of public services than those who have less; and
- the benefit principle, which suggests that people should contribute in accordance with the benefits they receive.

The authors also argue that the criterion of equity requires that the public sector interventions (as well as private sector activities) do not disadvantage the poor and other vulnerable groups, that they protect

such groups, or even that they are specifically designed to advantage them (positive discrimination). This may mean directing public policies to ensuring that basic physical needs are satisfied for all people (Devas & Rakodi 1993).

Equity considerations, in some cases, constrain the ability of the government to pass on costs through user charges. The decision to absorb the costs of government services, in part or in whole, with respect to some targeted portion of the population is a distributional decision (Boston, 1995).

Public or private provision of public goods does not necessarily correlate closely with public or private payment for them. Similarly, a collective decision to ensure the provision of a higher quantity or quality of goods or services than unregulated markets would provide does not predetermine whether these goods or services should be publicly or privately provided. Likewise, distributional concerns that might favour either universal access or targeted assistance do not predetermine public or private provision (Boston, 1995). In deciding what the nature of government intervention is required in the provision of goods and services, distributional issues need to be sorted out at the outset in a transparent manner and may be treated independently, in the first instance, from efficiency questions.

3.6 Conclusion

The way public and private institutions behave and how they interact with one another significantly impact on the economic efficiency of a country. Effective public management and service delivery necessitate effective co-ordination among the participants (Pugh 1995).

Effective collaboration in the delivery of a good or service results when roles are properly appropriated to the participants ("who does what"), depending on the nature of the good or service to be provided. When roles are properly delineated and institutional arrangements determined accordingly, systems of accountability take shape. Where there is a system of accountability, improved efficiency follows.

There is a wide range of institutional arrangements in service delivery, each differing substantially according to the attributes and importance of goods and services to be provided. In planning new services or rethinking the old ones, it should be recognized that there is more than one way to provide a service.

In deciding which institutional arrangements are appropriate to deliver a good or service, such as solid waste management service, certain contextual issues need to be addressed:

How is solid waste management (SWM) treated: Is it a public or private good/service?

Solid waste management services can be regarded as public, private, or even a mix of public and private goods. Mixed goods and services may attract a user charge which reflects the private benefit, perhaps by way of a toll as a user charge. The nature of SWM activities has to be determined at the outset since a range of service arrangement options can only be determined after having known how such goods or services are being treated.

What are the roles of the different participants in SWM service delivery chain?

If partnerships are deemed necessary in the delivery of SWM services, then the roles of each participant in the delivery chain have to be recognized and delineated. Knowing their roles would provide an indication of the accountability chain in SWM service delivery. A system with accountability mechanisms is more likely to be efficient (Devas and Rakodi, 1993).

What are the operating arrangements in the delivery of SWM services?

Implicit in this issue is the question of the strength and capability of people involved in service delivery. Having known the roles each participant plays in the SWM delivery chain, are the participants equipped with technical knowledge, skills and resources to adequately provide or deliver the services?

How do the institutional arrangements measure up to the criteria of efficiency, effectiveness, and equity?

After identifying the strengths and weaknesses of each service arrangement, they need to be evaluated against the criteria on efficiency, effectiveness, equity and accountability. The previous section discusses the criteria and indicators of performance to which the existing arrangements shall be evaluated.

This framework is to be used to examine and evaluate the ASEAN and Metro Manila case studies on solid waste management in the following chapters.

Chapter IV

SOLID WASTE MANAGEMENT IN ASEAN NATIONS: THREE CASE STUDIES

This chapter describes institutional arrangements for solid waste management in Singapore, Bangkok (Thailand), and Petaling Jaya (Malaysia) according to the framework outlined in Chapter III. Initially, a survey to examine the institutional arrangements and practices for solid waste management in major metropolitan areas in ASEAN countries was conducted at four mega-cities. Bangkok is the major metropolitan area in Thailand, a developing country with problems caused by rapid urbanization and high population density similar to Metro Manila; Singapore is a developed country and a major metropolitan area experiencing and generally seen as coping with problems on urbanization; Kuala Lumpur is a major metropolitan area in Malaysia and experiencing rapid urbanization; and Jakarta is the major metropolitan area in Indonesia.

Resource constraints meant that the survey was conducted without the benefit of face-to-face interviews. Questionnaires were posted to the agencies concerned (Appendix I). Follow-up letters, fax and electronic mail messages were sent to the embassies and directly to the appropriate agencies to prompt a response to the questionnaires. Despite help from the relevant embassies, difficulties were encountered.

The Ministry of Housing and Local Governments in Malaysia, unable to obtain the response of the Local Government of Kuala Lumpur, referred the questionnaire to the Petaling Jaya Municipal Council whose administrative jurisdiction is limited only to the municipality of Petaling Jaya. Nonetheless, Petaling Jaya is a rapidly urbanizing, industrial area. It is comparable with the typical municipalities within Metro Manila in terms of the size of its land area and population (e.g., Valenzuela in Metro Manila).

While the relevant agencies in Bangkok (Bangkok Metropolitan Authority) and Singapore (Ministry of the Environment) responded to the questionnaires, the Local Government in Jakarta did not. Hence, out of the four initially targeted metropolitan areas in ASEAN, only two (Singapore and Bangkok) case studies could be undertaken.

4.1 Physical and Demographic Profile of ASEAN Case Studies

Table 4-1 presents the physical and demographic characteristics of the three ASEAN case studies: Singapore, Petaling Jaya, and Bangkok.

Table 4-1 Physical and Demographic Characteristics of Petaling Jaya, Singapore, and Bangkok

City	Population	Area (Sq km)	Density	Annual Population Growth Rate
Petaling Jaya, Malaysia	450,000	51	8,824	15%[1]
Singapore	2,987,000	646	4,624	2.1%[2]
Bangkok, Thailand	6,556,000	1,569	4,179	1.03%[3]

[1] 1991-1995 calculated annual growth
[2] 1990-1995; Source: World Bank, 1995
[3] 1990-1995; Source: World Bank, 1995

Although Bangkok has the biggest land area and highest population, Petaling Jaya has the highest population density. Petaling Jaya grew by 15% annually between 1991 to 1995, far more than Bangkok (2.18%) and Singapore (1.03%).

4.2 Organizations and Practices in SWM in the ASEAN Case Studies

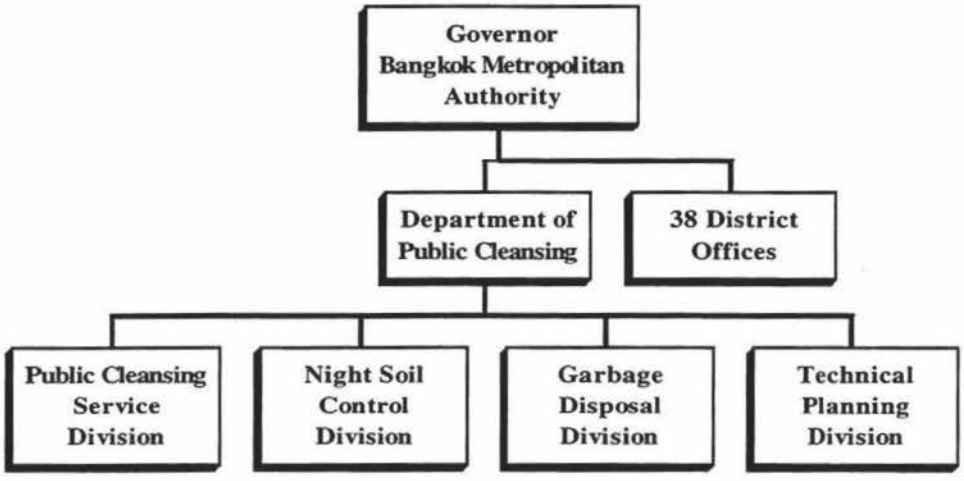
4.2.1 Bangkok (Thailand)

Organizational Structure

Solid waste management in Bangkok is the responsibility of the Bangkok Metropolitan Administration (BMA) together with the Cleansing Sections of the 38 District Offices. The BMA is the local administrative body of the capital and is headed by the Governor of Bangkok. The BMA comprises 4 Offices, 14 departments, and 38 district offices (Figure 4-1).

One of these departments, the Department of Public Cleansing (DPC), is in charge of solid waste management. Its main functions are the planning, control, and implementation of public cleansing, disposal of night soil as well as the provision and maintenance of temporary toilets and mobile toilet trucks.

Figure 4-1 Solid Waste Management Organizational Structure of BMA (Thailand)



The Public Cleansing Service Division (PCSD) of the DPC is tasked with the collection, transport and disposal of solid waste generated by the city's industries, institutions, and commercial establishments. It also collects wastes from hospitals, health centres, public markets and central government buildings. The PCSD-DPC is also responsible for the road sweeping vehicles which wash and sweep the major roads.

The Cleansing Sections of each District Office is responsible for collection and transport of waste from residential areas, markets, commercial centres, small industries and public areas of the 38 Districts.

Human Resources

The DPC employs 7,785 people to handle solid waste collection and disposal in Bangkok. Administrative personnel make up only 1.4% (112) of the workforce while the rest (7,693) are involved in collection (7,293) and transfer/landfill operation (380). Total salaries in 1995 amounted to 468,924,000 Baht or US$ 709,580 which is 20.3% of the total operation cost of DPC (2,307,406,110 Baht or US$ 89,758,098).

The human resource problems cited by the BMA in the survey arose from the lack of manpower in waste collection. The lack of public awareness, particularly about waste minimization, was

mentioned as a human resource-related problem which suggests that the DPC does not have the technical expertise or resources to undertake the public education needed. The survey confirms that there were no training courses offered on solid waste management for BMA personnel in 1995. Inspite of this approved need for training in waste minimization, the DPC plans to conduct public information campaign on methods of waste minimization.

Capital Investment

DPC valued its investment in trucks at 174,391,103 Baht (US$ 6,783,814). About 17,666,556,000 Baht (US$ 687,229,028) is expected to be spent for equipment for the next five years. The availability of an estimate on capital spending indicate BMA's budget commitment for SWM plant and equipment for the next five years.

The DPC is seeking to improve and increase the efficiency of both its personnel and equipment. The official policy on solid waste management is contained in the Fourth Development Plan of the BMA (BMA 1996). The activities and projects to be carried out include:

A. Solid Waste Collection

- Campaign and promotion of solid waste separation for materials
- Solid Waste Collections from households along canals
- Collection Centre Program
- Hospital Waste Collection
- Cleanliness and orderliness in vicinity of housing projects
- Street Sweeper's Contest
- Cleanliness, freshness, and orderliness Project
- Seminars and trainings for officials and employees of the DPC

B. Solid Waste Disposal

- To hire private companies to transport refuse from transfer station to landfill
- Construction of a new compost plant at Nong-Khaem
- Construction of additional incinerator plant

Collection

The BMA is the only organization involved in solid waste collection in Bangkok. In 1995 a total of 2,421,410 tonnes (6,634 tonnes/day) of waste was collected by the DPC and the Cleansing Section of the 38 Districts. This represents an estimated 98% of the total waste generated (2,482,000 tonnes) in Bangkok. The BMA did not give data on volume of waste by source or classification.

User fees are collected by the BMA to fund solid waste management activities. Garbage collection fees are directly collected by BMA from their customers. The user fees vary according to the type of community and the volume of waste. Shown in Table 4-2 are the user fees charged by BMA to residential customers.

Table 4-2 User Fees Charged by BMA

Volume of Waste (litres)	User Fee Charge (Baht/month)
< 20	1
20-40	6
40-60	8
60-80	10
80-100	12

For market, industrial, and commercial wastes the BMA charges 40 Baht (US$ 1.56) per cubic meter. In 1995 65,516,323 Baht (US$ 2,548,585) in user fees was collected. This means that BMA was able to recover 3.1% of their total expenditures for public cleansing in 1995 (budget of BMA for DPC in Fiscal Year 1995 was 2,113,404,100 Baht or US$ 82,211,419).

Waste Recycling/Materials Recovery

The BMA has conducted a public campaign to educate people on the importance of separating waste in order to facilitate recycling and disposal. The BMA is planning to grant a concession to the private sector to manage recyclable waste (Bangkok Post, 1996). It was estimated that the volume of trash created each day would be reduced by up to 30% if private operators were involved in the garbage recycling process. The BMA is drafting the Terms of Reference for this project and bidding is expected to be called soon. A fleet of garbage-separating trucks will be introduced around the city to encourage people to separate their waste prior to collection.

Transfer Operations

Trucks and boats are used in the transport of waste to three transfer stations maintained and operated by three private companies under contract with the Garbage Disposal Division (GDD) of the DPC. Two of them have a capacity of 3,000 tonnes/day while the third can accommodate 2,000 tonnes/day.

The BMA has plans to increase capacity of the transfer stations in the future.

Disposal

The two sanitary landfills receive 3,000 and 3,500 tonnes of waste per day. They are operated by same private companies that operate the transfer stations. Waste from hospitals and medical clinics are burned at two incinerator installations, each having a capacity of 10 tonnes/day. There is also a compost plant at On-Nuch with a capacity of 1,200 tonnes/day.

4.2.2 Singapore

Organizational Structure

Solid waste management in Singapore is the responsibility of the Ministry of the Environment (MOE). Of the MOE's 4 Divisions (Figure 4-2), 3 are directly involved in solid waste management. These include the Environmental Health Department-Environmental Public Health Division (EHD-EPHD), Engineering Services Department-Environmental Engineering Division (ESD-EED), and Pollution Control Department - Environmental Policy and Management Division (PCD-EPMD.) The fourth division, Corporate Services Division (CSD), is primarily involved in the administrative functions of the ministry like personnel management, public affairs, financial management, information systems management, and legal affairs.

Figure 4-2 Solid Waste Management Organizational Structure of Ministry of the Environment (Singapore)

The EHD-EPHD's primary functions are:

- Public Cleansing
- Solid Waste Regulation

  -licensing of general waste collectors

  -oversee provision of proper refuse storage and collection facilities in buildings and estates
- Landfill operations
- Waste Minimisation
- Licensing and control of food establishments, trade fairs and swimming pools

The EHD was also in charge of waste collection services but since 0l April 1996 a government-owned company, SEMAC Pte Ltd., took this over. SEMAC's operation is based around 5 depots located throughout the island.

The ESD-EED is responsible for :

- Planning and developing refuse disposal facilities
- Managing refuse incineration plants and refuse transfer stations
- Developing and upgrading cemeteries, crematorium, columbrium facilities, food centres and markets, and carries out improvement works for environmental health district offices
- Calling tenders on behalf of various departments in the Ministry

The PCD-EPMD handles the control of hazardous and toxic waste collection and disposal from industries as well as hazardous biological wastes from hospitals and medical clinics.

Human Resources

There are 951 personnel involved in solid waste collection and disposal. One hundred sixty-five (17%) of these are administrative personnel while 786 (83%) are operations personnel involved in collection and operation of the transfer stations, landfills, and incineration plants. Salaries of personnel in 1995 amounted to Sin$ 1,443,700 ($US 1,027,770) which is 5% of the total budget for SWM.

Effectiveness of collection was 428 tonnes/1,000 people while efficiency was 1,343.3 tonnes/employee. Like the DPC in Thailand, the MOE of Singapore cited lack of manpower in waste collection as its main human resource problem.

In 1995, 155 waste management staff attended training courses costing the Ministry Sin$50,000 (US$35,595) which is 0.2% of the total manpower budget. The commitment to training may explain why Singapore yielded high effectiveness and efficiency values among the three ASEAN case studies.

Capital Investment

The Ministry of Environment has a total of Sin$ 26,388,000 (US$ 18,540,724) in capital investment in solid waste management. This includes Sin$ 2,044,000 (US$ 1,455,124) for buildings, Sin$118,077,000 (US$ 84,059,016) for trucks, Sin$ 207,000 (US$ 147,363) for light vehicles, Sin$ 2,086,000 (US$ 1,485,023) for earthmoving equipment, Sin$ 1,902,000 (US$ 1,354,034) for compactors, and Sin$ 2,072,000 (US$ 1,475,057) for other equipment.

Revenues Generated from SWM

In 1995 the Ministry collected Sin$ 163,508 (US$ 116,401) from SWM operations broken down to Sin$ 148,129,000 (US$ 105,453,035) from refuse removal and disposal fees and Sin$ 15,379,000 (US$ 10,948,310) from the sale of electricity by refuse incinerator plants. From these, the Ministry was able to recover 0.6% of their SWM expenses in 1995.

However, it appears that revenues are not channeled back into solid waste management but instead go to the national treasury with the Ministry allocated a budget by the national government. Under this arrangement, there seems to be less motivation for the MOE to be creative in seeking other means to recover costs or use financial resources more efficiently as funding comes regularly from the national government.

Collection

In 1995 1,277,500 tonnes of waste was collected of which 48% (613,200 tonnes) is residential, market and commercial waste while 51% (651,525 tonnes) is industrial and construction waste. Institutional waste made up only 1% (12,775 tonnes) of the total waste collected. Waste collected by the MOE accounted only 48% of the total waste generated in Singapore (2,670,000 tonnes). The balance was collected by about 300 licensed private general waste collectors. These private collectors remove waste from industrial and commercial premises, shipyards and construction sites as well as private condominiums.

Waste collection was planned to be turned over to a state-owned company by 1996. By 1999, the Ministry plans to adopt a franchising approach to appoint other public waste collectors besides SEMAC.

Waste Recycling/Materials Recovery

With economic development, industrialization, and growing affluence of its citizens, the generation of refuse in Singapore has increased by more than six-fold in the last 25 years. This places a severe demand on the country's limited resources to collect and dispose of the waste.

The increasing waste output is a great concern as land is very scarce in Singapore. There is a limit to the number of incineration plants that can be built and the availability and increasing cost of new dumping sites. To reduce waste generation and promote recycling, the Ministry formed a Waste Minimisation Unit. The functions of the Waste Minimisation Unit are:

- Promote waste minimisation and resource conservation
- Develop and implement waste minimisation and recycling programmes
- Serve as secretariat for Green Labeling Scheme

Transfer Operations

The Ministry of Environment operates a transfer station in Kim Chuan. There are no plans to increase the capacity of the transfer station.

Disposal

Due to the scarcity of open land, the Ministry has opted to incinerate most of combustible refuse. About 80% to 85% of waste generated in Singapore is suitable for disposal by incineration. The Ministry operates and maintains 3 incineration plants and a sanitary landfill. The sanitary landfill receives 2,300 tonnes of waste per day. Moreover, the Ministry is constructing an offshore landfill site at Palau Semakau and another incineration plant at Tuas to handle the increasing amount of waste collected in Singapore.

4.2.3 Petaling Jaya (Malaysia)

Organizational Structure

The Municipal Council of Petaling Jaya is responsible for the collection, transport, and disposal of solid waste in Petaling Jaya. The council is headed by a director and has three divisions involved in solid waste management - Solid Waste Management Division (SWMD), Contract Services Division (CSD), and Support Services Division (SSD) (Figure 4-3).

Figure 4-3 Solid Waste Organizational Structure of Petaling Jaya

The SWMD is subdivided into sections according to type or source of waste they handle- household waste, schools/commercial establishments, government agencies/bulk bins, and garden refuse. The CSD takes charge of formulation, monitoring and enforcement of contracts related to solid waste management while the SSD maintains and operates the fleet of trucks and equipment used in collection and disposal of solid waste.

Human Resources

The Municipal Council of Petaling Jaya employs 338 people for its solid waste management function. Administrative personnel account for only 2% (7 personnel) while the rest (331 personnel) are operations personnel involved in collection, transfer, and sanitary landfill operations. Total salaries in 1995 amounted to 2,625,240 Malaysia Ringgit (MR) (US$ 1,061,621).

Effectiveness of waste collection in Petaling Jaya in 1995 was 236 tonnes/1,000 population and efficiency 315 tonnes/employee. The council did not cite any human resource problem in the survey. No training courses were conducted in 1995 for solid waste management personnel.

Capital Investment

The Council did not give any information on capital investment. This may indicate the low priority given to SWM in the Council's overall planning and programming concerns.

Collection

In 1995 106,420 tonnes of waste was collected, 60% (63,852 tonnes) of which was collected by the Council while the rest (42,568 tonnes) was collected by private companies contracted by the Council. Waste collected in 1995 was only 57% of the annual waste generated (187,800 tonnes).

The Council does not charge any user fees for solid waste collection. The solid waste management function of the Council is funded by assessment fees collected from residents and businesses. Solid waste management takes up 30% of the council's total budget. This indicates that solid waste management compete with other services being provided by the Council in terms

of funding which could affect operations and eventually lower efficiency and effectiveness should other services be given priority by the Council.

The function of solid waste collection will be turned over to private companies pursuant to the Malaysian government's five year development plan (1996-2000) which accelerates the privatization of state assets. The development plan anticipates that the private sector companies will undertake many of the government's functions and projects (Anonymous, 1996a) in the near future. In June 1996, four consortia were chosen by the Malaysian government to undertake collection, treatment, and disposal of solid waste (Anonymous, 1996b). One of the companies, Consortium Hicom, got the contract for the central and eastern regions of Malaysia which include Kuala Lumpur, Selangor, Pahang, Terengganu, and Kelantan. The state government of Selangor holds a 5% equity in this company. Although the 4 consortia have been awarded the concession, details of the contract are still being negotiated, particularly the tariffs for the service and how it would be charged.

Transfer Operations

There is no transfer station in Petaling Jaya since all wastes are directly transported to the sanitary landfill.

Disposal

The Council used to operate a landfill but closed it down on 01 March 1996 and waste disposed of instead to a sanitary landfill in Ayer Hitam, Puchong. This sanitary landfill is 30 kilometers away from Petaling Jaya and is operated by a company owned by the Selangor State Government in partnership with a French company. This landfill services 7 municipal councils and can accommodate up to 2000 tonnes of waste daily. The municipal councils are charged MR 25 per tonne while private companies pay MR32 per tonne.

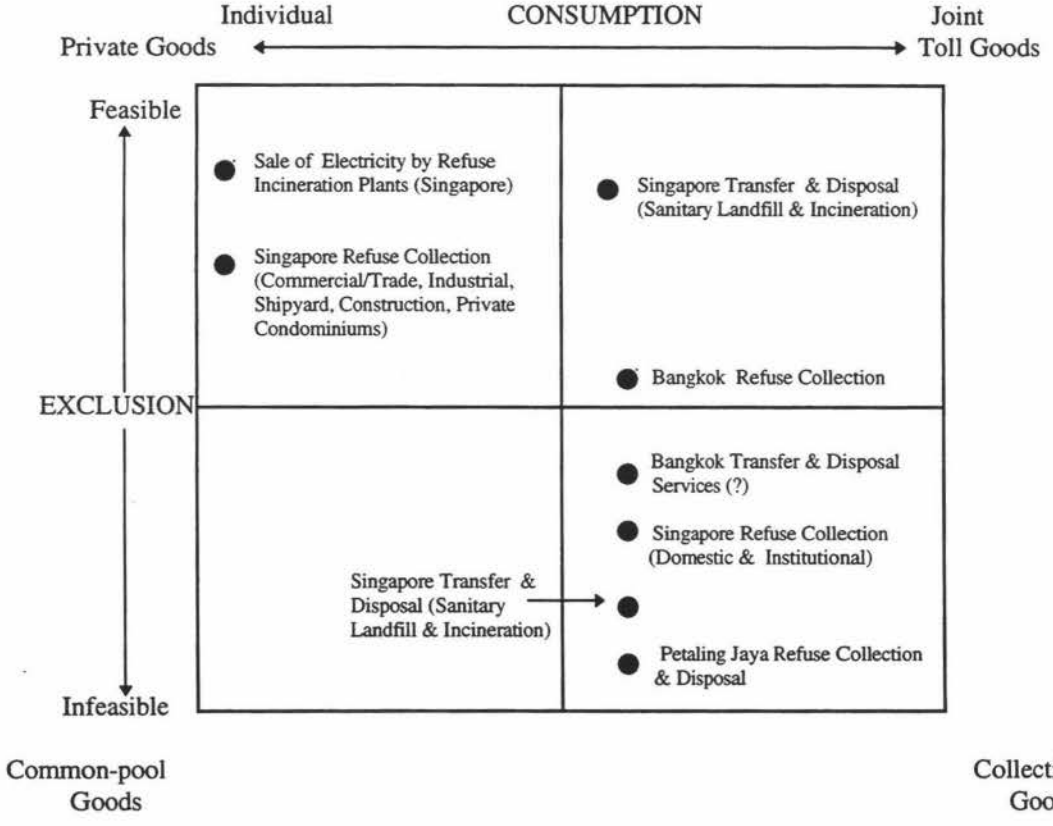
Like solid waste collection, disposal of waste will also be turned over to Consortium Hicom.

4.3 Comparison of Solid Waste Management Services and Institutional Arrangements

4.3.1 Nature of Solid Waste Management Services in ASEAN

Figure 4-4 shows how the various solid waste management services are treated in Singapore, Bangkok and Petaling Jaya. Singapore treats SWM as a public, private and mixed public-private good/service. The way refuse collection is treated in Singapore depends on where waste is

Figure 4-4 Nature of Solid Waste Management Services in Bangkok, Singapore, and Petaling Jaya



generated: refuse collection from domestic and institutional sources is considered public service; refuse collection from industrial, shipyard, commercial/trade, construction and private condominiums is considered a toll service. Transfer and disposal services are also treated as toll and public goods/services depending on the sources of waste. Electricity generated from refuse incineration plants is considered a private good sold to interested parties.

In Bangkok, refuse collection is treated more as a mixed, public-private good than a public good, because of the way user fees are collected on a door-to-door basis. It may be possible that refuse collection is done only in relatively well-off villages while those in poor villages/squatter settlements are not being serviced by BMA because of their inability to pay the charges. This raises equity issues which reflect the question of how far rapidly developing cities' SWM can be treated as a private good, and whether there is a need to differentiate charges on the basis of ability to pay.

No tipping fee was mentioned as being collected by the transfer stations and sanitary landfills managers. As BMA and the 38 districts under the Authority are responsible for transfer and disposal, this probably indicates that the charges imposed for collection included the cost of disposal.

In Petaling Jaya, refuse collection, transfer and disposal services are considered public services. No charges are imposed from refuse collection. There is no transfer station in Petaling Jaya; wastes are directly hauled and disposed of at the sanitary landfill operated by the Petaling Jaya Municipal Council in 1995. No tipping fee was mentioned as being collected for disposal of waste into the sanitary landfill.

4.3.2 Roles of the Government and Private Sector in the SWM Delivery Chain

Table 4-3 summarizes the roles of the government and the private sector in SWM in the three case studies. Most of the SWM services are produced by the government. In each case (Petaling Jaya, Bangkok, and Singapore), government is both arranger and producer. It should be noted that the public agencies in the case studies have mandates other than SWM. This could lead to competing or even conflicting priorities, such that one service is given more attention and resources than others, something which may significantly impact on service delivery.

Where the government is the producer of service, both political and managerial responsibilities are assumed by the administration. The delineation of the political and managerial responsibilities of the government becomes a problem. When political and managerial responsibilities are assumed by only one party and not distributed to separate bodies, there is a possibility that on occasion, efficiency may be sacrificed to protect the administration's political interests (Stein, 1990).

Table 4-3 Roles of the Government and Private Sector in the SWM Delivery Chain in Singapore, Malaysia, and Petaling Jaya.

Participants in SWM	Collection	Transfer	Disposal
Singapore			
Ministry of Environment	Arranger & Producer	Producer	Producer
Private Companies	Producer(License)	Not Applicable	Not Applicable
Bangkok			
Bangkok Metropolitan Authority	Producer	Arranger	Arranger
Private Companies	Not Applicable	Producer(Contract)	Producer(Contract)
Petaling Jaya			
Petaling Jaya Municipal Council	Arranger & Producer	Not Applicable	Producer
Private Companies	Producer(Contract)	Not Applicable	Not Applicable

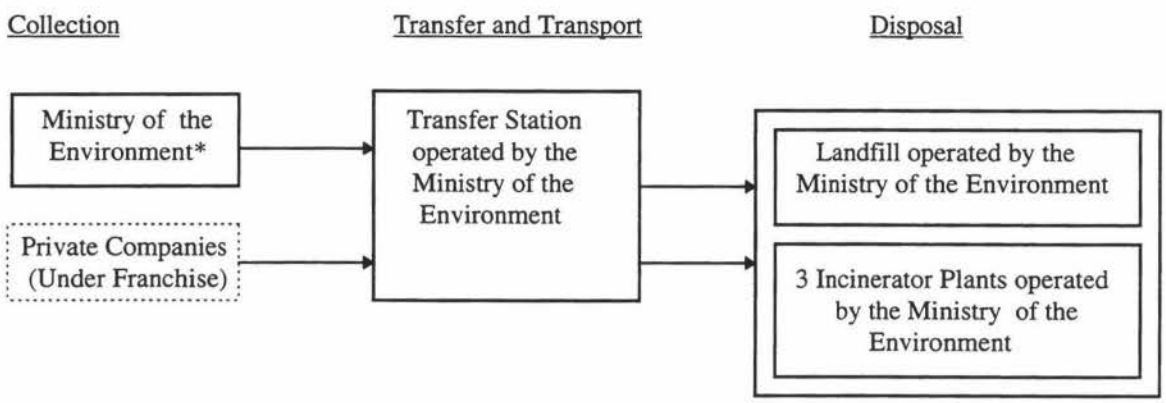
Partnership schemes between the government and the private sector are increasingly pursued because of the benefits reported by some organizations. Success in such partnerships, however, depends on the clear delineation of roles between the parties involved and clear accountability flows from one level to another. The agencies in Singapore and Petaling Jaya indicated that they were negotiating to increase the role of the private sector in producing the services, with the government agencies acting only in the role of arranger.

4.3.3 Institutional Arrangements in SWM in the ASEAN Case Studies

Figure 4-5 presents the different arrangements operating in SWM in Singapore, Bangkok and Petaling Jaya. Both direct producing and contracting are common to each agency. Singapore licenses private companies to collect refuse from industries and commercial/trade establishments and other sectors not serviced by the MOE. Singapore and Petaling Jaya are also considering using other modes of service arrangement (such as franchising and concessions). A tendency to resort to nondirect service provision (such as contracting out) may indicate that governments are seeking efficiency gains by involving the private sector in service provision, without giving up public responsibility.

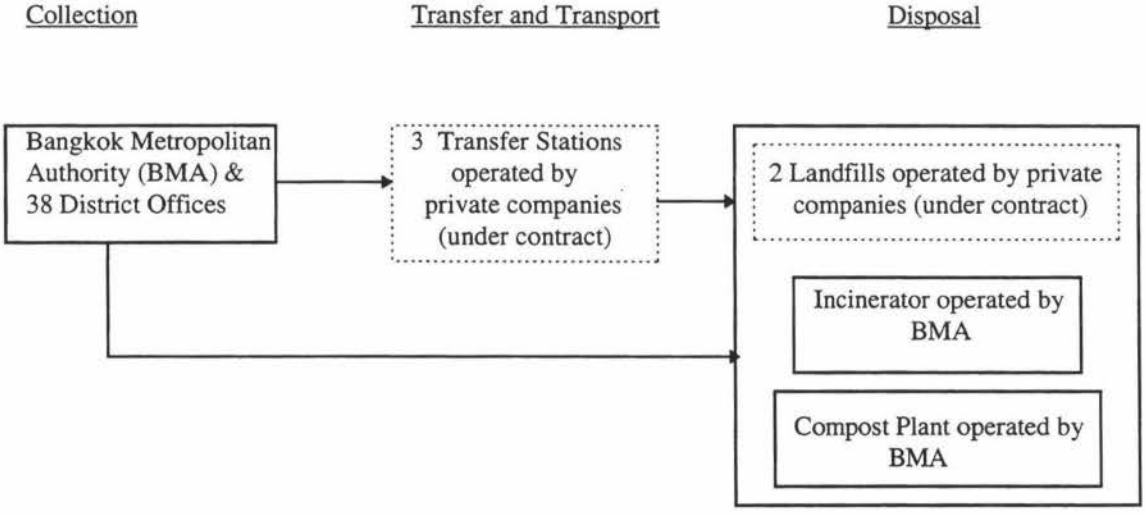
Figure 4-5 Service Arrangements in Solid Waste Management in Singapore, Bangkok, and Petaling Jaya

Singapore

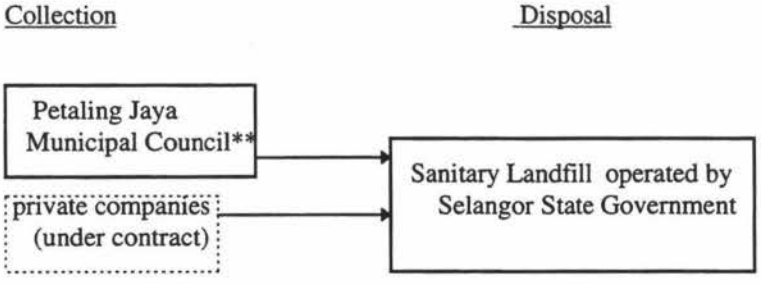


*Starting 01 April 1996, all the solid waste collection functions of the Ministry of the Environment Was taken over by SEMAC Pte Ltd, a government-owned company

Bangkok, Thailand



Petaling Jaya, Malaysia



** In June 1996 a private company, Consortium Hicom, was awarded a contract to collect, transport, and dispose solid waste in the central and eastern regions of Malaysia including Petaling Jaya in Selangor State. The Selangor State government holds a 5% equity in this company.

4.3.4 Evaluation of the Institutional Arrangements Against the Criteria on Efficiency, Effectiveness, and Equity

Measures of effectiveness and efficiency in refuse collection in each of the case study areas were calculated from information supplied. Effectiveness of collection was calculated as the ratio of waste collected in 1995 (in tonnes) to 1,000 population.

Efficiency of collection was calculated by dividing the total waste collected in 1995 (in tonnes) by the number of employees in each organization concerned. It must be noted that the number of employees referred here includes only the number of employees of the surveyed organization and does not include the employees of other organizations undertaking collection in the same area, if there are any. Table 4-4 and Figure 4-6 present the effectiveness and efficiency of collection for each case study area. Singapore is shown to have the highest effectiveness and efficiency, about four times greater than the other two case studies. Petaling Jaya's collection is virtually the same as Bangkok's in terms of efficiency but is less effective in terms of waste collected per 1,000 people.

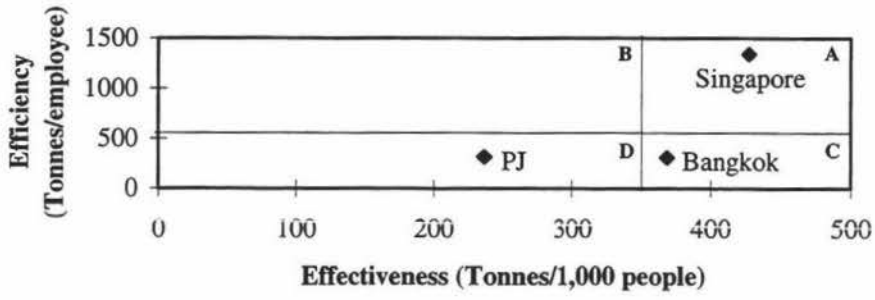
Table 4-4 Effectiveness and Efficiency of Waste Collection in Petaling Jaya, Singapore, and Bangkok

City	Waste Collection (1995 in Tonnes)	Tonnes per 1000 people	Number of Employees	Tonnes per Employee
Petaling Jaya, Malaysia	106,420	236	338	315
Singapore	1,277,500	428	951	1,343
Bangkok, Thailand	2,421,410	369	7,785	311

The operating arrangements for refuse collection in Singapore, where the Ministry allows private companies to participate in refuse collection services through licensing, are associated with the highest levels of effectiveness and efficiency of the three case studies.

The Petaling Jaya Municipal Council undertakes and hires contractors for refuse collection and may have realized efficiency gains but is still less effective perhaps because of the low priority accorded their SWM activities (e.g., lack of training programmes and absence of long-term planning for SWM).

Figure 4-6 Efficiency and Effectiveness of SWM in Petaling Jaya, Singapore, and Bangkok



Note:

A - Effective and Efficient
B - Less Effective but Efficient
C - Effective but Less Efficient
D - Less Effective and Less Efficient

Refuse collection in Bangkok is a purely government responsibility. The absence of private sector participation in refuse collection might account for BMA's low efficiency and relatively lower effectiveness.

Among the three case studies, only Bangkok contracts out the management and operation of the government-owned transfer stations and sanitary landfills. According to the survey, only Bangkok has plans to expand the operational capacities of the government-owned transfer and sanitary landfill facilities. Plans for development and investment may be more attractive when there is private sector involvement since financial investment and risks are usually borne by them.

The survey was not able to extract sufficient information to deal with equity issues. While the level of charges imposed in Singapore and Bangkok depends on the volumes generated, whether or not the charges are within the capacities of the consumers, and whether they favour particular interests could not determined.

In Bangkok, it appears that charges are mandatory. The question on whether or not squatter settlements and poorer areas of the city can avail themselves of these services of the BMA was not revealed in the survey.

In Petaling Jaya, SWM user charges are included in the payment of property taxes. The Municipal Council and its contractors undertake refuse collection regardless of whether

principle, everybody benefits from the collection services. However, this arrangement may not be sustainable in the long run because there is no incentive for people to minimize their waste and funding depends on central taxes.

4.4 Conclusion

Economies in the ASEAN region have been affected by global events over the last three decades, which have led governments to pursue reforms intended to sustain competitive need in the global market. Efficiency has become a major objective in public management, with governments increasingly turning to the private sector as a potential partner in the pursuit of this objective.

Common to two case study areas (Singapore, and Petaling Jaya) is a lead agency responsible for setting the relevant policies, legislation, and guidelines in the implementation of solid waste management plans and programmes in the national level. The Ministry of the Environment of Singapore takes the lead in the country's solid waste management, while the Ministry of Housing and Local Governments in Malaysia is the lead agency. These agencies were established before they assumed solid waste management functions.

The availability of well-trained staff in solid waste management could be a significant factor contributing to the efficiency and effectiveness of Singapore's waste collection. The two other case studies lack this component, which might have limited their performance. Constrained management practices limit skills and may contribute to this outcome. Also, the combination of direct (government) and indirect (licensing) modes of service arrangements may also have significantly contributed to Singapore's performance.

Only BMA indicated any long term planning process, indicating that it has committed financial, human, and logistical resources for SWM operations for the next five years. The two other case studies indicated that some aspects of their agencies' SWM will be privatized (through franchising arrangements) in the future, which could explain why they did not provide information about their five year capital expenditure for SWM. Should that be the case, the onus of long term planning for development and investment in SWM has to be assumed jointly by the government and the private sector. It is important for the service arranger (in these case studies, the government) to formulate long term plans that will guide the producer of service (often a private firm) in the design and delivery of the services.

The three case studies show that for each component of their solid waste management operations (waste collection, transfer and disposal), different modes of service arrangements were adopted. Two of the administrations in the case studies (Bangkok and Petaling Jaya) hired contractors to manage either their waste collection, transfer operations, landfill operations or both the first and second or second and third components.

There seems to be a growing tendency for these governments to increase the role of the private sector in solid waste management, particularly in Singapore and Petaling Jaya. However, this does not imply that the private sector is always more effective in supplying the services. The role of the government in terms of monitoring and auditing is vital for the SWM system to work effectively.

Cost recovery is either lacking or very limited in all three case studies. Although Bangkok and Singapore charge user fees, the revenues generated do not flow back to the SWM operations. Cost recovery does not seem to be a high priority because responsibility for funding remains with the national government. As such, there may be very little motivation for these administrations to use their financial resources efficiently or make revenue collection more productive since they do not have sufficient autonomy to make the appropriate fiscal decisions. Lack of financial autonomy of these agencies may limit the long-term gains in efficiency and effectiveness of SWM activities in those areas.

Chapter V

URBANIZATION AND ENVIRONMENTAL MANAGEMENT IN METRO MANILA

This chapter identifies the challenges of urbanization and opportunities for environmental management in the Philippines. It provides an overview of urbanization and discusses the primacy of Manila. An outline of recent development trends provides a context for discussion of environmental management. Finally, the institutional framework of environmental management is outlined.

5.1 Overview of Urbanization in the Philippines

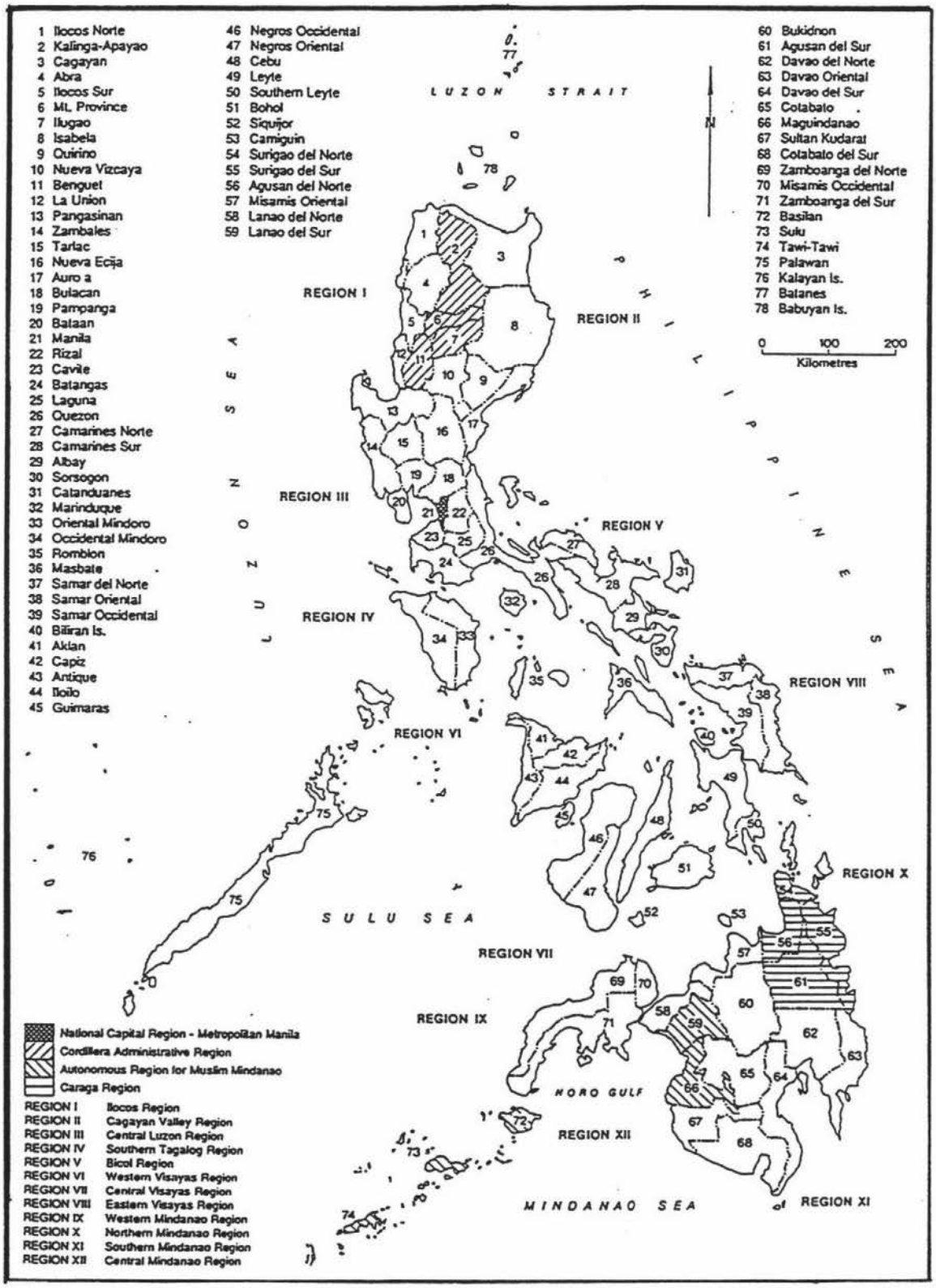
The Philippines has an area of approximately 300,000 square kilometers spread over 7,107 islands (Figure 5-1). It is an archipelago with a total coastline of 17,460 kilometers. The country is divided into three major island groups: Luzon, Visayas, and Mindanao. Their respective shares of the total land area are 47%, 19% and 34%.

Urbanization first gained momentum in the 1920s. Natural population growth and rural-urban migration were the leading causes. Initially, net migration gains outstripped natural increase in the cities. Early migratory patterns were associated with land availability in the frontier areas of Mindanao and Cagayan Valley in Luzon. In the 1950s and 1960s, migrants to the frontier areas came largely from areas with relatively poor agricultural resources, such as Ilocos (Northern Luzon) and the Visayas, and to a lesser extent from areas of high agricultural densities and agrarian unrest, such as Central Luzon.

However, the impact of these two factors was reversed after 1960. Rural-rural migration to frontier areas in Mindanao and the Cagayan Valley ceased as the supply of arable land diminished and security deteriorated with the spread of insurgency (Ruland, 1992). While both "push " and "pull" factors were responsible for rural-urban migration in the 1950s and 1960s, the recent upsurge in urban migration was caused primarily by "push" factors.

Social and economic changes promoted a shift from land-oriented frontier migration to urban migration, responding to the pull of industrialization. Urban growth averaged 4.4% in the 1970s and increased to more than 6% before the turn of the decade (Ruland, 1992). A study of factors determining the volumes and characteristics of interregional migration for the 1970-1975 period by

Figure 5-1 Map of the Philippines



Pernia and Gonzales (1981) underscored the key roles of economic opportunities at region of destination, kinship network and ethnicity, and educational attainment at region of origin.

In 1990, about 43% of the national population (almost 61 million) was classified as urban. This is expected to increase to 48% by the year 2000 (NSCB, 1993).

5.2 The Primacy of Manila

Unlike other Southeast Asian countries, the Philippines lacks a significant pre-colonial history of "sacred" cities and coastal or inland city states. In the mid-16th century, Manila was a relatively large agricultural and fishing village of about 2,000 persons (Doeppers, 1972). The existing population and the site's strategic and port advantages made Manila the ideal location for Spanish activities. Hence, in 1571, the Spanish declared Manila a city, and the capital and port for her new colony.

In the 17th century, the city was a thriving commercial centre with many opportunities for the accumulation of wealth. In addition, Manila attracted overseas migrants from Spain and from other areas of Southeast Asia to participate in trade (Arn, 1995). By 1650, Manila was considered an important multiracial world port with more than 41,000 residents. These included Spaniards, Japanese, Chinese, and Filipinos. Already, Manila was ranked first among the centres in the country, larger than Cavite and Cebu (the second and third ranked centres, respectively) combined (Doeppers, 1972).

At the beginning of the 19th century when the galleon trade declined, the Philippine economy became reoriented to export agriculture. Manila's dominance was reinforced by two factors. First, the main export crops were organized on a hacienda/plantation basis, supporting relatively few national or provincial urban centres. Second, the merchant and administrative elite in Manila invoked policies which supported the centralization of activities. Trade and transportation policies also favoured the geographical and functional dominance of Manila (Arn, 1995).

American colonialism during the Commonwealth period (1934-1946) led to more political centralization.. Having the country's export agriculture tied to the American market further stimulated the growth of Manila (Arn, 1995).

Import substitution also began during the late American period (Doeppers, 1984). From this period onwards, industries have located disproportionately in or near Manila. In 1940, two-thirds of the nation's manufacturing was located in Manila and its immediate hinterland. Road and rail

transportation developments continue to support the Manila-centered development and neglected areas outside Central Luzon (Smith and Nemeth 1986; Nemeth and Smith 1985).

The index of primacy (the ratio of the largest city's population to the next three larger ones) for Manila increased from 3% in 1913 to 4.3% in 1970. With the definition of Metro Manila broadened in 1960 to include four cities and 12 municipalities (one more was added in 1970), this primacy index increased to 5.9% (Hollnsteiner and Lopez 1976).

By the 1980s Metro Manila exhibited the characteristics of extreme urban primacy. Some 90% of the country's one hundred biggest corporations, all major newspapers, all commercial television stations, 60% of manufacturing establishments, and 45% of the country's non-agricultural labour force were located in Metro Manila (Einsiedel and Reforma, 1986). Metro Manila contributed about 90% of national internal revenue (taxes). About 80% of national imports entered through the harbours of the city. The city contributed about 60% of total Gross National Product (GNP) and accounted for one-half of all secondary and tertiary activities (Einsiedel & Reforma, 1986). Manila's primacy became especially pronounced when its industrial base strengthened as the country's economic policy shifted from export promotion to import substitution. This broadened industrial base included publishing, printing, food, and textiles (UN, 1986).

In 1990, with annual growth of 3.6%, Metro Manila had a population of 7.9 million (13 % of the national total, NSCB, 1993) located in an area of 636 square kilometers. Metro Manila has the highest population density in the country (Table 5-1) with 12,465 persons per square kilometer. It remains the centre of industrial and commercial activities (NSCB,1993), despite government attempts at promoting industrial zones in the outlying regions and provinces.

In a country with slow economic growth, increasing urbanization usually means a reduced capacity for government to provide basic services. Like other primate cities in the Southeast Asian region, Metro Manila's growth in social and physical infrastructure and utilities has not kept pace with population growth. As a consequence, serious problems exist in terms of poverty, environmental degradation, and the high incidence of diseases. A recent study concluded that about 3.6 million people or about 47% of the city's population live in so-called "depressed *barangays*" or communities characterized by high rates of child malnutrition and where families live below the poverty line (Murphy,1993). Manila's urban poor are found in niches of unoccupied land on the periphery of private subdivisions, along railroad tracks, dumpsites, cemeteries, market places. Some even carry their "houses" on pushcarts, going from place to place and seeking refuge under bridges at night.

Table 5-1 Population, Land Area, and Density by Region (1990)

Region	Population (thousands)	Land Area (sq km)	Density (persons/sq km)
Metropolitan Manila Area	7,928	636.0	12,465.4
Cordillera	1,146	18,293.6	62.6
Ilocos	3,551	12,840.2	276.6
Cagayan	2,341	26,837.6	872.0
Central Luzon	6,199	18,230.8	340.0
Southern Tagalog	8,264	46,924.2	176.1
Bicol	3,910	17,632.5	221.7
Western Visayas	5,392	20,223.2	266.6
Central Visayas	4,593	14,951.4	307.2
Eastern Visayas	3,055	21,432.7	142.5
Western Mindanao	3,158	18,730.1	168.6
Northern Mindanao	3,510	28,327.7	123.9
Southern Mindanao	4,459	31,692.8	140.7
Central Mindanao	3,171	23,323.2	136.0
TOTAL	60,703	300,000	202.3

Source: NSCB, 1993

Rapid urbanization has created serious environmental problems, manifest in inadequate urban infrastructures for basic services, accumulation of garbage, flooding, water pollution from domestic and industrial sources, continued sprawl of squatter settlements, and air pollution. These pose major health risks to the residents. The leading causes of morbidity in the city are bronchitis, diarrhoea, influenza, pneumonia, tuberculosis, measles, which are all traceable to poor sanitation. About 15% of waste generated in Metro Manila (817 tonnes out of a total of 5,447 tonnes per day) is thrown into waterways (PTFWM, 1993), clogging channels and resulting in floods, and contaminating shellfish and other marine products. These problems create additional pressure and costs for rehabilitation and clean-up, making a substantial demand on the national budget. They seriously jeopardise the sustainability of the metropolis' ecosystems and threaten the continuing development of the city as the country's centre of economic activity and as a cross-roads of global business and cultural affairs.

5.3 Development Trends in the Philippines

The growth of the Philippine economy from 1970 to 1990 has been modest. Average growth in Gross Domestic Product (GDP) over the twenty-year period was 3.7 %, the lowest among the Southeast Asian countries (Table 5-2).

Table 5-2 Economic Indicators of Southeast Asian Countries, 1970-1990

Country	Average GDP Growth (%)
Indonesia	6.4
Lao People's Democratic Republic	4.4
Malaysia	6.8
Philippines	3.7
Singapore	8.0
Thailand	7.3

Source: World Bank, 1992

The 1971-1990 period has been divided into two phases, the first of which is called the debt-driven phase (1971 -1980), when growth in Gross National Product (GNP) averaged 6.4% per year. This phase was characterized by heavy foreign borrowing to support the administration's development projects and to ease the country's balance of payments difficulties. Growth during this period was driven largely by investments financed through foreign loans, with industry accounting largely for the growth of real GNP, contributing 2.7%, with services and agriculture contributing 2.2% and 1.4%, respectively (Remigio, 1994).

The period 1981-1990 is called the debt constrained phase, when growth averaged 1.8% per year. This phase was characterized by severe strains on the economy's capacity to develop, occasioned by the need to service a huge foreign debt accumulated by past government administrations.Growth during the period was constrained by high interest rates brought about by the government deficit, which reduced government expenditures. During the 1980s, the deteriorating terms of trade (as manifest in unstable commodity prices and growing protectionism in developed market economies) and stagnating flows of aid further hindered development (Macneill, 1989).

Over the period 1971-90, debt servicing imposed severe pressure on the export sector to produce the foreign exchange needed for debt repayment and development financing. However, export receipts failed to eliminate the trade deficit and correct the country's balance of payments problems. Over the 20-year period, exports grew at an average annual rate of 12.4% while imports outstripped this, growing annually at 14.9% (DENR, 1992).

During the 20 year period, GNP growth fluctuated. The highest growth in the Philippine economy occurred in 1973 when its GNP grew by 9.3%. This fell to a low of -0.95% during the 1980-85 period. During 1984-1985 the country experienced an economic crisis; output contracted during this period. In 1986-90, real GNP registered positive annual growth rates (DENR, 1992).

In the light of this economic performance, servicing the country's debt entailed the diversion of resources away from the infrastructure needed to implement the development strategies proposed in the economic plans. The reduced financial capacity of the government prejudiced the delivery of social services, especially programmes that would benefit the poor, delayed infrastructure investment, deferred maintenance, and reduced macroeconomic growth (Remigio,1994).

In view of the slow economic growth, heavy debt servicing, and rapidly increasing population, the need for the Philippine government to adopt innovations in public administration and management became compelling. The major structural reforms implemented are:

- elimination of monopolies
- privatization of government-owned and -controlled corporations (GOCC)
- trade liberalization (NEDA 1987).

Privatization of GOCC commenced in 1986 when the government created a cabinet-level committee called the Committee on Privatization, and a public trust known as the Asset Privatization Trust (APT). With the privatization of government-owned and -controlled corporations, it was expected that the country would benefit from increased production quantity, improved output quality, reduced unit costs, expanded employment, and generation of new technologies, among others. Privatization is intended to assist in balancing the national budget, reducing government expenditure, financing capital investment programs, decreasing foreign debt, lowering consumer prices, broadening shareownership across society, and altering public attitudes toward business (Vernon, 1988).

Santos (1995) discloses that, as of 1995, the Philippine privatization program has generated US$6.8 billion in revenues with US$1.8 billion generated from assets transferred to the APT. Santos (1995) added that in 1994 alone, privatization generated US$2 billion, the first fiscal surplus ever generated by the government in twenty years.

Based on the Philippine experience, benefits realized from the privatization program include raising of government revenues, promotion of the participation of small local investors, promotion of open competition increase efficiency and lead to better and cheaper products for consumers and increased job opportunities (Santos , 1995).

5.4 Institutional Context of Environmental Management in the Philippines

5.4.1 History of Environmental Management

Development activities in the late 1950s and early 1960s contributed to air, water and land pollution in urban areas. These caused sufficient concern that environmental pressure groups began to be formed, the earliest of them the Philippine Society of Sanitary Engineers. This group lobbied for legislation on pollution control. On 18 June 1964, Republic Act No. 3931 creating the National Water and Air Pollution Control Commission was passed into a law (DENR, 1992).

It was not until 1966, however, that this law was implemented, and the Commission received only token funding of 50,000 Philippine Pesos during the first year, indicating that pollution control was not a government priority. The law turned out to be ineffective because the Commission was not vested with any real powers of sanction. The weak nature of environmental legislation during this period could be attributed to the dominant industrial interests persistently working to suppress the demands of the environmental lobbyists by means of political influence (Remigio, 1994).

American environmental activism in the 1960s, however, led to increasing interest in and awareness of environmental reform in the Philippines. But it was only in the late 1970s that environmental problems were given serious attention. In July 1976, an Inter-agency Committee on Environmental Protection (IACEP) was created by Presidential Letter of Instruction No. 422, and placed under the direction of the Department of Natural Resources. The main task of the Committee was to report to the President on the state of the environment and to review existing government policies and programs on environmental protection.

The Committee's findings indicated that:

- Implementation of environment-related policies, programs and projects was uncoordinated, falling to at least 20 government agencies each with its own sectoral responsibilities in environmental protection and management;
- there was lack of adequate environmental legislation and agencies with the requisite regulatory powers; and
- there was no mechanism for evaluating the environmental impacts of development projects.

The Committee recommended rationalization and integration of disparate environmental policies and programs and the consideration of three alternative institutional mechanisms for effecting these programs, namely:

a) the creation of a central environmental agency;
b) the creation of an inter-agency organization for environmental protection; or
c) the strengthening of existing agencies (Such as the Department of Natural Resources) with specific sectoral responsibilities that have environmental quality implications.

The creation of an inter-agency organization for environmental protection emerged as the preferred option. Hence, the IACEP was reconstituted into the National Environmental Protection Council (NEPC) on 18 April 1977. The Council was chaired by the President of the Philippines and had 14 members. Its primary task was to rationalize the functions of government agencies relating to environmental protection and the implementation and enforcement of environmental laws.

The creation of the NEPC was accompanied by the passage of important environmental legislation. The enabling law of the National Water and Air Pollution Control Commission was amended and strengthened. The Philippine Environmental Policy Law (Presidential Decree No.1151) institutionalized the environmental impact assessment system and the Philippine Environment Code (Presidential Decree No.1152) codified separate environmental legislation into a single law providing management standards for air and water quality, land use, natural resource management, and conservation and waste management (DENR, 1992).

The period between 1976-81 was relatively productive in terms of the formulation of environmental policy. But during the latter years of the Marcos regime, the government became more and more preoccupied with other national policy concerns (i.e., insurgency problems, massive capital flight, the contracting economy, poverty, unemployment, etc.) which overshadowed environmental issues.

The 1978-82 Development Plan addressed the problem of pollution, especially in Metro Manila, the environmental effects of mining activities, and the diminishing fisheries yields.

Measures to control pollution included:

- Development controls in important resource areas such as coastal zones, selected mineral lands, tourism areas, flood plains, fault zones, prime agricultural lands, watersheds, national parks, volcanic zones and areas within a 1-kilometer radius around airports;
- Intensified enforcement of the rules and regulations of the Pollution Control Law;
- The requirement for industrial polluters to install adequate treatment facilities; and
- Conduct of an environmental impact assessment (EIA) for proposed industrial development projects, initially covering those areas with serious pollution problems.

A development approach based on the principle of natural resource development, protection and replenishment was also pursued in the 1983-87 Plan and its updated version, the 1984-87 Plan. The 1983-87 Plan called for accelerating the land survey program, the continuation of the country's forest resources inventory, and the conduct of ecological mapping.

The coverage of the EIA system was expanded in the 1983-87 Plan, which also contained provisions on the training of government decision-makers and planners and private proponents on EIA procedures.

The 1984-87 Plan adopted a "stick and carrot" approach to improve pollution control. The "sticks" include:

- the establishment of air quality and noise standards and a requirement to install anti-pollution devices; and
- government regulation of the import, production, utilization, storage and distribution of hazardous and toxic substances and the disposal and dumping of untreated wastewater, mine tailings and other pollutants.

The "carrots" included tax incentives for the local manufacture of anti-pollution devices and tax credits for the conduct of research on pollution control.

The Plan also recognized the need for the integration of EIA procedures in planning the development of mineral and energy resources and the institution of EIA Systems (EIS) in all project planning activities.

In 1987, the World Commission on Environment and Development published its "Our Common Future" report. In June of the same year, Executive Order No. 192 created the Department of Environment and Natural Resources (DENR). Its main function is to ensure the sustainable use, development, management, renewal and conservation of the Philippine's forest, mineral lands, offshore areas, and other natural resources, including the protection and enhancement of the quality of the environment. The newly constituted Department comprises sectoral bureaus to perform the following functions: forest management, lands management, mines and geological resource management, environmental management, protected areas and wildlife management and ecosystems research and development. Line functions carried out by regional offices include implementing laws, policies, plans, programs and the rules and regulations of the DENR. The Department's power in adjudicating pollution cases are vested in the Pollution Adjudication Board (PAB).

The updated 1987-1992 Development Plan embodied a countryside agro-industrial development strategy. It also embraced a community-based approach to natural resource management. This approach considers the local communities as managers of their natural resources with the government developing and implementing a programme that provides natural resource users with the incentives and the know-how for their proper management.

The Plan called for the establishment of a resource and environmental information system network to aid in environmental and resource policy formulation, planning and programming at all levels. This called for the institutionalization of integrated resource and environmental surveys, monitoring and assessment.

The Plan also upholds the principles of sustainable development through incorporation of the Philippine Strategy for Sustainable Development (PSSD) conceptual framework for environmental planning and management. The concept of sustainable development as defined by the World Commission on Environment and Development underpins the PSSD.

5.4.2 The Philippine Strategy for Sustainable Development

The Philippine Strategy for Sustainable Development (PSSD) was formulated to guide the development initiatives in the Philippines. It attempts to reconcile the diverse and conflicting environmental, demographic, economic and natural resource use issues arising from development.

From the 1970s to the present there has been a growing propensity to:

- adopt a market-oriented approach to resource use regulation;
- integrate environmental considerations in overall development planning; and
- encourage the citizenry in planning, monitoring, evaluation and implementation of environmental programs.

The DENR developed a Philippine Strategy for Sustainable Development (PSSD). The goal is to achieve economic growth with adequate protection of the country's biological resources and its diversity, vital ecosystem functions, and overall environmental quality (DENR, 1990). The objectives for attaining this goal are to:

- ensure the sustainable utilization of the country's natural resources such as forests, croplands, marine and freshwater ecosystems
- promote social and intergenerational equity in the utilization of the country's natural resources;
- develop a management programme to preserve the country's heritage of biological diversity;
- achieve and maintain an acceptable quality of air and water;
- promote and encourage an exploration programme for economically important minerals;
- promote the technologies of sustainable lowland agriculture and upland agro-forestry through the encouragement of research and development (R & D) and the demonstration of results of these in pilot projects;
- promote the R&D in environmentally-sound and economically efficient processing of the country's mineral and energy resources; enhance the foundation for scientific decision-making through the promotion and support of education and research in ecosystems;
- promote and support the integration of population concern (including migration variables and family welfare considerations) in development programmes with special emphasis in ecologically critical areas;
- expand substantially the family planning programmes and responsible parenthood programme.

The PSSD has as its core the following strategies:

- Integration of environmental considerations in decision-making. The use of analytical tools in economic decision-making, such as environmental impact assessment, natural resource accounting, land use planning and the like are given emphasis. The aim is to include the misuse of the country's natural capital in the economic calculations of social and environmental impact.
- Appropriate Pricing of Natural Resources. This calls for the proper valuation of natural resources based on their cost of replenishment, the increase of their supply and/or the provision of appropriate substitutes. The strategy promotes charging users of natural resources to minimize, if not prevent, the wasteful extraction and utilization of resources. It also advocates charging polluters a social price for polluting the environment. Finally, the establishment of an environmental fund is promoted.
- Property Rights Reform. This promotes the assignment of access rights in the exploitation of natural resources to responsible individuals and communities as they are presumed to hold long-term stake in the protection and management of the resources.
- Establishment of an Integrated Protected Areas System. The purpose of this strategy is to conserve genetic resources for scientific, educational, cultural and historical values by establishing protected areas.
- Rehabilitation of Degraded Ecosystems. This strategy is linked with ecosystem protection programmes and policy reforms that deal with the socio-economic roots of ecosystem degradation.
- Strengthening of Residuals Management In Industry (Pollution Control). This strategy highlights resource recovery, recycling and waste reduction, and the use of economic incentives or market-based incentives to promote pollution control.
- Integration of Population Concerns and Social Welfare in Development Planning. This strategy includes improvements in health and education initiatives as well as values formation, apart from the control of fertility. Measures to manage population distribution and mobility and effect balanced regional development are likewise proposed to address the rapid population growth in large urban areas due to rural-to-urban migration.
- Inducing Growth in the Rural Areas. This strategy:

    a) promotes the empowerment of the rural poor through greater participation in decision-making;

b) promotes the accelerated implementation of land reform to achieve equity in the distribution of benefits;

c) involves the granting of equitable access for the rural poor to natural resource use and benefits;

d) involves the removal of economic policy and public investment biases against the rural sector;

e) involves the provision of infrastructure and support services to increase rural productivity and expand markets;

f) involves the establishment and reinforcement of "growth centers";

g) involves the strengthening of social services such as education, health and nutrition.

- Promotion of Environmental Education. The objectives of this strategy are: first, to enable citizens to understand and appreciate the complex nature of the linkage between environment and development and to develop social values that are strongly supportive of environmental protection; and second, to develop a knowledge base on the local natural resource and environmental systems through the institutionalization of tertiary and graduate courses in ecology, environmental science, resource management and resource economics at the formal educational level.
- Strengthening of Citizens' Participation and Constituency Building. This strategy emphasizes the importance of citizens' active participation in planning and implementation for a successful implementation of any development project in the country.

The environmental problems arising from Metro Manila's primacy and its rapid population growth were among the issues addressed by the PSSD. It acknowledges the fact that the ineffective management of the solid waste problem continues to threaten the health of the populace and the sustainability of the Metro Manila's ecosystems. It suggests that policy reforms need to be instituted to address the root causes of the urban environmental crisis. Due to the magnitude of the solid waste management problem in Metro Manila, the government sees the problem as a crisis needing a well thought-out, long-term solution.

In response to the solid waste management crisis in Metro Manila and other major urban areas in the country, the government formulated the Integrated National Solid Waste Management System Framework (INSWMSF). The INSWMSF contains specific strategies that follow the core strategies of the PSSD.

The INSWMSF promotes strategies on waste minimisation and recycling and materials recovery which are consistent with the PSSD principles and strategies. The participation of community-based organizations (CBOs) and non-government organizations (NGOs) in the information and education campaign on sanitation and waste minimisation is promoted in the INSWMSF as it is in PSSD. Proposed solid waste management projects are subjected to the Environmental Impact Assessment System (EIS) requirement to ensure that all impacts of such activities or the technologies adopted by the projects will be addressed and mitigated during implementation.

The imposition of user charges for collection and tipping fees for disposal is presently being considered by the government as a mechanism to recover costs. Based on the INSWMSF, the LGUs are expected to generate their own funds for solid waste management in their respective jurisdictions. The proposed charging system is consistent with the "polluter pays" principle put forward in the PSSD.

Already, opportunities to improve solid waste management system in the country are provided by the PSSD and have been given consideration in the INSWMSF. How these principles and strategies will be transformed into clear policies remains a challenge necessitating carefully designed institutions to put them to action.

5.5 Conclusion

The history of mercantile expansion, incorporation into the world market, and industrialization has tended to dictate the tempo and trend of urbanization in the Philippines. As a consequence of Manila's primacy, environmental problems were aggravated and manifested in deficient infrastructures for basic services, water and land pollution due to indiscriminate dumping of domestic and industrial waste, air pollution, and flooding. Social and environmental problems increased to crisis proportions.

Metro Manila's primacy became more pronounced as development was vigorously pursued by the government. In the 1970s, when development dominated national plans, urban growth was accelerated while the externalities associated with urban development and their impact on the environment were left unattended.

Towards the end of the 1970s, there was a shift in the emphasis in development planning towards the pursuit of programmes that aim to improve environmental quality. The shift was partly influenced by the American environmental activism that extended to the Philippines, being America's ally and former

colony. Nevertheless, environmental deterioration, especially in the major urban areas, continued to worsened.

The greater integration of environmental considerations in the overall development planning through the Environmental Impact Assessment System (EIS) was a major breakthrough during the late 1970s up to the 1990s. The EIS' nature gradually evolved from being regulatory to developmental as the country continued to pursue economic objectives.

During the 1980s and the early 1990s, the country experienced an economic crisis that severely affected the provision of social and public services. Economic problems eclipsed environmental concerns. The financial resources generated by the economy during that period were diverted to debt servicing. Although environmental protection legislation and institutions were already in place, insufficient financial resources were available to support environmental programmes and projects.

The chronology of planning phases and events associated with development plans from 1974 to 1992 (Appendix II) indicated that environmental concerns were subordinate to other planning priority concerns in the earlier planning periods (1950s to 1960s). Environmental problems were recognized but given minimal attention. Environmental protection assumed a high political profile only when the NEPC was created in 1977, although was still a second-order priority in practice. Political and economic circumstances in those times overshadowed the environmental agenda. With the introduction of the EIA system in the late 1970s, there was a further shift in the orientation of environmental management. From the traditional regulatory command-and-control approach, environmental management evolved to become developmental or compliance orientated.

Putting the principles of PSSD into practice was a great challenge in the light of economic difficulties. Not only was enforcement of environmental laws severely constrained, but the delivery of public services, such as solid waste management services which are basic services that affect the quality and the long-term sustainability of an urban ecosystem like Metro Manila, was difficult to sustain.

Faced by severe economic constraints, the country needed to undergo institutional reforms. The development plans and the PSSD have recognized the role of the private sector and non-government organizations as prime movers of development. Hence, partnerships and co-operation among the different sectors (government, non-government/private, and the citizens) were fostered in the implementation of environmental laws, codes and ordinances and in carrying out environmental

improvement projects. Clearly delineating and apportioning the responsibilities among them, however, still remains a big challenge for these partnerships on a long term basis.

Against this background, it can be claimed that problems of solid waste management in Metro Manila do not necessitate the application of technical solutions per se. Rather, some deep-seated institutional problems appear to impede effective solid waste management. Addressing these institutional problems may be the first step in making the solid waste management system more effective, and thereby bringing about significant improvements in the quality of the metropolis' ecosystem.

Chapter VI

THE METRO MANILA SOLID WASTE MANAGEMENT SYSTEM

The main purpose of this chapter is to present the historical, technical, legal and administrative framework of solid waste management in the Philippines, with emphasis on Metro Manila.

6.1 Current Status of Solid Waste In Metro Manila

6.1.1 Geographic/Demographic Profile

Metro Manila, the National Capital Region (NCR), comprises eight (8) cities (Manila, Quezon City, Makati, Pasay, Caloocan, Pasig Mandaluyong, and Muntinlupa) and nine (9) municipalities (San Juan, Marikina, Las Pinas, Paranaque, Pateros, Taguig, Malabon, Navotas and Valenzuela). It has a total land area of about 636 square kilometers (Map in Figure 6-1).

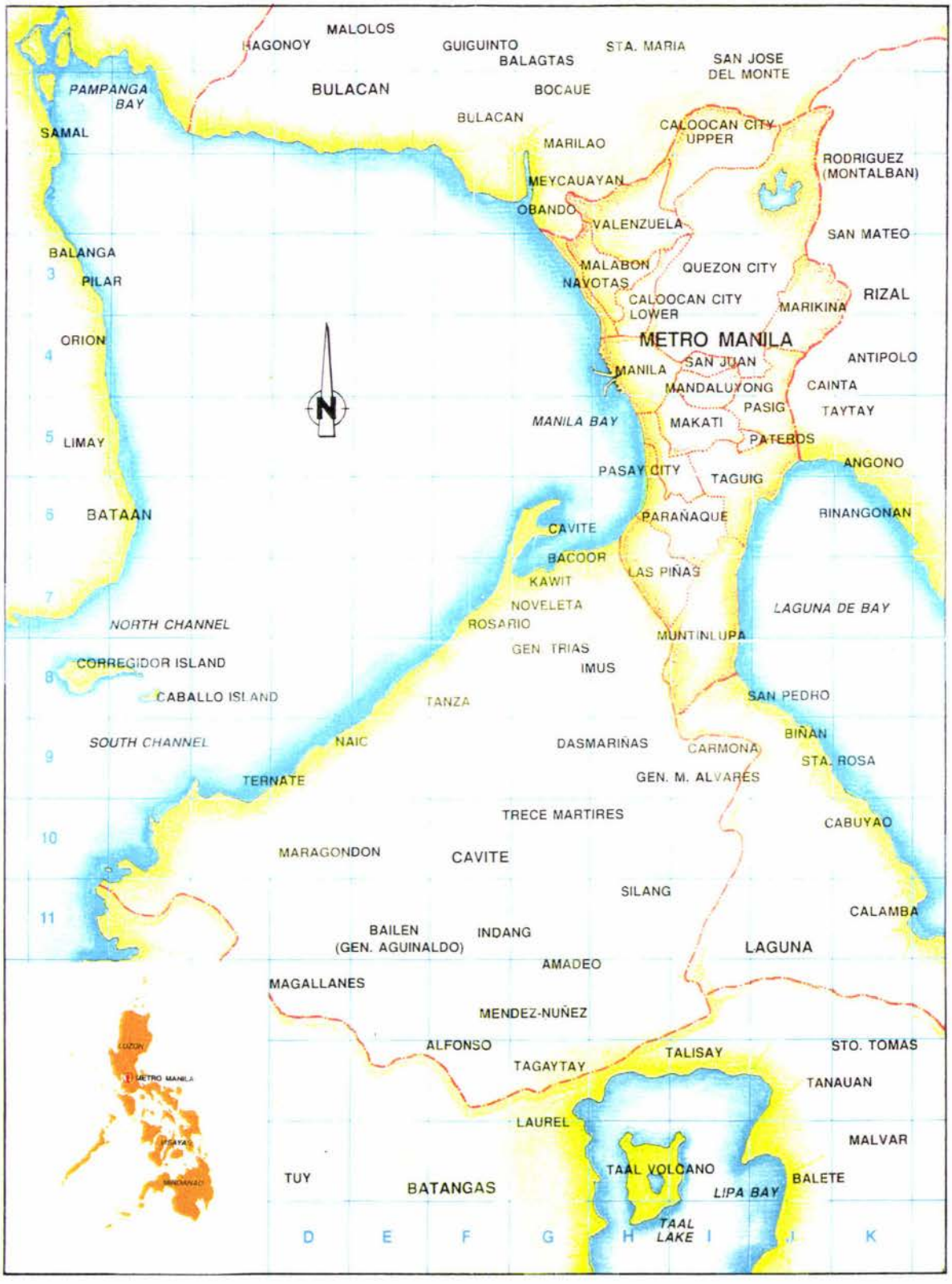
In 1980, Metro Manila had a population of 5.93 million (NSCB, 1993). In 1993, its population was estimated at 8.5 million. Projections show that the population of NCR would rise to 13 million by 2014 at a growth rate of 2.4% per year (PTFWM, 1993).

6.1.2 Solid Waste Generation, Collection and Disposal in Metro Manila

Generation

In Metro Manila, solid waste generation varies from one city or municipality to another depending on the nature and predominance of activities existing therein, as well as on levels of income. In 1993, solid waste generation was estimated at 0.64 kilograms per capita per day, equivalent to 5,440 tonnes per day (TPD)(Table 6-1). This was projected to reach 0.70 kilograms per capita per day (11,705 TPD) by 2014 (PTFWM, 1993).

Figure 6-1 Map of Metro Manila



Collection

Domestic waste collection was estimated to achieve 85% efficiency, or about 4,631 TPD. The basic collection function, although devolved to the Local Government Units (LGUs) in 1992, is still fashioned by the pre-devolution system and presumably achieves reasonable integration at the boundaries of the collection agencies' (LGUs') catchments. A "cell based"approach was established prior to this devolution and is in place (MMDA, 1996). Through this, the cities and municipalities are divided into cells and routes for waste collection purposes. A cell is a fixed area consisting of one or more streets with an estimated waste generation rate of 12 to 15 cubic meters (4 to 5 tonnes) daily, the volumes approximating the load capacities of collection trucks. The area coverage of a cell and route changes depending on the volume generation of the areas or the load capacity of the collection equipment.

More than 1,200 cells cover Metro Manila, each classified as regular cells, major thoroughfares or stationary cells. Regular cells are areas where door-to-door collection is being done at least three times a week. Major thoroughfares are the highways or major routes of vehicles where waste collection is done daily. Stationary cells are high refuse generating areas or institutions where collection is also done on a daily basis.

Table 6-1 Community Waste Generation in Metro Manila, 1993

Source of Waste	Total Amount (tonnes/day)	RelativeContribution (%)
Residential	2,655	49
Market	702	13
Commercial	299	5
Industrial	316	56
Construction and Demolition	60	1
Street Waste	1,000	18
Institutional	283	18
Other Wastes	125	2
Total	5,440	100

Source: Presidential Task Force on Solid Waste Management, 1993

The collection equipment used comprises: open dump trucks (6-wheelers and 10-wheelers) with load capacities of 12 and 15 cubic meters; and compactor trucks with capacities of 5, 12.8 and 24 cubic

meters. The LGUs rent a few compactor trucks and most of the open dump trucks from private companies.

The *barangay* is the smallest political unit with average population and area of 10,000 and three to five hectares, respectively. *Barangay* Chairpersons are sometimes given responsibilities by the LGUs for solid waste management activities, particularly for the dispatch of collection vehicles contracted by the municipalities. They are responsible for maintaining cleanliness and sanitation within their areas of responsibility.

The Metro Manila Development Authority (MMDA) assists the LGUs, especially those whose revenues are comparatively low, in garbage collection. From the fleet of compacting units acquired through grants from the Japanese Government (JICA), MMDA provides each LGU at least two units of compacting equipment.

Although waste collection in Metro Manila is being done daily in some areas, the service is generally inadequate and ineffective, particularly in peripheral and depressed areas of the metropolis. Constraints in budgetary allocations for collection and the general condition of collection vehicles are among the problems that render refuse collection ineffective. Most of the vehicles are old or obsolete, while the newer ones lack the necessary spare parts. This results to a deficient service which breeds public dissatisfaction and a general feeling of indifference towards the existing solid waste management system (Passe, 1993).

The slums or squatter settlements are not usually served by the municipal collection services because of narrow access roads and fewer recyclable components of waste. Some squatter settlements are situated along the riverbanks or on the banks of "esteros" (canals) within Metro Manila (Passe, 1993). The deficient collection system consequently results in the burying of uncollected garbage in crude pits available in backyard space or in indiscriminate dumping on vacant lots, roadsides or into the bays, rivers, banks, "esteros", and storm drains (PTFWM, 1993). The indiscriminate dumping of wastes into the waterways has caused the clogging of the channels and resulting in floods that cost the government more than $45 million for repair and rehabilitation every year. Also, the uncontrolled dumping of wastes into waterbodies causes seasonal proliferation of toxic phytoplankton (the phenomenon called

"red tide") which engulfs Manila Bay, contaminating shellfish and other marine products (Jimenez and Velasquez, 1989) and endangering the lives of the people.

Garbage Processing/Transfer and Transport

There is no intermediate processing done on wastes before disposal. About 40% of Metro Manila's waste consists of putrescible materials. The low yield of paper, metals, plastic, and glass (which account for a little less than 10% of the waste) is due in part to the fact that many of these recoverable materials are scavenged either before or during collection (Table 6-2).

Table 6-2 Solid Waste Composition in Metro Manila (1989)

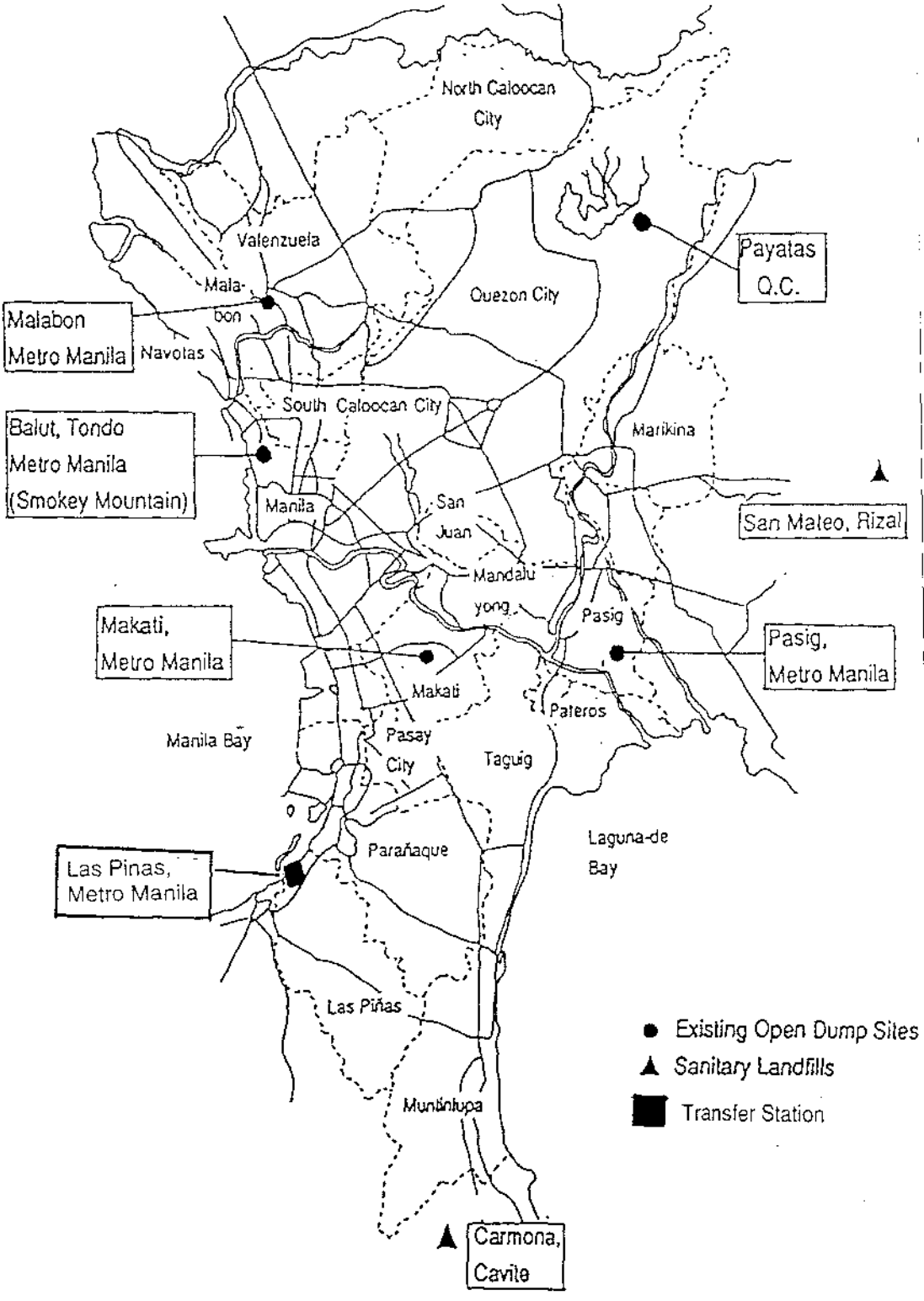
Component	% By Weight
Food Waste	11.0
Fines and Inerts	12.9
Paper and cardboard	10.2
Glass	1.9
Plastics and Petroleum Products	9.8
Yard and Field Waste	33.5
Textiles	4.1
Leather and Rubber	1.8
Metals	3.3
Wood	11.5

Source: Cansoer Townsend and Associates, 1989

There is only one transfer station in Metro Manila (Las Pinas) located along the Coastal Road near the boundary of Las Pinas, Metro Manila and Bacoor, Cavite (Figure 6-2). It is maintained and operated by the MMDA. This transfer facility has six bays, each capable of accommodating six collection vehicles at the same time. It is fully equipped with a system that literally vacuums the air to mitigate pollution while tipping operations are underway. It has 20 trailer vans, each equipped with a self-contained compaction mechanism for the long distance hauling of waste to MMDA's sanitary landfill in Carmona, Cavite.

The transfer station was originally constructed to service the requirements of the City of Manila and all towns and cities south of the Pasig River. It began to operate on 21 May 1993. In October 1995, the

Figure 6-2 Location Map of Transfer Station and Disposal Sites in Metro Manila



Source: After Passe, 1993

transfer station was placed under management contract with a private company but still under the supervision of the MMDA.

Garbage Disposal

Although collection was estimated to achieve 85% efficiency, the daily volume of domestic waste disposed of at various sites is estimated at 4,080 tonnes per day (TPD) or about 75% of total generation. The remaining 10% of the collected waste, added to the balance of uncollected waste (15%) making up 25% of total generation (aggregate total of 1,360 TPD of wastes) are believed to be dumped illegally anywhere in the metropolis, thrown in nearby creeks, burned, or recycled by collectors through segregation and sale to junk shops.

Generally, wastes are disposed of as they are collected.

The existing disposal sites in Metro Manila and their catchment are illustrated in Figure 6-2.

The Carmona (65 hectares) and San Mateo (71 hectares; Figure 6-3) landfills are both managed by the MMDA. The sites receive an average of 10,000 cubic meters (3,333 tonnes) daily representing 55.5% of the total waste generated in Metro Manila. When fully developed, the sites can contain a total of 21.5 million cubic meters (7.1 million tonnes) of waste, each with a useful life of 23 years (MMDA, 1996). The Balut dumpsite, popularly known as the Smokey Mountain, had been closed in pursuance to a Presidential Directive in May 1993.

Recycling and Waste Reduction Activities

Waste recycling is being practised in Metro Manila at various levels (MMDA, 1996).

Waste pickers work in every municipality pick reusable and recyclable materials from the streets using puchcarts. Waste pickers either belong to an organized group or operate independently as a means of livelihood. One of the widely recognized organized groups of waste pickers is called "Eco-aides" (MMDA, 1996).

Figure 6-3 Sanitary Landfill in San Mateo, Rizal

Most of the garbage crews in the collection trucks are also waste pickers. While collecting garbage, crews segregate the bottles, tin cans, and other recyclables at the rear of the truck and sell them at junk shops on their way going to the dumpsites. This practice, on one hand, increases the length of collection time which badly affects collection efficiency in conventional terms (Passe, 1993). On the other hand, it is a means to augment the income of collection crews while participating in waste recycling or waste recovery, which is among the strategies the Government is promoting in solid waste management.

Waste pickers, known as scavengers, also work the open dumpsites. They are organized, probably for the purpose of controlling the influx of more scavengers in the dumpsites. There are indications that scavenging in the dumpsites is a profitable venture as some junk dealers actively operate in these areas (Passe, 1993).

Some non-government organizations (NGOs) have organized recovery of recyclables as a means of livelihood for the informal sector (MMDA, 1996). The current activities of NGOs in Metro Manila are concentrated in waste recycling and reuse. However, most NGO activities or projects are fragmented, without the benefit of an overall plan or a framework for coordination (Passe, 1993).

6.2 The Regulatory and Organizational Systems of Solid Waste Management in the Country

6.2.1 Regulatory Aspects

Table 6-3 summarizes the laws, codes, and decrees relevant to solid waste management implemented by the relevant national agencies and the Local Government Units (Appendix III).

Table 6-3 Philippine Laws, Codes, and Ordinances Relevant to Solid Waste Management

Law	Description
1. Presidential Decree No. 825	The anti-garbage dumping law which imposes penalties on any person, public and private institution and establishment improperly disposing garbage, filth, and other waste matters.
2. Presidential Decree No. 856	"Code of Sanitation" which also covers proper waste collection, storage transport, and disposal
3. Presidential Decree No. 1152	This is the "Philippine Environment Code" which: • States the purposes of waste management • Mandates the establishment of waste management programs in all provinces, cities, and municipalities • States the responsibilities of local government units in waste management • Specifies legally acceptable methods of waste disposal • Allows the local government, including private individuals, corporations, and organizations to operate one or more sanitary landfills consistent with the other provisions of this code and other existing laws • Provides prescriptions in the location of disposal sites
4. Presidential Decree No. 1586 (Environmental Impact System Law)	• Requires the preparation of an Environmental Impact Statement (EIS) and the issuance of an Environmental Compliance Certificate (ECC) by the DENR for environmentally critical projects or non-critical projects proposed to be located in environmentally critical areas prior to project implementation
5. Presidential Decree No. 1160	• This empowers the local village leaders (*Barangay* Captains) to enforce environmental and pollution control laws
6. The Local Government Code - Republic Act No. 7160	• This law specifically tasks local government units to adopt measures to protect the environment and impose appropriate penalties for violations.
7. Republic Act No. 7718 (Amended BOT Law)	• Encourages private sector participation in the delivery of infrastructure services which includes solid waste management services.

These laws altogether provide a coherent statutory framework for solid waste management. Although relevant bodies and instrumentalities are identified and given responsibilities to implement them, technical and financial capacities of the agencies are often insufficient and they are unable to deliver what is expected of them.

6.2.2 Organizational Framework of Solid Waste Management in the Philippines

Before 1975, Metro Manila comprised 13 municipalities and 4 cities (now 9 municipalities and 8 cities), each managing solid waste generated in its jurisdiction. In 1975, by Presidential Decree 824, the Metro Manila Commission (MMC) was created. Its main purpose was to plan and manage metropolitan-wide projects, infrastructure and amenities. One of the major tasks of the MMC was solid waste management. In 1976, the Environmental Sanitation Centre (ESC) was created under the MMC to provide solid waste management services in Metro Manila. After February 1986, the MMC was retained but renamed as the Metro Manila Authority (MMA) (Del Rosario, 1989).

The creation of MMC or MMA did not, however, provide a solution to the growing problems of solid waste in Metro Manila. Solid waste was often uncollected, finding its way into streets, drains and waterways.

Having recognized the worsening solid waste problems in Metro Manila, the President issued Memorandum Circular No. 30 in November 1987, creating a Presidential Task Force on Waste Management (PTFWM). This comprised the Presidential Management Staff (PMS) as Coordinator and the MMA, Department of Public Works and Highways (DPWH), National Economic Development Authority (NEDA), Department of Environment and Natural Resources (DENR), Development Bank of the Philippines (DBP), Department of Health (DOH) and the City of Manila as members. The PTFWM and its Technical Working Group were soon involved with the problems of Metro Manila. Because of the city's size, changing political situation and lack of financial resources, solid waste has dominated PTFWM agenda ever since.

The Task Force had the following objectives:

- to review all relevant and existing proposals, programmes, concept papers and studies on waste management and package a project proposal that establishes technical, economic and financial viability;
- to identify agency roles and responsibilities; and
- to formulate a viable alternative livelihood programme for scavengers on a long term basis.

The Task Force prepared a solid waste management plan and a programme for scavengers. In March 1988, the President approved and directed the implementation of the Comprehensive and Integrated Metropolitan Manila Waste Management Plan through the issuance of Memorandum No. 161. However, the plan has not been implemented according to the scheduled timeframe due to the economic difficulties experienced by the country.

In July 1993, President Fidel V. Ramos directed the PTFWM to formulate an Integrated National Solid Waste Management System Framework (INSWMSF) which was particularly concerned with the major urban areas in the country (Appendix IV). The INSWMSF was approved in October 1993.

To effectively implement the INSWMSF, on 21 March 1994, the Task Force was reconstituted with the following membership:

Chairman:	Secretary, Department of Environment and Natural Resources
Members:	Secretary, Department of Public Works and Highways; Secretary, Department of Health; Director-General, National Economic Development Authority; Secretary, Department of Trade and Industry Secretary, Department of Interior and Local Government

There is a currently proposed amendment to the Memorandum Circular No. 88, 1994 to include the following additional members and special members:

Department of Education, Culture and Sports (DECS)
Department of Budget and Management (DBM)
Public Information Agency (PIA)

and

Metropolitan Manila Development Authority (MMDA)
Laguna Lake Development Authority (LLDA).

The chairmanship was transferred to the DENR because it is considered most technically and administratively competent to lead the solid waste management sector. The inclusion of the other agencies is to consolidate the efforts of the agencies with mandates on environmental improvement, public information and education and fiscal management.

The following new set of functions and responsibilities, was set out:

- Ensure the implementation of the Integrated National Solid Waste Management Systems Framework as approved for adoption during the Cabinet meeting on 19 October 1993;
- Ensure the continuous coordination and compliance by concerned agencies with the various policies and presidential directives issued on waste management;
- Formulate and recommend to the President all policies pertinent to the Framework Plan;
- Serve as Policy and Management Board for the Project Management Office on Solid Waste Management created under Administrative Order No. 90;
- Source the financial and technical requirement of the Plan from appropriate entities;
- Create the necessary Technical Working Groups/Committees to assist the Task Force in the implementation of the Plan;
- Submit quarterly reports to the President; and
- Perform such functions as may be directed by the President.

The functions and responsibilities of each of the member-agencies are outlined in Appendix V.

The Project Management Office (PMO) on SWM

Increasing environmental concerns resulting from solid and liquid wastes in urban areas led to the establishment of a Project Management Office (PMO) on Solid Waste Management based in the Environmental Management Bureau (EMB) of the DENR in October 1993. The Order establishing the PMO acknowledged the need to constantly update the framework and address the increasing garbage problem of Metro Manila and other LGUs, and the need for a more permanent body to assist the Task Force in the formulation of supporting standards and guidelines for waste management. The PMO has a number of functions and responsibilities. These include the formulation of strategies and standards for the collection and disposal of waste, provision of technical assistance, training, compilation of a

database and monitoring of performance and drafting of a bill creating a Waste Management Authority.

The PMO-PTFWM was strengthened in 1995 with a two-fold goal. First, it serves as the technical arm for institutional development aimed at enhancing the national and local governments administrative and project management capabilities. Second, it also serves to develop proper disposal options and facilities in association to the PTFWM. The detailed responsibilities of the PMO are in Appendix V (PMO-PTFWM, 1995).

6.3 Obstacles and Impediments to Effective Solid Waste Service Delivery

Despite these commitments, rapid urbanization means that environmental problems escalate with government support limited by the country's poor economic performance. Consequently, the solid waste management (SWM) services in Metro Manila and the other parts of the country continue to be seen as inefficient and inadequate. The existing SWM system appears incapable of coping with the increasing demands placed upon it (Passe, 1993). Some of these obstacles are discussed below.

6.3.1 Inadequate Institutions in SWM

Solid waste management responsibilities are diffused among different agencies. Formulating, coordinating and monitoring the implementation of solid waste management policies, plans, and programmes are the responsibilities of the PTFWM. However, because the PTFWM is an interagency arrangement, coordination remains problematic. Horizontal links between and among the agencies are weak with little interaction after the PTFWM meetings (Cook & Miles, 1994).

The Government, through the Environmental Management Bureau of the DENR, sought technical assistance from the World Health Organization (WHO) in the formulation of a national strategy for solid waste management. The technical assistance included the assessment of prevailing municipal solid waste collection and disposal practices, the identification of priority areas of municipal solid waste management which require improvement, and the formulation of a framework for national programs on solid waste management. The findings reveal that city and municipality governments in the country lack adequate technical capability in SWM. Little technical advice and guidelines have

been extended to them by the national government (Cook & Miles, 1994). Also, LGUs lack financial and logistical resources to carry out their waste management functions.

Because the LGUs have technical and logistical problems, the MMDA assists the LGUs, especially those whose revenues are comparatively low, in garbage collection. The MMDA is a representative body headed by a chairman elected by the 17 mayors who form the governing council. It is primarily responsible for coordinating and directing the delivery of basic urban services, which includes solid waste management, in the metropolitan region. The MMDA also operates transfer stations and sanitary landfills (MMDA, 1996).

The MMDA's main source of funds is contributions from the LGUs (Del Rosario, 1989). The Authority, however, is faced with problems stemming from its financial status. The LGUs have not been constantly remitting their contributions to the MMDA. With the enactment of the Local Government Code, the LGUs found a further excuse not to pay their mandatory contributions to MMDA which, consequently, has placed a strain on MMDA's ability to deliver the needed basic urban services in the region (Passe, 1993). Hence, numerous areas suffer from insufficient and inefficient waste collection. Lack of equipment, inadequate truck maintenance and irregular collection routes constitute the major operational problems (Medina, 1993).

Neither the MMDA nor cities and municipalities have developed technical and financial capabilities or institutional strength to cope with the mounting problems of SWM in the metropolitan region, and have to rely on the national government and international aid agencies for technical, logistical and financial support (Ogawa, 1991).

The magnitude and scale of collecting and disposing of more than 5,000 tonnes of refuse per day in Metro Manila has led the national government to embark on interim projects financed from its own resources. Through the PTFWM, the Department of Public Works (Bureau of Design) was asked to design portions of the identified landfill sites in Carmona (10 of 65 hectares) and San Mateo (15 of the 50 hectares) and to engage local consultants to design the Las Pinas Transfer Station. The Department of Environment and Natural Resources (DENR), for its contribution, provided a site for the sanitary landfill (in San Mateo), the land being under its jurisdiction (Cook & Miles,1994).

In the 1990s, the Government was given assistance by the World Bank for the detailed engineering design of the remaining portions of the Carmona and San Mateo Landfill sites, the identification of sites for transfer stations and the preparation of a proposal for loan for the construction of sanitary landfills and transfer stations.

The Government has no overall framework or programme for the participation of the informal sector in SWM despite its active engagement in the recovery of reusable and recyclable materials. Some non-governmental organizations (NGOs), such as the Metro Manila Women Balikatan Movement, are active in organizing the informal sector in recycling activities (Medina, 1993). However, the NGO activities are fragmented (Passe, 1993) and uncoordinated.

6.3.2 Poor Management Practices

Problems in solid waste services can be attributable to poor personnel and operational practices. For example, Passe (1993) indicates that the practice of collection crews separating recyclable waste materials during collection lengthens collection time and results in low collection efficiency.

Poor management of equipment and facilities also affects efficiency. Municipal and city solid waste collection in Metro Manila is performed mostly by private contractors. The contractors' collection fleet frequently experiences breakdowns. The supplementary contract vehicles are generally over 15 years old and are likely to be well beyond their economically useful life. Some compactors owned by the MMDA are not deployed because they lack the necessary spare parts to maintain them. Usually, the existing fleet is being serviced by spare parts cannibalized from other damaged compactors. Poor vehicle and equipment management practices result in inadequate refuse collection, adding further to inefficiencies already occurring in the present system (Del Rosario, 1989).

6.3.3 Inadequate Financial Resources

Financial resources have been limited. The budget allocated by the national government is insufficient to sustain the SWM operations (Del Rosario, 1989). For this reason, part of the PTFWM's function is to look for alternative sources to finance the implementation of solid waste management projects (PTFWM-PMO, 1995).

In addition, the non-remittance of revenues by LGUs to the MMDA affects the latter's ability to operate and maintain the solid waste management facilities (Del Rosario, 1989).

The Government also relies on foreign grants for the acquisition of vehicles and equipment for solid waste management operations. For example, a fleet of compactor units was received by the Government from the Japanese Government through the Japan International Cooperation Agency (JICA).

The absence of a formal system of charging fees to the solid waste management clientele makes it difficult for the SWM sector to sustain its operations (Del Rosario, 1989).

The reliance of the solid waste management sector on the national government allocation, remittance from LGUs and foreign grants have proved to be unsustainable and makes the system susceptible to failure.

6.3.4 The Attitude of the People

Selecting areas for disposal of solid waste has been problematic in many countries. In Metro Manila, local authorities have difficulties in finding suitable locations for sanitary landfills because of NIMBY ("Not-In-My-Backyard") attitude (Passe,1993). However, these same people may demand that the authorities should collect and dispose of the wastes in an environmentally-sound manner.

For example, in the City of Caloocan, the people, backed by a non-governmental organization, vigorously protested the proposal to utilize one of the local government's properties as a disposal site for the city. Their reluctance to allow the operation of a disposal site in their own jurisdiction stems from their fear that another "Smokey Mountain" might be created in their city in the future. "Smokey Mountain" in the City of Manila used to be Metropolitan region's principal dump site, where the accumulated waste materials became enormous, and smoke rose continuously from the dump due to combustible nature of waste materials. The people's vigilance paid off when, in this case, the court gave an order to stop the operations (Passe, 1993).

Subsequently, NIMBY attitudes appear to be a strong deterrent to government plans in SWM, particularly in the establishment of sanitary landfills.

6.4 Conclusion

SWM responsibilities are distributed among different agencies in which SWM is only one of several responsibilities. Although the PTFWM was created to consolidate the agencies' efforts in solving the solid waste crisis in the metropolis, efforts are still disjointed; coordination among agencies remains weak.

The devolution of SWM functions to the LGUs (particularly, waste collection) was done without taking into consideration their technical, management, and financial capabilities. The objective of devolution is to make public service more effective, efficient and responsive to the needs of the people. However, the devolution of SWM responsibilities was not preceded by the capacity building crucial for successful devolution. The transfer of responsibilities was not matched with empowerment, that is, giving the LGUs the autonomy to make decisions with regard to generating their own revenues to sustain the devolved activities, among others. The LGUs' continuing dependence on the national government and foreign assistance for technical, logistical and financial support is a deterrent to their effective management and, thus, needs to be addressed immediately.

The absence of a defined system of accountability in the SWM system appears to further weaken the overall structure. This exposes the whole system to corruption which renders it more inefficient, ineffective, and unresponsive to the needs of the populace.

The next chapter examines the arrangements for solid waste management in Metro Manila based on a survey of operating agencies.

Chapter VII

INSTITUTIONAL ARRANGEMENTS IN SOLID WASTE MANAGEMENT IN METRO MANILA

This chapter identifies the institutional arrangements for SWM in Metro Manila according to the framework and criteria discussed in Chapter III. A survey was conducted to examine the institutional arrangements and practices for solid waste management in the 8 cities and 9 municipalities in Metro Manila.

The questionnaires were prepared and revised according to comments from members of the academe in the Asian Institute of Management (based in the Philippines), technical staff from the Department of Environment and Natural Resources (Philippines) and the Metro Manila Development Authority (MMDA). Since it was not possible to conduct face-to-face interviews, the questionnaires were mailed to the city and municipal mayors and the General Manager of the MMDA. Follow up requests for completion were made through letters, fax messages and telephone calls.

The MMDA and 13 out of the 17 cities and municipalities responded to the questionnaire.

7.1 Physical and Socio-Economic Profiles of Cities and Municipalities in Metro Manila

Table 7-1 presents the land area of the cities and municipalities in Metro Manila where Quezon City is shown to have the biggest land area (166.2 sq km) comprising 26% of the total area of the metropolis. Navotas has the smallest area (2.6 sq km) covering 0.41% of the total area.

Table 7-2 shows the ranking of cities/municipalities according to the size of population. Quezon City, Manila and Caloocan City had the largest population (1.99 million, 1.9 million, and 1.02 million, respectively) in 1995 while Pateros had the least (55,213).

Navotas is the smallest municipality and has the highest population density among the respondent cities and municipalities. Manila ranks second (50,000 persons/sq km). Pateros has the lowest density (5,309 persons/sq km).

Table 7-1 Land Area of Cities and Municipalities in Metro Manila

City/Municipality	Area (sq km)
Quezon City	166.2
Caloocan City*	55.8
Valenzuela	47.0
Muntinlupa	46.7
Las Pinas*	41.5
Marikina	38.9
Paranaque	38.3
Manila	38.0
Taguig	33.7
Makati	29.9
Mandaluyong	26.0
Malabon	23.4
Pasay City*	13.9
Pasig*	13.0
Pateros	10.4
San Juan	10.4
Navotas	2.6

*non- respondent city or municipality
Source: MMDA, 1996

Table 7-2 Ranking of Cities/Municipalities According to Population

City or Municipality	Population	Rank
Quezon City	1,992,058	1
Manila	1,900,000	
Caloocan City*	1,023,159	
Makati	500,000	2
Malabon	493,815	3
Pasig*	471,075	
Valenzuela	436,750	
Las Pinas*	413,086	
Pasay City*	408,610	
Marikina	400,000	
Paranaque	394,304	4
Muntinlupa	380,236	
Taguig	374,752	
Mandaluyong	297,000	5
Navotas	229,039	
San Juan	135,000	
Pateros	55,213	

1 - Greater than 600,000
2 - 500,001 to 600,000
3 - 400,001 to 500,000
4 - 300,001 to 400,000
5 - 1 to 300,000
* - Non-respondent city or municipality; Source: MMDA, 1996

Table 7-3 Ranking of Cities/Municipalities According to Density

City or Municipality	Density (persons/sq km)	Rank
Navotas	88,092	1
Manila	50,000	2
Pasig*	36,236	3
Pasay City*	29,396	
Malabon	21,103	
Caloocan City*	18,336	
Makati	16,722	
San Juan	12,981	4
Quezon City	11,986	
Mandaluyong	11,423	
Taguig	11,120	
Paranaque	10,295	
Marikina	10,283	
Las Pinas*	9,954	
Valenzuela	9,293	
Pateros	8,142	
Muntinlupa	5,309	

1 - 75,001 to 90,000 persons/square kilometre
2 - 45,001 to 75,000 persons/square kilometre
3 - 15,001 to 45,000 persons/square kilometre
4 - 1 to 15,000 persons/square kilometre
* - non-respondent city or municipality; Source: MMDA, 1996

Table 7-4 Ranking of Cities/Municipalities According to Annual Population Growth Rate

City or Municipality	Growth Rate (%)	Rank
Muntinlupa	7.02	1
Taguig	6.93	
Las Pinas*	6.37	
Caloocan City*	5.64	
Valenzuela	4.81	2
Paranaque	4.57	
Malabon	4.13	
Quezon City	3.34	3
Navotas	3.30	
Pasig*	3.22	
Mandaluyong	2.75	
Marikina	2.68	
Pasay City*	1.96	
Pateros	1.37	
Makati	1.25	
Manila	0.62	4
San Juan	- 0.40	

1 - 5.1% to 7%
2 - 4% to 5%
3 - 1% to 3.9%
4 - less than 1%
* - non-respondent city of municipality
Source: MMDA, 1996

Average population growth rate for Metro Manila is 3.3% (MMDA, 1996). Table 7-4 shows that Muntinlupa, Taguig, Las Pinas, and Caloocan City have the highest annual growth rate (7%, 6.93%, 6.37% and 5.64%, respectively) from 1990-1995. Valenzuela , Malabon and Paranaque rank second. San Juan has the lowest growth rate which is -0.40%, the negative value being attributed to the municipal administration's continuous relocation of squatter.

7.2 Solid Waste Management Organizations and Operations in Metro Manila

Organizational Concerns

Structures of Waste Management Offices

Table 7-5 shows how LGUs structured their SWM units after the devolution of the function from the national to local government.

In nine LGUs, (Makati, Quezon City, Marikina, San Juan, Paranaque, Taguig, Navotas, and Pateros and Malabon) the Mayor created a Special Task Force (called either "Task Force on Solid Waste Management" or "Task Force Clean and Green") or an independent waste management unit to develop and implement environmental improvement programmes and activities, and to carry out waste management functions. In two municipalities (Navotas and Pateros), the waste management units are headed and supervised by detailed MMDA personnel (called Area Managers, reflecting the set-up when waste collection was still under MMDA's responsibility). All of these municipalities are being assisted by MMDA in their solid waste management operations in terms of augmenting their manpower and logistics and enhancing their technical capabilities.

Four LGUs (Manila, Mandaluyong, Muntinlupa and Valenzuela) integrated their waste management functions with their Public Service Division or Office. As such, solid waste management services compete for manpower, financial and logistical resources with other public service concerns of the city or municipality. Some of these LGUs are seeking assistance from MMDA to carry out their waste management functions. Manila, for example, because of its large population and large volume of waste is being assisted by MMDA.

Table 7-5 Structure of SWM Unit of Cities and Municipalities in Metro Manila

City/Municipality	Organizational Structure of SWM Unit	
	Special Task Force or SWM Unit Created by Mayor	Integrated With Public Service Division
Makati	X	
Mandaluyong		X
Manila		X[b]
Muntinlupa		X[b]
Quezon City	X[b]	
Malabon	X[b]	
Marikina	X[b]	
Navotas	X[a]	
Paranaque	X[b]	
Pateros	X[a]	
San Juan	X[b]	
Taguig	X[b]	
Valenzuela		X

[a] MMDA headed, supervised, and assisted
[b] MMDA assisted

Appendix XI shows the organisational structure of each city and municipality in Metro Manila.

Co-ordination of LGUs with PTFWM

There appears to be very little interaction between the LGUs and the PTFWM. Only 5 of the 13 respondent LGU report their waste management concerns to the PTFWM (Table 7-6).

Table 7-6 Coordination of Cities and Municipalities with PTFWM

City/Municipality	Reporting/Coordinating with PTFWM
Makati	
Mandaluyong	X
Manila	
Muntinlupa	
Quezon City	
Malabon	X
Marikina	X
Navotas	
Paranaque	
Pateros	
San Juan	X
Taguig	X
Valenzuela	

Human Resources

Most of the LGUs surveyed perceive lack of incentives (9 out of 13) and low salary (8 out of 13) as serious human resource problems (Table 7-7). Related to these problems is the lack of recognition or job status, mentioned by five LGUs. Other human resource problem is the apparent lack of benefits, like social security, life, health and accident insurance, which suggests that some employees in the solid waste management sector (particularly in Paranaque, Muntinlupa, and Quezon City) are not permanent employees. Lack of security of tenure of workers was actually mentioned by Quezon City Government as a serious problem.

Not all respondents acknowledge human resource difficulties. Ten (San Juan, Mandaluyong, Muntinlupa, Marikina, Malabon, Navotas, Manila, Makati, Quezon City, and Taguig), in fact, gave their employees trainings on SWM in 1995 (Table 7-8). The administrations of Manila, Makati, Malabon, Taguig and Quezon City provided their own training budget. The rest relied on sponsorship by the national government, international organisations or NGOs.

Table 7-7 Human Resource Related Problems Identified by LGUs and MMDA

Human resource problems	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Lack of manpower in waste collection					X				X			X	X	
Inefficiency (e.g. poor work practices)	X				X			X						X
Lack of skills in waste management					X		X						X	X
Lack of incentives	X	X			X		X	X	X			X	X	X
Lack of recognition	X	X			X				X					X
Low salary		X			X		X	X	X			X	X	X
Low morale		X			X				X					X
Lack of benefits (e.g. social security, life, health, hazard pay and accident insurance)	X				X							X	X	
Lack of communication systems							X							
Irregularities through making collections outside assigned jurisdiction thereby neglecting regular duty								X						
No security of tenure for workers (most are casuals or contractuals)												X		

1 - Paranaque
2 - San Juan
3 - Mandaluyomg
4 - Navotas
5 - Muntinlupa
6 - Marikina
7 - Valenzuela
8 - Malabon
9 - Pateros
10 - Manila
11 - Makati
12 - Quezon City
13 - Taguig
14 - MMDA

Table 7-8 Training on SWM of LGUs in Metro Manila

Cities and Municipalities	With Training in Solid Waste Management	Without Training in Solid Waste Management
Makati	X	
Mandaluyong	X	
Manila	X	
Muntinlupa	X	
Quezon City	X	
Malabon	X	
Marikina	X	
Navotas	X	
Paranaque		X
Pateros		X
San Juan	X	
Taguig	X	
Valenzuela		X

Capital Investment

Of the 13 administrations, only three (Malabon, Quezon City and Taguig) gave information about their capital investment. Six respondents (Mandaluyong, Makati, San Juan, Valenzuela, Malabon, and Taguig) acknowledged having 5 to 10 year investment plans. The governments of Pateros and Mandaluyong mentioned that their solid waste management activities are planned annually. It is not clear whether these figures reflect shortcomings in information systems, deficiencies in current management strategies, or an unwillingness to respond to these questions.

SWM Practices and Operations

Collection

The survey confirms that there is no established system for collecting fees or otherwise charging for SWM. Eleven respondents mentioned that municipal business licenses and permits include the fees for solid waste management services. This means that business and industrial establishments are charged, but not households. Charges vary according to the size of the area occupied by the business or industrial establishments. Only one municipality (Malabon) mentioned that payment for solid waste

management services is included in property taxes aside from the municipal business licensing and permitting fees.

Future plans of LGUs include the phasing out of old and dilapidated equipment (e.g., compactors), acquisition of their own dump trucks, and provision of small compactors, particularly in areas with narrow streets. Marikina plans to increase the frequency of collection.

Waste Recycling /Materials Recovery

Only two of the respondent LGUs pursue waste recycling or materials recovery. The City administration of Manila organizes junk shop owners in Manila into co-operatives with the assistance of the Clean and Green Foundation Metro Manila, the "Linis-Ganda" (Clean and Beautiful) Project, and the DENR.

Malabon, in co-ordination with an NGO (Linis-Ganda Foundation), has a project called the "Push Cart Brigade" which aims to organize the scavengers and provide them with carts for their collection of recyclable materials (bottles, newspapers, scrap metals, plastics, etc.) from households, markets and other sources. This is also a livelihood project for the informal sector.
The future plans of five LGUs include the implementation of "zero waste" or waste minimisation programs. One municipality plans to put up a recycling/redemption centre.

Transfer Operations

The Las Pinas Transfer Station is about 2 hectares, with a daily capacity of 1,178 tonnes. It accepts a daily average of 1,037 tonnes of waste. The station services all cities and municipalities in Metro Manila. A private company manages and operates the transfer station under a contract with MMDA. The MMDA does not charge fees for the use of the transfer station.

Future plans of three administrations (Marikina, Valenzuela and Taguig) include the establishment of transfer stations in their localities.

Disposal

There are two sanitary landfills: San Mateo (Rizal) and Carmona (Cavite). In 1995, the San Mateo sanitary landfill received 2,222 tonnes per day of waste from Manila, San Juan, Pasig, Pateros, Taguig, Marikina, Mandaluyong, Makati, Pasay and Caloocan City. It also accepted wastes from outside Metro Manila (Cainta and Antipolo, Rizal).

The Carmona sanitary landfill, on the other hand, received 1,072 tonnes of waste daily in 1995 which represents about 19% of the aggregated total waste collected from the cities and municipalities in Metro Manila as well as other municipalities in nearby provinces (Imus, Dasmarinas, Carmona, Sta. Rosa and Silang).

Both the sanitary landfills are managed and operated by private companies under contract with MMDA.

The MMDA does not charge tipping fees for the disposal of solid waste to sanitary landfills. However, the law requires the LGUs to pay 5% of their annual gross revenues to cover the expenses of the MMDA.

Future plans of two LGUs (Muntinlupa and Mandaluyong) include the establishment of solid waste incineration plant in their own localities.

Operational Challenge

The two landfills together can contain a maximum of 21.5 million cubic meters of waste. If the present trends of population growth and waste generation continue, the maximum capacity of the two landfills will be reached in around 6 years. Also, gains in efficiency of collection (raising it from the current estimate of 85%, page 96) will quickly exhaust landfill capacities. While planning for expansion or opening up of new disposal sites is necessary, programmes on waste minimisation and materials recovery may need to be vigorously pursued. To some degree, tolerating scavenging activities by the informal sector may be inevitable because of the apparent benefits they contribute in terms of minimizing the volume of waste to be disposed at the sanitary landfills. Also alternative means of disposal, such as incineration and composting may need to be explored.

7.3 Characteristics of SWM Services and Institutional Arrangements in Metro Manila

7.3.1 Nature of SWM In Metro Manila

Figure 7-1 illustrates how activities in solid waste management are treated by LGUs in Metro Manila.

SWM services in Metro Manila are treated mainly as public services. People are not directly charged for the services. However, according to the survey, charges for SWM services are included in the property tax and the business licenses/permits. As such, there is no way the government can influence people to adopt waste minimization practices.

In some areas, however, especially in big commercial areas and industrial establishments, refuse collection is treated as a toll service where private companies are contracted to collect waste.

The use of the transfer station and sanitary landfill facilities are also virtually free-of-charge, or at least any user contribution is indirect and cannot be identified. Users may pay general property tax to the LGUs. In turn, the LGUs are mandated by the law to pay MMDA 5% of their gross annual revenue. However, this covers the range of services rendered by MMDA and not just SWM.

The INSWMSF prescribes user charging, which is presently under study by the government.

7.3.2 Roles of the Government and Private Sector in SWM

7.3.2.1 Hierarchy of Roles and Responsibilities in Metro Manila

Figure 7-2 shows the hierarchy of roles and responsibilities in SWM in Metro Manila. In practice, there is no established system of accountability between these levels. The survey discloses that only five LGUs co-ordinate with the PTFWM about their accomplishments and concerns. As mentioned earlier, one of the responsibilities of the PTFWM is to "ensure the continuous co-ordination and compliance by concerned agencies...on the various policies and presidential directives issued on waste management".

Figure 7-1 Nature of Solid Waste Management Services in Metro Manila

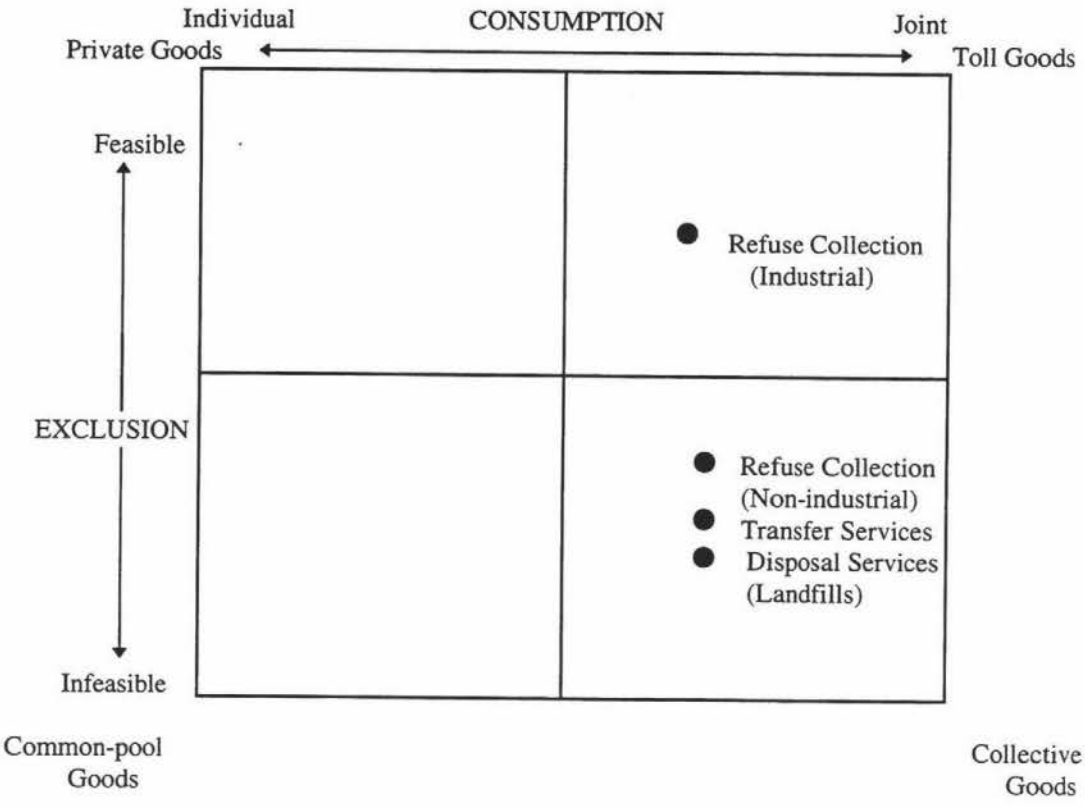
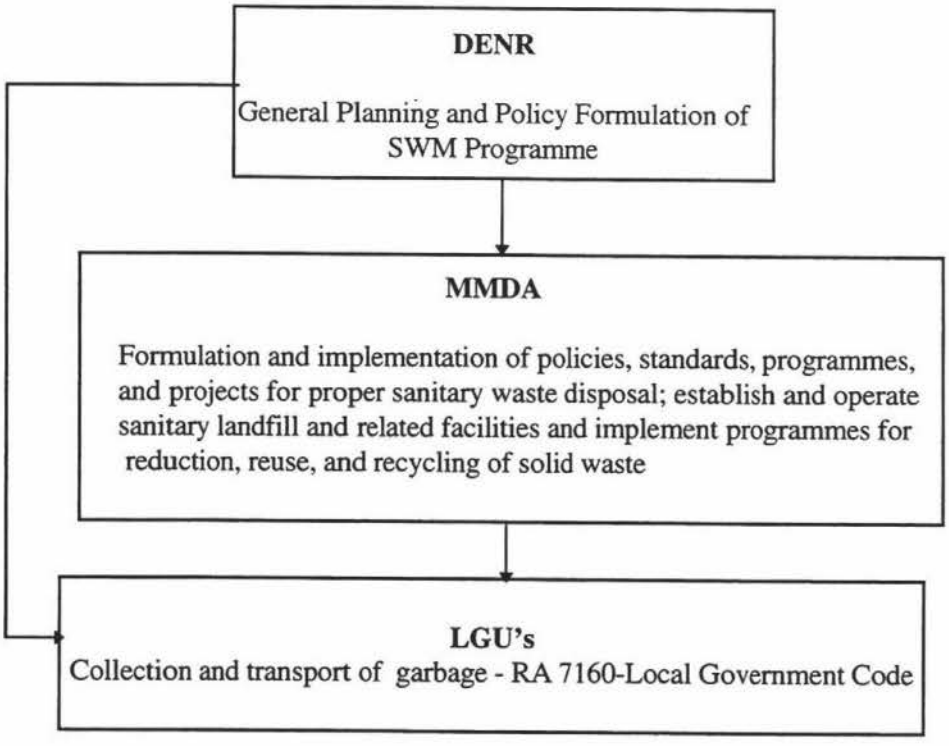


Figure 7-2 Hierarchy of Roles and Responsibilities in SWM in Metro Manila



Although the creation of the PTFWM suggests that solid waste management is a priority for government, appropriate accountability mechanisms have not been put in place to ensure compliance by the relevant agencies. This undermines the implementation of the INSWMSF.

7.3.2.2 Roles of the Government and the Private Sector in the SWM Delivery Chain

Table 7-9 presents the different roles assumed by the city and municipal government, MMDA and the private sector in the SWM delivery chain. The private sector plays a role in the production of services which spreads through the whole SWM delivery chain. The governments increasingly assume the role of arranger, which implies that it should also assume responsibility for performance monitoring and auditing. Also, as arranger, the governments need to develop capability in setting the guidelines on the level and quality of service to be delivered to ensure that the governments' expected outcome is achieved. The governments' assumption of the role of arranger necessitates a reasonable level of technical and administrative capability on the part of the government. But, as the survey reveals, a majority of the LGUs lack technical and managerial capability in SWM.

Table 7-9 Role of Local Government, MMDA, and Private Sector in Solid Waste Management Delivery Chain

Agency	Collection	Transfer	Disposal
Municipal/City Gov't	Producer/Arranger	Consumer	Consumer
MMDA	Producer	Arranger	Arranger
Private	Producer	Producer/Consumer	Producer/Consumer

The role of the government agencies as producer of SWM services also requires technical and managerial capability. As producer, the government agencies must know how to motivate personnel (e.g. by providing adequate benefits and incentive packages) and achieve efficiency. Seven of the respondent LGUs were found to be relatively ineffective and inefficient in waste collection (see Section 7.3.4). Of these, three undertake collection without private sector participation. The lack of incentives and benefits was among the problems identified by LGUs and may have caused low performance in SWM. Job promotion and salary increases are constrained by civil service policies. Also, it is difficult to fire or demote unproductive workers in the government because of civil service rules. These conditions may perpetuate inefficiency and unproductivity in government agencies in the SWM sector.

The governments' role as producer of service also implies that they have to undertake planning for manpower development and equipment management and investment. In Metro Manila, LGUs do not seem to have plans and programmes in these areas. Although some LGUs send their personnel on training courses, only five provide their own budget training. The rest rely on training sponsored by the national government, MMDA, NGOs or international aid organizations. Manpower planning and development seem to be very limited in the programmes of LGUs as far as SWM is concerned.

7.3.3 Institutional Arrangements in SWM in Metro Manila

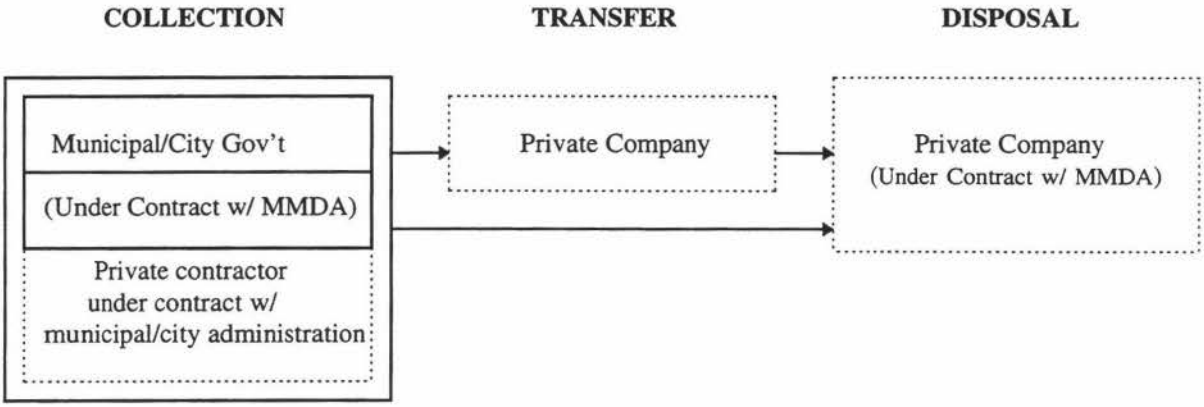
Figure 7-3 shows the different institutional arrangements in the delivery of SWM services in Metro Manila. The first arrangement, where the city/municipal administration, the metropolitan authority, and the private sector undertake refuse collection, is operating in seven 7 cities and municipalities. This arrangement is usually adopted by cities and municipalities with a large service area or large population, such that their own workforce and logistics/equipment are not enough to service their whole jurisdiction.

The second arrangement, where the municipal administration and the metropolitan authority undertake refuse collection, operates in three municipalities. The municipalities under this arrangement do not have large populations or service areas. The LGUs are being assisted by the metropolitan authority in refuse collection because they either do not have adequate skills or are short of manpower.

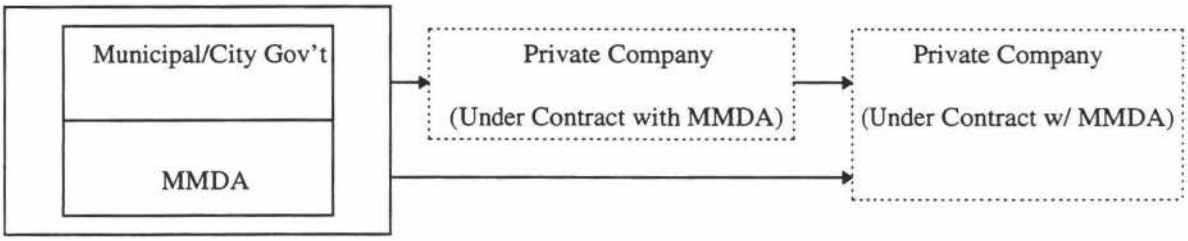
The last arrangement, where refuse collection is undertaken by the city/municipal administration and the private sector, operates in three LGUs. The administrations adopting this arrangement usually rely heavily on the private sector. Makati City, being the centre of business and trade in Metro Manila where foreign investors, diplomats, local businessmen and with high income residents, maintains a high standard of cleanliness and sanitation and relies on the private sector to deliver this standard. Mandaluyong is contiguous to Makati hence the influence of Makati's practice in SWM is carried over in Mandaluyong. Valenzuela is the only municipality in Metro Manila that has no operative in SWM so that it depends heavily on the private sector in the municipality's refuse collection.

The management and operation of transfer and disposal facilities are entrusted to the private sector under contract with the MMDA (Figure 7-3).

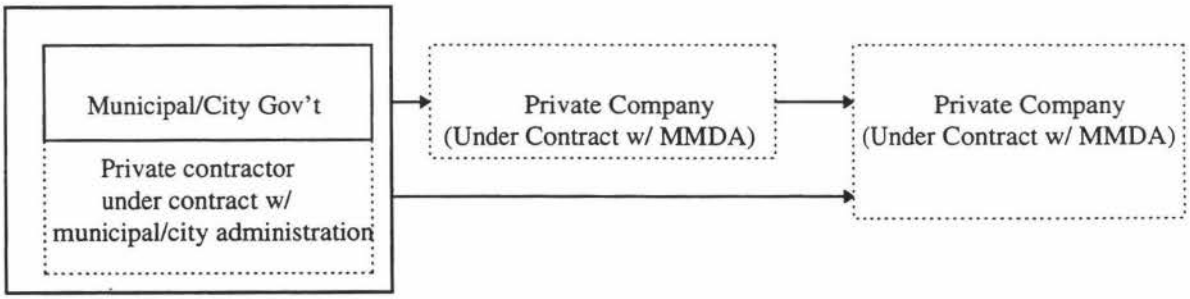
Figure 7-3 Institutional Arrangements in SWM Delivery Chain in Metro Manila, Philippines



A. Arrangement in SWM Delivery Chain in Manila, Muntinlupa, Quezon City, Malabon, Navotas, Paranaque, & Taguig



B. Arrangement in SWM Delivery Chain in Marikina, San Juan, & Pateros



C. Arrangement in SWM Delivery Chain in Makati, Mandaluyong, & Valenzuela

The only arrangement adopted by the administrations where the private sector is involved is contracting out. It should be noted that SWM responsibilities were devolved to the LGUs in 1992 regardless of their capability to carry out SWM functions. LGUs might have preferred contracting as an alternative way to provide the service because it costs less and provides the same or better quality of service (Cointreau-Levine, 1992). The skills lacking in their own workforce are available in the private sector. The fact that most LGUs do not undertake manpower development and planning in SWM indicates

that most of them rely, to a great extent, on the skills of the private sector in the performance of their functions in SWM.

Also, contracting out the service enables the LGUs to overcome salary limitations and civil service restrictions that may be otherwise encountered when they hire additional personnel.

Another reason why they may prefer contracting out is to avoid large capital outlays. The fact that most of the respondents in the survey have contractors indicates that local governments tend to rely, to a great extent, on the private sector's equipment for the whole duration of the contract period.

Contracting remains as the only alternative to government SWM delivery in Metro Manila at present. According to the survey, most of the local governments consider lack of incentives and benefits as a serious human-resource related problem which explains their poor work practices and low productivity. The private sector has more opportunities and flexibility for motivating staff. The private sector also has the ability to discipline and impose sanctions on personnel to maintain good work practices. In other words, the practice of "carrot and stick" approach in the private sector induces desirable work attitudes and habits that promote productivity.

Also, through contracting, the government agencies benefit from the private sector's innovations, investment practices, access to resources and access to technology which would otherwise be lacking should the former deliver SWM services alone.

But contracting is not without problems. The Philippine Government's experience in contracting reveals that some contractors use trucks past their useful economic life making the service ineffective. In this case, the private sector cannot solely be held responsible for ineffective service delivery. The government must provide the private sector reasonable terms to enable them to recover their investments on appropriate equipment. The government needs to carefully consider contract length and scope to enable the private sector to recoup their investments over time so that they will be motivated to invest on environmentally-sound equipment.

The writing of the terms in the contract document is critical in this arrangement. The obligations of both parties must be clearly defined. Otherwise, some aspects in the service delivery will be missed out which will create problems in the future (e.g., who should decide on the vehicles and equipment to be used in the operation; who is responsible in the maintenance of access roads to ensure good access by the collection or transfer vehicles; etc.).

7.3.4 Efficiency, Effectiveness, and Equity

Various arrangements in the provision of solid waste management services have evolved after the devolution of SWM functions, as discussed in the previous section. How far these arrangements have fared are reflected in the performance of the LGUs.

The results of calculations reveal that Manila has the highest effectiveness ratio of 382 tonnes\1,000 population, followed by Mandaluyong (369) and Quezon City (279). San Juan has the lowest ratio which is 87 (Table 7-10).

Calculations show that Quezon City has the highest efficiency of 3,304 tonnes\employee followed by Manila with 1,875 tonnes\employee. San Juan has the lowest efficiency ratio of 52 tonnes\employee (Table 7-10).

Multiple regression analysis shows that efficiency is highly associated with the cumulative effects of external factors such as population size, growth rate, size of area and density (Table 7-11). Among these factors, simple regression suggests that population is more important than area as a determinant of both efficiency and effectiveness. The results indicate economies of scale as a determinant of efficiency.

Table 7-10 Effectiveness and Efficiency of Solid Waste Collection in Metro Manila

City or Municipality	Waste Collection (1995 in tonnes)	Tonnes per 1000 people	Number of Employees	Tonnes per Employee
Makati	82,970	166	871	95
Mandaluyong	109,520	369	695	158
Manila	725,531	382	387	1,875
Muntinlupa	60,960	160	130	469
Quezon City	555,673	279	168	3,304
Malabon	72,768	147	270	270
Marikina	79,632	199	253	315
Navotas	48,667	212	78	624
Paranaque	97,560	247	416	234
Pateros	12,240	222	67	183
San Juan	11,764	87	224	52
Taguig	86,173	230	297	290
Valenzuela	82,973	190	851	98

Table 7-11 Regression Analysis for the Performance (Effectiveness and Efficiency) of 13 Ctites and Municipalities in Metro Manila

	Dependent Variables							
	Tonnes per 1000 People (Effectiveness)				Tonnes per Employee (Efficiency)			
Independent Variables	**R^2**	**Adjusted R^2**	**Significance F**	**P Value**	**R^2**	**Adjusted R^2**	**Significance F**	**P Value**
1.Population	0.547	0.235	0.053	0.053[b]	0.923	0.839	$6.71x10^{-6}$	$6.71x10^{-6}$ [c]
2.Area	-	-	-	-	0.836	0.671	0.00037	0.00037[c]
3.PDGA[a]	-	-	-	-	0.976	0.929	$2.3x\ 10^{-5}$	
Area	-	-	-	-				0.00384[c]
Population	-	-	-	-				0.02282[c]
Density	-	-	-	-				0.02343[c]
Gr. Rate	-	-	-	-				-

[a] Multiple Regression (Population, Density, Growth Rate, and Area)
[b] $P < 0.1$
[c] $P < 0.05$
- Not significant

Figure 7-4 shows the distribution of the cities and municipalities in Metro Manila with regard to their effectiveness and efficiency in collection. Manila and Quezon City have the highest efficiency and effectiveness ratings in refuse collection, and the only cities contained in Quadrant A. The arrangement common to these administrations is the involvement of the city administrations, the metropolitan authority (MMDA) and the private sector (under contract with the city administrations) in refuse collection. Efficiency and effectiveness in collection might have been made possible through the combined efforts of the private sector and the government.

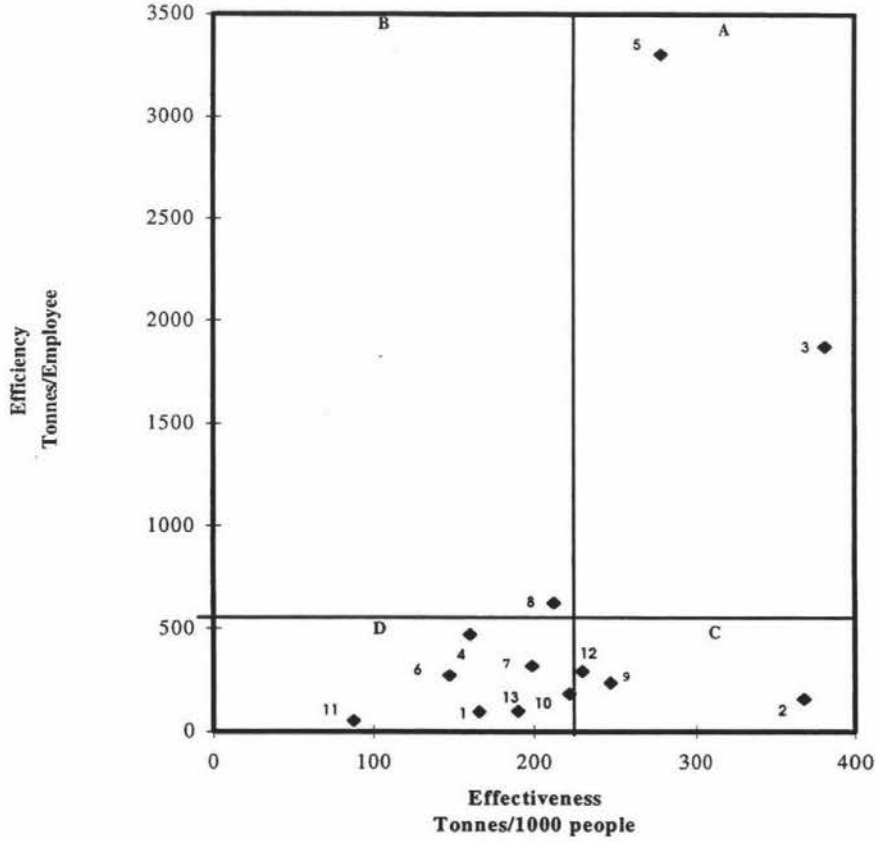
There appears to be a synergistic effect when both the government (local government and metropolitan authority) and the private sector combine their efforts in solid waste management. Since the devolution in 1992, the MMDA has assisted LGUs with large population size and high waste generation rate, such as Manila and Quezon City. The technical knowledge, manpower and equipment assigned by the MMDA to the said cities might have boosted the knowledge, manpower and equipment Manila and Quezon City governments already had, and when combined with the technical knowledge and experience, manpower and equipment of the private sector had resulted to effective performance in collection.

Due to these cities' large population and high densities, both the governments and the private sector might have realized economies of scale and operational economies in collection such that efficiency was achieved in collection. Hence, instead of the three organizations competing with one another, they complemented and supplemented each other's operations.

Navotas was shown to be efficient in its operation but not effective although it has the same mode of service arrangement as Manila and Quezon City. The fact that the Navotas Municipal Solid Waste Management office is headed by personnel of the MMDA suggests that there may be still integration difficulties.

Paranaque's and Taguig's service arrangements are also similar to Manila's and Quezon City's but their collection is considered effective but not efficient. It was revealed in the survey that both the governments of Paranaque and Taguig consider the lack of benefits and incentives as serious human resource problems. This might have affected their performance since there is no motivation for their personnel to adopt efficient practices. It might be possible that some of the collection crews also act as waste pickers during their scheduled collection, thus, lengthening collection time resulting to apparently lower efficiency.

Figure 7-4 Distribution of Cities and Municipalities Based on Performance(Effectiveness and Efficiency)



A - High Effectiveness and Efficiency
B - Efficient but not Effective
C - Effective but not Efficient
D - Not Efficient and Effective

1 - Makati
2 - Mandaluyong
3 - Manila
4 - Muntinlupa
5 - Quezon City
6 - Malabon
7 - Marikina
8 - Navotas
9 - Paranaque
10 - Pateros
11 - San Juan
12 - Taguig
13 - Valenzuela

In Mandaluyong, the municipal government and a private company jointly undertake collection. Mandaluyong's performance in collection is considered effective but not efficient. Mandaluyong's solid waste management functions are assumed by the Public Service Division. The integration of SWM functions with the Public Service Division of the municipality might have created problems as regards the assignment of personnel and logistics to their various activities, thus, affecting collection performance.

The remaining LGUs in the survey (and more than half of the respondents) appear relatively ineffective and inefficient in their operations (Quadrat D, Figure 7-4). Muntinlupa and Malabon, with similar arrangements with Manila and Quezon City, still performed poorly. These LGUs identified the lack of benefits and incentives as a serious human resource problem which might have also caused low performance in collection. There is no motivation for the workforce to become more effective and efficient in their operations.

The other LGUs with low performance either fall in an arrangement where the municipal government and the metropolitan authority (purely government--Marikina, San Juan, Pateros) undertake collection or where the municipal government and a private company undertake collection (Makati and Valenzuela). Efficiency gains might not have been realized in the first case because of the lack of private sector participation in collection. Also, the lack of benefits and incentives might have caused them to perform ineffectively and inefficiently.

In the second case, the LGUs' inability to monitor the performance of the private sector might have weakened overall performance.

As regards deciding on which arrangement is most equitable, all three arrangements appear to be equitable from the information available. The government may undertake refuse collection in areas where there are difficulties in accessibility (e.g., in poor settlements in Metro Manila are often left out in refuse collection because of their narrow access roads). Also, the arrangement provides opportunities for the government to implement programmes that would complement their collection activities. For example, the City of Manila has an on-going programme organising the informal sector to perform "house-to-house" collection of recyclable materials which provides income to the poor communities in Manila and at the same time promotes waste minimisation. This arrangement allows the government to become flexible in making adjustments in response to changing demand and circumstances.

7.5 Institutional Arrangements for SWM in Mega-Cities

7.5.1 Government Provision of SWM Services

Provision of SWM services solely by the government appears to be less efficient than mixed public and private provision, as shown by the Bangkok and Metro Manila experiences in refuse collection. The degree of effectiveness, however, differed in those cases. While Bangkok's collection was more effective than Petaling Jaya's, refuse collection involving only government agencies in Metro Manila was found to be less effective. Budgetary constraints, civil service restrictions, and the lack of incentive and benefit packages appear to have contributed to lower productivity among personnel and perpetuated inefficiency in the service. The lack of skilled manpower, appropriate and efficient equipment, clear system of accountability and development planning and investment in SWM in the local governments in Metro Manila may also adversely affect the performance of SWM sector in the metropolis. Under these circumstances it would not be surprising, therefore, that a purely government initiative in SWM provision would yield lower effectiveness and efficiency results because of the aforecited problems.

7.5.2 Joint Public-Private SWM Service Delivery

Common to all case studies is the involvement of both the government and private sector in SWM service delivery, although Bangkok does not involve the private sector in the refuse collection function.

The case studies suggest that joint undertakings of the government and private sector in refuse collection result in higher collection performance (effectiveness and efficiency). It is possible that when government agencies undertake collection, along with the private sector, they acquire the knowledge and experience necessary to monitor the performance of the contractors and to keep the private sector provider motivated. Thus, combined efforts might yield high efficiency and effectiveness in the system as a whole.

Efficiency gains may be realized by involving the private sector, especially in collection in areas where there is large population. In Metro Manila, there are opportunities for economies of scale because of the large population and high population densities in contiguous areas. Also, opportunities for the private sector to enter into different service arrangements with the local governments abound.

Public sector involvement in refuse collection may also be necessary to ensure that wealthy villages are not the only ones to benefit from SWM services. Equity and public welfare also justify government's continuing role in SWM service delivery.

7.5.2.1 Contracting

Contracting is the most common arrangement in providing SWM services in all case studies. Because of the potential benefits from this arrangement, partnership between the government and the private sector can be encouraged.

As shown in the case studies, the private sector supplements rather than replaces public sector provision of services. On purely logistical grounds, the private sector offers additional equipment and personnel to fill the gap in the service coverage constrained by public budgetary resources. Also, the private sector is a source of investment funds. In Metro Manila, it appears that contracting has been used by the LGUs not only because of the efficiency gains that can be realized from the arrangement, but also because the private sector is a source of manpower, equipment and investment funds.

The case studies have also shown that not all private sector service provision under contractual arrangement with the governments realizes effectiveness and efficiency. Effective contracting results most likely when contracts are of sufficient length and scope to enable the private sector to recover investments; when adequate performance monitoring is undertaken by the government; and when those in government have the administrative capability to implement these conditions (Cointreau-Levine, 1992).

The private sector engages in endeavours that ensure a return on investment. If the terms in contracting are not attractive, either the private firm will accept the terms but later compromise the quality of service, or simply avoid public service provision. Contracts must be of sufficient length to enable the private sector to meet investment criteria. The problem in Metro Manila over the use of a contractor's trucks past their useful economic life may have been due to a contract of insufficient duration or allowing insufficient margins for investment on newer and more efficient vehicles.

Also, the geographic scope of service must be sufficient for firms to be able to achieve economies of scale. The survey in Metro Manila suggests opportunities for efficiency gains from economies of scale. It is also possible that a private firm could operate in more than one city or municipality to obtain of these advantages.

The government, assuming the role of arranger, must be able to monitor performance to ensure private sector compliance with the terms of the contract, to see that quality of service delivered satisfies the needs of the public, and to ensure public welfare. One of the problems in Metro Manila, as mentioned earlier, is that out of the waste collected by the LGUs and private sector in 1993 at least 10% is not disposed of at designated disposal areas. These are believed to be either dumped elsewhere or recovered by scavengers through segregation. The lack of information about the destiny of the waste collected suggests inadequate monitoring, threatening the quality of service performance.

In some respects, contracting could even be more equitable than municipal service provision. Contractors tend to regard their service areas as a delivery workload commitment that needs to be fulfilled, lest they are fined for failure to meet the terms of the contract. Because they are bound to service the agreed areas, their prejudices (e.g., the tendency to postpone collection in poorer settlements in the city, etc.) cannot get in the way should there be problems during their collection schedules (e.g., vehicle breakdown). Contracting, because of its potential for enforcing service levels, could be more equitable than municipal service provision where political influences and more relaxed employment conditions offer no such sanctions.

7.5.2.2 Franchising

Singapore and Petaling Jaya introduced franchising in 1995 as an alternative to purely government service delivery. In Metro Manila, franchising could be considered because of the operational economies it offers especially when collection is undertaken along a contiguous route or within an exclusive zone (Donahue, 1989). Franchising may be appropriate in large commercial and industrial areas where large volumes of wastes are generated. Franchising, however, cannot replace contracting in Metro Manila because of the latter's advantages over the former. In franchising, clients are directly charged by the companies. Because the cost of billing and collecting user charges are borne by private companies, cost of franchise tends to be higher than cost of contracting (Boston, 1995). The transaction costs are more transparent and consequently appears to be higher under franchising. Under direct contracting arrangements, payments are indirect (via property taxes) and transaction costs are hidden.

In franchising, those that cannot afford to pay are excluded from the service. In Metro Manila, there are large poor settlement areas that may not benefit from franchising because of this. Hence, franchising highlight equity issues and is unlikely to be favoured by constituents residing in poor settlements in the metropolis.

7.5.2.3 Licensing/Concession

The Ministry of the Environment in Singapore licenses private companies to collect refuse in some designated areas. This arrangement appears to have boosted the performance of refuse collection in the metropolis, or at least is not inconsistent with relatively high efficiency and effectiveness. Licensing may be more viable in large commercial and industrial areas where generation is substantial. In Singapore, private companies collect refuse from industrial and commercial premises, shipyards, construction sites and private condominiums. In some areas in Metro Manila, such licensing arrangements may also be viable.

Success in licensing arrangements may depend on how the license agreement is formulated. Licensing agreements have to clearly specify performance standards, methods of judging performance, penalties for delay or non-performance, risk assignment, insurance requirements, dispute resolution, standards for worker safety and health protection, and environmental protection standards (Seader, 1989). Again, the government must have the technical and administrative capacity to enforce compliance with the terms and conditions in the agreement.

Under licensing arrangements, private companies directly charge their customers. This means that service is made available only to those who are capable of paying; those who are not capable of paying are excluded. On its own, this arrangement is not equitable as those who cannot pay are excluded from the benefits of private sector service.

In Metro Manila, licensing arrangements are not yet adopted in SWM. However, as the INSWMSF included in the strategies the construction and management of transfer stations under BOT, BTO or BOO management schemes, the government has encouraged the private sector to submit relevant proposals. To date, proposals have been submitted for the construction and management of transfer stations and sanitary landfills, and for the construction of waste-to-energy, composting and recycling facilities.

Licensing (whether BOT, BTO, BOO) may be a viable alternative for capital intensive undertakings in SWM, such as construction, operation and maintenance of transfer stations, sanitary landfilling with methane gas extraction for electricity generation, recycling plants, incineration facilities, and the like. Since these projects are capital-intensive, the long-term contractual agreement may allow the private sector to depreciate investments and generate reasonable returns.

Since most of the projects proposed for licensing schemes are large-scale, licensing arrangements for transfer, recycling and disposal may be forged between the MMDA and the private sector. A metropolitan-wide arrangement may be the most appropriate for agreement with the private sector with regard to transfer, recycling and disposal because of scope of the metropolitan jurisdiction and its ability to handle activities with associated large externalities.

7.5.2.4 Arrangement with Informal Sector

Community arrangements were not advanced as a formal arrangement in any of the surveys conducted. But in Metro Manila some of the local governments have projects involving the informal sector in SWM. For example, in Malabon, the government provided push carts to the communities to enable them to collect recyclable materials (house-to-house) which became an alternative means of livelihood for the informal sector. At the same time, the sector helps in minimizing the volume of waste to be disposed at the disposal sites.

Involving the informal sector in waste recovery activities has been one of the objectives of some non-government organizations (NGOs) in Manila. Some NGOs collaborate with the government in organizing the informal sector for waste recovery.

Some municipal governments in Metro Manila engage the services of waste pickers to collect refuse from areas where streets are narrow and collection vehicles cannot pass, requiring the picker to bring the collected refuse to designated areas where it can be collected. In this way, more areas are covered for collection, benefiting a larger population, thus, making the service equitable.

The informal sector has substantial potential for SWM, especially in collection and materials recovery. The city and municipal governments in Metro Manila could usefully replicate what is being done in Malabon. Training on recycling and recovery may be provided to the informal sector to improve their skills.

Also, the government could be a source of information about the business of recycling and materials recovery to enable the informal sector to identify opportunities, and to effectively negotiate the price of their goods.

The government may organize the informal sector into co-operatives and later on develop a more formal franchise arrangement with them for refuse collection. In this way, the rights and

responsibilities of the informal sector collectors can be defined, enabling the government to monitor their performance. A successful example of this arrangement is demonstrated by the experience of Zabbaleens (traditional scavengers) in Cairo (Egypt). The government transformed Zabbaleens into a private company contractually responsible for collection, transport and recovery of waste (Chapter III). This successful partnership between the government and the community has also resulted in poverty reduction.

Community partnering is a fast evolving concept which has emerged from public participation. This concept establishes the link between community empowerment and poverty reduction. It involves the people on a continual basis in planning, implementing and sustaining of local environmental improvements, and with income generation, enterprise development and skills training.

Community arrangements may be more viable in the poorer settlements in Metro Manila. However, rights and responsibilities must be clearly specified and terms and conditions in the agreement must be properly and carefully drawn according to the consultations made with the community.

By formally involving the informal sector in the SWM system, not only environmental objectives are being carried out through waste minimization and pollution control, but social and economic objectives are also met. This might involve transforming elements of the informal sector into part of the formal system for SWM mainly by education, providing incentives and encouraging organization.

7.6 Conclusion

It appears that high efficiency and effectiveness result in arrangements where the government and the private sector both undertake refuse collection, especially in highly populated areas. This is supported by the fact that municipal governments in the ASEAN region which are pursuing efficiency in their operations are working increasingly with the private sector.

Effectiveness does not necessarily follow efficiency. Effectiveness results when objectives are adequately achieved by a programme. Effectiveness also implies that the interests of stakeholders are taken into account, with the general public among the stakeholders. Since the government is supposed to represent the people's interest, then its involvement in public service delivery, whether arranger or producer of service, should be maintained. Leaving service delivery solely in the hands of the private sector could have negative consequences because the private sector is concerned mostly with efficiency.

Total privatization of public service delivery of public good like solid waste management may have repercussions as far as both equity and effectiveness are concerned.

Equity considerations justify the involvement of the public sector in SWM particularly with respect to refuse collection and materials recycling and recovery. The public sector is not solely concerned with efficiency but also with how services are distributed among the citizens. Also, the government can be flexible in making adjustments, as demanded by circumstances, which can not be so in private management (for example, allowing the urban poor communities to collect and segregate waste in some collection or disposal areas for economic reasons).

The case studies show that the role of the public sector is shifting from being SWM producer to arranger. The significance of its role, being the arranger, does not in any way diminish. In fact, the need for performance monitoring and auditing increases. These are the areas in which the capacity of government agencies need to be developed to make the public-private partnerships work.

On top of this informal sector participation should be encouraged within the SWM system because of its potential for promoting the equity, economic and environmental objectives of government. Community partnering is an approach that needs to be explored by MMDA and LGUs.

Chapter VIII
CONCLUSIONS AND RECOMMENDATIONS

In the developing countries of the ASEAN region rapid urbanization, industrialization, and uncontrolled population growth place a strain on governments' capacities to provide solid waste management and other urban services. The question this thesis addresses is whether the organizational design and financial, administrative and technical resources fall short of requirements for planning and sustaining an effective solid waste management service.

This study has focused on the context of SWM, examining the institutional arrangements in Singapore, Bangkok, Petaling Jaya and Metro Manila. The following sections summarize the problems of SWM in Metro Manila and the findings from the case studies. Recommendations for strengthening existing institutional arrangements for SWM in Metro Manila are presented and areas for further research are identified.

8.1 Commentary

8.1.1 Obstacles to Effective Solid Waste Management in Metro Manila

Inadequate Institutions in SWM

Responsibilities for policy formulation, planning and implementation are diffused among different agencies. The Presidential Task Force on Solid Waste Management (PTFWM), which is an inter-agency body, is responsible for setting the policies on SWM for implementation nationwide. The Metropolitan Manila Development Authority (MMDA) is primarily concerned with the establishment, operation and maintenance of transfer and disposal facilities in Metro Manila and the formulation of policies on waste minimization. The Local Government Units (LGUs) are responsible for the collection of refuse in their respective jurisdictions. Indeed, interaction among them only happens during PTFWM meetings, which are not held often. Coordination among these agencies is weak and mostly initiated by the lead agency (DENR).

The PTFWM comprises national agencies with different sectoral mandates most of which are not related to SWM. This limits their commitment to aligning financial, logistical and manpower resources with the requirements of SWM. SWM is not a priority concern in their respective agencies.

The PTFWM's role in SWM is merely "advisory". While SWM policies are formulated and discussed at the national level, progress in implementation at the local level, particularly for refuse collection, is not regularly reported to the PTFWM. There seems to be no formal link between the PTFWM and the LGUs for reporting, so monitoring compliance is weak. As such, efforts are still fragmented and uncoordinated. The intention in creating the PTFWM, to consolidate and coordinate the efforts of the different participants in SWM, does not appear to have been achieved.

Given this background of limited coordination, it is difficult to gauge the success of the Integrated National Solid Waste Management System Framework (INSWMSF). As long as there are no established mechanisms of accountability among participants and no pressure on them to implement and enforce the policies, implementation of the INSWMSF will be constrained.

LGUs are generally found to be deficient in technical skills, manpower, financial and logistical resources for SWM. Most of them rely on assistance from MMDA and/or private contractors for refuse collection. Although private sector participation alleviated the burden placed on the LGUs when responsibilities of SWM were devolved to them, the benefits of private sector participation may not be realized because of the LGUs' limited ability to set the conditions that make private sector participation financially viable and environmentally acceptable (through the use of effective equipment) and to monitor performance. The LGUs appear to lack administrative and technical skills themselves to make SWM operate effectively and efficiently. Furthermore, the survey provides no evidence that the LGUs are planning for the enhancement of SWM service delivery, nor do capital investment and development seem to be priorities.

Non-government organizations (NGOs) and the informal sector undertake activities in SWM independent of the government. Some urban poor communities are already organized for recycling and materials recovery. Others perform materials recovery individually. The independent activity of the informal sector in SWM adds to the lack of integration of the whole system, and possibly precludes opportunities for more efficient and effective delivery of services

through partnership with the community. If the government provides a framework for informal sector participation in SWM, the participation and collaboration of the community would increase.

Poor Management Practices

Low salary, lack of benefits and incentives, and lack of security of tenure are among the most common human resource-related problems cited by the LGUs. Most LGUs do not have training and development programmes. As a consequence, SWM employees have low morale and do not have enough motivation to perform effectively and efficiently. Poor management practices, in terms of employees shirking away from their responsibilities during collection time (crews scavenging while on duty), and poor management of equipment and vehicles reflect the lack of incentives and training and continue to undermine the service. Poor equipment and vehicle maintenance and management may also reflect the relatively low priority accorded SWM by LGUs.

Inadequate Financial Resources

Since the LGUs depend on national government allocation, SWM services often suffer because of limited funds. The LGUs do not have the means to recover the costs incurred in SWM. The MMDA does not charge tipping fees for the use of the transfer and sanitary landfill facilities. However, the law requires the LGUs to contribute 5% of their gross revenues to MMDA for the use of the transfer and landfill facilities of the government.

The lack of cost recovery mechanisms makes it difficult for the LGUs to improve their performance in SWM as they depend heavily on the national government or foreign donors for funding and logistical support. Hence, if the economy is not performing well, the delivery of SWM services may be jeopardized by the limited budgetary commitment of the national government to the sector.

Cost recovery would enable government agencies to improve the service independently of the budgetary resources provided by the national government. Greater fiscal autonomy (in terms of deciding on how to generate and use funds) could have been given to the LGUs when SWM functions were devolved to them if the aims of devolution were to be achieved.

8.1.2 SWM in Singapore, Bangkok and Petaling Jaya

Most of the SWM services are produced by the government in the ASEAN case studies. In Petaling Jaya, Bangkok and Singapore, governments are both arranger and producer of SWM services. The relevant agencies in the three areas have mandates other than SWM. This means that SWM activities compete with other services for financial, manpower and logistical allocation.

Recognizing the heavy demand for SWM services, the governments in each case study have allowed the private sector to participate in producing these services. The Ministry of the Environment in Singapore (MOE), through licensing, allows private companies to collect refuse in areas where the government does not operate. The Petaling Jaya Municipal Government hired private contractors to undertake collection which supplements municipal collection. The Bangkok Metropolitan Authority (BMA) hires private contractors to operate, manage and maintain their transfer stations and sanitary landfills.

There is an increasing tendency to increase the role of the private sector in SWM. Various partnership schemes with the private sector are being considered (e.g.,franchising, concession,etc.) possibly because of the benefits they have realized in their private-public partnerships so far and because of the benefits reported by other governments or organizations worldwide.

The challenge faced by ASEAN governments is to harness partnership arrangements so that maximum benefits can be obtained by both the government and the private sector.

In Singapore and Petaling Jaya, refuse collection is undertaken by both the government and private sector. Licensing and contracting out are the arrangements adopted by the Ministry of Environment (Singapore) and the Petaling Jaya Municipal Government, respectively. Singapore achieved high effectiveness and efficiency with Petaling Jaya achieving a reasonable measure of efficiency.

Collection efficiency appeared lowest in Bangkok where government has sole responsibility. However, Bangkok apparently achieves higher effectiveness than Petaling Jaya.

Among the three case studies, only BMA (Bangkok) indicated any long-term planning process. The two other case studies indicated that some of their SWM services will be tendered to the private sector under franchising arrangement. Should the government and the private sector enter into a partnership scheme, both of them must be involved in long-term planning: the government (as arranger) formulating long term plans and the private sector (as producer) contributing to the conceptualization of the work programmes according to the plans and implementing them.

Information extracted from the survey was not sufficient to deal with the equity issues. However, if payment of user charges is used as a basis for determining whether or not an institutional arrangement is equitable, it appears that the Petaling Jaya arrangement is most equitable because SWM services are provided by the government regardless of capacity to pay. In principle, everybody avails of the services of the Petaling Jaya Municipal Council and its contractors free of charge.

8.1.3 Solid Waste Management Services and Institutional Arrangements in Metro Manila

Solid waste management in Metro Manila is generally regarded as a public service and therefore the responsibility of the government. No user charges are imposed. However, **collection** is sometimes regarded as a toll service. Some commercial and industrial companies use private contractors to collect of their wastes.

Transfer and disposal services are free of charge. Maintenance and operation of such facilities are funded by the national government and through local governments contribution.

Local governments mostly assume the roles of arranger and producer. The transfer of SWM functions to LGUs was not preceded by capacity building. As arranger, the local governments do not adequately monitor the performance of the private contractors. As producer of service, the LGUs' performance is generally poor because of the absence of appropriate incentives and sanctions. Due to financial constraints, LGUs are unable to sponsor training to improve their performance. Most rely on national, international, and non-government organizations-sponsored training which are not tailored to their specific needs.

There are three institutional arrangements for SWM operating in Metro Manila. The first involves the LGUs, the MMDA and the private contractors in collection. This arrangement usually operates in cities and municipalities with large populations. This arrangement is

associated with highly effective and efficient operations. This might be attributed to MMDA's technical skills, manpower and logistical resources combined with relevant LGUs' existing capacity. Private sector participation might have further enhanced the collection performance.

The survey also reveals that efficiency gains might have been realized due to economies of scale prevailing in cities with large population and high population densities.

Some LGUs working with MMDA and private collectors did not perform as well, indicating that local technical and administrative capacities also have a significant bearing on performance.

The second arrangement involves only government agencies--LGUs and MMDA-- in collection services. The survey reveals that performance of LGUs under this arrangement was generally poor, with this possibly attributable to the lack of incentives and benefits in the public sector.

The third arrangement involves the LGUs and private contractors in collection. Under this arrangement, the LGUs rely heavily on the private sector's manpower, skills and logistical resources. Performance under this arrangement also appears to be poor. Although the private sector may endeavor to compensate for any government shortfall in service, the inability of the government to effectively monitor the private sector may weaken overall performance. Compounding this problem is the lack of benefits and incentives in the government which may result in poor performance of LGU personnel.

The three arrangements appear to be equitable. Both the government and private sector can service even the poor settlements in Metro Manila as SWM service does not discriminate according to one's ability to pay.

8.1.4 Institutional Options on Solid Waste Management for Metro Manila

Government Provision of SWM Services

Purely government provision of SWM services may be less tenable in Metro Manila because of the limited capacity of the government to absorb a heavy demand for such services. Population continues to increase due to migration and urbanization while the government remains limited in its capacity to provide the financial, technical, manpower and logistical requirements of SWM.

Compounding this problem is the inflexibility of civil service policies regarding salary upgrading, job promotions, providing insurance and other related benefits, and hiring and firing of personnel.

Joint Public-Private SWM Service Delivery

As the role of governments increasingly evolves into arranger, rather than producer, of services, new technical and administrative skills have to be developed. Attracting private investments into service delivery while maximizing public benefits remains the challenge for government.

Contracting is the most common arrangement identified in the case studies. Through this, the private sector makes up for any shortfall in governments' capacity to provide SWM services. In this way, the private sector supplements rather than replaces public sector provision of services, as a source of manpower, technical skills, equipment and investment funds that the governments need to carry out their SWM functions.

In order to maximize the benefits of this arrangement, contracts need to be of sufficient length and scope, performance has to be adequately monitored, and that government agencies must have the administrative capability to ensure that these conditions can be met.

Contracting does not discriminate according to the consumers' ability to pay. Usually, contractors are paid through national revenues. Since the government is the arranger of the service, it can continue to pursue equity and public welfare in the design of services.

Franchising arrangements may in due course be viable for Metro Manila, especially in large commercial and industrial areas, but are hardly practical until the country has implemented user charges. There are equity issues yet to be resolved in this area.

Like franchising, licensing may be applicable in large commercial/industrial areas and wealthy villages in Metro Manila for refuse collection. It is unlikely that the general public and politicians will agree to replace contracting with licensing, however, because of associated equity issues.

But licensing may be a more practical arrangement for capital intensive projects, such as the construction, operation and maintenance of transfer stations, sanitary landfills, recycling plants, incineration facilities, and others through the BOT, BTO, and BOO schemes. As these projects

are capital intensive, the long-term contractual agreement should allow the private sector to depreciate investments and generate reasonable returns.

To maximize the benefits from these arrangements (BOT, BTO, and BOO), the licensing agreement document should clearly specify performance standards, methods of judging performance, penalties for delay or non-performance, risk assignment, insurance requirements, dispute resolution, standards for worker safety and health protection, and environmental protection standards.

Again, the government must have the technical and administrative capacity to be able to formulate an effective and workable licensing document and be able to enforce the compliance of the private sector with the terms and conditions of the agreement.

Community arrangements were not mentioned in any of the case studies. The potential of the informal sector for activities such as recycling and materials recovery has only been partially realized by NGOs (Medina, 1993). In Metro Manila, some LGUs and NGOs do already organize the informal sector for recycling and materials recovery. However, there is room for further training in these activities as well as in business management to encourage community groups to build up and sustain their recycling operations.

The government may enter into partnership with the informal sector (organized into cooperatives) through franchising. Formalizing their role in SWM may increase their drive to cooperate with the government in environmental improvement while earning a living. Community partnering will also establish the link between community empowerment and poverty reduction. People can be involved in planning, implementation and sustenance of local environmental improvements with income generation, enterprise development and skills training.

8.2 Conclusion

The existing institutional set-up in the SWM sector in Metro Manila appears to be generally inadequate. There is limited coordination among the agencies involved, both vertically and horizontally. Too many small multipurpose units generally lack the specified technical and managerial capacity to perform SWM functions effectively. There is a big variation in collection efficiency and effectiveness among LGUs. Consequently, while opportunities for economies of scale are available, they are not maximized. Shortcomings on the part of public arranger of SWM

services also limits the forward planning which the private sector can undertake for investment in the collection phase of SWM.

At the same time, sanitary landfills are nearing maximum capacity while negotiations for disposal alternatives are only progressing slowly. It is difficult for the PTFWM to determine sites in the face of public resistance (NIMBY attitudes). The potential for the informal sector to contribute to SWM by recycling and materials recovery is far from maximized.

Because the existing system appears to be incapable of eliminating the impediments for effective solid waste management, despite the existence of technical solutions to most SWM problems, institutional reform emerges as a critical first step in addressing these problems. Some options are suggested below:

1. **"Do Nothing" or Status Quo.** Under this option the existing institutional arrangements remain but with potential for improved coordination and accountability. It can be assumed, for example, that LGUs and the national government would commit more resources for SWM programmes and activities and training of personnel in the technical, operational and managerial aspects of SWM, as waste management problems intensify. The roles and responsibilities of each participant-agency in SWM could be clarified. Accountability mechanisms and systems of reporting could be established and enforced among existing institutions (between PTFWM and LGUs; PTFWM and MMDA; LGUs and MMDA) to ensure that roles and responsibilities are carried out according to the intents of the INSWMSF.

2. **Individual LGUs to be given collection, recycling, transfer and disposal responsibilities and fiscal autonomy in revenue generation.** This option allows each LGU to provide all services in SWM--collection, recycling, transfer and disposal-- in its their respective jurisdiction and grants the power and autonomy to make decisions in revenue generation for SWM. This arrangement eliminates problems of coordination. Each LGU would have the right to enter into various partnership schemes with the private sector or community organizations that are deemed cost-efficient/cost-effective. Each LGU would take charge of identifying and operating its own disposal site and establishing complementary facilities in its own area. Under this arrangement, transparency and accountability to constituents are critical in order to prevent mismanagement and corruption. It could be expected that very variable

standards of SWM would be evident among LGUs. Small units could have particular difficulties.

3. **Creation of SWM Commissions among LGUs.** This would see all SWM services devolved, as in option 2, but LGUs cooperating to achieve economies of scale and scope. It would involve creation of a commission or commissions, composed of representatives from different LGUs (whose areal jurisdictions are contiguous with one another) that agree to undertake joint collection, recycling, transfer, and disposal operations in Metro Manila. Opportunities for economies of scale in SWM operations would be maximized. A Commission would have a Board of Directors who are mostly officials in their own cities or municipalities. The costs of SWM services would be shared among LGUs. The Board would agree on how the services would be financed, whether through user charging or individual city/municipality contribution. The amount of the user charge or contribution would be determined by the Board. It would also have the right to enter into agreement with private companies that would service the member-cities and municipalities. Terms and conditions in the contracts would be agreed upon by members of the Board. Monitoring and performance auditing would also be the Board's task. The Commission would also be responsible for locating sites for recycling, transfer and disposal operations. Public information, education, and enforcement would be jointly undertaken. Members would undergo joint training and hold regular meetings for sharing knowledge and skills in SWM. Since this arrangement encourages pooling of resources for SWM and sharing of technical and managerial capabilities among LGUs, savings may be realized by member LGUs that can be used for their continued capacity building, without a return to a centralized system.

4. **Creation of a Single-Purpose Metro Solid Waste Authority.** A metropolitan-wide authority may be appropriate to assume all the responsibilities in SWM (collection, recycling and recovery, transfer and disposal) because of the scope of its jurisdiction. Under this option the Authority would be responsible for providing SWM services to all the cities and municipalities, procure all equipment, hire personnel and enter into contractual agreements with private companies. This arrangement can maximize opportunities for economies of scale since only one authority enters into contractual agreements with the private companies for the servicing of all cities and municipalities. It should enable the metropolitan authority to pursue arrangements that are cost-efficient and cost-effective, by encouraging competition to provide services among private sector suppliers.

The option might also be most appropriate if there is a commitment to a high level of direct user charges. This would decentralize decision-making to generators of waste. The Authority may be assisted by a council composed of representatives from the 17 LGUs in Metro Manila in overseeing SWM operations to ensure that services are delivered according to agreed standards. Equity could be protected by the Authority purchasing a basic level of services throughout Metro Manila, for which it might charge each LGU. This option is unlikely to be favoured because it reflects a recentralization of resources and responsibilities.

Each of these institutional option would require new capacities for government agencies, although where those capacities would be located varies among them. They include competence in the development, negotiation, management, monitoring, and enforcement of public-private sector agreements.

Option 3 may represent the best strategic direction as it maintains movement towards devolution of infrastructure management to the community while offering the prospects of building managerial and operational competence and achieving economies of scale. It could create an environment in which specialized public SWM agencies were able to work closely with the community and respond to local conditions; develop the skills and capacity to work with, monitor, and manage private sector contractors; and build good working relationships with the informal sector and NGOs. They would have sufficient political influence and independent of local pressures to resolve landfill siting problems.

Should the "Do-Nothing" option be pursued, substantial improvement to existing institutional arrangements are justified in any case. These are discussed below.

- There is a need for government agencies in SWM to implement training and capacity building. Government agencies need to undergo training on the formulation of tender and contract documents. Also, government must develop its capacity for performance monitoring. Technical training must be conducted to improve the skills of the personnel in the technical aspects of collection, recycling and materials recovery, and transfer and disposal operations. Exposing government personnel to different technologies in SWM would enable them to make sound decisions with regard to the choice of technology suitable to their own local need. The role of international organizations in the conduct of these trainings is critical. International organizations like the World Bank, USAID and others have expertise in these matters and may be tapped for assistance.

- Mechanisms for accountability should be established for the whole system of SWM. Reporting systems must be devised between the Local Governments and the PTFWM. Local government plans and projects on SWM must be reported to the PTFWM; the Task Force must be informed about LGUs concerns in SWM not only to ensure compliance by LGUs with the INSWMSF but also to determine possible areas of cooperation between LGUs and national agencies.

- Public consultation should be undertaken by the local governments as SWM projects are proposed. Information and education campaign about solid waste management has to be undertaken on a continuous basis.

- The imposition of tipping fee at the unloading point (transfer stations and sanitary landfills) should be pursued to ensure the sustainable operation and management of SWM facilities.

- Environmental laws and ordinances must be strictly enforced by the government to safeguard against clandestine dumping of wastes into vacant lots, rivers and other water bodies. Budgetary resources must be committed for this purpose.

8.3 Areas for Further Research

This research has identified and assessed only five institutional arrangements for solid waste management for Metro Manila. Other arrangements may be worth examining such as provision of SWM services by corporatized (SOE) metropolitan or local authority. Other countries like the U.S.A., New Zealand, Indonesia may contribute success stories in their adoption of this arrangement. While it is presumed that the survey of arrangements outlined earlier is a necessary first step, none of those arrangements preclude moving towards corporatization in the long term. A survey may be conducted to determine its strength and applicability in the Philippines.

A totally privatized SWM provision and production may also be studied and assessed to determine the possible impact of totally privatizing solid waste management in the Philippines.

The current survey only included government agencies involved in SWM service delivery. The perspectives and capacities of private contractors or licensees need to be considered prior to

pursuing any one of the options outlined above. Any such analysis would consider how public-private partnerships would contribute to a particular institutional arrangement.

Cost-efficiency/cost effectiveness analysis for the existing and proposed arrangements may also be undertaken. Findings in this thesis may be extended and tested in other case studies.

A detailed study on the viability of community partnership arrangements also justifies research in its own right. The extent, level and the manner of informal participation in SWM is worth looking into for the purpose of strengthening government and community partnerships in the near future.

Further work also needs to be undertaken to assess the impacts on equity of the different institutional arrangements proposed. As part of this, a study on user charging should be undertaken to determine the manner, extent, and implications of its applicability in the Philippine context. Willingness-to-pay surveys may also be conducted as part of such a study.

The present thesis has provided an institutional framework for addressing the future of solid waste management in Metro Manila within which investigation into the operational detail and distributional consequences of alternative arrangements might now be usefully considered.

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APPENDIX I

6 August 1996

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_____
Wellington

Dear ***(Ambassador/High Commissioner):***

With reference to my letter of 30 July 1996, I would like to thank you for your assistance in the finalization of my questionnaire which I will be sending to the appropriate organization in your country, and for helping me identify the organization. As I mentioned in my previous letter, I am presently conducting research into different institutional options for solid waste management, with particular reference to Metro Manila. To place this in context, and to make it of value to other ASEAN nations, I also wish to examine current institutional arrangements for solid waste management in other countries, namely, Malaysia, Thailand, Indonesia, and Singapore. I hope to demonstrate the similarities and differences among them. This will enable me to evaluate options which might be appropriate for Metro Manila. It should also enable me to reach general conclusions on waste management arrangement of value to other cities facing similar problems in the ASEAN region.

Due to financial constraints, I am unable to go to the said countries to conduct the survey. For this reason I have prepared questionnaires to be sent to the relevant organizations and agencies in those countries.

I would be grateful for assistance from your embassy in the conduct of my research. May I request you to endorse my research to the ***(relevant agency in such country)*** and assist in the follow up and retrieval of the questionnaire? This is to help ensure that the questionnaire will be answered to a satisfactory standard within the required timeframe. Enclosed is a letter to the ***(Head of Agency)*** with the questionnaire.

Through the assistance of your embassy, I am confident that my research will be completed on schedule and will make a worthwhile contribution on an important issue for our region.

Thank you and best regards.

Very truly yours,

CONSOLACION P. BERGONIA
Masterate Student
Resource and Environmental Planning Department
Massey University

6 August 1996

_____
_____
_____
_____

Dear ***(Head of Agency):***

I am Consolacion P. Bergonia, a postgraduate student at Massey University in Palmerston North, New Zealand, pursuing a masteral degree in Resource and Environmental Planning. At present, I am conducting research into different institutional options for solid waste management, with particular reference to Metro Manila. To place this in context, and to make it of value to other ASEAN nations, I also wish to examine current institutional arrangements for solid waste management in other countries, namely, Malaysia, Thailand, Indonesia, and Singapore. I hope to demonstrate the similarities and differences among them. This will enable me to evaluate options which might be appropriate for Metro Manila. It should also enable me to reach general conclusions on waste management arrangement of value to other cities facing similar problems in the ASEAN region. I have prepared a questionnaire which identifies the information I would be needing in my study.

Due to financial constraints, I am unable to your country to conduct the research. I sought assistance from ***(relevant embassy)*** in Wellington, New Zealand, and I was advised to refer my inquiry to your Department. Please find enclosed the **questionnaire for your response**.

Considering the limited time I have to complete my research, may I request you to have my questionnaire answered and ready for retrieval from your agency **on or before 24 September 1996**?

Should you have inquiries regarding the survey, my contact address is: 71-A Albert St., Palmerston North, New Zealand. My telephone and fax number is (0064)(6) 358-5478. My supervisor, who is also the Department Head of Resource and Environmental Planning at Massey University, Dr. Philip McDermott, would also welcome any further inquiry you might have regarding this research. The Department's address is: Resource and Environmental Planning Department, Massey University, Private Bag 11222 Palmerston North, New Zealand. The telephone and fax numbers are (0064) (6) 350-4342 and (0064)(6) 350-5689, respectively.

I have enclosed two copies of the questionnaire. You may care to keep a copy of your answers for your future reference.

Thank you very much for your invaluable assistance to my research.

Best regards.

Very truly yours,

CONSOLACION P. BERGONIA

No. ____

SURVEY ON SOLID WASTE MANAGEMENT IN MAJOR METROPOLITAN AREAS

This survey will provide information for a research project looking at one of the most serious problems facing large metropolitan areas in the ASEAN region, collecting and disposing of solid waste. This is a serious issue because of the financial costs of organising and undertaking effective solid waste collection and the health and environmental costs of failing to do so. The research will help identify how we can manage solid waste collection and disposal better. Your cooperation through completing and returning this qustionnaire is appreciated.

All information provided will be kept confidential. Results will be aggregated with returns from other metropolitan areas to compare practices and trends.

Ms Consolacion P. Bergonia
Department of Resource and Environmental Planning
Massey University
Private Bag 11-222, Palmerston North,, New Zealand
Telephone No.: (0064) (6)350-4342
Fax No.: (0064) (6)350-5689
E-mail Address: C.P.Bergonia@massey.ac.nz

1. Organization

1a Please describe the structure of your organization in the space below, with emphasis on your solid waste management function. Please provide an organizational chart.

1b What is the nature of your organization?

	Tick One
Purely Government	
Quasi-Government/State-Owned Enterprise	

2. Collection

Number:

2a. How many service areas is the city divided into for waste collection purposes? [ ]

2b How many organizations undertake collection? [ ]

Tick One:

2c. Does your organization undertake waste collection? Yes [ ] No [ ]

Tonnes:

2c If yes, how much waste did you collect in 1995 [ ]

2d. Based on your 1995 collection, how much waste was collected per day, by source? (Please estimate the quantity in tons *or* percentage share in the following table.

Source of Wastes	Tonnes/Day	*or,* Share of Total(%)
Residential		
Market		
Commercial		
Industrial		
Construction & Demolition		
Street Waste		
Institutional Waste (Hospitals, etc.)		
Other Wastes *Please specify:*		
Total		100%

2e In 1995 what percentage of the total waste generated in your service area did you

(1) Target for collection _____ %

(2) Actually collect _____ %

2f If there are other organizations undertaking waste collection in the city, please identify them in the table below. Please indicate their individual service areas, and the population each serves.

Please indicate, also, the nature of each organization and the mode of service arrangement according to the following classification:

(1) *Nature of Organization*: **Purely Government, Quasi-Government, Private Organization.**

(2) *Service Arrangement*: **Under Contract, Under Franchise, Under License, Build-Operate-Transfer(BOT), Build-Operate-Own (BOO), Voluntary Service, Self-Help/Community-Based.**

Name of Organization	Service Area		Nature of Organization (1)	Service Arrangement (Note 2, above)
	Location	Population		

2g ***Please provide a map of the waste service areas within the city, if you have one.***

3. Transfer Stations

Number:

3a How many transfer stations are operational within the metropolitan area? [ ]

3b In the table below, please indicate who operates the transfer stations the nature of these organizations, and the service arrangement (for organizations other than the municipal authority) according to the classification below . Please include your organization if it operates transfer stations

(1) *Nature of Organization* **Purely Government, Quasi-Government, Private Organization**
(2) *Service Arrangement* **Under Contract, Under Franchise, Under License, Build-Operate-Transfer (BOT), Build-Operate- Own (BOO), Voluntary Service, Self-Help/Community-Based, Not Applicable.**

Name of Organization	Nature of Organization (1)	Service Agreement (2, above)

Tick One

3d. Are there plans to increase the capacity of the transfer station? Yes [ ] No [ ]

4 Sanitary Landfills

4a In the table below, please indicate how many sanitary landfills currently service the needs of the metropolitan area. Please indicate the nature of these organizations, and the service arrangements (for organizations other than the municipal authority) according to the classification below . Please include your organization if it operates sanitary landfills.

(1) *Nature of Organization* **Purely GovernmenT, Quasi-Government, Private Organization**
(2) *Service Arrangement* **Under Contract, Under Franchise, Under License, Build-Operate-Transfer (BOT), Build-Operate- Own (BOO), Voluntary Service, Self-Help/Community-Based, Not Applicable.**

Name of Organization	Nature of Organization (1)	Service Agreement (2, above)

4b In the table below, please indicate where the sanitary landfills are located, their capacities, and the city or catchment areas each serves.

Sanitary Landfill (Location)	Daily Volume Accepted (Tons/day)	Remaining Capacity (Tons)	Areas Serviced		
			Place	Area (sq. miles)	Population

5 Human Resources

5a In the table below, please indicate how many people are employed in the waste management function (collection, transfer, and landfill) in your organization?

Unit or Section	Number of Employees
Administration	
Planning	
Budget, Finance & Accounting	
Technical Service (not operations)	
Waste Management Operations: Collection	
Transfer	
Landfill	
Other in waste management , *please specify:*	
TOTAL	

5b Please indicate any human resource problems you experience in solid waste management:

		Tick Boxes Yes	No
Lack of manpower in waste collection	..		
Lack of skills in waste management	..		
Inefficiency (E.g., from out-of-date work practices)	..		
Lack of incentives for better performance	..		
Lack of adequate equipment	..		
Other	..		

5c For "other" or serious human resource problems, please briefly outline their nature in the space below

5d Training:

	Number
How many waste management staff attended training courses in 1995?	
How much was spent on staff training in 1995?	

6 Future Plans

6a Do you plan any significant changes to the structure or management of your waste management organisation in the next three years?

Yes	
No	

6b If yes, please briefly explain anticipated changes in the space below:

7 Funding of Solid Waste Management

7a What is the total cost of operation your solid waste management operations? _____

7b Please indicate in the table below how your solid waste management operation is funded. Please distinguish between capital and operating expenses and answer with reference to the 1995 fiscal year. (The amount may be expressed in terms of percentage shares of total funding).

Source of Funding	**Category % of Total**	
	Capital	**Operating**
Revenue: (a) User fees/charges (b) Retained revenue (c) Other, *please specify*:		
Taxes		
Loans		
Equity contribution (for example, if B.O.T) *Please indicate sources:*		
Grants *Please indicate sources:*		
TOTAL	100%	100%

8 User Charges

8a Who sets the charges to users? _____

8b Does the rate vary according to the following characteristics?

	Tick Boxes	
	Yes	No
Type of Community		
Type of Waste		
Volume of Waste		
Other, please specify		

8b If you answered yes to any of the above, please explain the basis for varying charges in the space below.

9 Capital Investment

9a In the table below, please estimate the 1995 values (in your own currency) of your buildings and capital plant and equipment committed to solid waste management according to the categories listed.

Category	Depreciated Value	Estimated Value
Buildings		
Trucks		
Light Vehicles		
Forklifts		
Earth Moving Equipment		
Compactors		
Other, please specify:		
TOTAL		

9b Do you have a long term investment plan?

	Tick Boxes Yes	No
For Five Years?		
For Ten Years		
Other Period, please specify...		

9c How much do you expect to spend on plant and equipment over the next five years _____

Can you provide copies of your annual report for each of the last three years (1993, 1994, 1995)?

Can you also provide the name of a contact to whom I can supply a summary of my findings

Thank Your Very Much For Your Assistance
Consolacion P. Bergonia

APPENDIX II

Philippine Development Plans From 1974-1992

Development Plan	Objectives	Development Strategy	Environmental Management Concerns
A. 1974-1977	1. maximum utilization of the labor force 2. feasible maximum economic growth 3. more equitable distribution of income and wealth 4. regional development and industrialization 5. promotion of social development 6. maintenance of an acceptable level of prices and balance of payment	1. Raising rural incomes and achieving self-sufficiency in food production through food production and land reform programs complemented by the development of cooperatives and infrastructure, particularly irrigation and feeder roads in the rural areas 2. Promotion of employment opportunities through the encouragement of labor-intensive methods of production, the expansion of manufactured exports, the strengthening of industrial linkages and intensified efforts at regional development 3. Infrastructure development	1. Forest resource conservation
B. 1978-1982	7. promotion of social development and social justice 8. attainment of self-sufficiency in food and greater self-reliance in energy 9. attainment of a high and sustained economic growth 10. maintenance of an acceptable level and improvement in domestic source mobilization and balance of payments position 11. increased development lagging regions especially rural areas 12. improvement of habitat through development of human settlements and proper management of the environment 13. maintenance of internal security	4. Attainment of a dynamic and balanced economy particularly through increased agricultural and industrial production trade diversification and rationalization, transformation of the energy structure, application of science and technology and proper management of natural resources and environment 5. More equitable access to social development opportunities and fuller utilization of human resource in nation building	2. Setting up of development controls within important resources areas such as coastal zones, selected mineral lands, tourism areas, flood plains, fault zones, prime agricultural lands, watersheds, national parks, volcano zones and areas within a 1-kilometer radius of infrastructure and 5-kilometers around airports 3. Intensified enforcement of the rules and regulations of the Pollution Control Law 4. Industrial pollution requiring each polluter to install adequate treatment facilities 5. Introduction of the Environmental Impact Assessment (EIA) system wherein conduct of an EIA for proposed industrial development projects is required.

Development Plan	Objectives	Development Strategy	Environmental Management Concerns
C. 1983-1987	1. increased productivity to sustain economic growth 2. more equitable distribution of income 3. development of natural resources	Same strategy as in the Five-Year Development Plan, 1983-1987 In addition, a Five-Point Program that includes: 1. loan restructuring program 2. economic stabilization program 3. refocusing of economic priorities 4. expansion and strengthening of the structural adjustment program 5. program to sustain the achievement of social objectives	1. Establishment of air quality and noise standards and the requirement for smoke-belching vehicles and factories that emit odors, create excessive noise and discharge particulate into the atmosphere to install anti-pollution devices 2. Government regulation of the importation, production, utilization, storage and distribution of hazardous, toxic and other substances and the disposal and dumping of untreated wastewater, mine tailings and other pollutants. 3. Integration of EIA procedures in planning the development of mineral and energy resources and the institution of EIS in all project planning activities 4. Called for accelerating the land survey program and the continuation of the country' s forest resources inventory 5. Recommended ecological mapping to generate baseline information on resources and to produce land-use decision maps to be used in classifying lands according to their best uses

Development Plan	Objectives	Development Strategy	Environmental Management Concerns
D. 1987-1992	1. alleviation of poverty 2. generation of employment 3. promotion of equity and justice 4. attainment of sustainable growth	1. Short-term strategy of stimulating recovery by inducing demand through increased income especially in the rural areas 2. In the medium-term, an employment-oriented, rural-based development strategy that seeks to develop agriculture by removing the policy biases against the sector as well as institutional and structural impediments to its development and by adopting a public investment program supportive of employment in the rural areas	1. Give stress to the importance of research on and development of appropriate, more efficient and cost-effective processes and technologies to control pollution 2. Mandated the full coverage of EIA to all development projects 3. Decentralization of EIA System 4. Called for the establishment of a resource and environmental information system network to serve the requirements of environmental and resource policy formulation planning and programming at all levels - this involved institutionalization of integrated resource and environmental surveys, monitoring and assessment, including the regular acquisition of satellite imageries, the periodic coverage of the country by low altitude aerial photography, and the updating of image processing systems, among others 5. Emphasized the strengthening of environmental scanning capabilities, enhancement of the information base through the conduct of a National Mapping and Survey Program and the development of local capability in the application of modern integrated information technology 6. Encouraged participatory approach to development planning by calling for the participation of citizens, especially the affected ones, not only in environmental rehabilitation but in the project decision-making process, and in the monitoring, evaluation, and implementation of environmental programs

APPENDIX III

Philippines Laws, Codes, and Decrees Relevant to Solid Waste Management

***Presidential Decree No. 825* ("Anti Littering Act")**

This is an anti-garbage dumping law which imposes penalty on any person, public and private institution and establishment improperly disposing of garbage, filth and other waste matters. All garbage and other waste matters shall be placed in the proper receptacles for disposition by garbage collectors.

The law provides that the Department of Public works and Highways (DPWH) with the assistance of the LGU officials shall supervise the implementation of this decree.

Presidential Decree No. 856 ("Code of Sanitation")

P.D. No. 856 prescribes sanitation requirements for food establishments and the refuse collection and disposal systems in cities and municipalities. The law provides that for industrial establishments, sewage disposal shall be by means of a municipal or city sewerage system whenever possible. If no municipal sewerage system exists, it shall be collected, stored, or disposed of in a manner to prevent health hazards, nuisances, and pollution.

For refuse disposal, the law provides that the cities and municipalities shall provide an adequate and efficient system of collecting, transporting, and disposing refuse in their areas of jurisdiction. Refuse shall be disposed through a municipal collection service. If this service is not available, disposal shall be by incineration, burying, sanitary landfill or any method approved by the local health authority.

***Presidential Decree No. 1152* (Environment Act)**

This is the "Philippine Environment Code" which:

- states the purposes of waste management;
- mandates the establishment of waste management programs in all provinces, cities and municipalities; states the responsibility of Local Governments in waste management;
- specifies the legally acceptable methods of waste disposal;
- allows the local government, including private individuals, corporations and organizations to operate one or more sanitary landfills consistent with the other provisions of this code and other existing laws; and
- provides prescriptions in the location of disposal sites; among others.

Presidential Decree No. 1586 ("Environmental Impact Assessment System")

This law requires the preparation of an Environmental Impact Statement for environmentally critical projects. The law also requires that the proponents of environmentally critical projects or non-critical projects proposed to be located in environmentally critical areas to secure an Environmental Compliance Certificate (ECC) from the Department of Environment and Natural Resources before they implement their projects.

Presidential Decree No. 1160

This law empowers the local village leaders (Barangay Captains) to enforce environmental and pollution control laws.

Republic Act No. 7160 (The Local Government Code)

This law devolves the responsibility for the formulation of solid waste disposal system or the environment management system and services or facilities related to general hygiene and sanitation to the Local Government Units (LGUs) as part of the basic services and facilities which LGUs shall deliver. The code also provides that the local legislative assemblies shall provide for an efficient collection and disposal system and prohibit littering, throwing of garbage, refuse or filth.

Republic Act No. 7718 (The Amended BOT Law)

This law sets the framework in encouraging the private sector to participate in the delivery of infrastructure services, which includes solid waste management services. The Build-Operate-Transfer (BOT) mechanism.

APPENDIX IV

The Integrated National Solid Waste Management System Framework

On 19 October 1993, the Integrated National Solid Waste Management System Framework (INSWMSF) was approved and adopted. The following outlines the relevant points contained in the INSWMSF with respect to Metro Manila:

Proposed Framework Plan for Metro Manila

- LGUs must adopt zero waste program at source.
- LGUs must be responsible for the collection of their own garbage and for generating funds for solid waste management.
- The Department of Health (DOH) must come up with a viable and sanitary system for hospital waste management.
- The overall garbage disposal system in Metro Manila should be maintained at the Metropolitan level.

Specific Objectives

- Reduction/minimization of wastes generated by source.
- Improvement of collection efficiency for all sources of solid waste.
- Improved efficiency and effectiveness of transfer and transport system from source to processing or final disposal sites.
- Reduce volume of solid waste to extend serviceability of final disposal sites.
- Implement a safe and environmentally acceptable way of disposing wastes collected from source.

Strategies

Generation

- Mobilization of community barangay /barangay units in recovery centres

- Mobilization of NGOs/POs who have experience and expertise on organisation of communities and blank networks
- Enactment of laws/ordinances and segregation of wastes at source
- Massive information and dissemination campaign/programme

Collection

- Establishment of a regular and systematic collection system in each barangay per municipality by local government units
- Revision and amendment of current pricing and contract systems for collection of waste in all municipalities
- Enforcement of ordinances, rules, and regulations relating to effective collection system

Processing and Recovery

- Review and assess existing technologies which can possibly be adapted to include but not limited to the following in their combination thereof: Incineration, Composting, Recycling, Conversion
- Establish guidelines for selection of technologies that will be adapted for recovery and processing

Disposal

- Continues efficient operation of existing sanitary landfill sites to serve as "field laboratories" on safe disposal of wastes
- Conduct appropriate activities leading towards development of appropriate guidelines on disposal of wastes
  Mobilisation of multi-sectoral concerns on information/education activities

APPENDIX V

Functions and Responsibilities of Each Member-Agency in the PTFWM

The Department of Environment and Natural Resources (DENR)

The DENR's mandate states inter alia:

"...the Department shall be the primary responsible for the conservation, management, development and proper use of the country's environment and natural resources..."

The DENR has 14 Regional Offices, 73 Provincial Environment and Natural Resources Offices (PENRO) and 173 Community Environment and Natural Resources Offices (CENRO). To provide better access to its rural and upland clientele and beneficiaries, many powers and authorities have been delegated to the aforesaid field offices. About 85% of DENR's manpower are in the field offices.

The DENR has 6 staff bureaus which are primarily concerned with planning and policy formulation for each sectoral concern. These are: Forest Management Bureau (FMB); Mines and Geo-Sciences Bureau (MGB); Land Management Bureau (LMB); Protected Areas and Wildlife Bureau (PAWB); Ecosystems Research and Development Bureau (ERDB); and Environmental Management Bureau (EMB).

The EMB advises the Secretary on matters related to environmental management, conservation and pollution control and acts as the Secretariat of the Pollution Adjudication Board (PAB).

The DENR's specific functions under the PTFWM are the following:

- Assume the overall supervision in the formulation of policies to ensure full implementation of the Integrated National Solid Waste Management Framework by the concerned agencies; Provide direction and guidance for the compliance of directives and responsibilities by the implementing agencies;
- Ensure close co-ordination between and among the member-agencies;
- Facilitate the development of disposal sites and implementation of waste management programs/projects taking into consideration the appropriate environmental management and protection measures;
- Provide technical assistance to the local government units in the formulation and implementation of their respective waste management plans; and
- Prepare research working plans on waste decomposition

The Department of Public Works and Highway (DPWH)

The DPWH is the main implementing arm of the government in respect of infrastructure and public buildings. The Department is represented in the PTFWM by the Assistant Secretary for Planning, and to some extent, is a measure of the importance the department gives to the SWM.

The DPWH has been involved in the Metro Manila Solid Waste Management Program since 1987. Through its Bureau of Design (Hydraulic Division), and National Capital Region (NCR) office, it was directly responsible for the design and construction of pilot sanitary landfill sites in San Mateo (15

hectares) and Carmona (10 hectares) and for the supervision of Proconsult, Inc. in the design of the Las Pinas and Manggahan Transfer Stations and Test Consultants, Inc. in the design of the remaining portions of the San Mateo and Carmona sanitary landfill sites.

Implementation of the Metro Manila Projects has been carried out by contracts, supervised by the solid Waste Management Project, Project Management Office (SWMP-PMO), specially created for the NCR office of the DPWH.

The Hydraulics Division (Bureau of Design) has an establishment of 20 permanent officers. The SWMP-PMO has an establishment of 3 permanent staff and 47 contractual positions, though in April 1994 only 17 positions were filled.

Specific functions of DPWH are:

- the development of the design and estimation of cost of the proposed disposal sites;
- co-ordination and supervision of all activities related to infrastructure development currently implemented and proposed;
- provision of all the infrastructure and construction requirements for all programs and projects;
- the subjection of all technical plans and designs of all projects to be implemented to technical review; and
- ensuring that solid waste management will be among its top priority activities.

The Department of Health (DOH)

DOH impacts on SWM through the Inter-Agency Committee on Environmental Health. This Committee was established by Executive Order No. 498 signed on 22 November 1991 and required inter alia to formulate policies, promulgate guidelines and develop programs for environmental health protection.

The Committee is assisted by a Secretariat headed by the Director of the Environmental Health Services (EHS), Office for Public Health.

The DOH's functions under the PTFWM are the following:

- implement the guidelines on bio-medical waste management and operationalize the waste management plan for all medical centres/hospitals;
- create public awareness on the cause and effect of solid waste pollution and its hazards to human health; and
- formulate monitoring plan on the health impacts by waste management projects.

The Department of Trade and Industry (DTI)

The direction and control of waste management in DTI have not been given much priority in the past. The emphasis has been on attracting industry through incentive programs and implicitly, waste treatment regulation has been considered to be something of a disincentive though the Department has always held a concern for the environment and acknowledged the process of obtaining Environmental Compliance Certificates (ECC).

Administrative Order No. 90 and supporting memorandum, explicitly addressed to the Secretary of Trade and Industry (among others), have prompted a formal response. DTI has been given the task of:

- preparing guidelines on industrial waste management; and
- including SWM projects in the Investment Priorities Plan.

National Economic and Development Authority (NEDA)

NEDA consists of the NEDA Board and NEDA Secretariat. The powers and functions of NEDA reside in the NEDA Board. It is the country's highest social and economic development planning and policy co-ordinating body. The Board is chaired by the President and has many of the government secretaries as members.

Assisting the NEDA Board in the performance of its functions are five cabinet level inter-agency committees. These are:

- Development Budget Co-ordination Committee,
- Infrastructure Committee,
- Investment Co-ordination Committee,
- Social Development committee, and
- Committee on Tariff and related matters.

The NEDA Secretariat is headed by a Director-General assisted by three Deputy Director-Generals, each of whom is responsible for one of the principal offices of NEDA, i.e., the National Development Office, the Regional Development Office and Central Support Office.

The division representing NEDA on the PTFWM is the Water Resources Division of the Infrastructure Staff Bureau. This Bureau

- provides technical staff support in co-ordinating the formulation of physical plans for the transportation, communications, water, power and energy and social infrastructure sectors;
- evaluates and conducts studies on policies in the said sectors;
- provides technical support in the evaluation and review of proposed programs and projects in the said sectors;
- provides technical assistance in program and project identification, development and evaluation; and monitors sectoral performance.

NEDA, under the PTFWM, is in charge of obtaining endorsement from the Task Force for submitted program/project proposals on waste management. It ensures that solid waste management activities are a legitimate land use in the National Framework for Land Use. It also assists in prospecting for possible technical and financial assistance through local or foreign grant.

Department of Interior and Local Government (DILG)

The national government department responsible for overall supervision of local governments is the DILG and as such, it aims to assist in the process of government. The bill creating the DILG was enacted on 13 December 1990, by bringing the Philippine National Police (PNP) under the responsibility of the then Department of Local Government (DLG). Despite the merger, the departmental organization of the local government side of the department's operations remains basically unchanged.

The organizational set-up for the local government side of operations, is based on Executive Order No. 262, " The Reorganization of the Department of Local government and for other purposes", dated 25 July 1987. This structure is geared towards:

- providing general supervision of local governments,
- promoting local autonomy, and
- encouraging community participation in local government.

The line offices which have a role in project development and implementation and in local government training are:

-Planning Service which provides planning, programming research and statistics.

-Bureau of Local Government Development (BLGD) which functions to:

- establish and prescribe plans, policies, programs and standards to strengthen the administrative (A), fiscal (F), and technical (T) capabilities of local government;
- formulate, prescribe, monitor and periodically evaluate the local development policies, plans, programs and projects;
- establish a system of incentives and grants to local government and prescribe policies, procedures and guidelines on the implementations of self-help projects; and
- formulate and develop models, standards and technical materials on local government development; other functions.

-Office of Project Development Services (OPDS) which functions to:

- formulate innovative approaches and strategies designed to promote the technical capabilities of local government;
- assist in the development of program components for the implementation of tested and appropriate systems and processes at the local level.

-Bureau of Local Government Supervision (BLGS) which is primarily concerned with the monitoring of local government performance and of their compliance with national laws. It also provides assistance and secretariat services to the leagues of provinces, cities and municipalities.

-Local Government Academy (LGA) which is primarily responsible for training local government officials and human resource development of the local government sector of DILG.

The functions of the DILG under the PTFWM are as follows:

- Co-ordination with all local government units for the efficient implementation of solid waste management system pursuant to the Integrated National Solid Waste Management Systems Framework;
- Encouraging co-operation among local government in establishing areawide waste disposal systems;
- Assistance in the identification of potential disposal sites within the territorial jurisdiction of the local government units;

- Pushing for the adoption of waste reduction, reuse, recycling and composting by its own offices and constituents; and
- Ensuring the strict implementation of Presidential Decree No. 825 and municipal ordinances on garbage with appropriate monitoring of enforcement.

Department of Education, Culture and Sports (DECS)

The DECS, being a new member of the Task Force is tasked to integrate waste management system in the school curricula to increase awareness and understanding. It also ensures the adoption of waste reduction, reuse, recycling and composting by its own offices and constituents.

Philippine Information Agency (PIA)

The PIA is tasked to develop a Communication Plan to inform and educate the general public on proper waste management and the adoption of the 3Rs and to foster acceptance and support for waste management projects/programs. It also ensures the implementation of IEC projects to secure understanding appreciation on the environmental safety measures in order to allay fears and public resistance against new waste disposal facilities.

The MMDA

The MMDA is responsible for:

- the continuous operation and maintenance of existing landfill sites so as to ensure the proper disposal of solid waste in Metro Manila;
- the formulation and enforcement of local policies to strengthen the solid waste management in Metro Manila;
- ensuring that all plans and designs for implementation are subjected to appropriate technical review;
- the institution of measures for the recovery or, at least, partial replenishment of costs for the maintenance and/or operation of sites by way of user charges/fees; and
- the assistance in the implementation of other alternative programs intended to reduce, re-use and recycle wastes.

The LLDA

The LLDA is tasked to ensure the compliance of waste management projects with environmental standards and regulations within the Laguna de Bay watershed area. It is also tasked to provide technical assistance to LGUs in the Laguna de Bay watershed area in the formulation and implementation of their respective waste management plans and programs.

APPENDIX VI

13 August 1996

The Chairman
Metropolitan Manila Development Authority
[redacted]

Dear Sir:

I am Consolacion P. Bergonia, a Filipino postgraduate student at Massey University in Palmerston North, New Zealand. I am pursuing a Masters Degree in Resource and Environmental Planning. Recently, I was informed that government scholars are encouraged to pursue studies relevant to the concerns of this Administration.

At present, I am conducting research into different institutional options for solid waste management, with particular reference to Metro Manila. My study will also examine current institutional arrangements for solid waste management in other countries, namely, Malaysia, Thailand, Indonesia, and Singapore. I hope to demonstrate the similarities and differences among them. This will enable me to evaluate options which might be appropriate for Metro Manila. I have prepared a questionnaire which identifies the information that I need for my study.

In this connection, I am interested to know about your operations, particularly about your solid waste management operations. Could you kindly provide information about your agency. Please find enclosed the questionnaire for your response. I will not identify the respondents individually but will summarize the results from a range of agencies.

May I request you to have this questionnaire completed and returned to me or to my representative by **24 September 1996**, together with copies of annual reports you have for the last three years. My representative is Ms. Charrie Paz. She can be reached at this number:633-7641 to 90 loc. 22807. Should you have any query, you may contact her at the given number.

My contact address in New Zealand is: [redacted] Palmerston North, New Zealand. My telephone and fax number is ([redacted] My supervisor, who is also the Department Head of Resource and Environmental Planning at Massey University, Dr. Philip McDermott, would also welcome any further inquiry you might have regarding this research. The Department's address is: Resource and Environmental Planning Department, Massey University, Private Bag 11222 Palmerston North, New Zealand. The telephone and fax numbers are (0064) (6) 350-4342 and (0064)(6) 350-5689, respectively.

I have enclosed two copies of the questionnaire. You may care to keep a copy of your answers for your future reference.

Thank you very much for your invaluable assistance.

Mabuhay Po Kayo!

Very truly yours,

CONSOLACION P. BERGONIA

SURVEY ON SOLID WASTE MANAGEMENT IN MAJOR METROPOLITAN AREAS

This survey will provide information for a research project looking at one of the most serious problems facing large metropolitan areas in the ASEAN region, collecting and disposing of solid waste. This is a serious issue because of the financial costs of organizing and undertaking effective solid waste collection and disposal better. Your cooperation through completing and returning the questionnaire is appreciated.

All information provided will be kept confidential. Results will be aggregated with returns from other metropolitan areas to compare practices and trends.

Ms. Consolacion P. Bergonia
Department of Resource and Environmental Planning
Massey University
Private Bag 11-222
Palmerston North,
New Zealand
Telephone No.:(0064) (6)350-4342
Fax No. :(0064) (6)350-5689
E-mail Address: C.P.Bergonia@massey.ac.nz

For MMDA

1. Organization

1a Please describe the structure of your organization in the space below with emphasis on your solid waste management function. Please provide an organizational chart.

1b With respect to solid waste management matters, who reports to the Presidential Task Force on Waste Management (PTFWM)? How Often?

Who (Position/Title)	How Often (times per year)

1c Who reports to you on waste management matters? How Often?

Who (Position/Title)	How Often (times per month)

1d Who do you report to? How often?

Who (Position/Title)	How Often (times per month)

2. Transfer Station

2a How many transfer stations are operational within Metro Manila?

Number

2b In the table below, please indicate where they are, their capacities, and the cities or municipalities they served in Metro Manila in 1995?

Transfer Station (Location)	Land Area of Station (hectares)	Daily Volume (tons/day)		Cities/Municipalities Served
		Capacity	Accepted Average	

2c How big was the area serviced by the transfer station/s in 1995?

Area *Sq. km.*

Population *Number*

2d Are there other agencies or organizations involved in the operation of transfer stations?

	Tick one:
Yes	
No	

2e If yes, in the table below, please indicate the name of the agencies or organizations, the nature of these agencies or organizations, and the mode of service arrangement they have with the city/municipal authority, according to the classification below.

(1) **Nature of Organization: Purely Government, Quasi-Government, Private Organization**

(2) **Service Arrangement: Under Contract, Under Franchise, Under License, Build-Operate-Transfer (BOT), Build-Operate-Own (BOO), Voluntary Service, Self-Help/Community-Based, Not Applicable.**

Name of Organization	Nature of Organization (1)	Service Arrangement (2)

2f Are there plans to increase the capacity of stations

	Tick one:
Yes	
No	

3. Sanitary Landfills

3a How many sanitary landfills are operational within Metro Manila?

Number

3b In the table below, please indicate where they are located, what their capacities are, and what cities and municipalities in Metro Manila were served by these sanitary landfills in 1995.

Sanitary Landfill (Location)	1995 Daily Volume Accepted (tons/day)	Remaining Capacity (Tons)	Cities/Municip. Served

3c How big was the area serviced by the sanitary landfill in 1995?

Area — sq.km. ☐

Population — Number ☐

tick one:

3d Are there other agencies or organizations involved in the operation of sanitary landfills?

Yes ☐
No ☐

3e If yes, in the table below, please indicate the name of the agencies or organizations, the nature of these agencies or organizations, and the mode of service arrangement they have with the city/municipal authority according to the classification below:

(1) **Nature of Organization: Purely Government, Quasi-Government, Private Organization**

(2) **Service Arrangement: Under Contract, Under Franchise, Under License, Build-Operate-Transfer (BOT), Build-Operate-Own (BOO), Voluntary Service, Self-Help/Community-Based, Not Applicable.**

Name of Organization	Nature of Organization (1)	Service Arrangement (2)

4. Human Resources

4a In the table below, please indicate how many people are employed at MMDA.

Unit or Section	Number of Employees
Administration	
Planning	
Budget, Finance & Accounting	
Technical Service other than Waste Management Services	
Waste Management Services	
Collection	
Transfer	
Landfill	
Other Units (pls. specify)	
TOTAL	

4b Total Wages and Salaries paid to personnel n Waste Management Unit/Section in 1995

In Pesos

4c Please indicate any human resource problems you experience in solid waste management (please tick if relevant)

	Tick Boxes	
	Yes	*No*
Lack of manpower in waste collection		
Lack of skills in waste management		
Inefficiency (from poor work practices)		
Lack of incentives		
Lack of recognition		
Low morale		
Low Salary		
Other Problems, pls. specify		

4d Training

	Number
How many waste management staff attended training courses in 1995?	
	In Pesos
How much was spent on staff training in 1995?	

5. Funding of Solid Waste Management Activities

5a Please indicate in the table below how the solid waste management operation is funded. Please distinguish between capital and operating expenses and answer with reference to the 1995 fiscal year.

Source of Funding	**Category**	
	Capital (in pesos)	Operating (in pesos)
Revenue: (a) User Fees Charges (b) Retained Revenue (c) Other, pls. specify		
Taxes		
Loan		
Equity Contribution (if BOT) Pls. indicate sources:		
Grants Pls. indicate sources:		
TOTAL		

6 User Charges (Please refer to the glossary of terms for the definition at the end of this questionnaire)

6a Do you charge user fees for waste collection?

	Tick one:
Yes	
No	

6b If yes, to whom do you charge user fees?

	Tick One
households	
business	
industries	
others, pls. specify	

_____
_____
_____

6c Who sets the user fees charges? _____

Does the rate vary according to:

	Tick Boxes Yes	No
Source		
Type of Community		
Type of waste		
Volume of waste		
Others, please specify		

If your answer is yes to any of the above, please explain the basis for varying charges in the space below.

6d. How are user fees collected?

	Tick boxes
Property Tax Collection	
Other charges	
Direct Collection	
Others, pls. specify below	

_____
_____
_____

7. Capital Investment

7a Please indicate the current market values (in pesos) of your capital and equipment for solid waste collection in the following categories:

Categories	Depreciated Value(1995)	Replacement Value(1995)
Buildings		
Trucks		
Light vehicles		
Forklifts		
Compactors		
Others,please specify:		
Total		

7b Do you have a long term investment plan?

	Tick Boxes	
	Yes	*No*
For Five Years		
For Ten Years		
Other Period, please specify		

7c How much do you expect to spend on plant and equipment over the next five years? _____

8. Future Arrangements

			Tick one:
8a	Do you plan to institute any management changes in solid waste management in your city/municipality within the next three years?	Yes	
		No	

8b If yes, what are these changes? Please explain.

9. Relationships

			Tick one:
9a	Do your transfer station managers have contact with the collection managers?	Yes	
		No	
	If yes, how often		

			Tick one:
9b	Do your transfer station managers have contact with the sanitary landfill managers?	Yes	
		No	
	If yes, how often		

			Tick one:
9c	Do your transfer station managers have contact with the recycling managers?	Yes No	☐ ☐
	If yes, how often		☐
			Tick one:
9d	Do your transfer station managers have contact with the recycling agency managers?	Yes No	☐ ☐
	If yes, how often		☐
			Tick one:
9e	Do your transfer station managers have contact with the collection managers?	Yes No	☐ ☐
	If yes, how often		☐
			Tick one:
9f	Do your transfer station managers have contact with the scavengers?	Yes No	☐ ☐
	If yes, how often		☐
			Tick one:
9g	Do your sanitary landfill managers have contact with recycling agency managers?	Yes No	☐ ☐
	If yes, how often		☐

Can you provide copies of your annual report for each of the last three years (1993, 1994, 1995)?

Can you provide the name of a contact to whom I can supply a summary of my findings?

Thank You Very Much For Your Assistance

Consolacion P. Bergonia

13 August 1996

_____
_____
_____
_____

Dear ***(Mayor):***

I am Consolacion P. Bergonia, a Filipino postgraduate student at Massey University in Palmerston North, New Zealand. I am pursuing a Masters Degree in Resource and Environmental Planning. Recently, I was informed that government scholars are encouraged to pursue studies relevant to the concerns of this Administration.

At present, I am conducting research into different institutional options for solid waste management, with particular reference to Metro Manila. My study will also examine current institutional arrangements for solid waste management in other countries, namely, Malaysia, Thailand, Indonesia, and Singapore. I hope to demonstrate the similarities and differences among them. This will enable me to evaluate options which might be appropriate for Metro Manila. I have prepared a questionnaire which identifies the information that I need for my study.

In this connection, I am interested to know about your operations, particularly about your solid waste management operations. Could you kindly provide information about your agency. Please find enclosed the questionnaire for your response. I will not identify the respondents individually but will summarize the results from a range of agencies.

May I request you to have this questionnaire completed and returned to me or to my representative by **24 September 1996**, together with copies of annual reports you have for the last three years. My representative is Ms. Charrie Paz. She can be reached at this number [redacted] Should you have any query, you may contact her at the given number.

My contact address in New Zealand is: [redacted] New Zealand. My telephone and fax number is ([redacted] My supervisor, who is also the Department Head of Resource and Environmental Planning at Massey University, Dr. Philip McDermott, would also welcome any further inquiry you might have regarding this research. The Department's address is: Resource and Environmental Planning Department, Massey University, Private Bag 11222 Palmerston North, New Zealand. The telephone and fax numbers are (0064) (6) 350-4342 and (0064)(6) 350-5689, respectively.

I have enclosed two copies of the questionnaire. You may care to keep a copy of your answers for your future reference.

Thank you very much for your invaluable assistance.

Mabuhay Po Kayo!

Very truly yours,

CONSOLACION P. BERGONIA

No.___

SURVEY ON SOLID WASTE MANAGEMENT IN MAJOR METROPOLITAN AREAS

This survey will provide information for a research project looking at one of the most serious problems facing large metropolitan areas in the ASEAN region, collecting and disposing of solid waste. This is a serious issue because of the financial costs of organizing and undertaking effective solid waste collection and disposal better. Your cooperation through completing and returning the questionnaire is appreciated.

All information provided will be kept confidential. Results will be aggregated with returns from other metropolitan areas to show and compare practices and trends.

Ms. Consolacion P. Bergonia
Department of Resource and Environmental Planning
Massey University
Private Bag 11-222
Palmerston North,
New Zealand
August 1996

---

1. Organization

1a Please describe the structure of your organization in the space below, with emphasis on your solid waste management function. Please provide an organizational chart.

1b With respect to solid waste management matters, who reports to: The Presidential Task Force on Waste Management (PTFWM)?
The Metro Manila Development Authority (MMDA)?

	Who (Position/Title)	How Often (times per year)
PTFWM		
MMDA		

1c Who reports to you (the Mayor)on waste management matters? How often?

Who (Position/Title)	How Often (times per month)

2. Collection and Volumes

Tons:

2a How much waste did you collect in 1995?

2b Based on your 1995 collection, how much waste was collected per day, by source? Please estimate the quantity in tons or percentage share in the following table.

Sources of Wastes	Amount (tons per day)	Share of total(%)
Residential		
Market		
Commercial		
Industrial		
Construction & demolition		
Street Waste		
Institutional Waste		
Other wastes, pls. specify		
TOTAL		100%

2c How big was the service area covered by your waste collection service in 1995?

Sq. km.

Area

Number

Population

Please provide a map of the waste service area covered by your waste collection service in 1995, if you have one.

2d If there are other organizations undertaking waste collection in the city/municipality, please identify the organizations, their individual service areas, and the number of population each serves in the table below. Also, please indicate the nature of the organization and the mode of service arrangement according to the following classification:

(1) **Purely Government, Quasi-Government, Private Organization.**

(2) **Under Contract, UnderFranchise, Under License, Build-Operate-Transfer(BOT), Build-Operate-Own (BOO), Voluntary Service, Self-Help/Community-Based.**

Name of Organization	Service Area Location	Nature of Organization (1)	Mode of service Arrangement (2)

2e In 1995, how much waste was actually generated, targeted for collection and actually collected in your service area?

	Tons
Waste generated in 1995	
Waste targeted for collection in 1995	Tons
Waste actually collected in 1995	Tons

3. On Human Resources

3a How many people are employed in the City/Municipal Office?

Unit	Number of employees
Administrative	
Planning	
Budget & Accounting	
Technical Services other than Waste Management Services	
Waste Management Services Collection	
Other personnel in Waste Management (pls.specify)	
Other Units (please specify)	
Total	

3b Total Wages and Salaries paid to personnel in WasteManagement Unit/Section in 1995. Pesos

3c Please indicate any human resource problems you experience in solid waste management (please tick if relevant)

		Tick Boxes Yes	No
Lack of manpower in waste collection	..		
Lack of skills in waste management	..		
Inefficiency (e.g., poor work practices)	..		
Lack of incentives	..		
Lack of recognition	..		
Low salary	..		
Low morale	..		
Other Problems	..		
	..		

3d For "other" or serious human resource problems, please briefly outline their nature in the space below

3e Training

How many people from the solid waste management unit attended training courses in 1995? ☐

In Pesos

How much was spent on the training? ☐

4 Funding of Solid Waste Management Activities

4a How is the solid waste management unit funded? Please answer with reference to the 1995 fiscal year.

Source of Funding	Category	
	Capital (in P)	Operating (in P)
Revenue: (a) User Fees/charges (b) Retained Revenue (c) Other, *please specify*		
Tax		
Loans		
Equity Contribution (ex., if BOT) *Please indicate sources:*		
Grants *Please indicate sources*		
TOTAL		

5. User Charges (Please refer to the glossary of terms for the definition)

5a Do you charge user fees for waste collection

Yes	*No*
☐	☐

5b If yes, to whom do you charge user fees?

Tick Boxes

- households ☐
- business ☐
- industries ☐
- others, pls. specify

_____

_____

_____

5c Who sets the user fees charges? _____

Does the rate vary according to:

	Tick Boxes Yes	No
Type of Community		
Type of waste		
Volume of waste		
Others, please specify		

_____
_____
_____

5d If you answered yes to any of the above, please explain the basis for varying charges in the space below

5e How are user fees collected?

	tick boxes
Property Tax Collection	
Other charges	
Direct Collection	
Others, pls. specify below	

_____
_____
_____

6. Equipment

6a Please indicate the current market values (in pesos) of your capital and equipment for solid waste collection in the following categories:

Categories	Depreciated Value(1995)	Replacement Value(1995)
Buildings		
Trucks		
Light vehicles		
Forklifts		
Compactors		
Others (pls. specify)		
Total		

Tick one:

6b Do you have a 5 or 10 year plan for investment? Yes ☐ No ☐

6c How much do you expect to spend on equipment over the next five years? _____

7. Future Arrangements

Tick one:

7a Do you plan to institute any management changes in solid waste management in your city/municipality within the next three years. Yes ☐ No ☐

7b If yes, what are these changes? Please explain.

8. Relationships

Tick one:

8a Does your collection manager have contact with the transfer station manager. Yes ☐ No ☐

If yes, how often? ☐

Tick one:

8b Does your collection manager have contact with the sanitary landfill manager? Yes ☐ No ☐

If yes, how often? ☐

Tick one:

8c Does your collection manager have contact with the scavengers? Yes ☐ No ☐

If yes, how often? ☐

Tick one:

8d Does your collection manager have contact with the recycling agency officer? Yes ☐ No ☐

If yes, how often? ☐

Can you provide copies of your annual report for each of the last three years (1993, 1994, 1995)?

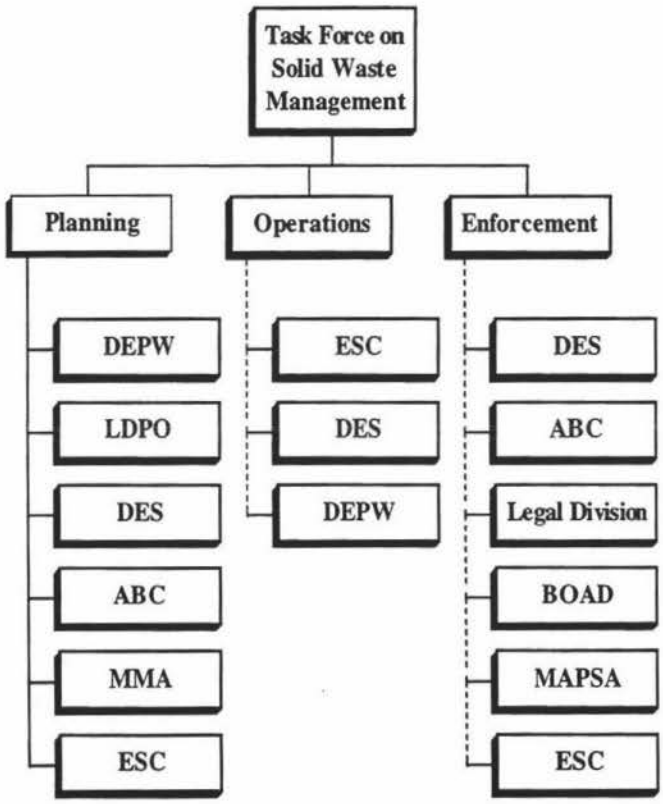
Can you also provide the name of a contact to whom I can supply a summary of my findings?

Thank You Very Much For Your Assistance
Consolacion P. Bergonia

APPENDIX VII

Solid Waste Management Organizational Structure of Selected Cities and Municipalities in Metro Manila, Philippines

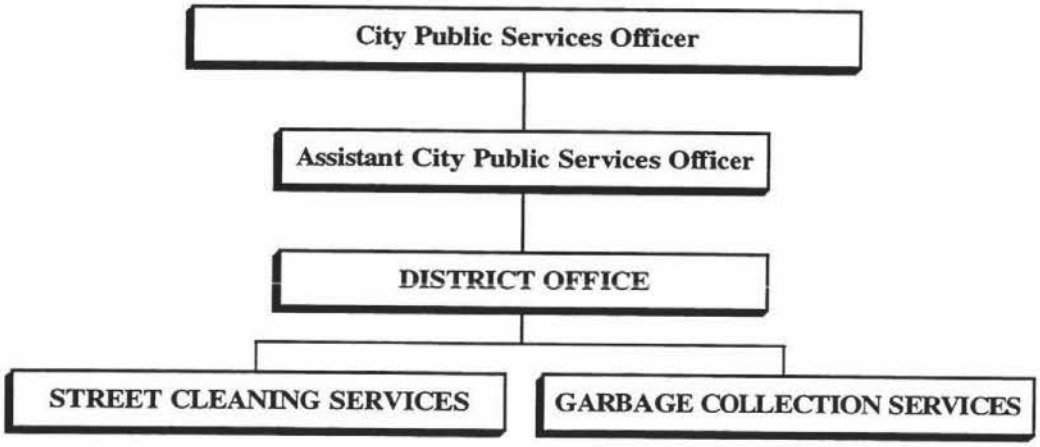
A. Makati City



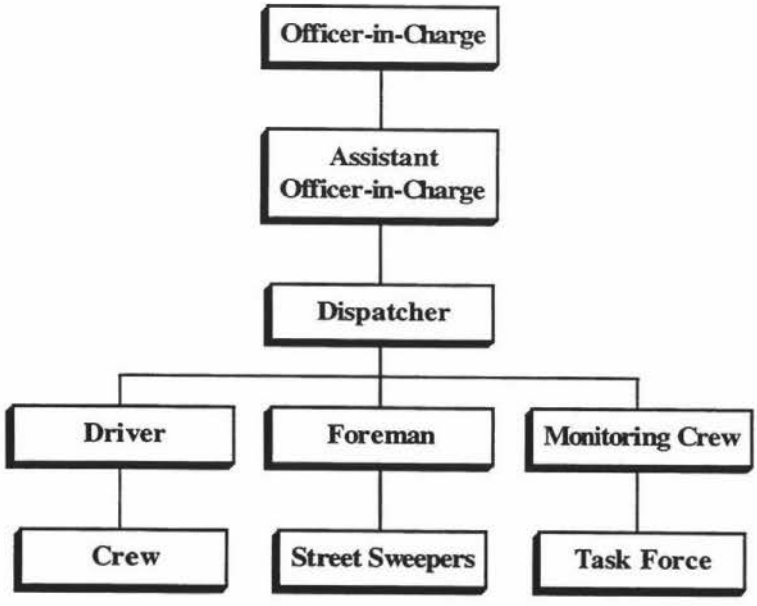
- COORDINATIVE RELATIONSHIP

DEPW - Department of Engineering and Public Works
LDPO - Local Development Planning Office
DES - Department of Environmental Services
ABC - Association of Barangay Council
MMDA - Metro Manila Development Authority
ESC - Environmental Sanitation Center
MAPSA - Makati Assistance for Public Safety Authority

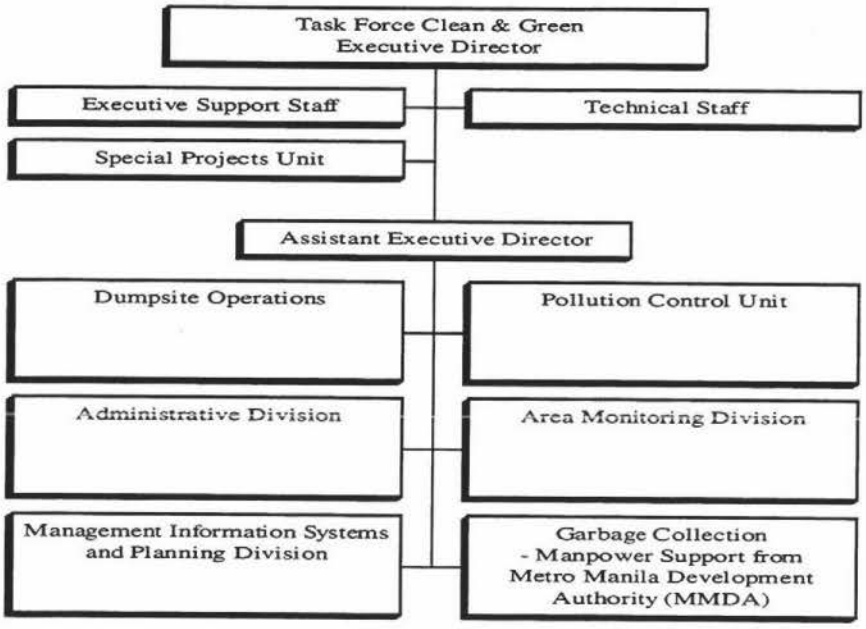
B. City of Manila



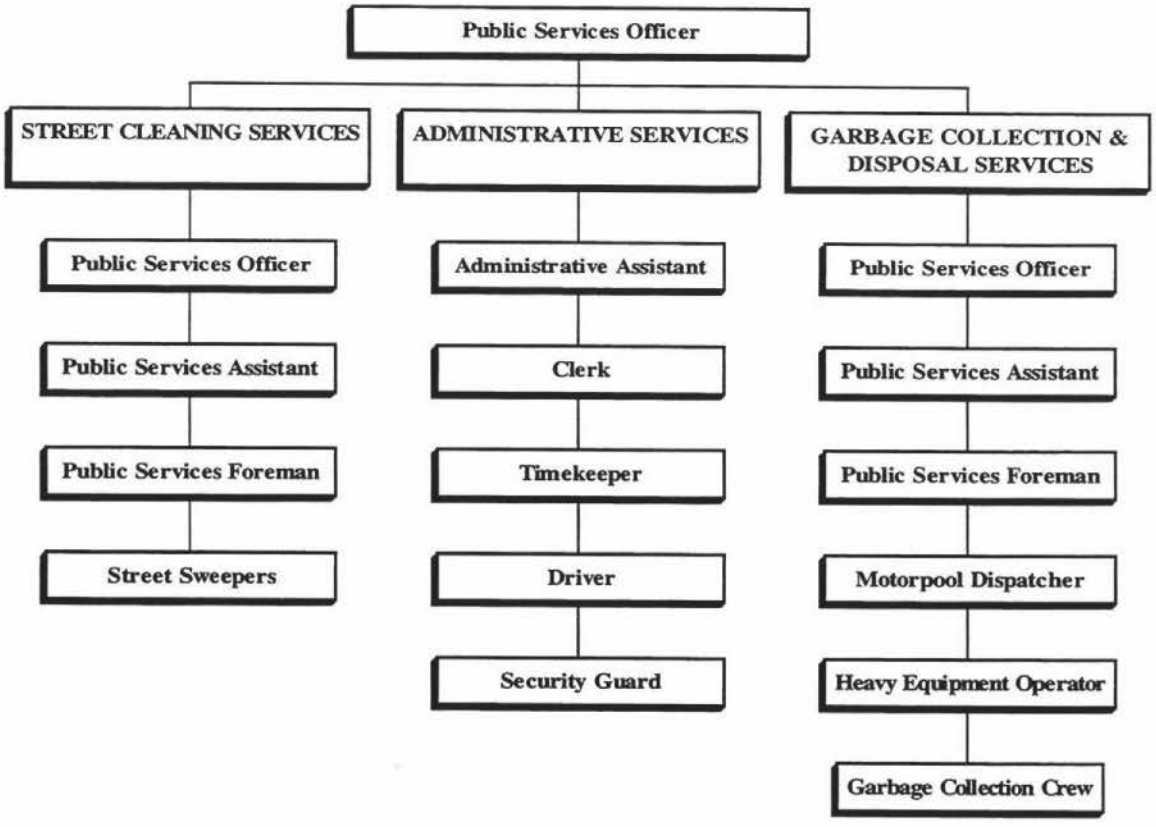
C. Mandaluyong City



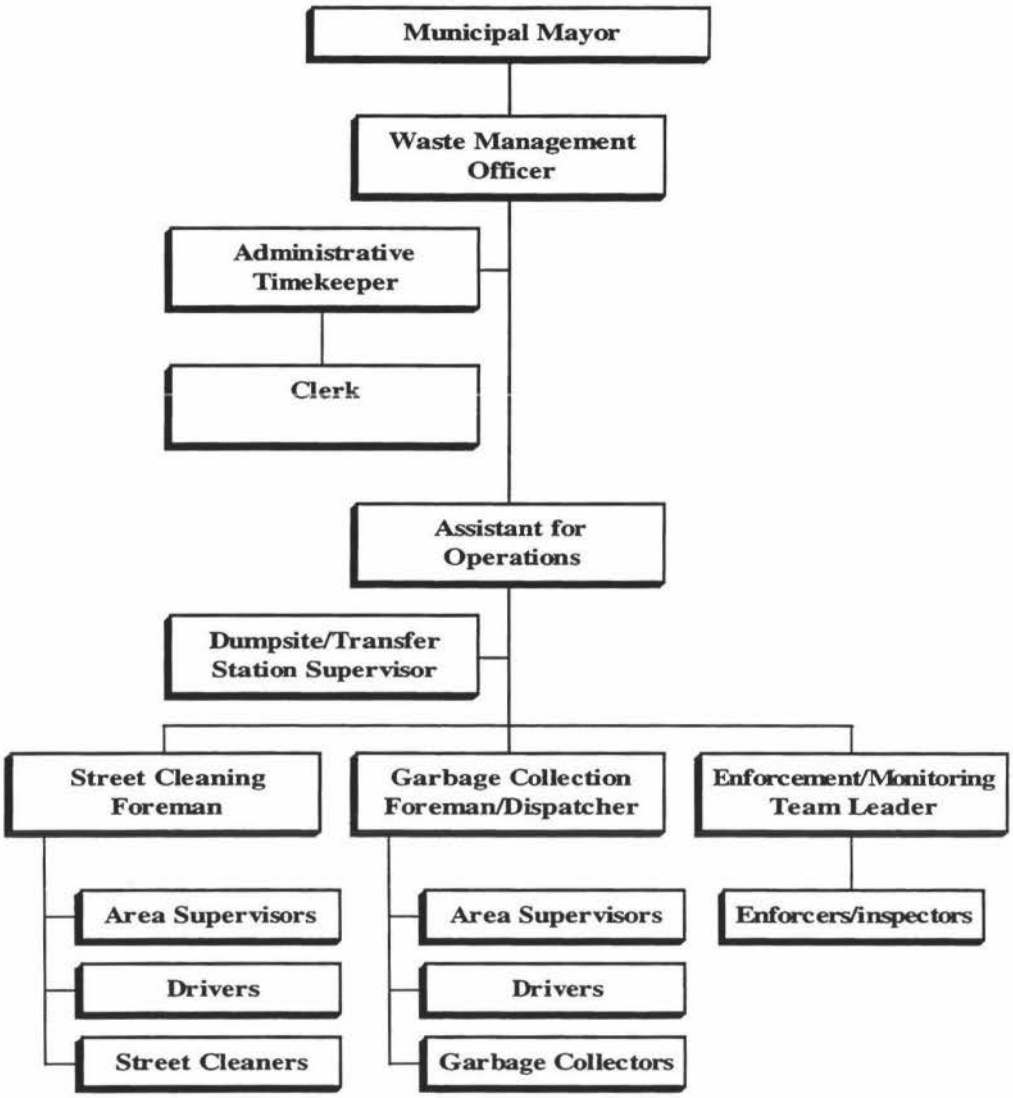
D. Quezon City



E. City of Muntinlupa

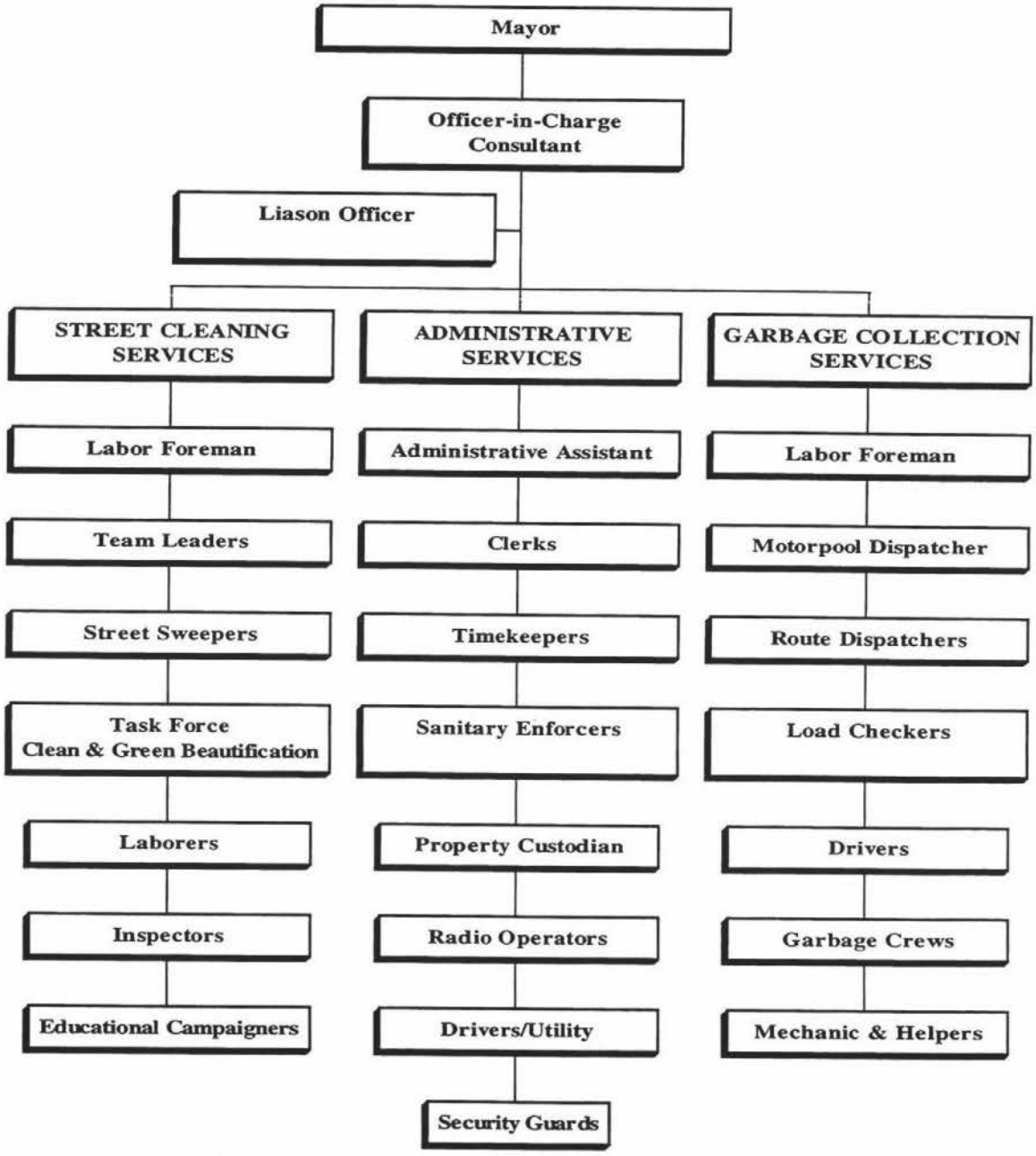


F. Marikina City

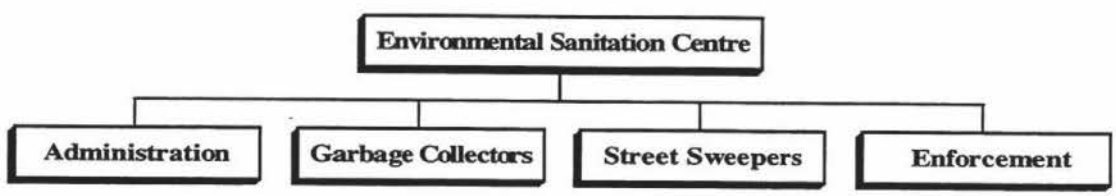


G. Municipality of Valenzuela

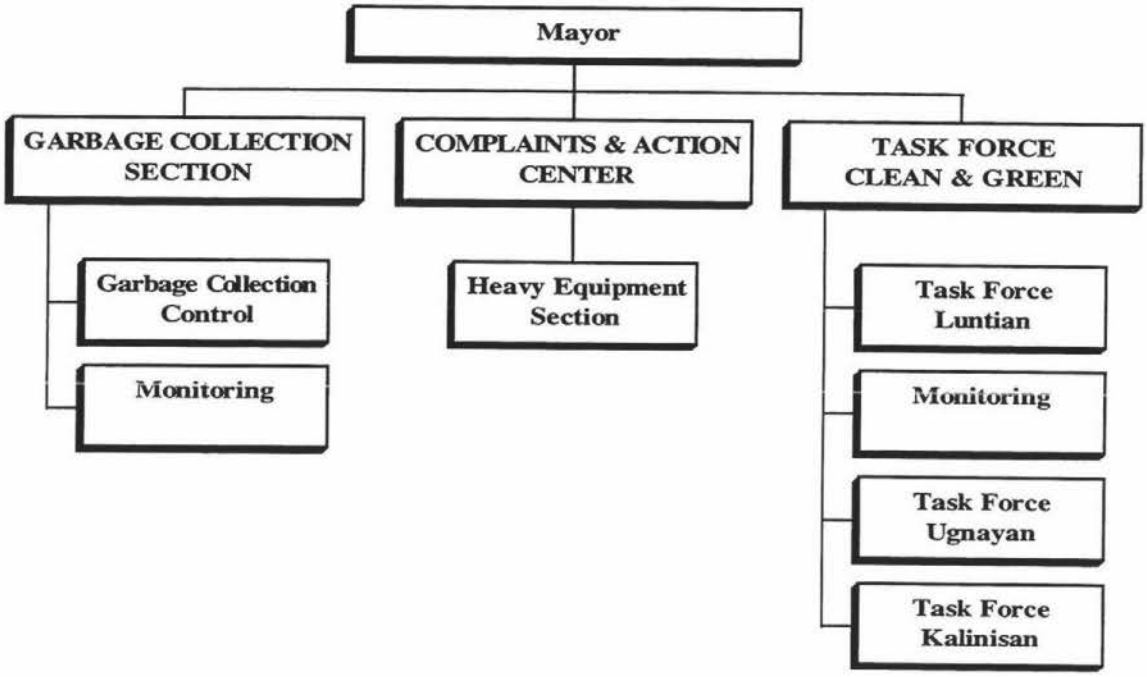
H. Municipality of Paranaque



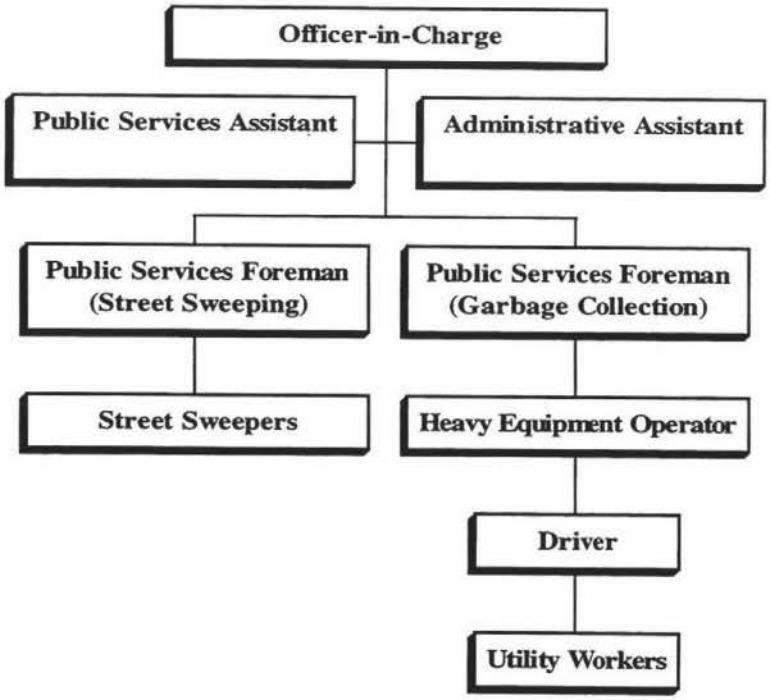
I. Municipality of Navotas



J. Municipality of Taguig



K. Municipality of Pateros



L. Municipality of Malabon

M. Municipality of San Juan