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THE AMERICAN UNIVERSITY IN CAIRO
SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
DEPARTMENT OF POLITICAL SCIENCE

ASSESSMENT OF SOLID WASTE MANAGEMENT IN EGYPT DURING THE
LAST DECADE IN LIGHT OF THE PARTNERSHIP BETWEEN THE EGYPTIAN
GOVERNMENT AND THE PRIVATE SECTOR

SOHAIR MOURAD MILIK

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE OF MASTER OF ARTS IN POLITICAL SCIENCE

OCTOBER/2010

DEDICATION

I dedicate this thesis to Mrs. Yousriya Loza Sawiris, the founder of the Association for the Protection of the Environment, who has been the wind beneath my wings until I completed this work. Without her support this thesis would not have been realized. I am indebted to her for the life.

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Sohair M. Milik

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CHAPTER 1

INTRODUCTION

1.1. Introduction

Solid Waste Management (SWM) is a crucial public service issue affecting both environment and health. Waste management is not limited to the collection of waste and its disposal; it includes collection, transportation, sorting and recycling of waste. SWM is highly affected by people culture and their level of awareness. However, the challenges of Solid Waste Management in Egypt has always been, and will continue to be one of the most pressing challenges facing the Egyptian authorities for the coming decades. This magnitude of the problem increased with the rapid population growth and the fast-growing urbanization rate. In July 2006, statistics put Egypt's population at 79 million, making it the most populous country in the Middle East. Most of the population is concentrated in Cairo, Alexandria and in the Nile Delta. Cairo, which is considered the tenth mega city in the world, has a population of about 17.5 million. Its population is estimated to exceed 20 million by 2017. It is worth noting that the population density in Egypt approaches 2500 person per square kilometer.¹

¹ *Demographic World Urban Areas & Population Projections: 5th Comprehensive Edition (Revised April 2009)*

On one hand, SWM was generally the local government's responsibility, particularly in terms of planning and financing through the central government allocation. On the other hand, waste collection services and waste transfer were provided by both the formal and informal sectors. While local authorities, such as the Cairo Cleanliness and Beautification Authority (CCBA), formed the formal public sector, the informal public sector was composed of the traditional garbage collectors. Traditional garbage collectors serviced one third of the collected garbage through door-to-door service. CCBA collected another third and the last third was just dumped in streets and empty lots and remains uncollected. This portion was the source for scavengers "other people outside the traditional collection system" who would pick up whatever they want from the valuable content of the waste. The last portion represents the main source for garbage accumulation in the streets.²

During the 1990s, Egypt, like many other developing countries, followed the Structural Adjustment Program (SAP) that was introduced by the International Monetary Fund (IMF) and the World Bank. One of the reform objectives was to liberalize the economy by increasing private sector involvement in operating public projects; i.e. "Privatization". Based on "Privatization," the government changed its approach in the field of SWM to play the role of the organizer who provides the appropriate environment for economic activities, in addition to its main role in formulating policies. By 2002, the private sector, in particular international companies, became involved in implementing SWM. They started in Alexandria then moved to Cairo and Giza governorates. Hence, the

² Economic Aspects of Informal Sector Activities in Solid Waste Management WASTE, Skat, 2007

formal international private sector became involved in achieving the Egyptian development objectives in the field of solid waste management.³

The year 2002 witnessed the shift in SWM system from a provision system orchestrated by the public sector (public authorities) and the private informal sector (garbage collectors) to a system managed by the international private sector. The involvement of the multinational private sector companies in solid waste management is one of the most controversial issues that is often quoted as a main reason for the failure of SWM in Egypt.

After eight years of international private sector participation in SWM in Egypt, particularly Cairo, Alexandria and Giza governorates, the situation has deteriorated as admitted by the Minister of State for Environmental Affairs in a report issued in 2009. The report estimated that the amount of generated solid waste in Egypt is nearly 75 million tons and the generated municipal waste is about 20 million tons annually. Municipal waste thus represents only 25 per cent of the generated solid waste with daily generation of 55 thousand tons in Egypt. In Greater Cairo, this situation is very critical because of the high population density, and the increased amount of garbage produced as well as the deficiency in the collection process, means of transportation and the recycling systems.

³ Cabinet of Ministries, Egypt and the 21st Century, 1 997

The produced municipal waste in Greater Cairo is put at 25 thousand tons daily. However, the total collection efficiency ranges from 15 to 65 per cent and the coverage of municipal waste collection in urban areas ranges from 35 to 95 per cent.⁴ These percentages explain the accumulated garbage found everywhere. The accumulation of waste in streets, particularly food waste, that represents about 55 per cent of municipal solid waste,⁵ has increased dramatically after pigs' slaughtering, which is perceived as a failed and unscientific intervention to deal with the swine flu.

One of the most feasible solutions of the problem of the generated waste is recycling. Recycling activities in Egypt do not exceed 20 per cent of the generated garbage. However, the World Bank in its report by METAP in 2008 showed different figures about recycling activities. The data given in the report indicates that recycling activities are limited to 2 per cent, composting to 8 per cent, garbage in landfill is 2 per cent and 88 per cent of the collected garbage is openly dumped.

It was concluded that not only the environment and SWM are in a critical status but the traditional garbage collectors are also undermined. Traditional garbage collectors, the informal private sector, have suffered a great deal under multinational companies, the formal private sector, that became involved in SWM in Alexandria (2002) and Cairo (2003). Once international companies took over SWM responsibilities in Cairo in 2003,

⁴ Genana, Tarek. *Solid Waste Management in Egypt : A Programme for the Next Decade* , EcoConserv, June 2000

⁵ *Economic Aspects of Informal Sector Activities in Solid Waste Management*, Reference number 81084644, Final Report, 2007 prepared under contract to GTZ and the CWG, Volume 1 .

traditional garbage collectors either joined these companies as workers, or worked as subcontractors for these companies due to the companies' limited capabilities. This system forced the garbage collectors to undertake the same tasks they used to carry out previously but with less income under the new system. Within the new framework set by the government in Cairo, Alexandria and Giza, international companies were the sole official collectors of garbage. In some instances, garbage collectors had to pay international companies to allow them to work and collect garbage. Moreover, many garbage collectors couldn't join the new system under international companies. This created another problem, as some of them would work early in the morning to pick up anything of value that could be recycled leaving the streets dirty as a result of the spread of the remaining garbage. These garbage collectors are called "scavengers".

1.2. Research Questions

As a result of the bad performance of multinational private sector companies in SWM in Egypt during the last decade, the level of street cleanliness deteriorated and the pollution resulting from open burning increased. In addition, the circumstances aggravated the already bad situation. Pig slaughtering, which took place in June 2009 and that is a consequence of misunderstanding and mismanagement of the swine flu crisis, aggravated SWM problems further. Pig slaughtering resulted in the spread of large quantities of food waste in the streets. Unfortunately, the Egyptian government did not offer alternative solutions to garbage collectors who lost their pigs and their income they generate from breeding pigs. For decades, pig breeding has been one of the main components of the recycling process. Not only did the pigs feed on food waste, but they

also were a source of income for garbage collectors. With no more pigs raising, garbage collectors disposed, in the streets, of food waste that constitutes 55 per cent of the collected solid waste, refusing to carry the cost of transporting the waste to the dumps. Even though getting rid of food waste by feeding it to pigs is not the ideal solution and is not environmentally and healthy viable, however, upgrading could have been an alternative option for policymakers. These developments increased waste dispersion in the streets, rates of pollution, and the number of lost opportunities from recycling. This can be attributed to the hasty decisions of the government to privatize SWM and slaughter pigs. These decisions are two of the main issues that will be studied in depth in this thesis.

1.3. Thesis main questions are as follows:

What are the main reasons behind SWM failure in Egypt in terms of unclean streets, very low percentage of recycling (does not exceed 20 per cent) increased environmental pollution, loss of economic chances, and unavailability of sanitary landfill sites? What was the rationale behind the Egyptian government decision to contract the multinational private sector who lack the understanding of the Egyptian culture, through unfair contract? Was the traditional /informal garbage collector system successful or is it really in need of reform and upgrading? What is the best possible system for the management of SWM in Egypt? Is it the formal public, the informal private or the formal international private sector? To what extent does the environmental awareness of citizens affect the SWM process? Does the level of citizens' awareness shape SWM in Egypt? Low environmental awareness in Egypt is not only the result of culture but is

also a result of environmentally insensitive policies and regulations. Are the current policies and regulations enough to ensure citizens' compliance with environmental requirements and are they really applied? This thesis will argue that solid waste is a public good and will seek to understand the incentives that the government can use to encourage the people to respect the environment. It will also explore whether the economic status plays a role in responding to environmental protection.

1.4. Hypothesis

The paper argues that the main reason for the current SWM failure is the government's lack of an integrated, holistic approach in decision making, planning, and implementing processes. Integrated approach means the bringing together of different activities that guarantee sustainability in solid waste management such as collection, transfer, recycling technologies, incineration, and land filling, adjustment of the citizens behavior, activation for current environmental policies and regulation and the cooperation between different stakeholders in SWM.⁶ Activities that are part of the SWM process include; collection, transfer, recycling technologies, incineration, and land filling; In addition to those crucial activities, SWM is involving also all stakeholders in decision making, planning, implementing processes.

⁶ Moczygomba, Elena & Smaka-Kincl Vesna; *69 per cent recycling rate for waste management in Graz*, Management of Environmental Quality: An International Journal , *Austria*, Emerald Group Publishing Limited, *Vol . 18, p.126- 136, 2007.*

The paper argues that the decision making process in SWM, the process by which choices are made, worked irrationally and it is considered as one of the SWM failure reasons. Contracting multinational private sector, whilst an obvious case, worked irrationally and did not follow scientific base in terms of neglecting important stakeholders and produced a random weak contract with international companies. These contracts are of 15 years duration, and include only 20 % of recycling rate, with very weak monitoring system and a lot of weaknesses. Pig slaughtering decision was another example for irrationality and lack of study.

The lack of the awareness of the Egyptian people on environmental aspects played a crucial role in weakening any effort done to achieve good results in SWM. The poor community response to environment protection and the weak level of community environmental awareness is a result of many interrelated factors, which include inactive policies and regulations, the unclear role of community due to lack of clear messages with incentives for environment protection and the level of poverty and unemployment. It is believed that, it is very difficult for people under economic and social pressure to respond to environmental aspects.

1.5. Literature review

To assess the framework in which the present work debate can be organized, it is essential to agree upon whether solid waste management is public or private service. A

“Public good” is defined as a good that is non-rival and non-excludable.⁷ SWM is considered nonexclusive i.e. once the service is delivered to any part of the community, all the community can share the benefits not only the receivers. At the same time, it is also non-rival because any person in the community can enjoy the service without affecting the ability of others to access the service. However, those who do not pay for the services cannot be excluded.⁸

Samuelson, who is one of the most influential contributors to the Public Good theory, states that "Which all enjoy in common in the sense that each individual's consumption of such a good leads to no subtraction from any other individual's consumption of that good"⁹

Samuelson argued that the characteristics of Public good is; non excludability and non-rivalry (or collective) consumption, which means that once a good or a service is supplied, it is delivered to all people whether or not they pay for it. It is known that public goods are usually delivered by the government and financed through by tax payers,¹⁰ while private goods are used to be traded in markets.¹¹ The relationship

⁷ Sechrest J. , Larry , *Private Provision of Public Goods: Theoretical Issues and some examples from Maritime History* , Sul Ross State University ,Alpine ,Texas 79832, March 2003

⁸ Cointreau, Sandra –Levine , *Private Sector Participation in Municipal Solid Waste Services in Developing Countries*; Urban Management and the Environment, UNDP/UNCHS/World Bank, 1994

⁹ Samuelson ,A Paul , *The pure theory of public expenditure "Review of Economics and Statistics "*36 ,no 4:387-389 ,1954

¹⁰ Sechrest J. , Larry , *Private Provision of Public Goods: Theoretical Issues and some examples from Maritime History* , Sul Ross State University ,Alpine ,Texas 79832, March 2003

between both buyer and seller is controlled by mutual agreement. The ownership of the service is transferred to the buyer once both buyer and seller agreed upon the price and the service specification. Contrary to that is a "Public good" that is a service or a good which benefit is not excludable and not limited to only one person or group of people. Wind, air, rain, and national defense are examples of public goods.

Relying on the above-mentioned characterization; SWM can be classified as a public good but not for all activities. SWM includes many activities; collection, transfer, recycling, resource recovery, and land filling or dumping. Not all of them are purely considered as public goods, based on the degree of excludability. For the collection step that includes public streets, public parks cleaning, it is typically a public good as once a street is cleaned, all citizens enjoy it and the cost of this collection is covered by the government from the taxes revenues. However, the case will be the opposite in the case of the garbage being collected from door to door it could be a private good as the service is limited to the receiver. Therefore, only the receiver can cover the cost. Another activity of SWM which is considered a public good is the dumping of all rubbish "the portions that couldn't be recycled yet" in a safe sanitary landfill; its benefits not limited to a certain group of citizens but to all citizens. The cost of land filling is one of the most expensive SWM activities.¹² The dilemma of cost of the public good is the determination of who should bear the expenses. Some people try to avoid paying the cost of the received service and at the same time they enjoy the service benefits. Those are known as "free riders", they are unwilling to contribute to the cost of public goods.

¹¹ Kaul, Inge, *Global Public Goods : A new way to balance the world's books* ,2000

¹² Ibid

If consumption is unlimited or cannot be provided on a “user-pays” basis, then free riding is an inevitable result. According to Samuelson, the market competition system is the best as it can deliver a certain good at the same price to all people. However, the equal price can't be achieved because of the free riders. Therefore, market fails to guarantee equal prices for the same service and an equal mechanism of distribution. Based on the above-mentioned discussions, Samuelsson preferred that government be responsible for public good supply while private sector delivers private goods.

George J. Stigler tried to solve the free riders problem based on a collective action mechanism. This mechanism suggests that individuals should pay for the received services through coercion via a collective body such as a committee or a union.¹³ In the SWM field, there is obvious market failure and according to the neo classical theoretical model of a competitive market there are two important aspects to be identified 1-) market failures and 2) - policies failures.¹⁴ Reasons behind market failures could be; externalities, public goods/ bads, and a lack of risk and future markets. Baumol and Oates identified externalities as follows:

"Externalities are present whenever some individual's utility or production relationships includes real variables whose values are chosen by others (persons, governments, corporations) without particular attention to the effects on that individual's welfare."

¹³ Stigler J. ,George , *Free riders and Collective Action :an Appendix to theories of economics regulations* , Bell Journal of Economics and Management Science ,5,No2 ,1974

¹⁴ Bojo, Jan, Maler, Karl-Goran & Unemo, Leno, *Environment and Development :An Economic Approach* . Published by Kluwer academic publisher \Boston \London,1992

Public goods/ bads from the market perspective cause failure when prices of goods do not include the marginal cost of consumption to a society. Policy failures usually originate from government interventions that lack the consideration of environmental impacts. For example, when government formulates policies related to population, taxes, international trade etc., and these policies lack needed information concerning the environment. This omission leads to misdirected public investment and suppression of environmental information.¹⁵

Based on the aforementioned characteristics, SWM can be categorized as a public good. However, activities such as door-to-door collection are an exception because they benefit all individuals and are the responsibility of local government. This does not mean that local government should take over SWM completely. Sandra Cointreau introduced the study that recommends the private sector provision for SWM based on government role reduction. The main goal of private sector participation is to increase service delivery efficiency, lower cost, and enhance the available resources. Currently, SWM in Egypt is handled by the international private sector. The role of the government is limited to controlling and monitoring the work of these companies. Such a relationship draws on a number of concepts that can answer and clarify the debate. One of these concepts is Public Private Partnership (PPP). PPP is defined by the World Bank, as follows: “a range of possible relationships among public and private entities in

¹⁵ Ibid

the context of infrastructure and other services”.¹⁶ Other terms could be used to describe the relationship between private and public sectors such as Private Sector Participation (PSP) and also Privatization (Pn). The use of these terms is often interchangeable; however, there are minor differences between them. The main feature of the PPP is the involvement of the private sector in handling some services in such a way that guarantees “win – win” situation for both private and public sectors. For successful PPP tasks, obligations and risks should be well defined for both partners as prerequisites for a successful relationship.

According to Kolzow 1994, circumstances around PPP are crucial issues that could affect this partnership positively or negatively. Kolzow stated that; culture that encourages citizens' participation, positive leadership, and clear common vision between both private and public sectors are very important circumstances.¹⁷ Both private and public sectors are seeking advantages through PPP; therefore, the contract between them should be tailored to well fit risks to the partner who can well manage those risks hence, costs will be minimized and performance will be improved. On the other hand, Private Sector Participation (PSP) is a relationship where the government contracts the private sector to deliver certain services to the government therefore; private sector becomes responsible for fulfilling public good provision. Theories introduce PSP in SWM as "a possible opportunity to mobilize private investment and

¹⁶ The world Bank /International Finance Corporation : *Public- Private Partnership PPPs –An overview* ,2004

¹⁷ Kolzow,D.R., Public /private partnership: *Economic development organization for the 90s, Economic development review* 12 ,1994, pp.4-356

introduce efficiency in SWM."¹⁸ However, the case of Egyptian PSP in SWM sought efficiency rather than mobilizing private investment.

Theories explain PPP approach from sociological, economical and management perspectives. The sociological theories that shape the relationship between public and private sector in SWM are functionalism and general systems theories. Abuyuan expressed PPP in light of functionalism theory as follows: institutions can survive if they can adapt their circumstances by interdependence on their partners. According to the mentioned theory, partners are parts from a whole system who deliver the services .In the case of SWM, both private and public sectors are seen as interdependent partners inside a larger body and each of them have different capabilities and different tasks. Nevertheless, the general system theory explains the PPP from different points of views: 1) system relations that is important to determine the kind of relationship between different partners. 2) System effectiveness that encourage the satisfactory circumstances for better and optimum use of resources for different partners. 3) System dynamics to explore the forces of the system that should be changed and in what directions. Those introduced theories have to be examined before starting the PPP as prerequisites for success relationship.¹⁹

¹⁸ Cointreau, Sandra –Levine : *Private Sector Participation in Municipal Solid Waste Services in Developing Countries; Urban Management and the Environment*, UNDP/UNCHS/World Bank,1994

¹⁹ Abuyuanl, A.M., Collaboration; A sociological perspective. Yale/Yale UNDP research clinic report .Yale/UNDP Public private partnership programme, Yale University, USA, 1999

Theories that explain PSP from economical perspective are most appropriate for touching the present study and will be the core of the theoretical framework. PSP explanation based on Neoliberals was first propounded by Friedrich Von Hayek during the early twentieth century. Hayek suggested "minimal government intervention in the economy with some market controlling mechanisms to smooth out market anomalies".²⁰ Beside Hayek's economic philosophy, John Maynard Keynes expressed his points of views during 1936 that government intervention may reduce escalating levels of unemployment therefore economy level could be improved. However, Hayek argued Keynes in his book "The Road to Serfdom" and he indicated that government intervention leads to both economic and political crisis.

Later, Milton Friedman and George Shultz adopted Hayek's philosophy about minimal government intervention and their thoughts were known as the Chicago School. Those economists, Milton Friedman and George Shultz, argued that, there were many problems in the application of Keynesian theory during the 1960s and 1970s. They claimed that, the USA and the British economies suffered uncontrollable inflation in light of the Keynesian theory. However, during 1979 Neoliberalism emerged again victorious under Margaret Thatcher in UK and Ronald Reagan in USA. During the two years 1989 and 1990, the International Monetary Fund IMF and the World Bank promoted Neoliberalism by introducing Structural Adjustment Programs (SAP). One of the main goals for SAP was the deregulation of the economy in developing countries and the involvement of the private sector for the purpose of enhancing the efficiency

²⁰ Commanding Heights: *The Battle for the World Economy*, Episode 1 :Chapter 6 ,2006

and promoting competition between different firms. SAP encouraged privatization as a main tool for improving economy based on enhancing competition. Privatization is defined according to Kemp Roger in his book “Private Sector and Participation” as follows:

"The government engages the private sector to provide capital or otherwise finance government programs, purchase government assets and operate government programs through various types of contractual arrangements".²¹

In addition to the minimal government intervention thoughts that were encouraged by Hayek, he introduced competition between different entrepreneurs as a tool to search for unexploited opportunities. Hayek explained that competition between different firms operating in developing countries was previously limited therefore competition encouragement could be a good tool to increase efficiency and to change individual's behavior.²²

Public choice theorists also encourage market provision for public services over regionalism particularly in case of political fragmented metropolitan regions. Through

²¹ Roger, Kemp, *Private Sector Participation: the Provision of Public Services by the Private Sector*, Jefferson: McFarland & Company, 1991.

²² Friedrich A. Hayek, " *Competition as a Discovery Procedure* " , trans Marcellus S. Snow *The Quarterly Journal of Austrian Economics* 5 , Fall 2002

the public choice theory, theorists argue that the notion of competition between different markets is central to the public services delivery.²³

Associated with the Neoliberalism there was the theory of the government failure due to government performance inefficiencies. This theory was introduced by the PSP as a solution for government failure.²⁴

Beside the explained theoretical framework, there are theories that explain the rational approach to the decision-making process. The goal of clarifying this approach is to examine the Egyptian government rationale beyond its decisions on SWM particularly PSP and pigs slaughtering. The decision making process and its planning stages have to be properly examined in light of outcomes. Max Weber's introduced his model of decision-making and he focused on rationality.²⁵ The rational approach to decision-making process is the center of Herbert Simon' work. He explained that human decision-making process is driven by two different types of rationality; on one hand, reasoned rationality and on the other, passion rationality, advocated by Freud, Pareto and Lasswell. Simon explained that "we have to accommodate intellect"—Simon bounded rationality concept – “human behavior in organizations is, if not wholly

²³ Warner, Mildred and Hefetz, Amir," *Applying Market Solutions to Public Services: An Assessment of Efficiency, Equity, and Voice*", Urban Affairs Review 2002; 38; 70, The online version of this article can be found at <http://uar.sagepub.com/cgi/content/abstract/38/1/70>

²⁴ Walsh , Kieron :*Public Service and Participation and Market Mechanism :Competition ,Contracting and New Public Management* (London: Macmillan Press,1995)

²⁵ Parson, Wayne: *Public Policy: an Introduction to the Theory and Practice of Policy Analysis* ,Edward Elgar ,Cheltenham &Northampton ,1995

rational, at least in good part intendedly so. "²⁶.However, according to Simon, human rationality is limited. Limitation could be caused by one or more of the following; the incomplete and fragmented nature of knowledge, unknown consequences, and limits of attention, i.e. problems that should be dealt with step by step. "attention span of human being, the existence of multiple values and the large measures of uncertainty which confronted decision-makers" Simon offered a number of solutions to the limitations on rationality. Specialist groups and organizations is one of the solutions to overcome the challenge of dealing with repetitive routine decision. The idea of specialist groups can help in determining the reasons behind the government's failure in SWM, particularly in its decisions to contract the private sector to deliver SWM services. Another solution that was introduced by Simon is adversary proceeding; which is instrumental to improving the rationality of decision-making.

"Adversary proceedings are like markets in reducing the information that participants must have in order to behave rationally. Each participant in adversary proceeding is supposed to understand thoroughly his own interests and the factual relating to them. Each pleads his own cause, and in doing so, contributes to general pool of knowledge and understanding."²⁷

²⁶ Ibid

²⁷ Ibid

Another important theoretical framework is the world experiences context whether developed or developing countries. Reviewing countries that have had experienced PSP, is an essential tool to assess the Egyptian experience taking into consideration the different culture and different circumstances. Concerning PSP, there are many scholars who support this kind of solid waste provision by private sector and in collaboration with public body. Those scholars seek the PSP efficient performance, cost reduction and effective services. Their argument is based on the idea that private sector efficiency and effectiveness result from its easy access to technology, its past experience in SWM field, and its inclusion of flexible systems. They also seek, cutting governmental expenditure as a result of governmental employment reduction. Scholars opposed to these ideas are arguing that, solid waste is a public good and it should be delivered by public sector in solid waste provision. They trust public sector in controlling solid waste services provisions and they base their argument against private sector on three main reasons; profit-maximization drive compromises, in most cases, service quality, the tendency to neglect work in low-income areas because of the lower value of its garbage, and the bad condition of labors. ²⁸

UNDP commented on the two extreme arguments and on factors that could enhance the success chances of PSP. UNDP stated in its report entitled "options and issues" that the success of SWM provision is conditional upon a number of factors such as regulatory

²⁸ Roger, Kemp : *Private Sector Participation :the Provision of Public Services by the Private Sector* (Jefferson :McFarland &Company,1991

and political factors as well as the harmony and cooperation between all stakeholders. The prerequisites to satisfactory partnership are the power of the market forces to facilitate PSP; the government's ability to monitor and supervise the work; and the willingness of the community to engage in environmental initiatives.

International experiences showed different results concerning PSP. In developed countries such as the US, Austria and Canada, private sector participation gave satisfactory results. The most exciting experience is that of Austria which is an integrated experience in which all stakeholders, the entire community, municipalities, local companies, and solid waste management advisors, were positively involved. This integrated experience resulted in a low disposal rate, high percentages of recycling rates that reach 69 per cent ,which means lowering the waste to be land filled by 71 per cent in the following next 10 years .²⁹The strategies that were drawn to achieve this rate of success will be a core recommendation in this thesis while taking into consideration the differences in cultures.

Meanwhile, other experiences are found in developing countries. Nairobi, Kenya presents a very good example. After suffering for a long time from the very bad SW services provision, the Nairobi city council contracted a private sector company in 1997 that increased the efficiency of services from 40 per cent to 90 per cent. Previously, the

²⁹ *Management of Environmental Quality: An International Journal* Vol. 18 No. 2, 2007 pp. 126-136 , Emerald Group Publishing Limited 1477-7835DOI 10.1108/14777830710725803

services were provided by municipalities and the informal sector but later it was provided by the private companies.³⁰ The same scenario took place in Tanzania where after a long story of solid waste crisis, the collection efficiency increased from 2 to 75 per cent upon contracting private sector companies.³¹

The case studies that have been successful under private sector provision after a long period of solid waste failure serves as a guide to the Egyptian case to determine the missing policies and weaknesses of the current procedures and arrangements as well as recommend possible remedies.

Another important dimension that will help unravel the present work debate is the communities' environmental awareness. Environmental issues came to the core of the international agenda during 1990s as a factor affecting people's lives and as having a serious implication towards the earth. Both developed and developing countries suffer from environmental degradation but the extent to which people's lives are affected from this degradation is different. Boyce, James K introduced the relationship between human beings and nature, he stated that countries that suffer from high environmental degradation always show inequality between people in terms of power distribution. On the other hand, environmental degradation is less visible in countries where there is an equal distribution of income, high level of education, political rights and civil liberties equally available for all citizens. In Boyce analysis, the relation between human and nature that usually produces losers and winners, suggest that: "environmentally

³⁰ UNCHS, *Privatization of municipal services in East Africa*.

³¹ Ibid

degrading economic activities typically create winners, who reap net benefits from activities, as well as losers, who bear net costs.³²" He commented that losers do not have sufficient power to prevent the winners from imposing the cost of the environmental activities on the losers.

According to the relationship between human beings and nature as stated by Boyce, the level of community awareness towards solid waste also highly affects the success of the services in both developed and developing countries. Solid waste workers have low social status in general whether in developing or developed countries; however, it is more obvious in developing countries. This is because of the negative perception of people towards the solid waste field in general and the disrespect towards its workers. This negative perception creates poor quality workers.³³ To raise the level of people awareness towards environment and particularly towards SWM, many philosophers stated that the process needs education, knowledge, understanding, and change of people attitude. They focus attention on children and students to instill environmental values. Students are more responsive to the surrounding environment.

³² Boyce, James K., *The Political Economy of the Environment*. Published by Edward Elgar Cheltenham, UK. Northampton, MA, USA, 2002

³³ Bartone, C.R., *The role of the private sector in developing countries: Keys to success*. Paper presented at ISWA Conference on Waste Management - Role of the Private Sector, Singapore, 24-25 September 1995.

1.6. Thesis structure

This Chapter has presented the most controversial issue of SWM in Egypt with a focus on the problem at both the macro and micro levels. It has been situated in academic context and within specific debates in the literature.

Chapter two gives a detailed historical background about SWM policies in Egypt. The history will be introduced with focus on the different stakeholders involved in each period. Within the historical context, the legal, institutional and economic framework for SWM will be examined. By the end of this chapter, I will identify and discuss the factors that encourage the Egyptian government's strategy in contracting private sector.

In Chapter three, the key stakeholders in the field of SWM in Egypt will be identified. Emphasis in this chapter will be the exploration of the role and size of the informal sector in Egypt and highlighting the consequences of neglecting them during private sector participation. The informal sector in the international context was explored, particularly in the developing countries in order to indicate the vital role of this sector that is highly affecting SWM.

In Chapter four, the integrated approach of SWM will be explained. Details will be given about how this integrated approach in solid waste management will positively

affect the environment and health. It is intended to explore the international case studies as a useful tool for explaining SWM in the real world. The integrated approach will also include the effect of the community environmental awareness and to what extent it affects the services provision. The chapter attempts to answer the questions about current policies and regulations and if they are enough to drive citizens to abide to environmental requirements or not. Additionally, this chapter will focus on the incentives through which the Egyptian government can encourage people to respect the environment. And finally, the chapter addresses the issue of whether the level of economic status "in other words poverty ", level of education and people perception affect their environmental awareness or not and to what extent.

In light of the findings of the previous chapters, chapter five will assess the current SWM system to determine the reasons behind SWM failure in Egypt in terms of unclean streets, very low percentage of recycling that doesn't exceed 20 per cent that results in environmental pollution, loss of potential economic gains, and unavailability of sanitary land filling sites. By the end of this chapter, I will introduce a proposed system for SWM in Egypt. The proposed system will result from the present research as well as series of interviews with Egyptian SWM advisors.

In Chapter six, the above chapters' findings will be summarized and re-caped. The most relevant and insightful findings supporting or contradicting with the thesis hypothesis will be highlighted.

1.7. Methodology

In the course of the present research, several research methods have been utilized to better explore the present study questions. The study started by examining the various positions on, and perceptions of private sector participation in SWM, it focused on analyzing both arguments and the contradictions between them, which laid out the framework for the present study. The study also referred to and analyzed some international case studies in an effort to guide and shape the answer to the thesis question. Interview and focus groups were important tools, used to address the thesis questions. The main goal of the focus groups was to measure community environmental awareness; assess the understanding and the perception of citizens regarding the environment; and demarcate the extent of the interaction between the public and the international private companies that deliver SWM. Three focus groups were conducted in various income areas; one in a low income area, Sharabyia; one in a middle income area, Hadayek El Koba; and one in a high income area, Heliopolis. The Zabbaleen participated in the focus group, which was conducted to assess their current problems under private sector SWM companies and those resulting from pigs slaughtering. The focus groups consisted of persons within the age of 15 and 70, from both sexes and with different levels of education.

Interviews with SWM advisors and experts also helped in answering the thesis question. Experts from various establishments were interviewed. Some were from governmental

organizations, such as the Cairo Cleanliness and Beautification Authority (CCBA) and the Egyptian Environmental Affairs Agency (EEAA), and others were from NGOs working in environment protection and the empowerment of garbage collectors.

1.8. Conclusion

Theories that best describe the current SWM circumstances in Egypt, are the Public Private Partnership (PPP) and Private Sector Participation (PSP).As previously mentioned, the terms PPP and PSP are used interchangeable; however, there is a minor difference between them.

During the last decades, Egyptian authorities managed solid waste in Egypt through central and local government. Informal private partners such as garbage collectors and formal small private companies have been involved in SWM during the 1900s and until the beginning of 2000. In addition, the international private formal sector has been involved in handling solid waste in Egypt since 2002 through fifteen-year contacts between Egyptian authorities and private international companies. According to the PPP and PSP theories, there are essential prerequisites that should have been secured to achieve successful Public Private Partnership. The theory identified those prerequisites to be system relations, system effectiveness and system dynamics. Based on PPP and

PSP theories, the thesis traces the reasons that weakened the relationship between Egyptian public authorities and the private international companies. In addition, the thesis studies the tasks of each stakeholder; the risks to SWM processes; and the culture that encourages citizens' participation in accordance to the PPP and PSP theories.

There are limitations in the literature itself. It was observed that some of the theories do not reflect the reality of SWM. In addition, the international experiences cannot be applied in Egypt due to the different circumstances, culture and financial resources. However, it is believed that both literature and international context could serve to provide a snapshot of the current key concepts while taking into consideration the differences in analysis. In addition, the unavailable data concerning SWM represents a major limitation in monitoring and comparing the situation before and after private sector participation.

Another important limitation is that the data provided by garbage collectors is contradictory. Some of them exaggerate to attract more attention to their problems while others stick to the facts.

CHAPTER TWO

HISTORICAL BACKGROUND OF SOLID WASTE MANAGEMENT IN

CAIRO DURING 1900s

2.1. Introduction

This chapter provides the historical background of municipal solid waste management during the 1900s in Egypt, particularly Cairo. While it navigates through the fundamental stages of the history of municipal solid waste management, it focuses on the role of the various stakeholders. In particular, it examines the role of garbage collectors during this period. The chapter also examines the legal, institutional, and economic framework of municipal solid waste management. It also analyzes the factors that encouraged the Egyptian government to contract the private sector.

2.2. Definition of Solid Waste

The American Chamber of Commerce in Egypt defines solid waste and semi-solid materials as "... of no value or use in their present state and are disposed of at source although they may be reused or recycled under other conditions". Similarly, the Concise Oxford Dictionary refers to waste as "lack of use or value or useless remains." Waste can also be defined as "A byproduct of human activity. Waste is composed of the same materials of the useful products; but it differs from the useful products by its lack of

value.” As for municipal solid waste, it is a combination of household solid waste and commercial solid waste.³⁴

Waste is found in several forms; however, there are some integral aspects that are instrumental to defining waste. Waste may be found in a solid or semi-solid state, it may be made of several materials such as glass, paper, plastic, or metal. Sources of waste differ; for instance, waste may be food or packaging waste. Likewise, origin of waste ranges from commercial, domestic, agricultural, and industrial. The safety levels of waste also differ, as some can be hazardous while others non hazardous.

2.3. Salient Actors in SWM in Cairo during the 1900s

Traditional garbage collectors, dubbed “Zabbaleen” in Arabic, were the main actors in the process of solid waste management during the 1900s. Zabbaleen were first spotted as early as the mid-1900s around the boundaries of Cairo. They were more densely concentrated in a place that became known, at a later stage, as garbage village. Zabbaleen migrated from the rural south of Egypt or Upper Egypt particularly from Assuit governorate. They originally worked as pig breeders and they were called Zarraba. Most of the Zarraba were Christians as Muslims avoid breeding pigs due to religious beliefs and to negative perceptions of the cleanliness of pigs.

³⁴ P.R. White, M. Franke & P.Hindle, Integrated Solid Waste Management a lifecycle inventory, An ASPEN publication ,New York, Chapman &Hall,1995

Prior to Zabbaleen, there was a prominent actor called “Wahaya”, which is Arabic for “people from the oasis”. In the early 1900s, Wahaya migrated from Dakhla oasis and settled in Bab El Bahr in Cairo. They struck an agreement with the then limited number of Cairo residents to collect their garbage from home. Food waste, which then amounted to almost half of the collected garbage, was gathered, dried and sold as fuel for Turkish and fava bean cooking.

In the 1930s, the established fuel system was disrupted dramatically because food waste was replaced with oil. Disposing of organic waste presented a challenge to Wahaya. They, however, came to an agreement with Zabbaleen by which food waste was fed to pigs. Together, Wahaya and Zabbaleen formed the solid waste collection and disposal processes. Wahaya played a more or less administrative role, as they were responsible for collecting the monthly fees from the clients, which enabled them to garner most of the benefits. On the other hand, Zabbaleen took care of the dirty and tiring part of the processes.³⁵ They separated the waste; delivered paper waste to Wahaya; kept food waste for animal feeding; and sold metal and plastic waste.

During the 1950s, Zarraba appeared in the processes of garbage collection and disposal. However, by the time they carved a place for them in the collection system and

³⁵ Walker, Wendy: *The Torah Zabbaleen ;From tin shacks to high rises* ,The American University in Cairo Press 2005,Cairo,Vol.1

succeeded to get a small share of the monthly fees from Wahaya, Cairo residents were not able to differentiate between Wahaya and Zarraba. To them, both are garbage collectors.³⁶

During the 1900s, solid waste management in Cairo was dependent on the presence of Zabbaleen. Even though Zabbaleen were evicted more than five times in thirty years, Cairo authorities always relocated them to other areas knowing that the solid waste management system was conditional upon their presence. By time, and due to the increase in the quantity of solid waste, which was a direct result of population growth, the system grew. This expansion enabled garbage collectors to bring their relatives on board, who, in the order of things, migrated and settled in the same area of garbage collectors.

In the 1970s, Zabbaleen used donkey carts to transfer the collected garbage from residential areas to their homes. Once in their homes, Zabbaleen separate and sort the collected garbage. Garbage management is a family based business; each member of the family has a role in the process. Traditionally, men and boys collect garbage from households while women and girls handle the sorting in their houses. Sorting that is carried out by women, is considered the most unpleasant part of the process.

³⁶ CID consulting agency, *The Informal Sector in Waste Recycling in Egypt*, Report submitted to GTZ, May 2008

In 1986, the Cairo Cleansing and Beautification Authority (CCBA) was established to supervise solid waste management in Cairo. By 1990s, the great majority of garbage collectors abided by the orders of CCBA and used trucks instead of donkey carts. According to a survey done in 1993, 84 per cent of garbage collectors used truck, while the remaining percentage insisted on using donkey carts, particularly those who work in less patrolled areas.³⁷

2.4. Cairo Cleansing and Beautification Authority

Cairo Cleansing and Beautification Authority (CCBA) was established in Cairo to achieve the following main objectives:

- Supervise the various stakeholders involved in the waste management system
- Provide SWM services to poor, low-income neighborhoods where garbage collectors refuse to provide this service because of the low value of the garbage collected from these areas
- License new Egyptian private garbage collection companies

Simultaneously, the Giza Cleansing and Beautification Authority (GCBA) was established in Giza with almost the same mandate. Prior to the establishment of the CCBA and GCBA, Zabbaleen managed the municipal solid waste management (MSWM) service haphazardly. For example, the service fee was not standardized; it varied from house to house for no consistent or preset criteria. The service also lacked a

³⁷ Assaad, Marie and Bruce, Judith: *Empowering the Next Generation: Girls of the Moquattam Garbage Settlement*. Seeds No.19, 1997

monitoring system. Zabbaleen, however, were not the only service providers at the time. There were a few Egyptian private companies that were licensed to collect garbage from areas not serviced by garbage collectors.

CCBA and GCBA used two completely varied systems in allocating work and contracting garbage collectors depending on the institutional nature of the garbage collector. While CCBA and GCBA awarded licenses and contracts to private companies through competitive bidding and gave them a fee in return for their services, Zabbaleen acquired their licenses by paying deposit money to the CCBA or GCBA to allow them to work. Unlike private companies, they were not contracted and were not given a fee in return for their services. On the contrary, they collected their fees from their clients who on many occasions were reluctant to pay. CCBA assumed responsibility for sweeping and lighting main streets as well as maintaining public parks.

Greater Cairo was divided into 2000 zones. Zabbaleen had to pay an insurance deposit of around 3000 LE to get the license. In addition, CCBA and GCBA charged Zabbaleen between thirty piaster and one Egyptian Pound per apartment per month. Zabbaleen charged households between two and three Egyptian Pounds per apartment depending on the socio-economic level of the district. Zabbaleen owned the collected garbage, particularly the recyclables. Wahaya acted as an intermediary on behalf of Zabbaleen in the process of acquiring licenses from CCBA because the Zabbaleen were illiterate.

Dr. Laila Iskandar, An Egyptian Solid Waste Management Expert, commented on the economic viability of the garbage collection service by Zabbaleen arguing that:

"The one Egyptian pound the Zabbaleen had left after paying the government and the middlemen (waahi) each the same amount, hardly covered the cost of operating, maintaining or upgrading their vehicles, with little or nothing remaining to cover the costs of labor, health and safety, or any other incidental expenses associated with providing the service."³⁸

By the 1990s, Zabbaleen started becoming aware and conscious of the challenges they are facing. Some became literate and were able to deal directly with the authorities on their behalf as well as on behalf of their fellow Zabbaleen who were still illiterate.³⁹

2.5. Why Did The Egyptian Government Seek Private Sector Participation in SWM?

Since the 1990s, Egypt, like many developing countries, started to implement the Economic Reform and Structural Adjustment Program (ERSAP) that was introduced by the IMF and the World Bank. The program advocated privatization and private sector participation in the provision of public projects. It advanced economic liberalization in

³⁸ Iskandar, Laila & Tjell, Jens Chr., Cairo: *A colossal case of waste mismanagement to learn from*, Los Angeles, London, New Delhi and Singapore <http://www.sagepub.com>, Waste Management & Research, 2009

³⁹ CID consulting agency, *The Informal Sector in Waste Recycling in Egypt*, Report submitted to GTZ, May 2008

the form of privatization. In response to the ERSAP, the Cabinet of Ministers issued in 1997 a document entitled "Egypt and the 21st Century". The document addressed many topics, the most important of which is the role of government in relation to private sector participation in the provision of public services. Against this backdrop, the role of the government took a momentous turn to become a regulator and an enabler of an environment conducive to economic activities rather than an implementer of public projects. This change highlighted the need and the importance of introducing policies that guarantees free and fair competition. ⁴⁰

SWM was one of the pressing issues that were opened to Private Sector Participation (PSP) in light of the many weakness and failures that were previously encountered. There was a growing need to expand the coverage of solid waste management throughout Cairo as the population was increasing rapidly (Cairo population reached twelve million in 2000) with daily-generated municipal garbage reaching ten thousand tons. Zabbaleen were able to cover about 30 to 40 per cent of the generated garbage and were able to recycle eighty percent of the collected garbage. To extend the service, the government was left with one alternative, which was to contract local private companies to extend the coverage of solid waste management to the non-covered areas. This

⁴⁰ Cabinet of Ministers, Egypt and the 21st Century (1997), 2.

solution, however, did not fix the problem; on the contrary, it worsened the situation as the garbage in municipal dumpsites was burned. ⁴¹

In addition to the aforementioned factors behind private sector participation, other factors came into play reinforcing this participation. On one level, there is a new global consciousness of the importance of environmental protection and sustainable development. The goal is to limit environmental degradation; manage climate change; and reduce human impact on ecologies. This new trend shaped the Egyptian political and economic agenda; which was manifested in the promulgation of Law 4/1994 reestablishing the Egyptian Environmental Affairs Agency (EEAA). The mandate of the EEAA is environmental protection, including management of solid waste in coordination with other ministries. In 1997, EEAA started to act as the executive branch of the Ministry of State for Environment, which had turned into an independent State Ministry fully committed to environment issues. On another level, international donor agencies put pressure on the Egyptian government to develop short and long-term strategies targeting environmental degradation, and pollution. Internal factors also played an instrumental role in leading the change in SWM. Collection efficiency was very low ranging between 15 and 65 per cent ⁴²; service coverage was also dragging low between 30 and 95 per cent of the areas where the service is offered; and dump sites were very poorly designed. All these were important factors that resulted in the creation

⁴¹ Genana ,Tarek . *Solid Waste Management in Egypt : A Programme for the Next Decade* , EcoConserv, June 2000

⁴² Ibid

of the current SWM system in Egypt. The situation in Upper Egypt was worse than that in Cairo and Alexandria.

In October and November 1999 and 2000, black clouds covered Cairo, which gave rise to a debate about Egypt's environmental problems. The government argued that burning rice straw is the main cause behind air pollution, particularly the black cloud. To counter this problem, the Egyptian government established a Ministerial Committee composed of the Ministries of Health, Environment and Finance. The committee developed an action plan that included developing a program entitled the "Integrated Program for SWM" and launching the "National Strategy for Municipal Solid Waste Management" with the EEAA as the owner of the initiative.⁴³

The poor state of SWM became more visible to the Egyptian community, particularly the media, who played an important role in raising awareness about the problem. It analyzed the problem and its timing and highlighted the possible reasons behind air pollution, in general, and the black cloud, in particular. The media also scrutinized the reasons behind the government's failure to manage solid waste, which resulted in the

⁴³ Behairy ,Heba :*Government environmental policy making private sector participation in solid waste management in Egypt :A case study of Alexandria governorate* , AUC ,2003

piling of garbage around Cairo. The media also paid special attention to the possible solutions and pressured relevant stakeholders for creative solutions.⁴⁴

These reasons and circumstances led the Government to believe that PSP is the most appropriate solution for the SWM problem. The government based its decision to choose private sector international companies on two grounds. The first is the obvious failure of the government in managing the SWM system even in partnership of local private companies and the informal sector's participation. This direction is consistent with the Neoliberal ideology, which argues for minimal government intervention. The second is the efficiency of the private sector in providing SWM services. The private sector owes its efficiency and effectiveness to private sector technological and field experience and strong management skills. Cost effectiveness was also factored in the government's equation, which necessitated cost cuts and employee reduction. Moreover, the success stories of private sector companies in the US and Canada made the solution look more attractive. In both countries, soliciting the services of private sector companies resulted in bolstered efficiency and in a 25 per cent cost reduction.⁴⁵

Almost the same scenario repeated itself in Alexandria, when the government decided to contract international private sector companies to manage the SWM process due to

⁴⁴ Ibid

⁴⁵ Cointreau, Sandra –Levine : *Private Sector Participation in Municipal Solid Waste Services in Developing Countries; Urban Management and the Environment*, UNDP/UNCHS/World Bank,1994

the failure of all other alternatives. In the 1970s, garbage collectors threatened to go on strike if simple basic infrastructure was not provided to their area in Alexandria. The Governor of Alexandria, however, responded by evicting them out of Alexandria. In their place, the authorities in Alexandria contracted small private companies and NGOs and also provided municipal services but on an ad hoc basis. Unfortunately, these efforts did not yield satisfactory results particularly during the summer season when Alexandria receives more than two million visitors seeking to enjoy its nice weather and beautiful beaches. In the year 2000, Alexandria authorities made the decision to contract an international private company after all local service providers proved to be inefficient.⁴⁶The aforementioned reasons and circumstances, whether internal or external, resulted in the evolution of the new trend in SWM in Egypt and encouraged the government to make a series of decisions, the most important of which is PSP.

2.6. Institutional Framework for SWM in Egypt

The administrative ownership of SWM has always been divided between many government bodies whether at the central or local levels. To clarify the role of each government body, it is necessary to focus on the strengths and weakness of the system. This might help answer the question; what was the rationale behind the government's choice of international private sector companies? The assessment will also show the points of weaknesses in the current SWM system.

⁴⁶ Behairy ,Heba :*Government environmental policy making private sector participation in solid waste management in Egypt :A case study of Alexandria governorate* , AUC ,2003

2.6.1. Ministries

The SWM responsibilities do not fall within the mandate of one ministry; they are divided among several ministries. Some ministries handle the technicalities while others handle the financial and organizational side. The relevant ministries form what is called “the Central Government for SWM.”⁴⁷

The Ministry of State for the Environment

The Ministry of State for the Environment, together with the EEAA as its technical and executive arm, has a general mandate for solid waste management. The mandate is to monitor and protect the environment. Some of the more specific tasks include:

- Formulating policies
- Coordinating MSWM issues with the concerned ministries and the informal sector
- Monitoring the implementation process of SWM
- Providing guidelines for accurate and proper MSWM
- Reporting environmental violation to the relevant ministry in charge
- Providing guidelines for health care and hazardous wastes
- Imposing and collecting fines from the violators
- Setting the national strategic waste management plan

⁴⁷ Hamza, Ahmed, "Solid Waste Management in Egypt: National Policy Objectives, Action Plan and Implementation Problems ", April 2002,1

In 1999, the Ministry developed the national waste management strategy, which set the following specific operational objectives for SWM:

- Collection coverage must exceed 60 per cent for towns by 2005 and 70 per cent by 2010.
- Collection coverage must exceed 80 per cent for capitals of governorates by 2005 and 90 per cent by 2010.
- At least 80 per cent of disposal to occur in landfills as opposed to dumpsites by 2005 and 90 per cent by 2010.
- Fifty percent of organic waste generated to be composted by 2005.
- Twenty percent of solid waste generated to be recycled by 2005.
- Forty percent of municipal solid waste to be source segregated into wet and dry by 2005
- Five percent source reduction to be achieved by 2005
- Full cost recovery of waste management services to be reached by 2005
- The level of funding for waste management services to reach 0.35% of GDP by 2005."⁴⁸

However, the results achieved so far are still very far from those set in the strategy. It is worth mentioning that the role of EEAA is restricted to a purely advisory role rather than an executive one since it is not involved in the implementation of the guidelines. The only exception to this role is that the EEAA has the authority to approve the

⁴⁸ *The informal sector in waste recycling in Egypt*; Report submitted to GTZ by CID consulting agency, May 2008

Environmental Impact Assessment "EIA" for new lands, new industrial projects, or environmental activities.

The tasks of EEAA also include the following:

- Identifying landfills for governorates, towns and cities all over Egypt.
- Checking and reviewing EIAs for waste treatment and disposal facilities in cooperation with the concerned local authority. EIA must issue its judgment within sixty days.
- Monitoring the Environmental Register facility to guarantee the consistency of the data collected according to the ideal environmental standards. Towards this end, it prepares samples and carries out other technical tests.

The Ministry of Health

The Ministry of Health is responsible for taking care of environmental health objectives throughout Egypt. It is responsible for inspecting and ensuring safe disposal of hazardous solid waste by all medical institutions that generate waste. Its tasks include overseeing all types of medical institutions whether private or governmental hospitals, teaching hospitals, private and public clinics, private and public labs, and pharmaceutical companies. It has a clear executive responsibility over the enforcement of the safe management of hazardous clinical wastes.

The Ministry of Local Development

The main mandate of this ministry is rural development throughout the country in all fields including solid waste. In cooperation with the Ministry of Defense, the Ministry of Local Development provides funds for local projects such as composting projects.⁴⁹

The Ministry of Finance

The role of the Ministry of Finance is to approve the budget for solid waste management.

The Ministry of Planning

The role of the Ministry of Planning is to approve the plans of capital investments in the field of solid waste management.

The Ministry of Administrative Development

The Ministry of Administrative Development is responsible for setting the grades and levels of the SWM work force.

The Ministry of Agriculture

The Ministry of Agriculture is responsible for agricultural waste management. It directs farmers to the proper recycling technology and methods. For example, it manages the recycling of rice straw to minimize the burning of straw, which presented a pressing environmental problem that started appearing in the late 1990s.

⁴⁹ Ibid

The Ministry of Irrigation and Water Resources

The Ministry of Irrigation and Water Resources is responsible for the protection of the Nile River. Many individuals and institutions pollute the Nile River by disposing their waste in it.

The Ministry of Tourism

The Ministry of Tourism shares the responsibility for the protection of the Nile River with the Ministry of Irrigation and Water Resources.

2.6.2. Local Government

It is essential to have a general overview of the structure of the local government in Egypt to analyze and understand how it is involved in SWM. Egypt has 29 governorates, of which four are urban governorates. These are Cairo, Alexandria, Port Said, and Suez. These governorates have a different administrative division from the other 25 governorates. They are divided into four major municipalities. For example, Cairo is divided into North, South, West and East Cairo. Each of these municipalities is, in turn, divided into districts, "Ahyaa."⁵⁰The other 25 governorates are divided into districts, "Marakez". Each district has a city or mother village, which in turn is divided into smaller villages. Each governorate is headed by a governor who is appointed by the President of Egypt, while the Prime Minister selects the chief for each district.

⁵⁰ Mayfield, James; *Local Governorate in Egypt: Process and the Challenge of Reform*; Cairo; American University Press, 1996, 75.

The following structure illustrates the Egyptian Governorate Executive Structure⁵¹

(table 1)

		Governor		
Level one	District Chiefs	Services Directors	Financial Directors	Director CAOA*
Level two	Planning and follow up department	Governor's office	Development departments	Director of information center
		Secretary General		
Level three	Administrative affairs	Financial affairs		
	Personnel affairs	Local council affairs		

CAOA: Central Agency for Organization and Administration

Upon analyzing the administrative division of Egypt, the following can be deduced:

- The administrative structure is very complex and persons in charge particularly in the first level have dual responsibilities and dual reporting lines. For example, the districts chiefs who are appointed by the Prime Minister have to report to the Ministry of Local Development. Simultaneously, they must report to the local administrative government. The same rules apply to other directors. The first level in this structure reports to central and local government. Dual reporting lines results in what is known as

⁵¹ Ibid

the “dual control principle”, which means that the person in charge is caught in a power game between the various ministries that has a mandate over his/her work.⁵²

The Second level in the administrative structure, the local departments, directly report to the governorate and have no relation to central government. However, they must submit their plans to the first level that, in turn, must submit it to the concerned ministries. For example, the governorate office includes several departments and support office that reports directly to the governorate but not to central government. Development department that is at the second level includes units responsible for specific issues such as the Environment Management Unit "EMU". The tasks of EMU include monitoring and following up on environmental activities, such as MSW dumping, pollution of the environment resulting from burning of agricultural waste, and following up on the implementation of environmental laws and their violation. In some governorates, they participate in policy formulation.⁵³

The third level, administrative affairs, financial affairs, personnel affairs, and local council affairs, report directly to the Secretary General. The Secretary General reports to the Governor whose character affects to a large extent the different procedures depending on whether he/ she believes in centralization or decentralization.

⁵² Ibid

⁵³ Ibid

Planning process

The administrative bodies are involved in the executive processes while the planning process is done through only two councils, the Executive Council and the Local Popular Council. The governor heads the Executive Council at the governorate level while a district manager heads the Executive Council at the district level, and the village head presides over the Executive Council at the village level. Executive Councils generally consist of 12 members who are representatives of the various relevant ministries. They meet once a month. The Executive Council has the following tasks:

- Participate in the preparation of the budgets and the investment plans
- Participate in the preparation of the administrative and financial plans
- Implement and monitoring activities

The Local Popular Council, *El Mahaliate*, consists of 8 or 12 members, depending on the size of the governorate. They represent the people at each district. The tasks of Local Popular Councils are as follows:

- Approval of annual budget and annual social and economic plans
- Participate in the approval of construction, housing, and food security programs
- Impose local fees for some services

The powers and the integrity of Local Popular Councils are usually a subject of questions and criticisms. This, however, differs from one governorate to the other depending on the integrity of the members of the council rather than the structure of the council. In the solid waste management process, Local Popular Councils play a crucial role in contracting private sector companies, particularly international companies. They

also participate in imposing solid waste management fees by adding them to electricity bills.⁵⁴

Waste management at the local level

Waste management at the central level falls within the mandate of the above-mentioned ministries. However, at the local level the situation is so confusing and differs from one governorate to the other. Responsibility for SWM at the local level is dispersed among different authorities. In some governorates, the Environment Management Unit (EMU) takes responsibility for solid waste management at the executive level while other governorates leave this responsibility for the Housing and Public utilities departments. The EEAA in its national strategy for municipal solid waste management report, published in June 2004, stated that most of the solid waste responsibilities lie at the local level whether in the executive or planning phases. They must assume responsibility for waste planning, collection, transportation, dumping, law enforcement, and raising public awareness. Moreover, they are completely involved in the planning phase as well as in following up the implementation phases. The situation in Cairo and Giza governorates are slightly different from other governorates. The CCBA and the GCBA are the responsible authorities that carry out the same tasks of the municipalities in other governorates.⁵⁵ However, those two authorities have separate budget allocations for solid waste.

⁵⁴ Ibid

⁵⁵ El Halwagi, Mokhtar; *Background paper on Municipal Wastes in Egypt*, Cairo ,Number 1,1996

2.7. Institutional, Technical and Financial Inefficiencies in Solid Waste Management

2.7.1. Institutional and Technical inefficiencies

Arnold van de Klundert Inge Lardinois (Waste, the Netherlands) stated that institutional inefficiencies in developing countries is due to a lack in critical and creative thinking and this is a result of the inadequate understanding of the relationship between consumption, disposal, recycling and other related activities.⁵⁶ He added that the lack of talented senior staff in solid waste management, who can politically prioritize the SWM as a top priority for the state, resulted in a weak institutional framework. He maintained that the master plans for solid waste management do not take into consideration the properties of the local systems. The plans are designed according to the systems in the large cities only. Once these plans are approved by the central government, they follow bureaucratic systems. Creative solutions that suit the local environment are not adopted. Arnold argues that this way of thinking is inherited from the 19th century.

Moreover, Arnold correctly highlighted the fragmentation of the management of SWM labors and their undefined responsibilities. In the case of Egypt, this situation is manifested in the fact that SWM labor report to the engineering departments or to the housing and public utilities departments. The undefined responsibilities, lack of clear tasks, lack of resources and bad working conditions all have contributed to institutional inefficiencies.

⁵⁶ Van de klundert, Arnold & Lardinois, Inge :*Community and Private (Formal and Informal) Sector Involvement In Municipal Solid Waste Management In developing Countries* ,Background paper for the UMP workshop in Ittingen 10-12 April ,May 1995

In Egypt, at the institutional level, the performance of the local government in SWM is obviously substandard. This is attributed to many factors. During recent decades, particularly in the 1990s, the development priorities for the Government were focused on health, sanitation, and education, among others, while environment, in terms of waste management, was the least of the government's priorities. This can be seen in the crippled performance and weak capacities of the staff. The SWM staff lacked planning, follow up, and monitoring skills. In most cases, they lacked the required understanding of the SWM scope and how solid waste management works.

The poor performance at the local government level was obvious and was a direct reason for the failure of many recycling initiatives. The experience of Sawiris Foundation for Development⁵⁷ and the Association for the Protection of Environment APE⁵⁸ during 2004 and 2005 showed the poor performance of local government staff. Both organizations worked together to launch recycling programs that included establishing recycling transfer stations in different governorates. The programs showed bad results and very poor outcomes in the cases where local government assumed responsibility for the project. In other cases where the responsibility was endowed with NGOs and the private sector, great success stories were observed. That was stated by one of the founders of the Sawiris Foundation, who also said:

⁵⁷ The Sawiris Foundation for development is a funding agency established in 2001 with main aim of job creation. It has granted a lot of projects in the field of environment particularly SWM with protecting environment and job creations objectives.

⁵⁸ The Association for the Protection of the Environment A.P.E. is a nongovernmental organization with main mission in environmental protection and waste management technologies since 1984

"The poor performance of the staff of El Mahaliate, their lack of understanding, lack of systems for monitoring and following up led to the shutting down of the recycling transfer stations. We had established a lot of recycling outlets and gave the responsibilities to NGOs such as A.P.E and also to the private sector such as EL Gouna Recycling Transfer Station. In both cases, the experiences were of great financial and technical success. El Gouna Recycling Transfer Station reached zero waste. Corruption and poor personal integrity in EL Mahaliate is an important factor behind their failure."

The A.P.E. Director for the period of 2004 added:

"The staff of Local Popular Councils used to run the recycling transfer station until they encountered the first equipment failure due to technical reasons. No action was taken because of lack of regular maintenance system. Once a machine stopped they didn't try to fix the problem. For the first year after the transfer station was established, we used to run it in close cooperation with the staff of the Local Popular Councils to build their capacities until the transfer station reached the neutral point. Once we left, the situation started to deteriorated despite our monthly monitoring visits. We also used to check on the operations by phone and they used to tell us that everything is going well, however; our monthly visits revealed a lot of technical problems and halting of operations. Despite that, no one cared. The situation is totally different when we deal with NGOs or private sector as they have excellent technical experience and their success exceeds ours."

The poor performance of the Local Popular Council staff can be attributed to bad working conditions, very low salaries, lack of training, lack of resources and in some cases lack of offices.

2.7.2. Financial Inefficiencies:

The most critical constraint in SWM is financial resources; the allocated budget and the available resources do not cover the costs of SWM processes and activities. The central government is main funder of SWM in Egypt. However, there are other funding sources such as the cleansing fund and donors' funds, which support SWM. Funds from donors are directed to NGOs or NGOs in cooperation with Ministries.

There is no direct fund for SWM through the central government budget but it follows the central government regulation in other fields. The national budget is divided into the following four sections:

- 1) Salaries and wages to all fields. Since the SWM is one of the public fields, SWM permanent staff is paid under this section of the budget
- 2) Operating cost including the Solid Waste operating cost
- 3) Capital expenditure such as budget for equipment such as vehicles, loaders and tractors
- 4) Investment plan such as building landfills, and composting plants

In addition to the central government fund, there is the cleansing fund,⁵⁹ which is dedicated to solid waste management in Egypt as per Law 38/1967 that was amended by the Laws 31/1976 and 129/1982. This law regulates solid waste management in Egypt including the resources for the cleansing fund. It stipulates that the sources for the cleansing fund is: the obligatory fee, to be paid to local councils by residents of the buildings, which must not exceed two per cent of the nominal rental value; and penalties paid by violators under Article 9 of the same law and other environmental laws. The money raised through this system is very low for the following reasons:

- The registered buildings only pay two per cent while the unregistered buildings don't pay. Many of the building in residential areas in Cairo are unregistered.
- The two per cent is calculated according to the rental fees, which are very low particularly in the case of buildings that were built before 1970.⁶⁰

There are other funding sources for the cleansing fund such as the donors' funds that supports SWM and the funds directed to NGOs or NGOs in cooperation with Ministries. However, these funds are supporting the SWM according to the donor agenda, which may not be compatible with national plans. The insufficient financial resources, as well as the other factors, contribute directly to SWM weakness.

2.8. Conclusion

The above analysis shows the institutional, managerial and financial inefficiencies in SWM in Egypt. At the institutional level, SWM responsibilities are dispersed among

⁵⁹ Egyptian Environmental Affairs Agency, *Laws and Regulations for Solid Waste Management in Egypt*, 2000, 1.

⁶⁰ El Halwagi, Mokhtar; *Background paper on Municipal Wastes in Egypt*, Cairo ,Number 1,1996

various authorities in different Ministries. At the central level, some Ministries are involved as technical Ministries, other as financial or organizational Ministries. The institutional level lacks the adequate understanding of the relationship between consumption, disposal, recycling and other related activities. In addition, at the institutional level, they lack the talented senior staff in solid waste management who can politically prioritize the SWM as a top need for the state. Furthermore, they lack the understanding for the need for comprehensive plans for solid management. The implementation is usually the local government responsibility, which lacks a specialized unit for SWM implementation. This differs from one governorate to the other; in some governorate the SWM implementation is the EMUs responsibility, while in other governorates, it lies with the departments of the Ministry of Housing. The role of EEAA is limited to an advisory rather than executive role. The only exception to this role is the task of approving the EIAs for new lands, new industrial projects, and environmental activities.

The performance of the local government in SWM is obviously poor. This is attributed to the development priorities of the Government, which was highly focused on health, sanitation, and education, among others. However, environment in terms of waste management was the least of the government's priorities. This resulted in poor performance and weak capacities of the staff. The SWM staff lack planning, follow up, and monitoring skills. In most cases, they lacked the required understanding of the SWM scope and how solid waste management works.

The SWM financial resources are insufficient as the allocated budget and the available resources do not cover cost of SWM processes and activities. The main source for funding SWM in Egypt is the central government, followed by the cleansing fund and other funds such as donors' funds that support SWM and funds are that are directed to NGOs or NGOs in cooperation with Ministries. There is no direct fund for SWM through the central government budget but it follows the central government regulation in other fields.

CHAPTER 3

SOLID WASTE MANAGEMENT KEY STAKEHOLDERS, THE FORMAL AND THE INFORMAL SECTORS

3.1. Introduction

This chapter discusses the role of the different stakeholders of SWM in Egypt and assesses the extent of their impact on SWM. It explores, in particular, the role and size of one of the most influential SWM stakeholders in Egypt, the informal sector. The chapter will also study the events and circumstances that led to their involvement in SWM. Finally, it will scrutinize the consequences of contracting international private sector companies and neglecting the informal sector while designing the SWM system in Egypt.

It is important to explore the role of the Egyptian informal sector, particularly in light of the experiences of other developing countries to understand its impact on SWM. A comparative study between the cases of Egypt and other countries will also be conducted to identify points of weaknesses and strengths and mechanisms to improve SWM in Egypt.

3.2. Key stakeholders In Solid Waste Management in Egypt

The stakeholders in SWM can be classified into formal and informal sectors. The formal sector includes:

- Central Government
- Local Government
- Ministries
- Formal private sector "formal small private companies"
- Donors "national and international"
- Commercial waste generators and residents
- Non-Governmental Organization (NGOs)

The informal sector includes (informal private sector):

- Traditional garbage collectors (Zabbaleen)
- Roamers (Sariiha)
- Robabekia and Saxonian peddlers
- Middlemen and intermediary buyers/dealers
- Wholesale merchants of items from roamers 61

In chapter 2, the role of the central government, local government and the different ministries involved in SWM was studied. This chapter will focus on the formal Private

⁶¹ *The informal sector in waste recycling in Egypt* ;Report submitted to GTZ by CID consulting agency, May 2008

Sector "small companies", the International Private Companies and the Non Governmental Organizations (NGOs) that are involved in protecting the environment and work in solid waste management. Finally, the role and size of the informal sector will be explored.

3.2.1. The Formal Private Sector in SWM in Egypt

According to Fruedy, the "formal private sector" can be defined as:

*"Private sector corporations, institutions, firms and individuals, operating registered and/or incorporated businesses with official business licenses, an organized labor force governed by labor laws, some degree of capital investment, and generally modern technology."*⁶²

There are two types of the formal private companies; the formal local private companies, also known as "Small Local Companies", and the International Private Companies. The formal local private companies are involved in SWM in Egypt since 1980s. According to a World Bank report number 43; the number of local companies exceeds 100 companies in Cairo and is about 20 to 40 at the other governorates. Before PSP, there were four types of contracting agreements between the local companies and the government. These are as:

⁶² Van de klundert, Arnold & Ladinois, Inge: *Community and Private (Formal and Informal) Sector Involvement In Municipal Solid Waste Management In developing Countries*, Background paper for the UMP workshop in Ittingen 10-12 April, May 1995

1. Contracting

The government contracted private companies to perform specific services in return for a determined fee and for a specified duration of time. A competitive procurement process was carried out and one firm was selected for the contract. The services that were provided by private companies included solid waste collection, street sweeping, transfer station operation and beach cleansing. Misr Service, Care service, and Europe 2000 are examples of these local private companies. Some drawbacks were experienced during the implementation of these contracts. The contracting process lacked transparency and corruption played a crucial role. The implementation process also lacked government monitoring and supervision.⁶³

2- Concession:

The government awarded a private company a government-owned facility- a dumpsite- to set up and use for the purpose of resources recovery or recycling activities in "composting, paper recycling or transfer and dispose waste". However, this type of contracting is not so widely used in Egypt. For example, in Mansoura city, Dakahlyya, a private firm was awarded a concession of dumpsite to recover recyclables. Later the governorate discovered that the dealer made huge profits and so they canceled the concession. Mismanagement and corruption are factors that lead to the failure of this

⁶³ Cointreau, Sandra –Levine : *Private Sector Participation in Municipal Solid Waste Services in Developing Countries*; Urban Management and the Environment, UNDP/UNCHS/World Bank,1994

type of contracting. Concessions could be more appropriate in the case of large investment projects.⁶⁴

3- Franchise – Licenses

In most countries, waste is owned by local government, which has the right to give a license to a private firm in return for a determined fee. "The firms pay the license fee to the local government." The firm provides services in the concerned area and collects fees from residents in return for the services performed. As per the agreement, the private firm owns the generated waste. A typical example of this type of contractual agreements is what was happening with garbage collectors "Zabbaleen" during 1980s and 1990s. Under this kind of licenses, the local government in Egypt awarded some private firms licenses to operate composting plants that had been set up by the government. The monthly license fee ranged from 3000 to 10000 Egyptian pounds depending on the licensed plant.

However, most of those license agreements failed. A good example is the compost plant at Dakhleya. The private company had financial problems and lacked sufficient technical experience, which resulted in the burning down of the compost plant. There

⁶⁴ Ibid

were few exceptions to these failures one of which was the garbage collectors experience "door to door collection services" ⁶⁵

Franchise or the license has succeeded in developed countries such the US in both large and small cities. This is due to the local authorities' abilities to choose the private firms; and the high level of awareness of residents and their cooperation with the private firms. The authorities chose the firm based on its high technical, financial and investment capabilities to guarantee skilled labor, good track record of experience and good flow of money. In addition, the level of people's awareness and their cooperation with the private companies was a crucial factor in the success of this type of license agreement in waste collection. ⁶⁶

4- Private Subscription – Open Competition

The use of open competition agreements differs between global and national levels. At the global level, households and commercial waste generators in each area hire a firm to provide them with waste services in return for a specified fee. Accordingly, more than one firm operates in the same district, which increases competition but leads to substantial increase in cost. ⁶⁷

⁶⁵ Ibid

⁶⁶ Ibid

⁶⁷ Ibid

In Egypt, this type is observed in the informal sector as “Arbgee, Sarihha, and saxonia peddlers” are usually found in the same areas, particularly in rural areas. Those informal groups, collect the garbage generated from certain areas on demand. They work illegally and are usually on the run from the police.

3.2.2. Multinational Private Companies "Formal Sector "

The year 2002 witnessed, for the first time, the provision of solid waste services by multinational firms in Alexandria. The Egyptian government conducted a bid for SWM in Alexandria and in three administrative zones out of the then four zones of Cairo. The three zones in Cairo were serviced by:

- 1) A Spanish company called FCC. It started working in Cairo East
- 2) An Italian company called AMA. It is an Italian Public Private Partnership Firm, which started working in Cairo North, then won Cairo West
- 3) A Spanish company called Urbaser, which became known later as "Enser". In 2006, the company terminated its contract and left its zone “Middle of Cairo”, as it wasn’t able to accommodate its operations to Egyptian culture and way of life. EL Fostat Company took over for a limited period until AMA won Cairo Middle.
- 4) The fourth zone, "Southern Cairo", is serviced by CCBA, which formed a local company called "EL Fostat". El Fostat Company subcontracted another private company called Europe 2000 to provide Solid Waste services in El Maadi and its

surrounding areas. Later, both Spanish FCC and AMA won some areas in Giza governorates.⁶⁸

3.2.3. The Informal Sector and Solid Waste Management in Egypt

Parson focused in his book entitled “Public Policy: An Introduction to the Theory and Practice of Policy Analysis” on the decision-making process that is shaped by the power and agendas of the various stakeholders such as "power of class, wealth, bureaucratic and political arrangements, pressure group, and technical knowledge or professionals". Those stakeholders lobby to ensure that the decision-making process is in their best interest.⁶⁹

In the case of SWM in Egypt, the technical knowledge concerning SWM is dispersed among different stakeholders. It is obvious that technical experts do not possess SWM experiences, it can rather be found with traditional garbage collectors (Zabbaleen) whose role in the decision making process is totally neglected by the government.

⁶⁸ Van de klundert, Arnold & Ladinois, Inge: *Community and Private (Formal and Informal) Sector Involvement In Municipal Solid Waste Management In developing Countries*, Background paper for the UMP workshop in Ittingen 10-12 April, May 1995

⁶⁹ Parson, Wayne: *Public Policy: an Introduction to the Theory and Practice of Policy Analysis*, Edward Elgar, Cheltenham & Northampton, 1995

Informal sector definition

According to Furedy, the informal sector refers to:

*"...unregistered, unregulated, or casual activities carried out by individuals and/or family or community enterprises, that engage in value-adding activities on a small-scale with minimal capital input, using local materials and labour-intensive techniques."*⁷⁰

Arnold van de Klundert believes that the drivers behind the informal sector's emergence in SWM are mainly poverty, and struggling for survival. Kingsley Haynes also identified the driving forces as poverty, lack of jobs, low productivity, high inflation and high population.⁷¹ He added that the informal activities are initiated personally and spontaneously. He divided the informal sector activities into individuals' or families' activities. The informal activities are not registered, and are always small businesses. Even though they make considerable profits, their profits are still less than the profit of their formal registered counterparts. The informal sector SWM activities include recycling; the garbage collectors, however, recycle items of value only, which are the materials that can be recycled. These activities also include simple ways of waste extraction, handling and transportation.

⁷⁰ Van de Klundert, Arnold & Ladinois, Inge: *Community and Private (Formal and Informal) Sector Involvement In Municipal Solid Waste Management In developing Countries*, Background paper for the UMP workshop in Ittingen 10-12 April, May 1995

⁷¹ Haynes, Kingsley E. & El-Hekim, Sherif M., *The Urban Waste Management Systems in Cairo*, American Geographical Society, Vol. 69, No. 1 (Jan., 1979) pp.101-108

Kingsley Haynes added that religious and ethnic minorities particularly the rural immigrants who are looking for subsistence income carry out the informal sector in SWM. He identified the characteristics of the informal sector and its participation in waste management systems as follow:

- "- Motivated by the need for subsistence activities and survival*
- Performing activities because of their potential to generate income or produce needed goods*
- Using resources too marginal to attract competition from the formal sector*
- Beneath the notice of most decision makers in municipal government, except as an embarrassing nuisance"*⁷²

Informal sector in Egypt

The informal sector that was involved in SWM in Egypt includes different actors; the traditional garbage collectors (Zabbaleen), roamers (Sarriiha), Robabekia, Saxonia peddlers, middlemen, intermediary buyers/dealers and wholesale merchants of recoverable from roamers.

Traditional Garbage Collectors "Zabbaleen"

The history of the emergence of garbage collectors was covered in chapter 2. At this point, it is very important to trace the size of the activities of garbage collectors. It is

⁷² Ibid

estimated that more than 40,000 people in Cairo are involved in collection, transport, recovery and recycling activities, whether directly or indirectly.⁷³ They carried out one third of the SWM activities in Cairo. "The estimated collected garbage in Greater Cairo was 11000 ton daily before the year 2000 while currently the estimated collected garbage in greater Cairo is 25000 ton daily". The informal sector sorted and recycled about 80 to 85 per cent of the collected garbage "about 3000 to 4000 ton daily." In other words, 15 to 20 per cent of the collected garbage is not recycled. They provided a door-to-door service at a minimal fee paid by residents and at no cost to the government.

A survey conducted in 1996 indicated that the informal sector collected about 33 per cent of the total collected waste in Cairo and 40 per cent of the total collected waste in Giza.⁷⁴ On the one hand, the survey stated that the number of the garbage collectors during 1990s in Egypt was estimated to be between 30,000 and 60,000 direct workers. On the other hand, another study conducted in 1994 reported that the size of garbage collectors stands at 30,000 workers in addition to 400 recycling utilities that covered about 70 per cent of the recycling activities in Cairo.⁷⁵ In July 2002, El Ahram Weekly (Issue No.594) announced that the Mokatem garbage collectors were 30,000 workers in addition to 8000 workers in El Motamedia.

⁷³ *Economic Aspects of Informal Sector Activities in Solid Waste Management*, Final Report, 2007 prepared under contract to GTZ and the CWG

⁷⁴ The World Bank report number 22

⁷⁵ Ibid "Economic Aspects of Informal Sector Activities in Solid Waste Management."

Garbage collectors have developed links with the formal and the informal markets for selling recyclable items. In addition to the collection, sorting and recycling activities, they purchase the sorted garbage from the commercial waste generators for recycling, or reuse. They also purchase recyclable items to sell them as reusable goods or as inputs to factories or SME recycling enterprises.⁷⁶

Garbage collection processes among the Zaballeen is a family business where men, women, sons, and daughters have clear and defined roles. Women and girls handle the sorting process while men and boys carry out the collection process.

In 2008, CID consulting conducted a study and submitted it to GTZ. The study identified the main areas where garbage collectors worked. These are:

1) Mokattam: the study identified Mokattam as the largest area for garbage collectors with an estimated population of 60,000. Almost 95 per cent of Mokattam's population works in garbage collection processes. It includes about 1000 small enterprises and workshops specialized in recycling activities.

2) Ezbt El Nakhl, Qalyoubiyya: this area has an estimated population of 25,000. They mainly work in Heliopolis, Zieton and Saria-el Koba.

3) Moetamadeyya: the garbage collectors from this area are involved in the collection process of Mohandessin and Giza;

⁷⁶ Ibid

4) El Baragiil: the garbage collectors from this area collect garbage from Zamalek, Dokki, Agouza, and Embaba. They are also partially involved in the collection process in Mohandessin.

5) Torah: Torah is the only garbage collectors residential area that is totally separated from the area where the actual garbage collection processes take place. In 1998, Maadi inhabitant complained about the garbage sorting that used to take place in Torah. Thus, A.P.E., in coordination with the government, decided to ban any garbage collection processes from taking place in Torah and transferred it to Katamiya. Accordingly, garbage collectors from Torah live in Torah and work in Katamiya, where the sorting and recycling activities take place. They collect garbage from El Maadi, Basateen and Dar el salaam, among other areas.

6) Helwan: In Helwan 80 to 85 per cent of the collected garbage is recycled. The garbage collectors also buy other sorted garbage to recycle it. They also still offer a door-to-door collection service for a minimal fee, compared to other areas. The informal sector in Helwan is linked to other formal and informal markets in Egypt.⁷⁷

Roamers (Sarriiha)

The name Sarriiha refers to the *Modus Operandi* of this group. They roam streets to buy, trade and exchange recyclable items. Sarriiha are found all over Egypt. There are two

⁷⁷*The informal sector in waste recycling in Egypt* ;Report submitted to GTZ by CID consulting agency, May 2008

types of Sarriha; “Sarriha Khrodia” and “Lae’ita”. Sarriha Khrodia are concerned with metal items. The word Khrodia refers to a person specialized in scrap metal. Roamers buy their recyclables from commercial waste generators such as supermarkets and also from institutional waste generators, while Sarriha Khrodia buy metal scrap from workshops. They usually use donkey carts to transport their items. Some of them work for a big trader, dubbed in Arabic "Mo'Allem", who supplies them with cash money and donkey carts. He also usually owns a large area for storage.⁷⁸

“lae’ita”, which means scavengers, collect recyclables from landfills, dump sites and street garbage containers. The lae'ita have increased in numbers, particularly after PSP, as a huge number of garbage collectors lost their jobs and street bins replaced door-to-door collection. Street bins became perfect attractions for scavenging of valuable recyclables. This usually took place either early in the morning or very late in the middle of the night. They almost always left the streets very dirty.

Robabekia and Saxonia Peddlers

Robabekia and Saxonia Peddlers are a traditional that has been around for a long time. They trade unused and old items that they buy from households. Sometimes they fix and reuse the items they trade. They also buy recyclables such as clothes, furniture, dishes, cups, old TV sets, glass bottles and metal scrape.

⁷⁸ Ibid

Middlemen and Intermediary Buyers/Dealers

Middlemen and intermediary buyers/ dealers, traditionally, belong to garbage collectors. They move in and out of garbage collectors' areas; they buy recyclables from the roamers and Saxonia peddlers; they own store area; and they have cash money. This group sells their recyclables to wholesale merchants of recoverable from roamers.⁷⁹

Wholesale Merchants of Recoverable from Roamers

This group works on a larger scale; they buy from roamers, saxonia peddlers and middlemen. Usually they also own warehouses and are specialized in one category of recyclables, particularly inorganic recyclables.⁸⁰

The Economic Impact of the Informal Sector on SWM before and after the PSP

To study the economic impact of the informal sector on SWM, the present analysis will focus on the formal and the informal sectors' economic performance in terms of the percentages of the services they extended, their operation cost and their net profits. It will also explore the economic impact on the informal sector before and after PSP.

⁷⁹ Ibid

⁸⁰ Ibid

It is worth mentioning that both formal and informal sectors are involved in all garbage collection processes but to different extents. These processes include primary collection from households, and transfer of the garbage to secondary collection points where sorting into organic and inorganic waste takes place. "Inorganic waste is further sorted into all kinds of wastes. The following step is recycling activities, and finally dumping the discarded." The following data gives a clear indicator of the performance of each sector.⁸¹

✓ Total material recovered by the informal sector is 2,567,143 tons annually while the total material recovered by the formal sector is 810,667 tons annually. That means the total material recovered by the informal sector is greater than three times the amount of total material recovered by formal sector.

✓ Total net profit earned by garbage collectors and other people in the informal sector is EGP 606,742,043 per year while the total net profit for the formal sector is EGP 29, 087, 3175 per year. This reveals that the informal net profit is twenty times higher than the formal net profit.

✓ Total annual sales of the recycled products are LE 197,524,095 for the informal sector.

✓ The informal sector recycled 84 per cent of the collected waste; while, the formal sector recycled of 45 per cent of the collected waste.

⁸¹ *Economic Aspects of Informal Sector Activities in Solid Waste Management*, Final Report, 2007 prepared under contract to GTZ and the CWG

It is worth noting that profits for the informal sector comes from service fees, recycling activities, and street sweeping

The mentioned data indicates that the informal sector participates by handling larger quantities of waste material at a lower cost than that of the formal sector resulting in more profits for the informal sector.

After PSP, the system has been based upon the fact that all household solid waste is handled by the formal sector and no more waste is handled by the informal sector. This resulted in a 30 per cent drop in the volume of recycling carried out by both the formal and the informal sectors. In addition to the economic loss created by the decrease in the recycling volume, the volume of the material dumped surged by 27 to 44 per cent.⁸²

*"The percentage of material recovered drops in the subtraction scenario from 73% to 42%."*⁸³

As mentioned previously, one of the major challenges faced by formal international companies in Alexandria and Cairo was the lack of experienced labor and lack of a solid understanding of the operating environment. Therefore, their last resort was to contract garbage collectors, which they did through the following:

1. Formal relationship with middleman

⁸² Ibid

⁸³ Ibid

2. Informal relationship between the garbage collectors and the staff of multinational companies, i.e. sub-contracting
3. Hiring waged labor from the traditional garbage collectors, particularly those who lost their jobs due to PSP

However, the informal sector still operates informally and through sub-contracting with international companies. This leads to a decrease in the volume of recycling and loss of profits. The study conducted by GTZ and WCG concluded that the informal sector lost about 80 million Euros in annual net profit due to PSP.

The activities performed by the formal sector have increased compared to the period before PSP; however, the private sector did not achieve good results in the recycling activities even after cooperation with the informal sector.⁸⁴

The Informal Sector in the International Context

Based on the previous analysis, it can be deduced that the size and the role of the informal sector at the national level affects SWM in Egypt to a large extent. Therefore, the new trend of PSP in Egypt that has been implemented during 2002 and 2003 should be studied in light of the presence of these groups. In addition, it will also study the size, power and impact of the informal sector on SWM at the global level.

⁸⁴ Ibid

Informal Sector at International Context, "General Comments"

The presence of the informal sector in SWM is a global reality particularly in developing countries. In the countries of the South, it is estimated that about 20 to 70 per cent of the informal sector labor work in SWM.⁸⁵ Globally, the main activities that the informal sector is involved in are recycling and recovery of recyclables. Those activities recover tons of disposals leading to:

- 1) The support of poor marginalized people
- 2) Decreasing public cost in the field of SWM by lowering the volume of waste dumped

At the global level, it has always been realized that the cost of recycling activities through the informal sector is less than that through the formal sector. However, the activities of both the formal and the informal sectors are interrelated and it is difficult to separate them. Even if the informal sector is marginalized, the work in both sectors is still interconnected but the overall cost of recycling and other activities increases. Informal sector activities, particularly in recycling and in waste recovery lead to environmental benefits. The waste recovery process provides needed materials to industries, thus it decreases the rate of consumption of natural resources and decreases mining and refining processes.

⁸⁵ Ali, Mansour, *The informal sector: what is worth?* Waterlines, Vol. 17, No. 3, January 1999

The Size of Activities in the informal sector in Some Cities All Over the World

WASTE, an advisor on urban environment and development, conducted a study to assess the informal sector in six cities in different countries. The study was conducted in cooperation with Gouda, the Netherlands, Skat, Swiss resource centre and consultancy for development, and St. Gallen, Switzerland. The six cities are:

- Cairo, Egypt
- Cluj-Napoca, Romania
- Lima, Peru
- Lusaka, Zambia
- Pune, India
- Quezon City, the Philippines

The study stated that the six cities have significant informal sector activities alongside the formal sector, and that the informal sectors are involved in recycling, recovery activities and waste trading. The recycling activities are considered the main source of income for the informal sector.

The study also stated that the formal sector's main focus is waste collection and disposal while waste recovery and recycling is considered their secondary concern and usually is the informal sector's responsibility. However, Lusaka is considered the example of the informal sector that was involved illegally in waste collection, transportation and disposal for almost a third of the generated garbage in the city.

The formal sector in the six cities has limited recycling activities except in Pune, where the formal sector has some recycling activities. Their recycling rate is also considered low in comparison with the informal one. It is also observed that in all six cities, the cost in the informal sector is substantially lower than that in the formal sector.

The composting of organic and food waste for all six cities is the informal sector's primary activity, in addition to the inorganic recycling. However, each city has its own technique for composting.⁸⁶

Cluj-Napoca, Romania: informal sector

Cluj-Napoca is located in Romania at the Northern West. Romania joined the European Union in 2007. The formal and the informal sectors are participating in SWM at Cluj-Napoca city. The informal sector is involved mainly in recovery of waste processes. However, the recyclables are sold at low prices because they don't do much processing of recovery. The number of the informal participants is almost about 3226. They mainly work as door-to-door collectors, street pickers and dump pickers. They operate as family businesses and in some cases, on their own. They transport the wastes using bicycle or donkey carts. Part of the collected waste is utilized for the personal use "feeding, clothing etc." and the rest is sold as a source of income

⁸⁶ Ibid

Informal against formal sector in Waste Management

On one hand, the informal sector in Cluj city collects about 10 per cent of the total waste to be collected in the city and they achieve 100 per cent of recovery for the collected waste. On the other hand, the formal sector collects 90 per cent of the garbage but they only recover 6 per cent of the collected garbage.

Lima and Callo Cities - Peru:

The cities of Lima and Callo are located in Peru. They consist of 49 districts. The formal sector works in 25 districts through municipality equipment and crews while the informal sector works in the other districts through concession agreement. The main activity for the informal sector in those cities is the inorganic recycling that is then sold through more than 750 shops. As for the collected organic waste it is passed to the piggeries. The informal sector participates in the collection process by very low percentages and usually carries out the sorting and recycling in streets, dumpsites and in municipal collection trucks, in transfer stations, and in landfills.

Informal Versus Formal Sector in Waste Management

The informal sector participates in 45 per cent of waste processes and recycles about 62 per cent of the collected garbage. While the formal sector deals with 55 per cent of waste processes, they only recover and recycle 0.5 per cent of the collected garbage.

Lusaka –Zambia- Africa

Lusaka is located in the central Zambia. The informal sector consists of unregistered informal waste collectors, street pickers and dumpsite pickers. The study stated that, despite the presence of a formal licensed company that won a franchise contract in SWM field, the unregistered waste collectors violate this system and collect and sort garbage illegally throwing the rubbish. "Unwanted garbage and its potential is to be dumped" on the road to avoid paying landfill fees. The study also revealed that the high unemployment rate and poverty are the main reasons behind the emergence of this group.

Informal Versus Formal Sector in Waste Management

The informal sector in this city contributes in collecting more than 50 per cent of the garbage to be collected; however, they only achieve 5,5 per cent of material recovery from the collected garbage. The formal sector achieves less than the informal sector in collection process but it exceeds the material recovery percentage as they recover about 13 per cent of the collected garbage.

Pune- India:

Pune is the financial capital of India and it is located in the Southeast of Mumbai. Both formal and informal sectors contribute in SWM. The informal sector forms a sort of union of waste pickers, waste buyers, scrape dealers, farmers, informal sector composting agents, and residents in landfills.

Informal against formal sector in Waste Management

The informal sector contributes in collecting almost the third of the garbage to be collected and achieves 89 per cent of material recovery while the formal sector contributes in collecting the other two thirds of the garbage and does not carry out any recycling and recovery processes.

Quezon-Metro Manila- Philippines:

Quezon is a part of Metro Manila in Philippines. It has the highest population in comparison to the other six cities in the study. The most significant issue in SWM in Quezon is that the informal sector recycles all of the waste that they handle. Moreover, they receive some of the collected garbage through the formal sector. They never dump any collected garbage.

Informal Versus formal sector in Waste Management

The informal sector contributes in collecting almost less than the third of the garbage to be collected (about 20 per cent) and achieves 100 per cent material recovery while the formal sector contributes in collecting more than two thirds of the collected garbage, 80 per cent and only 3 per cent of this collected waste is recovered.⁸⁷

⁸⁷ Ibid

3.4. Conclusion

The above analysis elaborates the role and the size of both formal and informal sector in SWM in Egypt. It also focuses on the global experiences in six cities in different countries with respect to the role of the informal sector.

The general conclusion that emerges from the study is that the presence of the informal sector in SWM is a global reality particularly in developing countries. The reasons behind that, according to Arnold van de Klundert, are poverty, and struggling for survival. According to Kingsley Haynes, lack of jobs, low productivity, high inflation and high population in addition to the high unemployment rate and poverty are the driving forces for the informal sector emergence.

The analysis showed also that the informal sector in different countries shares some significant features in spite of the differences between the countries. It is estimated that the informal sector labor force, in countries of the South, in the field of SWM ranges from 20 to 70 per cent.⁸⁸ .

Globally, the informal sector is mainly involved in recycling and recovery of recyclables. Those activities recover a lot of tons of disposal leading to supporting poor marginalized people and decreasing public cost in the field of SWM by lowering the volume of waste that is dumped.

⁸⁸ Ali, Mansour, *The informal sector: what is worth?* Waterlines, Vol. 17, No. 3, January 1999

Moreover, globally the cost of the recycling activities at the informal sector level is less than the cost at the formal sector level. However, the activities of both the formal and the informal sectors are both interrelated and it is difficult to separate them. Even if the informal sector is marginalized, the work is still connected to each other but the overall cost of recycling and other activities is higher than in the case of the operation of the informal sector solely. The activities of the informal sector, particularly in recycling and in waste recovery lead to environmental benefits. As the waste recovery process provides materials to industry so the damage of natural resources by mining and refining processes is reduced. In addition to the environmental benefits, the informal sector has significant economical benefits.

At the national level, the size of the informal sector is estimated to be more than 40,000 people in Cairo, whether they're related to the sector directly or indirectly. They are involved in collection, transport, recovery and recycling activities.⁸⁹ They carried out one third of the SWM activities in Cairo. "The estimated collected garbage in Greater Cairo was 11000 ton daily before the year 2000 while currently the estimated collected garbage in greater Cairo is 25000 ton daily".

The informal sector sorts and recycles about 80 to 85 per cent of the collected garbage, which amounts to "about 3000 to 4000 ton daily". In other words, only 15 to 20 per cent of the collected garbage is not recycled. From the economic perspective and in comparison to the formal sector, the informal sector in Egypt participated by handling

⁸⁹ *Economic Aspects of Informal Sector Activities in Solid Waste Management*, Final Report, 2007 prepared under contract to GTZ and the CWG

larger quantities of waste material at a lower cost than that of the formal sector resulting in more profits for the informal sector.

It is obvious that the size of garbage collectors, their technical experiences and the active role they played in SWM in Egypt should have been taken into consideration while designing and implementing any new trend. In addition, the informal sector has added socioeconomic benefits for marginalized people in Egypt. In brief, it may be stated that the Egyptian government's incomprehensive assessment of the roles of the various actors in SWM in Egypt, during the process of contracting private sector international companies, has further weakened the SWM system because it ignored an important stakeholder.

CHAPTER 4

SOLID WASTE MANAGEMENT INTEGRATION APPROACH

4.1. Introduction

The goal of this chapter is to study the integration approach of SWM. It is argued that one of the reasons behind the failure of SWM is the lack of an integration approach, particularly in strategic planning, decision-making and the implementation processes. It is also believed that, this approach could achieve satisfactory results that positively affect health and environment.

The integration approach does not only include technical issues but also the community environmental behavior and the SWM policies and regulations. The environmental behavior of citizens as well as the legal framework has a significant impact on the provision of SWM services. In this part of the research, those two important issues will be raised to assess their effect on the performance of SWM and to understand whether the current policies and regulations are sufficient to ensure citizens' compliance. Moreover, this chapter will focus on the incentives through which the Egyptian government can encourage people to respect the environment.

It is important to assess the case of SWM in Egypt in light of the international case studies, whether they're successful or failed experiences, as it is a useful tool in

understanding SWM in practice. Finally, this chapter will examine whether or not factors such as poverty levels, education levels, and people's perceptions affect their level of environmental awareness.

4.2. The Integration Approach

Integrated approach refers to:

"The integration of different aspects of sustainability, the adjustment of the conception to the habitat scale and the co-operation with different stakeholders such as citizens and domiciled companies."⁹⁰

The definition of an integrated approach encompasses several aspects that are integral to achieving an integrated SWM. These include:

- ✓ Sustainable development
- ✓ Integration of different activities that guarantee sustainability in solid waste management such as collection, transfer, recycling technologies, incineration, and land filling,
- ✓ Citizens behavior,
- ✓ Enforcement of current environmental policies and regulation and the cooperation between different stakeholders in SWM.⁹¹

⁹⁰ Moczygomba, Elena & Smaka-Kincl, Vensa : *69 per cent recycling rate for waste management in Graz, Austria*, Management of Environmental Quality: An International Journal Vol. 18 No. 2, 2007pp. 126-136 , Emerald Group Publishing Limited 1477-7835 DOI 10.1108/14777830710725803

⁹¹ Ibid

4.2.1. Sustainable development

The concept of sustainable development is one of the main pillars that should be taken into consideration to achieve integration. This concept was addressed in the World Conversation Strategy in 1980 and by the year 1987 it was adopted in the World Commission on Environment and Development (WCED). Sustainable development is defined as:

*"...the development that meets the needs of present generations without compromising the ability of future generations to meet their own needs."*⁹²

The understanding of sustainable development elaborates many important issues concerning present and future generations and the available resources. Regarding the present generations, intervention should focus on satisfying current needs, solving current problems and introducing appropriate solutions. Ongoing projects and current interventions, however, should not compromise the ability of future generations to satisfy their needs and solve their problems. In other words, environmental resources must be sustained for the welfare of future generations. In addition, sustainable development focuses on the notion of environmentally and economically sustainable projects, preferably at the global level.⁹³

⁹² Bojo, Jan, Maler, Karl-Goran & Unemo, Leno, *Environment and Development: An Economic Approach*. Published by Kluwer academic publisher \Boston \London, 1992

⁹³ Brown, Lester R. & Flavin, Christopher & Postel, Sandra; *"Saving the planet: How to shape an environmentally sustainable global economy."* Published by Earth scan Publications Ltd, London, 1992.

In order to ensure the sustainability of any project, many aspects must be taken into consideration, the most important of which are economic feasibility and community participation. Economic feasibility of environmental projects could guarantee success and sustainability if designed on economically sound basis. However, SWM in Egypt lacks the concept of economic feasibility as it neglects the processes that generate economic benefits such as recycling and recovery. The Egyptian government has contracted international firms on the basis of achieving 20 per cent recycling activities, which translates into a loss of 80 per cent of recycling. This wastes economic resources, harms the environment, and increases the volume of dumped waste, a fact that poses a high risk to future generations. It is obvious that these factors are intertwined because if project planning lacks economic feasibility, the natural resources and the environment are affected adversely.

In addition to attaining economic feasibility, it is important to ensure community participation in designing and implementation of projects. The different scholars and practitioners refer to participation in various ways. On the one hand, some scholars believe that participation is a notion related to political processes only while others, such as activist groups, argue that participation must also be in the decision making process. On the other hand, economists restrict community participation only to reaping economic benefits i.e. all stakeholders have the right to share equitable benefits from the project. Others see participation as a tool to enhance the quality of projects.

Regarding environmentally oriented projects, participation could be an active process by which beneficiaries and stakeholders influence the direction and the implementation of development projects. This will serve their wellbeing in terms of income, personal growth, and self-reliance, among other things. From an environmental perspective, the beneficiaries could be community stakeholders such as public sector, private sector, NGOs, and citizens as they all benefit from a clean environment and suffer from a polluted environment. Since environmental resources are a public good and all community stakeholders benefit from it, they all should play a role in protecting the environment. Participation is not only considered as one of the factors that leads to sustainable development but it also empowers communities.

"In community, instead of being ignored, denied, hidden, or changed, human differences are celebrated as gifts."(M. Scott Peck, the Different Drum)⁹⁴

Communities with high participation enjoy involving all community groups with the benefit of engaging special talents and interests of contributing organizations, which makes everyone feels responsible. In addition, participating communities usually behave openly with clear vision and clear current and future plans concerning their

⁹⁴ Reid , J. Norman , *How People Power Brings Sustainable Benefits to Communities*, USAID Rural Development ,Office of Community Development, June 2000

projects. Naturally, this allows all community members and stakeholders to determine their role and their opportunities.⁹⁵

Against this background, one can conclude that the SWM process in Egypt did not involve all relevant stakeholders. For instance, garbage collectors were ignored during the decision-making process of government partnership with international companies. This process did not also involve the relevant NGOs who have long experiences in dealing with SWM problems. The process also failed to involve citizens who are the primary beneficiaries of the service. This unilateral decision-making process resulted in poor strategic planning, poor SWM service provision, and unsustainable and unfeasible SWM projects. Nevertheless, the most harmful consequences were that the garbage collectors lost their role and rights and became more vulnerable; and that citizens became more skeptical of the SWM system.

4.3. Integration of Solid Waste Management Processes

To understand the integrated approach, the successful case of Graz, Austria will be examined and contrasted against the unilateral decision-making process of SWM in Egypt.

⁹⁵ Ibid

4.3.1 The Case of Graz, Austria

The case of Graz, Austria is considered as one of the best cases in the application of integrated SWM. In this case, the purpose was to increase the profits of municipalities to allocate more money to SWM and to bolster the protection of the environment. Towards this end, a new method was introduced to reach higher rates of collection and recycling, thus generating higher net profit. The city of Graz dealt with this issue holistically and followed an integrated approach to achieve the city goal. They also adopted a participatory approach where they ensured that the entire population, local private companies, municipalities, and key stakeholders, are involved.

"The integration of different aspects of sustainability, the adjustment of the conception to the habitat scale and the co-operation with different stakeholders such as citizens and domiciled companies."

The city had planned to approach all aspects of solid waste management and it set practical steps to achieving their goals. These steps are:

Waste reduction through waste prevention: as waste production increases, the cost of waste disposal also increases. Therefore, the city started by measuring public awareness of the concept of waste prevention and garbage separation at source, by using surveys and interviews. The collected data was used as a baseline survey to inform the design of a public campaign under the supervision of the SWM advisors. For the purpose of waste prevention, the City of Graz established the "Waste Advising Centre" that was the first center in Austria responsible for enhancing public awareness

of waste prevention and recycling activities in an ecological cycle⁹⁶. The city also made the decision to introduce garbage separation at source to all citizens.

Firstly, the City of Graz approached the community as the most important stakeholder. It measured their awareness, identified their need, determined their role, and developed a plan of action to achieve the first objective, which is waste prevention. The city of Graz bolstered this step by amending policies to obligate all citizens to apply source separation.

High rate of waste collection and recycling: The rationale behind this objective was to achieve a clean environment through higher collection rate; increase economic return by raising the recycling rate to 69 per cent of the collected garbage; and protect the environment by protecting soil, air and water and by reducing the volume of dumped waste (not to exceed 14% of the collected garbage).

The city approached these goals through various means, the most important of which was the "Industrial ecology-closed loop". This system uses waste as inputs for new

⁹⁶Industrial ecology: "is the shifting of industrial process from linear (open loop) systems, in which resource and capital investments move through the system to become waste, to a closed loop system where wastes become inputs for new processes."

processes, which results in zero waste and profitable environmental products. Industrial ecology is an approach that aims to achieve sustainable political economy.⁹⁷

To achieve this goal, the city applied many techniques such as composting; "recycling of the organic waste and food waste into fertilizers"; energy production; and recycling of all inorganic parts such as paper and plastic. The city enforced a large number of regulations concerning dealing with wastes and the techniques to be employed in recycling. For example, regulations stipulated that if the calorific value of waste is high, the waste must be recycled to produce energy rather than being recycled into other products.

Strategic planning: The city approached SWM strategically; it determined its long-term objectives and developed a long-term plan with various scenarios. Carter McNamara defined strategic planning as follows:

*"Strategic planning determines where an organization is going over the next year or more, how it's going to get there and how it'll know if it got there or not. The focus of a strategic plan is usually on the entire organization, while the focus of a business plan is usually on a particular product, service or program."*⁹⁸

⁹⁷ Skikku, Laura, *Eco-industrial parks ;a background report for the eco – industrial park project at Rantasalmi* ,Regional Council of Etela-Savo 71, 2006

⁹⁸ McNamara, Carter , *Strategic Planning (in nonprofit or for-profit organizations*, published by Authenticity Consulting, LLC

The city of Graz approached the SWM holistically by encompassing all aspects and did not, for example, focus on one service such as collection. In line with their objective to achieve a higher collection and recycling rate, the city focused on the entire SWM process in a long-term plan. They started in the 1980s and prepared their objectives and their action plan until the beginning of 2000. They estimated the amount of the generated garbage each year; calculated the percentage increase; and developed several scenarios based on their objectives. For example, one of the objectives is to reduce the dumped waste by 71 per cent by the year 2014.

Dumping the 14 per cent of non-recycled waste: The last step for the city was to adopt a strategy to deal with the non-recycled waste. The city didn't approach this issue by establishing a new landfill but they participated with the Slovene City of Maribor to use their landfill. Using the already existing landfill in exchange for a certain amount of money was cheaper than establishing a new one. They also based their plan on the objective of reducing dumped waste by 71 per cent by 2014.⁹⁹

⁹⁹ Moczygemba, Elena & Smaka-Kincl, Vensa : *69 per cent recycling rate for waste management in Graz, Austria*, Management of Environmental Quality: An International Journal Vol. 18 No. 2, 2007pp. 126-136

4.3.2. The Case of Egypt, Lack of an Integrated Approach–(Unilateral Decision-Making)

The previous chapters of this thesis reveal that SWM in Egypt is plagued by a series of weaknesses related to institutional, technical and financial problems. The lack of integrated approach is a direct factor for the failure. The case of the city of Graz showed that the integrated approach is key to guaranteeing sustainable development, as well as protecting the environment, coupled with economic success. The Egyptian case showed that solid waste management is dispersed among more than one structure and ministry that lacked the vision of cooperation and planning between different stakeholders. In addition, each ministry or structure approaches each SWM process separately; for example, relevant authorities planned for waste collection regardless of how much recycling rate is to be achieved and how many landfills are needed. The planning process for waste collection is done separately from the treatment and disposal of the non-recycled garbage. In the case of contracting private sector, the government asked international companies to recycle only 20 per cent of the collected garbage i.e. 80 per cent of the collected garbage was to be dumped. They never considered the issue of citizen behavior as an important factor that could contribute to improving SWM. The government didn't consider requiring institutions to develop plans to raise public awareness.

a. The Egyptian Approach Towards Waste Collection and Recycling

Chapter two examined the institutional framework of SWM in Egypt, which sheds light on the weaknesses of solid waste at the managerial level. In this section and to assess the whole SWM system, the process of waste collection will be examined. Generated waste can be divided into many types; municipal waste which is produced from residential areas; commercial and institutional sources; agricultural waste; medical and hazardous waste; demolition waste; sewage waste; and industrial waste. In 2001, Egypt generated more than 15 million tons of municipal solid waste and by 2006 and 2007, the volume increased to 21 million tons. Forty per cent of this amount is generated in rural areas.

According to a recent study by the Central Agency for Public Mobilization and Statistics, the percentages of the produced waste are as shown in table 2.

Table 2: percentage of the produced wastes in Egypt 2008

Solid waste	Percentage
Solid waste resulting from canals and sewage	49%
Municipal waste	25%
Demolition and construction waste	7%
Industrial waste	10%

Agricultural waste	6%
Municipal sewage	3%

Source is: The Central Agency for Public Mobilization And Statistics for the year 2008

It is worth mentioning that, the type of waste of concern to the present study is the municipal waste. According to a study done by the National Environmental Action Plan of Egypt for the year 1992, household waste represented 68 per cent of the total municipal waste; waste from street sweeping was 12 per cent; waste from commercial processes was 11 per cent; waste produced from industrial establishments represented 5 per cent; and waste produced from institutions such as hospitals, hotels, and educational institutions was 4 per cent.

It is estimated that the average amount of the daily produced garbage per person ranges from 0.1 to 1.1Kg and the average is 0.7 Kg. The amount of garbage produced is affected by the standard of living, economic status, geographical location and social factors. Therefore, in the poor areas the amount of garbage produced per person is very low and the composition of garbage is totally different from that in richer areas. According to a study by EEAA, Cairo scored the highest percentage of generation of municipal waste followed by the Delta region and then Alexandria. Upper Egypt is the lowest area in waste generation.

Concerning the efficiency of waste collection, the Central Agency for Public Mobilization and Statistics stated in its report published in March 2010, “the efficiency

of garbage collection did not exceed 77% from the generated waste during the year 2008. There are huge amounts of accumulated garbage in streets, in empty lots spaces, between buildings, in slum areas; in canals, rivers and in very vital areas.” The report stated that the open burning of garbage is considered as a main way for garbage disposal and is also considered the main source of air pollution.¹⁰⁰ According to a report entitled "Control Measures to Reduce Pollutant's Levels in the Greater Cairo", published by Air and Waste Management Association (AWMA), USA-June 2008, the open burning of the municipal solid waste represents the second factor affecting air pollution (12 per cent) while the burning of agriculture waste is considered the main source of air pollution in Greater Cairo.¹⁰¹ This means that open burning, whether of agriculture or municipal waste, caused more than 50 per cent of air pollution in Greater Cairo during the last few years.

Waste collection efficiency in Egypt suffers from many obstacles, the most pressing of which is the behavior of the citizen who lacks the understanding of the importance of environment protection. This is mainly due to the relevant institutions' lack of appreciation of the importance of raising public awareness. The source separation for garbage is another critical process that led to great results in other countries in SWM as a whole. Source separation means that citizens have to separate their garbage to wet and dry or food and non-food. Non-separated waste leads to difficulties in dealing with

¹⁰⁰ The annual report for environment statistics for the year 2008 by the Central Agency for Public Mobilisation And Statistics, the report published in March 2010, available at <http://www.capmas.gov.eg>

¹⁰¹ Control Measures to Reduce Pollutant's Levels in the Greater Cairo by Air and Waste Management Association (AWMA), USA-June 2008

waste during recycling, decreasing the recycling opportunities and increasing the waste to be dumped, which result in soil contamination and open burning. Another hazard is that the non-separated waste contains medical waste from houses such as used syringes and medicines that may lead to many serious problems to garbage collectors.

Waste collection suffers also from the fact that the international companies applied a European method in which the collection of garbage takes place at definite times, early in the morning and afternoon and through containers in streets. This did not account for the Egyptian behavior and culture in which citizens are not used to abide by strict timing in collection and requires individuals to drop off their garbage in containers in streets to then be collected.

b. The Egyptian approach towards waste treatment and disposal, landfill and dumpsite

Waste treatment and disposal methods are done through composting, incineration or landfills besides recycling. Over the past three decades, open dumping has been common practice, which has progressively been a source of air and water pollution. Treatment of the rejected waste through sanitary landfills, composting and incineration are still in the primitive phases whether in planning or in implementation stages. About 88 per cent of the collected waste is disposed in open dumps in urban areas, while in the rural communities solid waste is left in the streets or dumped in drainage canals.

About 20 per cent recycling activities take place particularly in Cairo.¹⁰² In this part, the research will elaborate on composting and incineration, landfill and dumpsite.

Landfill and dumpsite

Disposal of the waste should be done in sanitary landfill with specific design features that prevent the infiltration of fermented waste elements to the soil. However, sanitary landfills in Egypt still suffer from many drawbacks. Instead of the sanitary landfill, dumpsites are dispersed randomly and open burn is commonly practiced.¹⁰³ Currently, there are, what may be called, semi landfills in Cairo, Giza and Alexandria; in addition to, other two landfills in Upper Egypt and one landfill in Aswan. The Aswan landfill that was implemented and financed by GTZ is a demonstrating small landfill. In light of the very low number and the improper sanitary landfills, the dumpsites whether official or illegal face a large number of problems that lead to a substantial increase in environmental pollution. The most pressing problem is the determination of the dumpsites locations. This step is carried out randomly without any comprehensive plan as each governorate determines the location of the dumpsite separately without coordination with other authorities. For example, in 1986, Cairo governorate allocated 25 acres for the first sanitary landfill in Cairo. In 1991, 5 years, later they discovered that the land is a military security area and they had to cancel the plan.¹⁰⁴ In addition to the lack of coordination in allocating dumpsites or landfill sites,

¹⁰² World Bank Report No. 31993-EG.

¹⁰³ Solid Waste Management Strategy for Dakahleya Governorate, March 1999, section 2

¹⁰⁴ Report on dumpsites by the technical cooperation office for the environment ,EEAA,1996

the lack of proper clear criteria for selecting the dumpsite location is another problem. This is what happened in Alexandria, where the two dumpsites are just two or three kilometers away from a residential area. These locations triggered serious environmental problems in the residential area such as bad smell, air pollution and the spread of insects and flies.¹⁰⁵

The lack of coordination and the conflict between different structure bodies, concerning dumpsites land allocation, is also very obvious. In Giza governorate, the Giza Cleansing and Beatification Authority selected and started the operation of a dumpsite in Shabramant, which is very near to Saqqara area home to the Step pyramid. Therefore, the Supreme Council of Antiquities refused to construct the site. Likewise, the Aswan Governorate authority selected a dumpsite in Aswan very near to Abou Simbel temple in a very unique area which is much more suitable to luxury residential buildings.¹⁰⁶ EEAA has started to identify the criteria for selecting dumpsites locations in a program in cooperation with the EU known as "Action plan for Site Selection of Sanitary Landfills in Egypt Governorates."¹⁰⁷

In addition, there are a large number of technical problems as well as the lack of proper management, which leads to the burning of the landfills for many successive days. The insufficient financial resources are additional factors that aggravate the situation. It

¹⁰⁵ S. Helmi & Shassouna. Alexandria Solid Waste Management Privatization study, 1998

¹⁰⁶ EcoConServ, Aswan Cleanliness Project Tender, 2000

¹⁰⁷ Waste management in Giza ,EEAA, 1996

may be concluded that the dumpsites in Egypt are a source of health and environmental pollution problems, which is attributed to the lack of a comprehensive integrated approach.

Composting

During the 1990s, the Egyptian government started to focus on waste recovery particularly compost techniques. Compost is considered a unique product as it has double usefulness. On the one hand, it allows for the recycling of a huge amount of organic waste, such as "food waste, agriculture waste, animal manure". On the other hand, this process yields a useful product with high demand in the Egyptian markets for land reclamation. Egyptian national policy states that each governorate in Egypt should establish two compost plants by using the Windrow Technique.

According to the national program for recycling organic matter to compost, the plan for the years 2007 and 2008 chose seven governorates to establish ten composting factories as shown in the following table:

Table 3: Composting Factories in Governorates*

Number of Composting Factories	Locations
Zagazik City, El Sharkia governorate	2

SeediSalm City, Kafr EL sheik governorate	1
El Khanka City, El Qalyobia governorate	1
El Gharbia governorate	2
El Dakhliya governorate	2
Koam Hamada City, El Monofia governorate	1
Assuit governorate	1

*EEAA and Central Agency for Public Mobilization And Statistics, 2008

However, of the 40 or more composting projects in Egypt, a majority face operational, cost recovery, marketing problems¹⁰⁸ and technical problems. The main problem is that the revenue could not cover the running cost, which includes high maintenance cost due to the badly designed and manufactured equipment.¹⁰⁹ The compost plant in Zagazig in Sharqiya started working in 1995 with local manufactured equipment and is still facing operational, cost recovery and marketing problems.¹¹⁰ The lack of technical experiences also results in many problems such as burning of the privately run compost plant in Sharm EL Shiekh due to accumulation of untreated waste over long periods.

¹⁰⁸ *Solid Waste Management Strategy for Dakahleya Governorate*, March 1999, section 2

¹⁰⁹ EcoConServ, Aswan Cleanliness Project Tender, 2000

In spite of the fact that garbage source separation is highly recommended for proper efficient recycling, particularly in compost, the Egyptian authorities are still convinced that it is a luxury technique and poor people in Egypt cannot approach it due to narrow kitchens."Amin EL Khaiel—a senior official in EEAA". In 2008, the Association for the Protection of the Environment (APE) launched a campaign in the low-income area "El Dewaka" in Cairo, which aims at protecting health and environment as well as recycling a large quantity of organic waste to manufacture compost. APE is asking residents to separate food and non-food in two different colored bags. They also trained the garbage collectors to collect those different colored bags separately in their trucks. The compost plant of APE is a pioneer project that operates to produce compost with high quality, high market demand and considerable profit. The application of source separation is considered a support factor to increase productivity as used raw material is not contaminated with other inorganic waste.¹¹¹

Incineration

According to law 4/1994, the incineration for hospital and hazardous waste became a mandatory treatment. However, the number of incinerators is still limited and the majority suffers operational and financial problems as well as lack of unskilled labor.¹¹²Some clinics pay hospitals that have incinerators to issue them certificates attesting that the hospital incinerated the medical waste of the clinic, without having really done so.

¹¹¹ The Association for the protection of the environment report, 2009

¹¹² EcoConServ, Aswan Cleanliness Project Tender,2000

4. 4. Citizen Behavior

As previously mentioned, the integrated comprehensive approach includes, in addition to the aforementioned aspects, the role of citizens as main stakeholders. It is important to understand the extent of the impact of the level of public awareness on SWM service provision. That is why this chapter will focus on this issue. George Waheeb, the head of the awareness unit in AMA (one of the international companies that work in Cairo North which has established an awareness unit that is responsible for raising Cairo North residents' awareness concerning the SWM) said that:

"Our hard work is usually lost due to carelessness of the people towards the streets. We have a specific plan for cleansing the streets; however, the streets become dirty after one hour of the cleaning process particularly in streets that includes schools. For that reason, we conducted a lot of awareness programs for students."

Abdalla El Shazly, who is working in AMA as a coordinator between the awareness unit and the operational unit stated that the bad behavior of people negatively impacts the level of solid waste performance of AMA Company by more than 50 per cent. However, many people who live in Cairo North believe that their role as citizen comes second after the company in charge of the task. They believe that the main factor for garbage accumulation in streets is the bad performance of the company and its poor equipment. In the field interviews, I discovered that both the company and citizens complained of each other. Such situation pushed me to measure the level of public environmental awareness and the knowledge on the public's role in SWM. In addition,

I will explore whether or not SWM experts take the issue of public awareness seriously.

4.4.1. Literature review

There is a hypothesis that states that the citizens of developing countries are less likely to be concerned with environmental issues and pro-environmental behaviors (Intglehart, 1995). On the other hand, opponents of this hypothesis state that citizens of the developing countries show high environmental concern but the most serious problem is that awareness raising is usually not taken seriously (Gardner and Stern, 1996). The Pan-African Green Belt movement, led by Wangari Maathai also supported this hypothesis and added that people in developing countries are less likely to pay to improve the quality of environment; however, they are willing to participate in volunteer work in favor of the environment.¹¹³

Most of the research and literature dealing with citizen behavior and environmental concern are being applied in developed countries while very few have been conducted in developing countries. Research usually correlate between environmental concern and the pro-environmental behavior and they focus on socio demographic factors, self-efficacy perceptions and individuals' values.¹¹⁴

¹¹³ Rice, Gillian: Pro-Environmental Behavior in Egypt: *Is There a Role for Islamic Environmental Ethics?*, Journal of Business Ethics, Vol. 65, No. 4 (Jun., 2006), pp. 373-390, Published by: Springer Available at : <http://www.jstor.org/stable/25123800>

¹¹⁴ Ibid

1) Socio Demographic Factors

Some scholars such as Van Liere and Dunlap, 1980s, argue that demographic factors such age, income, and education affect people's behavior towards the environment while others believe that public environmental awareness is a factor of consumer decision making.

Diamantoplous et al, 2003, focused his studies on developed countries such as the United State and he concluded that the correlation between people and environmental concern is characterized by the following:

- ✓ Females are more concerned and more willing to participate in environmental initiatives
- ✓ Married people and large families are more concerned and more willing to participate in environmental initiatives
- ✓ There is a positive correlation between education in terms of knowledge, behavior and attitude, and between the environment
- ✓ There is a negative correlation between age and environmental concern

Gillian Rice, the author of the book entitled "Pro-Environmental Behavior in Egypt: Is There a Role for Islamic Environmental Ethics?" focused his research on the Egyptian behavior and he concluded that in the case of Egypt, gender was uncorrelated to environmental concern while marital status and the size of families are positively related to environmental concern and education was positively related to pro-

environmental concern. However, university student are less likely to interact with environmental actions than teachers who are highly educated and married.¹¹⁵

2) Self Efficacy Perceptions

Diamantopoulous et al, 2003 argued that the socio demographic factors could be misleading in the explanation of environmental behavior; therefore, other variables particularly the notion of control and self efficacy are affecting people's environmental concern.

Bandura, (2000) elaborated the following:

"The stronger is a person's self efficacy, the more active are the person's efforts to engage in particular behaviors."¹¹⁶

Gillian Rice hypothesized that people with high environment concern are those who believe that they have more personal responsibility. In addition, they believe that environmental degradation could affect them and their families.

¹¹⁵ Ibid p.p.383

¹¹⁶ Ibid,p.p.376

3) Values

Granzin and Olson, 1991; Hopper and Nielsen, 1991; Taylor and Todd, 1995 underscored the importance of conducting environmental models that are based on values. They referred to that as helping behavior with environmental behavior. They maintained that people usually lack knowledge about the environment. Therefore, explaining the role of values is a good method in communicating successfully with people about environmental concern. Based on this theory, Gillian Rice encouraged the role of values particularly in the case of Egypt. This is due to the limited public knowledge in Egypt about environment; (United Nations 2002) and due to the religious nature of Egyptians, which drives them to obey religious teachings than to abide by laws. Likewise, Izzi Dien, (2000) believes that:"Ethics are far more effective in bringing about behavior change."¹¹⁷

Based on the previous literature, I agree with those who argued that "citizens at developing countries show high environmental concern but the most serious problem is that material for raising awareness usually is not taken seriously"¹¹⁸.

The present study is focused on two main items of which the first is the level of public awareness concerning SWM in terms of knowledge and behavior and the second is the

¹¹⁷ Ibid p.p.379

¹¹⁸ Ibid p.p.375

scope of the efforts that have been introduced "whether by public sector, private sector or nongovernmental organizations" that aim to raise public environmental awareness.

In the course of this research and to investigate the level of public knowledge and behavior, a simple questionnaire has been distributed among citizens in Cairo specifically at El Zawia district, which is a low-income area and in Heliopolis, which is a high-income area. The study targeted women and men of different ages and with different educational backgrounds. Illiterates and school students were also targeted in the present study.

4.4.2. Egyptian Efforts in the Field of Raising Public Awareness of SWM

Raising public awareness in SWM in Egypt is done randomly and on ad hoc basis. There is no comprehensive plan targeting public awareness. NGOs conduct awareness activities, not a comprehensive program, which is funded by international donors in response to the Global agenda. Very rare studies were done to intervene in the field of people behavior. In 2004, the international company AMA convinced by the importance of the comprehensive approach, asked the Italian cooperation to fund the implementation of a project targeting public environmental awareness in Cairo North. AMA was asked to cooperate with the National Council for Childhood and Motherhood (NCCM) and APE. NCCM was established in 1988 with authority in the areas of protection of child and mother. NCCM included nine aspects in the program

that are related to "Adolescence, FGM, and so on. APE is the Association for the protection of the Environment. It works with the informal garbage collectors of Cairo. APE aims at helping this traditionally marginalized group find innovative ways to save the environment and help themselves.

AMA and APE work in the field of SWM while NCCM was asked to join the project for political reasons. NCCM had the upper hand in the project and they added the environmental awareness as a component among the 9 aspects for motherhood and childhood. The results of three years work of the project were very poor particularly in the field of environmental awareness. This was due to the fact that the relevant officials consider environmental awareness programs that aim at changing or improving people behavior, a luxury program. They perceived it as being superficial and did not take it seriously.¹¹⁹

EEAA has started to launch environmental programs that aim at enhancing citizen awareness concerning environmental issues. EEAA has announced that till the year 2006, they conducted 298 environmental seminars, 90 environmental campaigns, produced 90 brochures, and reprinted 4 environmental booklets, 4 posters and 4 bulletins. In addition, they conducted 5 environmental camps that aim at changing environmental behavior. They participated in 24 conferences and launched 8 environmental competitions including green corners competition for schools and

¹¹⁹ The Association for the Protection of the Environment report.

university students. They conducted 35 workshops about the economic benefits of agriculture waste recycling. They also launched 59 training workshop for public officials in different fields to raise their capacities in environmental aspects. EEAA has not only promoted environmental awareness through direct interaction with citizens, but has also approached the issue through legislation. This was reflected in the constitutional amendments, which took place in March 2007. Article 59 states that "protecting the environment is a national duty".¹²⁰

However, the activities or the programs that were launched by EEAA lacked the national program that targets beneficiaries from all over the country. It also lacked the experts who are convinced by the role of changing people's behavior, and lacked the support of the media.

The survey conducted by the author in two districts in Cairo; EL Zawia district, which is a low-income area; and Heliopolis, which is a high-income area, revealed interesting results. The majority, more than 80 per cent, of the participants stated that the environment in their districts is in bad shape, and solid waste management is getting worse than before. They also did not know anything about environmental programs

¹²⁰ Kamal, Nilly El Amir, *the role of public opinions polls in spreading the environmental awareness in Egypt*, a report submitted to the conference of the information and decision making support center at Egypt.

that had been launched whether through the EEAA or through NGOs. However, the few who had participated in some environmental activities criticized the low performance levels of the programs.

4.4.3. Measuring the level of citizen awareness

Methodology

It has been of great importance to the research to measure the level of awareness of Egyptian citizens of SWM in terms of citizen knowledge and environmental concern. The research focused on measuring the scope of the efforts that have been exerted "whether by public sector, private sector or nongovernmental organizations" in the field of raising public environmental awareness. A simple questionnaire targeting citizens in El Zawia district, a low-income area, and Heliopolis, a high-income area, was distributed to 110 households, men and students. Despite the small size of the sample it represented different categories of citizens with different socio-demographic factors such as "age, education, gender, and income". The first group that participated in the questionnaire consisted of 40 women between 25 and 45 years of age; half of them are illiterate while the other half was educated, most of them held a middle education certificate and a small number of them were university graduates. The sample number was equally distributed in the two chosen districts. Forty men who met the previous criteria participated in the questionnaire. Thirty students in different schools in preparatory and secondary grades in the two districts were also included.

❖ To measure the level of citizens' awareness, in particular their knowledge, the questions included the following:

What do you know about SWM?

Which body is responsible for your district's waste collection and disposal?

What is the next step after waste collection?

What are the consequences of the garbage accumulation?

Do you know any information about recycling activities?

What are the sources of your information about SWM?

❖ To measure the level of citizen's awareness of particular environmental issues, the following questions were asked:

What is your evaluation of the performance of the SWM responsible company?

What are the main challenges concerning the company's performance?

Who are concerned about SWM service provision generally, i.e. "stakeholders"?

Do you feel that you are one of the stakeholders in SWM? If yes, what is your role?

If there are large amounts of garbage accumulated in your district, what can you do?

Do you know the hot line number of the responsible company in SWM at your district?

Have you ever participated in planting or cleansing activities at your district?

❖ Lastly the questionnaire included questions to study the efforts of private and public sectors and NGOs in the field of raising public awareness. These included the following:

Have you ever attended any environmental programs or activities? If yes, who was the organizer? What are the benefits of attending those activities? How many times did you participate in those activities? Did you encourage others to participate? Do you remember any of the messages of those activities?

4.4.4. Results and Analysis

1- Citizen knowledge about SWM

The results concerning environmental knowledge indicated that women are more knowledgeable than men and even students. Regarding daily garbage disposal activities, 63 per cent of the participating women had considerable information about SWM, as women are more involved in waste disposal, in particular in low-income areas. However, students were more knowledgeable in SWM recycling information, which they acquired through television programs, magazines and school activities such as seminars and research activities. Seventy one per cent of the participating students had a lot of information about recycling and its economic and environmental benefits. Thirty per cent of the participating women and men indicated that the phase following waste collection is the burning, while 60 per cent did not have any information about the processing of the collected garbage. The remaining 10 per cent of women and men

had slight information about sorting and recycling activities. It was obvious through the analysis that women and men in Heliopolis showed slightly more knowledge concerning SWM than in EL Zawia El Hamra. Students in both districts had almost equal levels of knowledge about SWM.

Only 10 per cent of all participants in El Zawia El Hamra knew that there is a company responsible for SWM and most of them indicated that the traditional garbage collector, Zabal, is the one who collects and disposes of garbage. While 50 % of all participants in Heliopolis were aware of the difference between the company and the traditional garbage collector and complained about paying the collection fees twice; a pre-determined amount of money through the electricity bill and another amount to the Zabal.

Generally, the following concluding remarks could be deduced:

- ✓ The level of knowledgeable female about general SWM was 45 per cent while the level of knowledgeable men about general SWM was 38 per cent. Female are more knowledgeable than men in the field of SWM
- ✓ There is a direct relationship between the level of income and level of education with the level of information and knowledge
- ✓ The most effective information source for citizens is Television.
- ✓ Students up to 63 per cent show a slightly higher level of information concerning recycling activities, which they acquire through watching television programs and schools activities.

✓ The majority of participants do not recognize the company responsible for SWM in their districts, while they know the garbage collectors very well.

✓ Generally, the citizen level of SWM information is less than 50 per cent.

2- Citizen environmental concern

The citizens in both low-income and high-income areas were willing to participate in programs for the welfare of the environment and as they said, “to protect our children’s lives”. Seventy three per cent of participants showed high concern towards the environment in particular the level of street cleanliness and plantation. Eighty three per cent of the participating men, 71 per cent of the participating school students and 66 per cent of participating women appreciated participating in environmental protection programs and they agreed that they had a role in protecting their environment. However, the majority of them do not know what this role could be in specific. Only 20 per cent of them expressed that citizen behavior is instrumental to the protection of the environment.

Some participants refused to participate in programs that protect the environment. Their rationale was that SWM is a government responsibility, which the government fails to carry out adequately.

In particular, in the low-income El Zawya El Hamara, people questioned their ability to participate in protecting the environment whilst they suffered from other challenges such as low wages, unemployment, high inflation, and the government weak response to their needs. Others considered environment protection and waste disposal a luxury issue. One of the participants commented saying "I have to put bread on the table for my children first then think about these luxury issues"

3- The efforts of the private and public sectors and NGOs in raising public awareness.

The results of the present survey indicated the inadequate efforts of the different bodies that are aimed at raising environmental awareness. Only 23 per cent of the participating men and women were invited to attend environmental programs while 64 per cent of school students participated in environmental activities in schools. A very few number of the participants attended similar programs in religious institutions. In addition to the low number of programs concerned with raising environmental awareness, the quality, depth and effectiveness of the programs were poor. The topics were handled in a superficial way in terms of 1) conducting activities rather than programs, which are characterized by, clear objectives and outcomes 2) the absence of clear messages 3) the programs lacked the innovative and creative methods to impart environmental messages. The weaknesses in the activities were obvious during the participants' interviews where very few of them could remember any of the delivered messages or could identify the benefits of environmental protection programs.

Based on the previous results and analysis, I agree with those who argued, "citizens in developing countries show high environmental concern but the most serious problem is that the material for raising awareness is usually not taken seriously."

While interviewing the person in charge of environmental awareness raising in AMA International Company, it was realized that the company does not take this issue seriously and the department is not a core department.

The following can be concluded:

- Citizen behavior has a main role in protecting the environment in particular the SWM.
- In spite of the pressure of social and economic problems, citizens are willing to participate in environmental protection programs.
- The emphasis of environmental institutions is very low for awareness programs
- The effectiveness of the material used for environmental awareness is compromised.

4. 5. Laws” Legislation and constitutional issues in SWM”

There are several environmental laws that control solid waste management in terms of waste collection, waste disposal, and wastewater treatment, among others. The most

important law pertaining to SWM is law 38/1967 regarding Solid Waste Collection and Disposal from Homes, Public Places, Commercial and Industrial Establishments. This law was amended by the law 134/1986 Regarding the Regulation and the Instructions of Waste Collection and Transfer from Industrial Activities and Homes. In addition, the law regulates methods of disposal such as dumping or composting. Law 38/1976 then amended Law 31. Law 43/1979 on Local Administration stipulated that local councils at the towns' level are the authority responsible for solid waste infrastructure. Afterwards, law 129/1982, then the law 4/1994, "environmental law", particularly article 37 and article 38 for the regulations procedures of solid waste burning, were issued. There are other laws that regulate important decisions on the environment such as the law number 48/1982 on Nile Protection law. In addition, Article 59 of the Constitution stipulates that the protection of the environment is a national duty.

The current SWM laws have serious constraints. First, the policies and legislations stipulate high standards that cannot be met. For example, the law criminalizes open burning of solid waste, however, in most cases there is not a properly designed landfill and the existing dumpsites lack the proper technical management. Another example is the level of car emissions. The law identifies accepted levels of car emission, however, the enforcement system is compromised by the fact that the "transport stations" that are responsible for approving car licenses lack the required equipment for measuring car emissions. The gap between law and application compromised the entire system and perpetuates violations.

Second, the enforcement of laws is weak. SWM law enforcement falls under the mandate of Environmental and Surface Water Police, which has the authority to enforce penalties against violations. As per the law, the Environmental Management Unit (EMU) has the power to monitor, document and transfer violations in each governorate to the Surface Water Police. However, although this unit has the judicial power to detect any violations, in most cases, its judicial power is not utilized due to corruption and inefficiencies. The head of the districts who are the ones who have the right to delegate the judicial power to EMU staff usually refuse to delegate it to EMU because of corruption issues. Therefore, EMU's role is reduced to detecting violations and, in most cases, violators ask the EMU to get a police order first. Even in cases where EMU does have the judicial power, they must refer the case to the Environmental and Surface Water Police, which sometimes neglect to punish the violator. In fact, the police force either lacks the required information and understanding about SWM laws or SWM is not one of their priorities.¹²¹

4.6. Conclusion

The previous chapters reveal that SWM in Egypt is plagued by a series of weaknesses related to institutional, technical and financial problems. It is also believed that the lack

¹²¹ Behairy, Heba :*Government environmental policy making private sector participation in solid waste management in Egypt :A case study of Alexandria governorate* , AUC ,2003

of an integrated approach is a direct cause of the failure. The above analysis explained the Integrated Approach in SWM and its great importance to achieving good results in that field. The case of Graz, Austria showed how the integrated approach is a key to guaranteeing sustainable development, protecting the environment, and achieving economic success. The case of Austria factors several aspects that guarantee achieving an integrated SWM. These include:

- ✓ Sustainable development
- ✓ Integration of different activities that guarantee sustainability in solid waste management such as collection, transfer, recycling technologies, incineration, and land filling
- ✓ Citizens behavior
- ✓ Activation of current environmental policies and regulation
- ✓ The cooperation between different stakeholders in SWM

The Egyptian case showed that Solid waste management is dispersed among several authorities and that it lacked cooperation between, and participation of the various stakeholders. In addition, each SWM process was approached or tackled separately; for example, authorities planned for waste collection regardless of the recycling rate and the number of landfills needed. The planning process for waste collection is done separately from the treatment and disposal of the non-recycled garbage. In case of contracting private sector, international companies were asked to recycle 20 per cent of the collected garbage i.e. 80 per cent of the collected garbage was dumped. They never considered the issue of citizen behavior as an important factor that could contribute to

improving SWM in Egypt. The government didn't set, or require institutions to set plans to raise public awareness.

Community behavior, in particular community knowledge and environmental concern is less than 50 per cent of the total number of participants in the questionnaire in both low and high income areas. The questionnaire also revealed the following:

- Citizens' behavior plays a main role in protecting the environment, in particular SWM
- Despite the pressure of social and economic problems, citizens are willing to participate in environmental protection programs
- The concern of the environmental institutions is very low concerning the awareness program
- The effectiveness of the material used for environmental awareness is compromised
- The existing environmental laws are neither effective nor enforced.

CHAPTER FIVE

ASSESSMENT OF SOLID WASTE MANAGEMENT IN LIGHT OF PSP

5.1. Introduction

In this chapter, I will assess the SWM system, particularly under the PSP provision, according to the following points:

- The government's decision-making process specifically the contracting process with the international companies
- The current findings about waste collection efficiency and waste accumulation
- Experts' perspective
- Community perspective

The proposed solutions for SWM in Egypt will be discussed towards the end of the chapter. The solutions are proposed based on research, interviews with Egyptian SWM advisors and the analysis of the gathered data.

5.2. The Government's Decision-making Process specifically the Contracting Process with the International Companies

As mentioned previously, the SWM system in Egypt during the late 1990s and early 2000s faced many challenges. Most of the stakeholders including citizens and media have recognized the need to reform the government's contractual procedures, particularly with the private sector for the provision of the SWM services.

Etzioni explains that the "Decision making falls between policy formation and implementation". Many circumstances can influence the decision-making process. However, Parson expressed a very important notion regarding the international influence, which is "whatever the influence of the 'International' or 'global', agenda setting the locus of decision making remains the nation state." Parson defines the process of decision-making "as a process in which choices are made or a preferred option is selected ".¹²²

In light of Parson, the contracting process between the Egyptian government and the international companies was influenced by, and borrowed from the international cases, which resulted to many flaws.

In chapter three, the research explored the misinformed decision of the government to marginalize important stakeholders, such as traditional garbage collectors. This section will also focus on the same issue but from the perspective of the bidding process and contract-formulation. Both factors affect the SWM negatively and, in turn, they have adverse effects on health, environment and the economy.

¹²² Parsn, Wayne: *Public Policy: an Introduction to the Theory and Practice of Policy Analysis* ,Edward Elgar ,Cheltenham &Northampton ,1995

5.2.1. Municipal Solid Waste Management in Policy Framework

To assess the PSP policymaking process and its contract formulation, the research will shed light on the two most important policy actions that the EEAA have taken in 1999. It will also test whether or not the PSP and its new contracts fit within the MSWM policies.

Previously, I focused on the factors that encouraged the government to make a series of decisions regarding SWM during 1999. This year witnessed the promulgation of two important policies; the first establishes the National Program for Solid Waste Management and the second adopts the National Strategy for Integrated Solid Waste Management. The Ministry of State for Environment Affairs, the EEAA and the Ministry of Local Development established a SWM Ministerial Committee comprised of representatives from eleven relevant ministries. By 2000, the Ministerial Committee managed to prepare a national program to address waste management, in particular municipal waste. The program aimed at addressing the most pressing problems in MSWM, which include waste accumulation; the application of integrated waste management; the rehabilitation of the already existing landfills; the construction of new ones; and the application of MSWM in rural areas.¹²³ The time frame of the program was for four years and the priority was for waste removal from the eleven governorates

¹²³ El Behairy, Heba :*Government environmental policy making private sector participation in solid waste management in Egypt :A case study of Alexandria governorate* , AUC ,2003

with the highest accumulation (Cairo, Giza, Qalubiya, Alexandria, Aswan, Red Sea, Luxor, Gharbia, Monofia and Fayium)¹²⁴

The second policy was the National Strategy for Integrated Solid Waste Management. One of the high priority goals of the National Program for Solid Waste Management is the application of Integrated Solid Waste Management. The Ministerial Committee had prepared the National Strategy for Integrated Solid Waste Management in the year 2000 and this strategy was based upon the following:

- Creating an adequate environment for proper SWM through policies and guidelines.
- Activating and enabling the legal framework of the SWM system
- Applying an integrated approach at the institutional set up
- Raising the capabilities of human resources
- Providing the financial resources for adequate infrastructure, operational and physical systems.
- Applying awareness programs to raise citizens' environmental concern, and improve their behavior.

The Ministerial committee planned the National Strategy for SWM with a ten-year life time and with definite outputs. They also set indicators for mid-term and post-closure performance assessments.

¹²⁴ EEAA Operational plan for Remove Accumulations and Solid Wastes in the first phase Governorates, 1999

Those two SWM policies, in fact, lacked the mechanisms for implementation. In particular, they lacked the following:

- 1) Funds
- 2) The needed technical support
- 3) The needed mechanisms for coordination between relevant ministries

The first obstacle that the programs faced was funding. The technical secretariat proposed five disbursements of the amount of eighty million Egyptian Pounds during the year 2000 to fund the first year activities. They proposed that the Social Fund for Development would cover the first disbursement, amounting to fifteen million, while the other disbursements would be secured through the state budget. The proposed were not secured due to internal problems and the implementation of the National Program for SWM was postponed to 2001.¹²⁵

In addition, the National Program for SWM lacked the technical support needed for implementation. The program lacked the technical solutions for the SWM problems. For example, the National Program tackled the problem of agricultural waste and organic waste by proposing the composting technique. The composting plant, however, suffered a large number of technical drawbacks specifically self-igniting, which resulted in

¹²⁵ El Behairy, Heba :*Government environmental policy making private sector participation in solid waste management in Egypt :A case study of Alexandria governorate* , AUC ,2003

substantial economic losses. The National Programs failed to solve the technical problems facing the proposed activities.

Moreover, the National Program lacked the required mechanisms to achieve its approaches. For example, the National Program included the Public Private Partnership as one of its approaches to achieve Integrated SWM; however, it did not explain the mechanisms to utilize this approach.

5.2.2. Private Sector Participation in the field of SWM Process

The weakness of the National Strategy for Solid Waste Management in terms of funding, technical assistance, and lack of mechanisms for implementation has led to the freezing of the program. The Governor of Alexandria tried to solve the SWM problems independently based on international experiences. He initiated the PSP by issuing a tender for SWM provision at Alexandria governorate. He opened the bidding process to international companies for SWM at Alexandria. The governor secured funds for the new trend through adding the cost of waste collection to the electricity bill of households and shops. In the year 2000, the Alexandria governor signed a contract with "Onex Company" to provide SWM services in Alexandria. The contract stipulated that Onex would provide Integrated SWM including collection, transportation, recycling up to 20 per cent, and disposal of the waste. In addition; it would treat industrial and medical wastes.

5.2.3. The Miracle Solution of Alexandria Governorate

In light of the inactive National Strategy, lack of financial resources, and lack of technical experience, other Egyptian governorates believed that the Alexandria case is a miracle. They felt that by handing over SWM to international companies, the headache of solid waste problems would be taken off their shoulders. The Egyptian authorities thought that international companies could be efficient and could have the needed capital.

"The government engages the private sector to provide capital or otherwise finance government programs, purchase government assets and operate government programs through various types of contractual arrangements".¹²⁶

However, according to the body of knowledge, certain prerequisites must exist before signing a formal contract. Theories have identified the following steps as prerequisites to successful relationships. 1. Determine the nuts and bolts of the relationship between the government and the various stakeholders. 2. Coordinate the use of the comparative advantage of each stakeholder to optimize efficiency. 3. Adapt the dynamic of the relationships between the government and the various stakeholders according to the new delineation of tasks.¹²⁷

¹²⁶ Roger, Kemp, Private Sector Participation: the Provision of Public Services by the Private Sector, Jefferson: McFarland & Company, 1991.

¹²⁷ Abuyuanl, A.M. Collaboration ; A sociological perspective. Yale/Yale UNDP research clinic report. Yale/UNDP Public private partnership programme, Yale University, USA, 1999

In reality and in less than one year of signing the Alexandria contract, fifteen other governorates followed the Alexandria case as if it were the ideal solution irrespective of any rationale. The Technical Secretariat headed by the EEAA recommended PSP in SWM as the ideal solution and they extended technical support to other governorates in preparing their tender and the bidding documents. There were many circumstances that supported PSP, such as the National Strategy and the laws issued by the government to encourage investments in the SW field, according to law 8/1997. Those circumstances encouraged as well as obliged the different governorates to start the bidding process. Many officials in charge at the EEAA indicated that the tender documents for most of the governorates and even the tender announcements in newspapers were just copies of those of the Alexandria case.¹²⁸ The tenders were prepared by the EEAA and the different governorates and were reviewed by the Technical Secretariat. It was very obvious that all of them lacked the required skills required for the preparation of international tenders. Weak capacities were a core factor of weak contracts.

The World Bank observed some weaknesses in the bids. These include unclear bids that lacked the clear legal side and inflated cost in some cases, such as in Luxor and Red Sea governorates.¹²⁹ In many of the interviews I have done, experts argued that contracts

¹²⁸ El Behairy, Heba :*Government environmental policy making private sector participation in solid waste management in Egypt :A case study of Alexandria governorate* , AUC ,2003

¹²⁹ The World Bank,34

with international companies had the most negative impact on SWM. This will be explained in more details in the section of expert evaluation.

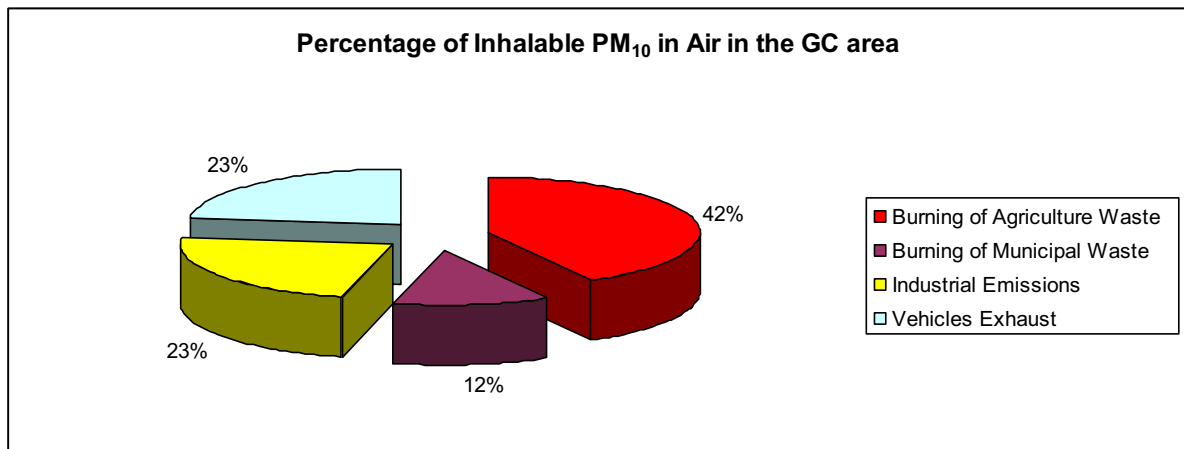
5.3. Waste Collection Efficiency and Waste Accumulation.

To assess SWM during the last few years, I will review recent reports on waste collection efficiency and compare it to reports about SWM before the new PSP. In addition, I will assess the volume of accumulated garbage in different periods. The Central Agency for Public Mobilization and Statistics in its report that was published in March 2010, announced that the current SWM cannot meet the community's need in achieving an acceptable level of cleanliness whether in low, middle or high income communities. The level of street cleanliness is unsatisfactory, the health and environment problems exceed the bearable standards and garbage accumulation affects the general civil appearance.

The report indicated that, during the year 2008, the efficiency of garbage collection did not exceed 77 per cent in the cleanest cases. There were huge amounts of accumulated garbage in streets, in empty lots, between buildings and in slum areas, in canals, in rivers and in very vital areas. The report stated that the open burning of garbage is considered the main way for garbage disposal and is also considered the main source of

air pollution.¹³⁰ According to a report entitled "Control Measures to Reduce Pollutant's Levels in the Greater Cairo Area." by Air and Waste Management Association (AWMA), USA-June 2008, open burning of municipal solid waste is the second air pollutant for 12 per cent of the total air pollution while the burning of agricultural waste is considered the main source of air pollution in Greater Cairo with 42 per cent.¹³¹ This means that open burning whether of agriculture or municipal waste represents more than 50 per cent of air pollution in Greater Cairo during the last few years.

Figure 1: Source is Air and Waste Management Association (AWMA), USA-June 2008



The annual report for environmental statistics for the year 2008 announced that the composition of the Municipal Solid Waste "MSW" is as shown in table 4:

¹³⁰ The annual report for environment statistics for the year 2008 by the Central Agency for Public Mobilization And Statistics ,the report published in March 2010,available at <http://www.capmas.gov.eg>

¹³¹ Control Measures to Reduce Pollutant's Levels in the Greater Cairo by Air and Waste Management Association (AWMA),USA-June 2008

Table 4: Solid waste composition

Item	Percentage of Waste
Organic matter	50-60%
Paper	10-25%
Plastics	3-12%
Glass	1-5%
Metals	1,5-7%
Textile	1,2-7%
Others	11-30%

Source is EEAA, 2008

The highest percentage of the MSW is organic matter. The core method for recycling organic waste is composting. However, as mentioned before, composting plants suffer from lack of technical, managerial and financial experiences. There are more than 40 composting projects throughout Egypt, the majority of them are facing technical and marketing problems. The main challenge is that revenues do not cover running costs, including high maintenance cost, due to the poorly designed and manufactured equipment.¹³² In addition, the lack of technical experiences has led to enormous problems such as in the case of Sharm EL Shiekh where the compost plant that was run by a private company, was burnt down due to the prolonged time of untreated waste that

¹³² Ibid

is self-combustible. The National Program for SWM allocated 10 new factories in 7 governorates throughout Egypt for the year 2007 and 2008, although the composting obstacles remain unresolved and/or investigated.

The problem of organic waste became more complicated; particularly after the pig slaughtering that took place in June 2009 as a consequence of misunderstanding and mismanagement of the swine flu crisis. Garbage collectors feed their pigs food waste only. Therefore, the pigs' economy is considered the fruitful part in the garbage cycle. With no more pigs raising, garbage collectors have to dump food waste, which constitutes 50-60 per cent of the collected solid waste, in dumpsites. Garbage collectors refused to carry additional expenses that they did not incur previously, such as the cost of transportation of food waste. In addition; they lost the income of breeding pigs. The government didn't offer alternative solutions to garbage collectors, so they decided to not carry extra costs. As a result of the current situation the organic waste recycling to compost is negatively affected and some of the garbage collectors dispose the organic part in streets over the night that is considered as one of the recently emerged reasons for the street uncleanness.

5.3.1. Garbage Collection Efficiency

According to a report by the EEAA for the year 1996 and another report for the year 1999, the efficiency of garbage collection in different governorates was 33.3 per cent in South Sinai, 77 per cent in Alexandria, 62 per cent in Cairo, and 64 per cent in Giza.

Table 5: The waste collection efficiency percentages for some Egyptian governorates during 1996 and 1999

Governorate	Waste collection efficiency % for the year 1999	Waste collection efficiency % for the year 1996
Cairo	62%	68%
Giza	64%	61%
Qaliubya	50%	
Gharbya	50%	
Alexandria	77%	
Aswan	41%	
Luxor	45%	
Red Sea	52,5%	
South Sinai	33,3%	

Source is EEAA, National strategy, 20

Two sources are used to compare between waste collection efficiency during the last few years, with the previously quoted data. The first source is a report by the Central Agency for Public Mobilization and Statistics that announced the efficiency of garbage collection does not exceed 77 per cent in the cleanest areas. The second source is the Environmental Management in Egypt, paper # 418, prepared by Fatma Abou Shouk, Head of the Environmental Management Sector & the Central Department for the

Environmental Impact Assessment (EIA), Egyptian Environmental Affairs Agency (EEAA)¹³³This source announced that the average waste efficiency is 65 per cent.

Table 6: Daily waste generation in different governorates in Egypt and the waste efficiency

No.	Governorate	Daily generation (Ton/day)	Compiling efficiency
1	Cairo	10000	68%
2	Giza	3800	45%
3	Qaliubya	3600	55%
4	Alexandria	2500	80%
5	Beheira	2200	55%
6	El-Wadi El-Gedid	90	65%
7	Qena	1200	75%
8	Red Sea	305	70%
9	MarsaMatrouh	520	75%
10	Mnofya	1370	60%
11	Gharbya	2050	65%
12	Kafr El-	2200	50%

¹³³ Abou Shouk, Fatma, Environmental Management in Egypt Paper # 418 ,Air and Waste Managemnet Assocation (AWMA),USA-June 2008

	Shiekh		
13	Damietta	1300	70%
14	Sohag	1000	65%
15	Aswan	670	80%
16	Assuit	850	55%
17	Daqahlya	3600	50%
18	North Sinai	325	65%
19	South Sinai	450	80%
20	Port Said	800	75%
21	Ismailia	650	70%
22	Luxor	300	80%
23	Suez	500	70%
24	Sharqya	1800	55%
25	BeniSuef	750	55%
26	Minya	1200	65%
27	Fayoum	600	60%
Total		44630	65%

Source is: EEA in cooperation with Air and Waste Management Association (AWMA), USA, June 2008

Comparing and analyzing the data for the three governorates that applied the PSP, Cairo, Giza and Alexandria, reveals that despite PSP, waste efficiency in Cairo

governorate was constant between 1996 and 1999 (62 to 68 per cent) and in 2008 (68 per cent). In addition, waste efficiency in Giza dropped from 64 per cent in 1999 to 45 per cent in 2008, which shows that the problems in SWM under PSP increased dramatically.

The only positive change was in Alexandria, which showed a slight increase in waste collection efficiency from 77 per cent in 1999 to 80 per cent in 2008. Nevertheless, the average percentage for waste collection efficiency did not show any improvement in 2008; it remained at an average of 65 per cent in all governorates, reflecting no change from earlier years. The illustrated tables show that the collection efficiency in Upper Egypt is much lower than that in Lower Egypt and Upper Egypt is still suffering the same during the 2000s.

According to a study that was conducted by the EEAA in cooperation with the UK Department for International Development (DFID) for the year 1999, there were no waste collection services in some rural and poor areas. The previous results were also indicated by another source, which stated that the total collection efficiency ranges from 15 to 65 per cent, while the coverage of municipal waste collection in urban areas ranges between 35 and 95 per cent.¹³⁴ The comparison showed that the waste collection

¹³⁴ Genana, Tarek. *Solid Waste Management in Egypt : A Programme for the Next Decade* , EcoConserv , June 2000

coverage and waste collection efficiency shows no change under the PSP but in some cases such as Giza, the situation deteriorated.

The PSP contracts stipulated that the companies use state-of-the-art equipment and technologies, which should have positive effects on the waste collection processes. However, according to the results of interviews with citizens at Cairo North, the new equipment worked well at the beginning, particularly in removing the huge amount of accumulated garbage in main streets, however, by time the equipment were not seen in streets.

5.3.2. Garbage accumulation

The problem of garbage accumulation goes back many years and there are many reasons behind it, the most pressing of which is the lack of enough and appropriate dumpsites and landfills. According to the National Program for Solid Waste Management in 1999, there were core activities that had been specified as top priorities in SWM such as garbage accumulation removal, rehabilitation of existing landfills and determination and construction of new dumpsites and landfills. According to the time table set by the relevant committee, the proposed activities should have been achieved by 2004. However, the problems of waste accumulation and dumpsites still stand. In 2006, the Ministry of Environment cooperated with the Egyptian governorates to identify and select landfill sites. They identified 53 sanitary landfills with only 4

operational in Cairo, Alexandria, Suez and Port Said. ¹³⁵The Ministry of State for Environmental Affairs (MSEA) and the EEAA has estimated the accumulated garbage in greater Cairo as indicated below in table 7.

Table 7: Historical Volumes of Solid Wastes in the Greater Cairo

No.	Governorate Name	Total amount in million m ³
1	Cairo	10
2	Giza	3
3	Qaliubeya	1
Total		14

Source is EEAA in cooperation with Air and Waste Management Association (AWMA), USA-2008

Since 2006, MSEA, in cooperation with the Ministry of Local Development, started to remove the historical volumes of accumulated garbage. During 2006, they removed of 4.5million m³ of historical accumulations. In 2006, 15 million m³ of accumulated garbage was removed.

The following table shows the removal of accumulated Solid Wastes in 2006.

¹³⁵ Ibid, Environmental Management in Egypt , paper #418

Table 8: The accumulation removal of Solid Wastes in 2006

Governorate	Quantity of accumulation disposed of by leveling and covering (m3)	Quantity of accumulations transferred to controlled landfills (m3)	Controlled landfill
Cairo	4,000,000	100,000	El-Wafaawal-Amal
Giza	300,000	100,000	Shabramant
Qaliubeya	200,000	185,000	Abu Zaabal
Total	4,500,000	385,000	

Source is: EEAA in cooperation with Air and Waste Management Association (AWMA), USA-2008¹³⁶

Looking at the available sources, it can be deduced that the government, more specifically the EEAA in cooperation with the governorates, removed the accumulated garbage. The private sector was not much involved in these areas except for the main streets of some areas.

In 2009, the EEAA removed and transported about 25,700 square meters to El Wafaa we El Amal landfill; 25350 square meter to Shabrment landfill; and 12500 square meter to EL Salam. In addition, they dealt with fires in El Robakee landfill.¹³⁷

¹³⁶ Ibid “Environmental Management in Egypt , paper #418”

¹³⁷ The annual report for EEAA ,2009

5.4. Assessment of Solid Waste Management in Egypt Based on Experts evaluation

5.4.1. Vague Contract between the Egyptian Government and the International Companies

Amin EL Khaiall, Head of the General Department for Solid Waste Management in the EEAA, indicated that there are a lot of weaknesses in Solid Waste Management and that the situation was deteriorating. He argued that those weaknesses can be contributed mainly to several factors and not only the PSP provision. Rapid population growth, particularly in Cairo is an important factor in increasing the generated waste, which requires an increase in financial and human resources and landfills. He added that the most serious change that transpired during last decade is the obvious increase in the rate and the consuming habits of Egyptians regardless of their economic status. The increase in the living standard of some sectors of the Egyptian community leads to more waste generation as they usually seek a more luxurious life. Although the amount of the accumulated garbage is lower than that in the year 2000, people are still complaining from the scattered garbage. The decrease in the accumulated garbage is due to the efforts of the EEAA in removing accumulated waste during the last few years. Mr. Amin El Khaial stated that the PSP process lacked many circumstances and factors of success. He explained that although the international companies have had many positive impacts such as the state-of-the-art equipment and the integrated approach that was adopted, many negative obstacles negatively influenced their performance. The behavior of people was a critical challenge that hindered the cooperation between the

community and international companies in spite of the awareness raising efforts, behavioral change requires a long time.

However, the factors that had the most negative impact on SWM during the last few years are the lack of financial resources and the vague and weak contract with international companies. Concerning the process of tendering and formulization, the contract between international companies and the various governorates showed a large number of drawbacks and lacked the experienced qualified team in international bidding and international contracts. The Technical Secretariat of the Ministerial Committee for Solid Waste that is headed by EEAA was responsible for the process of preparing the tender documents and formulating the contract. The Technical Secretariat worked as the technical advisor for the Cabinet of Ministries that is headed by the Prime Minister. The process of SWM privatization was initiated in Alexandria who shared its bidding documents with other governorates, which carried out its bidding process and drafted the contracts with the help of the EEAA. The weakest point in the contracts is the lack of a defined system for monitoring and penalties. For example, the contracts set a total amount of money for all requested services including collection, transportation recycling and land filling. This resulted in difficulties in applying penalties. The process of determining the fines is not specified, which made the process of imposing penalties unclear. In addition, the contract was copied from the European-style contracts, by which the collection of garbage was to be done in definite times; early in the morning and afternoon through containers in streets. This system does not take into account

Egyptian behavior and culture that does not abide by very strict collection timings and the use of street containers. Although streets were still unclean, the government could not penalize international companies as the contract stipulated that they collect garbage only twice daily and in specific times. In addition, the monitoring system is dispersed between the CCBA and EMU in each governorate, which leads to much confusion in practical application. The most important indicator that the contracts had many drawbacks is that the EEAA started revising and amending the contract with international companies. They are currently trying to change the system to pay the international companies based on the kilometers of services they provide and the amount of garbage collected. In other words, the cost of collection, transportation and street cleansing will be calculated separately from the recycling activities.

Mr. El Khaial also added that the system under PSP lost the experienced garbage collectors. He, however, indicated that the EEAA had arranged a large number of meetings with garbage collectors and governorate representatives but garbage collectors had refused any kind of cooperation as believed that their system is powerful and is capable of surviving. Mr. El Khaial stated that the EEAA has been working to amend the contracts with international companies to involve garbage collectors legally in the SWM system, under international companies, and specify each service they will provide against a specified cost.

5.4.2. The Current System Lacked the Experienced Labor

George Waheeb, Awareness Manager in AMA Company, joined AMA since its inception in 2003. He stated that the company achieved good results in Cairo North, particularly during the first years of operation. They removed a huge amount of accumulated garbage in different areas and that the citizens were able to see this achievement. He, however, admitted that the solid waste provision is getting worse particularly since June 2009 after pig slaughtering. He explained that since the participation of AMA in SWM in Cairo North, they hired huge numbers of traditional garbage collectors and contracted others as subcontractors, who really carry the workload. He added that although garbage collectors lost almost 40 per cent of their income under the umbrella of international companies, they accepted that because they have no other choice. However, after pig slaughtering, the turnover of experienced traditional garbage collector was high in AMA. The reason behind the high turnover is that garbage collectors carried extra cost due to pig slaughtering. Fifty per cent of the collected garbage is food waste that was used to feed pigs that the garbage collectors profited by selling them and their manure. By losing pigs, garbage collectors had to dispose of the 50 per cent food waste, which meant extra transportation cost, in addition to the lost income from pigs. Some garbage collectors could not afford the extra cost and so they left AMA. Other workers who are not originally garbage collectors did not usually have enough experience; they were very slow; and they did not accept garbage collection as a job. He concluded that labor is a crucial factor for success in SWM and international companies did not succeed in training new staff. A lot of effort is needed to change negative perceptions of garbage collectors.

5.4.3. Lack of Coordination

I interviewed Dr.Salah El Haggar, Professor of Mechanical Engineering at the American University in Cairo, Vice President of the Association for the Protection of Environment (A.P.E.) for the last 15 years and the author of a number of books on Solid Waste. Dr. El Haggar said that SWM is in a critical situation due to the very low percentages of recycling (15-20%).Through recycling we could reduce pollution, increase economic opportunities and create more jobs. Dr. El Haggar summarized the weaknesses of the current SWM system in Egypt in the lack of coordination between the formal and informal sectors, which leads to the waste of effort, increased conflict, and more SWM problems. In addition, there is a lack of coordination between the various stakeholders in the decision making-process of contracting international companies. Moreover, the stakeholders lacked the awareness and the needed understanding for the holistic approach of SWM. He added that SWM in Egypt suffers a lot at the managerial and institutional levels and he recommended that the EEAA take full responsibility of SWM and coordinate with the Minister of Local Development for implementation and follow up. Dr. El Haggar recommended linking the awareness programs with the national development strategy as the citizen behavior towards SWM is considered a barrier to achieving good results.

5.4.4. Lack of Integrated Solid Waste Management

Mrs. Yousriya Loza, the Founder of the Association for the Protection of the Environment and the Chairperson of a Solid Waste Company based on integrated solid waste services, argued that the weaknesses of the SWM, is because the government neither supported the garbage collectors to upgrade their system nor let them to be formally involved in the new system. In addition, the garbage collectors used to be entrepreneurs but no one helped them to improve and organize even the Nonprofit Organization. On the other hand, the garbage collectors have always been reluctant to upgrade their system as proposed by authorities. Mrs. Loza believes in the Integrated Waste Management based on Sorting, Collection and Recycling Programs to reach Zero Solid Waste. The proposed system takes in consideration that Egyptians are used to door-to-door collection. In addition, the system should be labor orientated not equipment oriented.

Sorting Programs: At source separation refers to separation of garbage into organic and non-organic waste at source. She said that A.P.E. had started a pilot project to separate garbage at source, which had been undertaken by Dr. Marie Assad – Volunteer development Consultant – and Dr. Ayman Mohram – Head of A.P.E’s staff at that time. This project was testing three hypotheses:

- ✓ Whether the separation would help in dealing with some of the problems of final disposal of the garbage.

- ✓ Whether the separation would help in the process of sorting thus improving the performance of the Zabbaleen.
- ✓ Whether improving the performance of Zabbaleen would encourage them to cooperate in keeping Cairo clean.

Since its establishment in 1999, El Gouna resort in Hurghda has applied separation at source and is considered a success case. Mrs. Loza said that the key success for the SWM is convincing all Egyptians to apply separation at source. Programs, such as awareness raising campaigns, training for garbage collectors to receive the separated garbage and incentives to encourage residents to separate garbage at source, could be the tools to achieve waste source separation. The most important program in integrated waste services is the Collection and Recycling Programs based on the involvement of the upgraded accumulated experiences of informal waste collectors, recognition of their operational methods, and the importance of their continued and increased involvement (especially following the execution of pigs), in the collection, transport and recycling of waste in Cairo. A main theme for the collection system is that the more garbage collectors collect garbage, the more money they gain.

Collection: Collection should be from door to door while applying at source separation.

Transfer and processing of collected waste using garbage collectors vehicles: garbage collectors will transfer and process the collected waste in accordance with the adopted environmental standards for each district.

Sweeping and cleaning of public streets and squares: All main streets and public squares will be swept and cleaned using modern equipment with advanced technologies through

company workers while individual garbage collectors will sweep and clean adjacent and narrow streets.

Monitoring system: the monitoring system is a key element in the success of the applied system, which includes daily monitoring of all serviced areas, fines for unsatisfactory work, and finally outing of the system on repetition of improper work.

Transfer stations: Collected waste will be moved to intermediate transfer stations located outside the serviced area "no more than 20 kilometers from the original waste collection site," where waste vehicles will be weighed to document the amount of waste received by the transfer station, followed by the separation of all solid waste contained in the vehicle using semi-automatic sorting belts. Transfer stations will then purchase organic (food, agricultural and other waste as previously defined) and recyclable materials (plastic, paper, metal, etc...) according to the prevailing market price determined by approved and participating transfer stations. The mentioned strategy encourages garbage collectors to collect more because the more they collect, the more money they make. The collected and sorted organic matter will be converted to compost through anaerobic fermentation technologies. Sorted recyclable material will be processed according to defined technologies for each type of recyclable material while medical waste will be sterilized and dumped in designated landfill sites outside of Cairo. Awareness programs will be conducted to educate citizens about their role as partners in the solid waste management system. Citizens are the primary beneficiaries of a successful solid waste management system. Programs will also encourage waste

separation at source (the separation by citizens of household organic wastes, recyclables and other non-organic waste) according to a pre-defined action plan.

5.4.5. Adoption of Integrated Solid Waste Management is the Best Choice

Dr. Mahmoud El Kady, Professor of Energy and Environment at the Mechanical Engineering Department, Faculty of Engineering, Al-Azhar University.

Dr. El Kady stated that solid waste management is an issue of great importance that has to be dealt with intensive care. The adoption of an integrated solid waste management approach is the only way out of this problem. The stakeholders and their role should be clearly specified. A comprehensive program for raising citizens' awareness of MSWM aspects should be planned and executed by the EEAA. According to the Egyptian culture, it has been proven that door-to-door collection is an acceptable way for garbage collection. Traditional Zabbaleen have been successful in carrying out this process. Citizens will be encouraged to collect their waste in two separate bags of different colors, one for organic waste and the other for the rest. The project of separation at source can start in the high-income areas, and extend in a step-by-step fashion to the other areas. Non-Governmental Organizations (NGOs) will be responsible for implementing this process.

The role of the Government will focus on the construction of sanitary landfills and NGOs will be responsible for running these landfills. The location of these landfills will

be about 50 km from residential areas; therefore transfer stations will be constructed in well selected areas nearer to the residential areas; about 20 to 25 km. In transfer stations, waste sorting will take place. The transfer station should be equipped with all the necessary equipment for the preparation of recyclables. The prepared recyclables should be transported to the places where recycling takes place. Zabbaleen and Sarreha should be permitted to work in these transfer stations. The transportation of waste to the transfer stations will be in small trucks accessible to the narrow streets. The waste remaining in the transfer station will be collected in big trucks and transported to the landfills. The strategy will be based on increasing the quantity of waste to be recycled and decreasing the amounts of waste to be sent to landfills.

Recycling process of organic waste to compost should be controlled and supervised by the EEAA to guarantee profitable projects. All recycling processes will be looked at as job creating projects.

As for sweeping and cleaning of public streets and squares, all main streets and squares will be swept and cleaned using mechanical equipment through the authority in charge of this process. Small and side streets will be swept manually.

It is of great importance to have a very active monitoring system. Monitoring will be on regular basis to guarantee proper implementation of all tasks. The authority in charge of

the monitoring process will specify in the contract with the company in charge of the implementation process, a penalty system based on measurable criteria. Dr. El kady added that it is about time to think about having centers for collecting recyclables. These centers will be shops where any citizen can sell any recyclables; paper, carton, plastics, metals, cans, etc... Meanwhile, these shops will sell the recyclables to the places where recycling processes take place.

5.5. Assessment of the Solid Waste Management based on Community Evaluation

5.5.1. Road El Farg, the geographical district where the questionnaire was conducted

I will discuss community evaluation of the current Solid Waste Management and will discuss the results of a questionnaire I conducted to measure citizen satisfaction with the services. I will also discuss the main recommendations to enhance the services quality. The questionnaire conducted in Road El Farg district, which is one of the seven Northern Cairo districts. The population of Road El Farg is 173,805 with a total area of 502 square kilometers.¹³⁸ Road El Farg is a middle-income area and it is an old district where vegetable market existed, the market had been transferred to El Obour area. The questionnaire covered a sample of 200 households distributed in Mosques and Churches in Road El Farg Street and Toson Street. A team of four field workers has assisted in running this questionnaire. There were a few limitations as some of the participants were reluctant to respond and it was impossible to take acquire approvals to conduct the questionnaire in the streets so I approached Mosques and Churches. The author used to

¹³⁸ Rod EL Frag district, documentation department

work with them in projects for environmental and health awareness. In addition, the questionnaire did not concentrate on the comparison between the old system and the new system because the old system had already been terminated in 2003. However, some participants mentioned the difference in the quality of the service between both as they still deal with the Zabbaleen.

Road El Farg district is a middle-income area, in general, however, extremes are highly observed. While conducting the questionnaire, one can observe the high luxurious buildings near to very poor areas, more like slums. It can be concluded that the area is a mixture of middle-income and poor-income residents. The questionnaire focused on the two levels that represent Road El Farg inhabitants through conducting the questionnaire in the Mosques and Churches in both main and side streets.

5.5.2. Questionnaire Analysis and Outcomes

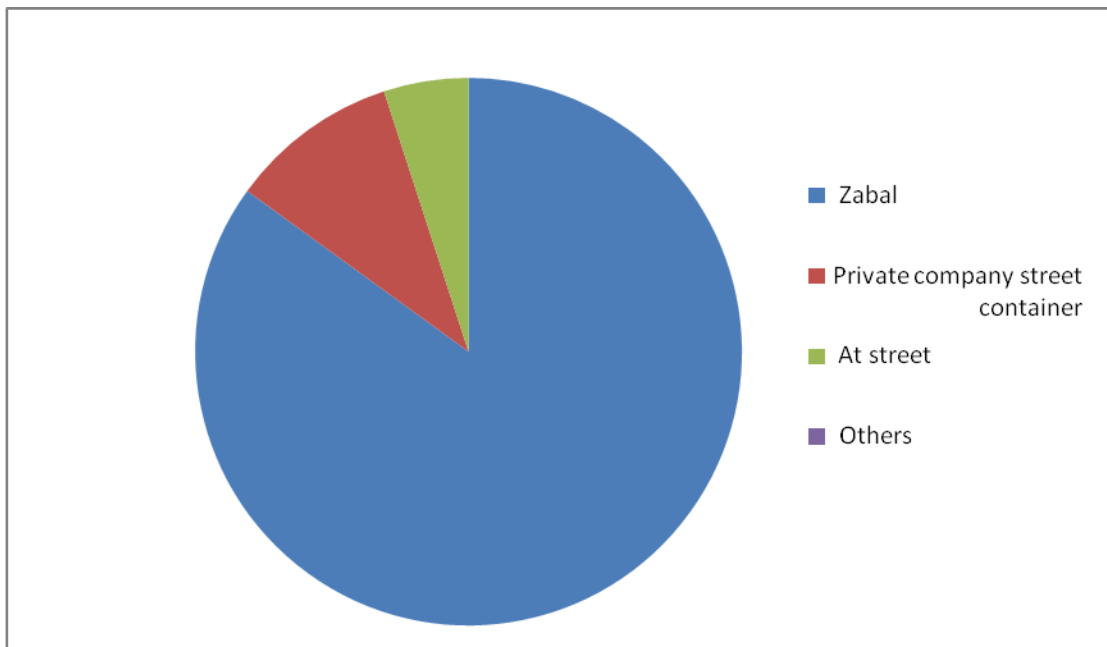
The questionnaire included groups of questions; each group was concerned with a certain aspect of MSWM. The answers were evaluated as percentages.

Getting rid of the waste through (Garbage collector" Zabal", Company or other)

The goal of this question is to know the body responsible for waste collection. Formally, AMA Arab Company is the international contractor for waste management provision in

the district since 2003. It, however, subcontracted the Zabaleen in some areas for waste collection from houses. The question offered four answers; the Zabal, street containers; throwing outside homes and others.

Different Waste Collection Means

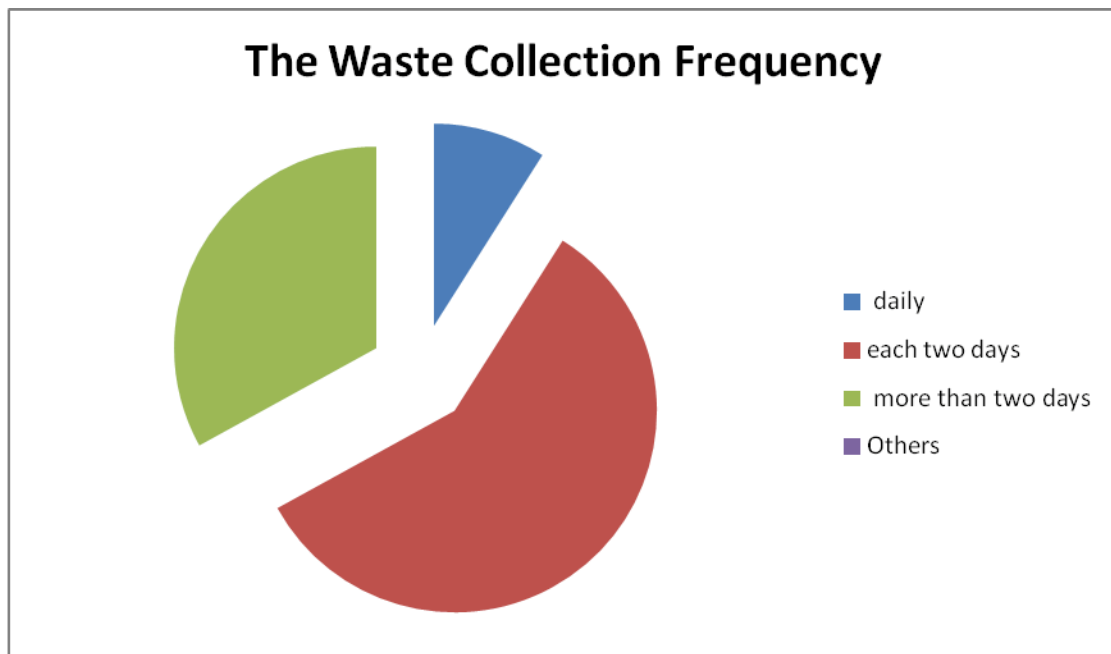


Eighty-five per cent of the participants indicated that the Zabal comes periodically to collect their garbage. The majority indicated that their area is serviced by Zabal while 10 per cent of the participants dispose their garbage through the building guard who collects the garbage and dumps them in street containers. Five per cent of the participants, particularly participants who live in side streets indicated the lack of street containers near their streets as well as the lack of person is in charge of collecting

garbage. Therefore, they just throw garbage in empty lots. Accordingly, we can conclude the following:

Eighty-five per cent of municipal waste is collected through traditional garbage collectors in the area under investigation. Door to door collection is the suitable way of waste collection, which fits the Egyptian style of life. Ten per cent of participants use street containers as a means of waste collection and are usually living in buildings with guards who can collect the garbage and transfer it to street containers. Narrow streets lack sufficient numbers of street containers for garbage collections.

Frequency of waste collection under International Company Responsibility:



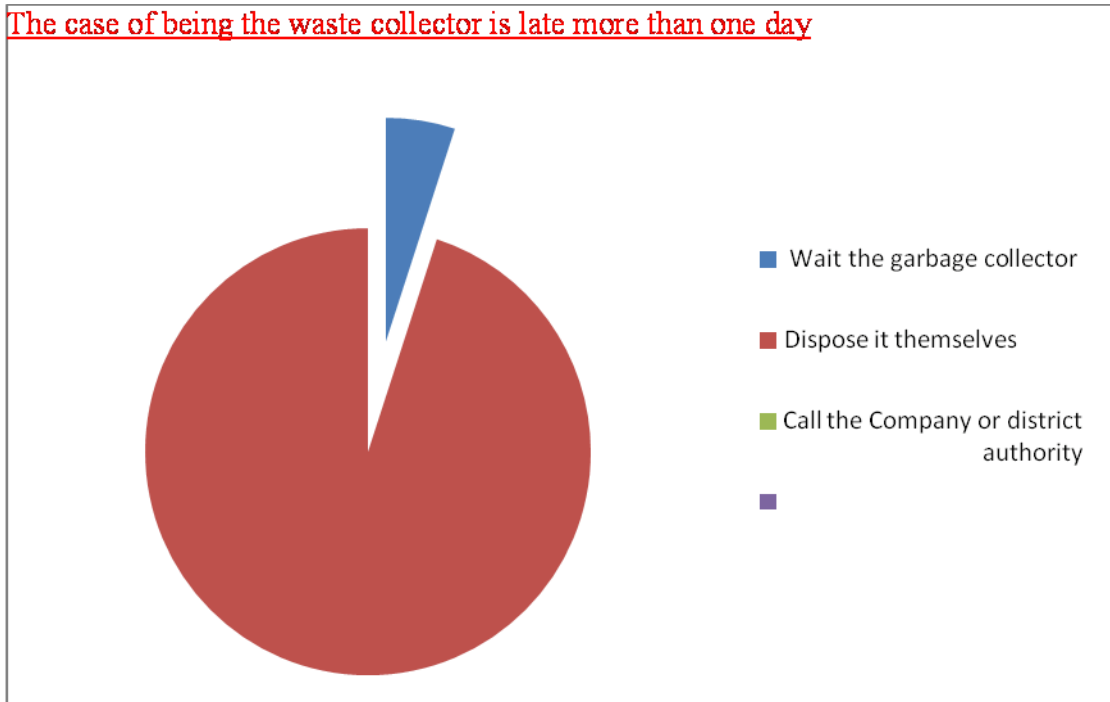
Fifty-eight per cent of the participants dispose their garbage every two days while 33 per cent of them complain that garbage collectors collect the garbage each four or five days. Only nine per cent dispose their garbage daily.

It is worth noting that the participants referred to here are only the 85 per cent of the total participants who depend on garbage collectors to collect garbage from door to door. Others dispose of the garbage themselves whether through the building guard or directly to street containers. Citizens complain that the low frequency of waste collection affect their home environment as they cannot keep the garbage in their homes for more than two days because of the odor, flies and other insects. Therefore, they get rid of the garbage themselves.

The case in which the waste collector is late more than one day

Ninety-five per cent of the participants indicated that they dispose of the garbage themselves in street containers. However, they complained that containers are usually full of garbage and they noticed that the responsible company does not empty the containers on daily basis. Sometimes, the containers are full for two days, which affect street cleanliness. Only five per cent of the participants indicated that they wait for garbage collectors until they come. No one mentioned that they call the company or call the district authority or the CCBA.

The answers of participants showed the absence of any relationship between the citizen and the company as no one mentioned that they tried to call the company or even knew the company's hot line number .In addition, the citizens are not aware of their right to contact the district authority directly. The participants noticed that the company used to come once or twice a week to remove the garbage from street containers, which affect street cleanliness.



The proper time for waste collection:

Eighty per cent of the participants are satisfied with afternoon collection as they return home from work around this time. They don't prefer early morning collection.

Cost of the Waste Collection:

Under the old system, citizens used to pay an average of three to five pounds on monthly basis to garbage collectors while under the new system, the cost of garbage collection is added on the electricity bill and the fees are determined according to the level of income of each area. In Road El Farg, citizens pay five pounds each month, which is added on the electricity bill. However, citizens still have to pay garbage collectors, as they are the ones who actually collect the garbage. Participants complain that under the new system, they are paying double the fees they are obliged to pay through the electricity bill. In addition, they have to pay garbage collectors as well. They indicated that garbage collectors do not ask for money however, if citizens stop paying, the garbage collectors stop collecting the garbage.

Seventy-one per cent of survey participants indicated that they pay double the cost as they pay through the electricity bill and the garbage collectors while 27 per cent indicated that they pay only through the electricity bill. The other two per cent did not respond to the question.

Concerning the amount of money that they pay to garbage collector, almost half of the participants said that they pay what they found it suitable while the other said there is an agreement between garbage collectors and the residents. They also stated that the cost is determined based on the number of times of waste collections per week. Some of them

stated that each pickup per week cost one pound. Accordingly, if garbage collectors come three times per week, they have to pay three pounds per week.



Citizen Satisfaction Concerning the Current System:

The questionnaire has raised some issues to measure citizen satisfaction

- Door to door waste collection Vs, using street containers
- The distance of between containers and houses
- Double paying
- Street cleanliness satisfaction
- Overall service satisfaction(satisfied –unsatisfied)

Table 9:

Item	% satisfaction
Waste Collection through Door to Door collection	93%
Waste Collection using Street Containers	7%
The distance between containers and houses	82%
Acceptance of double paying	85%
Street Cleanliness Satisfaction Satisfied Unsatisfied	27% satisfied 63% unsatisfied
Overall service satisfaction Satisfied Unsatisfied	41 % satisfied 59% unsatisfied

The data listed in the above table (table 9) shows that 93 % of the participants prefer door-to-door collection while only seven per cent agree to dispose their garbage directly in street containers.

Eighty-two per cent of the participants find the distance between street containers and their houses acceptable, although they do not accept street containers as a means of waste collection for the following reasons:

- 1- The frequency of garbage removal from containers is very low that lead to garbage accumulation inside and outside containers
- 2- The presence of street containers encourage scavengers to pick up valuable waste from the containers that lead to street contamination.

Eighty-five per cent of the participants do not mind paying waste collection fees linked to the electricity bill together with paying garbage collectors who offers the service. Although the economic status varies between low and middle-level, citizens accept paying double the fees in order to receive good service. In addition, citizens do not accept the idea of carrying their waste to street containers form cultural point of view. Most of them are trying to keep the Zabal in order to get rid of their garbage.

To conclude the questionnaire results, citizen satisfaction concerning street cleanliness and concerning the overall service is very low. Only 27 per cent of the participants are

satisfied by street cleanliness and 41 per cent of them are satisfied by the overall service provided by the company. While the majority of the participants, 63 per cent, are unsatisfied with street cleanliness and 57 per cent of the participants are disappointed by the overall service.

5.6. Zabbaleen Community Perspective

Garbage collectors are the main stakeholder in SWM whether before or after the new system of PSP in SWM provision therefore interviewing garbage collectors was an important tool to assess the current SWM system. I interviewed a garbage collector, called Malak. He said that the new system harmed their work dramatically. Under the old system, Malak was responsible for waste collection from 5000 apartments and he used to get a license from CCBA and he pays administrations fees. Malak added that his income under the new system has been reduced to half of his previous income. Under the old system, he was paid two Egyptian pounds from each apartment per month and pays 15 per cent of the collected money to CCBA, according to the contract between him and CCBA. In addition, he owned the collected garbage and the recyclables. In light of the new system, he worked under the umbrella of international companies. They only permit him to collect garbage from 1000 apartments in return for paying 600 LE each month to the company for allowing him collect the garbage and take the recyclables. He does not ask citizens for money for waste collection; however, people used to give him money as they see fit. International companies, after pig slaughtering, did not ask garbage collectors to pay money for waste collection permission to

encourage them to work since many of them stopped working after pig slaughtering. He added that in light of the new system, the recyclables that he collects decreased considerably because door men collect them before disposing of garbage in street containers. The most critical factor is the fines that they pay for violations. He said that international companies used to levy fines on them, which in some cases exceeded their income.

5.7. Conclusion

The above analysis assesses the SWM system under PSP based on the following:

- The government decision-making process, specifically the contracting process with international companies
- Current findings about waste collection efficiency and waste accumulation
- Experts' perspective
- Community perspective

The research explores the drawbacks of the government's decision-making process, particularly in the bidding and the contracts' formulation processes. The contracting process was initiated based on the freeze program and weakness of the National Strategy for Solid Waste Management in terms of funding, technical assistance, and lack of mechanisms for implementation. The bidding and the contracting processes followed in the footsteps of the Alexandria case in which SWM problems were solved by soliciting the services of international companies. Egyptian authorities believed that

international companies can be more efficient and can provide the capital that they lacked. In less than one year of signing the Alexandria contract, another fifteen governorates followed in its footsteps as if it were the ideal solution irrespective of any rationale. The tenders were prepared by the various governorates in cooperation with the EEAA and were reviewed by the Technical Secretariat. It was obvious that all of them lacked the required skills for the preparation of international tenders. Weak competencies was a core factor of the weak contracts. The World Bank identified the weakness of the bidding process as unclear bids that lacked the clear legal side and unreasonable cost in some cases such as Luxor and Red Sea governorates. The contracts became an obstacle to achieving acceptable SWM.

The assessment of waste collection efficiency and waste accumulation before and after PSP reveals that the waste efficiency during 1996 and 1999 was between 62 and 68 per cent. In 2008, it was 68 per cent, which means that waste collection efficiency is almost the same in spite of PSP. In addition, waste collection efficiency in Giza dropped from 64 per cent in 1999 to 45 per cent in 2008, which shows that SWM problems under PSP have dramatically increased.

Slight improvement in waste collection efficiency was observed in Alexandria only, as it increased from 77 per cent in 1999 to 80 per cent in 2008. Moreover, the average percentage of waste collection efficiency in 2008 remained at 65 per cent for all governorates, with no change from earlier years. Upper Egypt collection efficiency is

much lower than that for Lower Egypt and Upper Egypt is still suffering the same during 2000s.

Both SWM experts and citizens are unsatisfied with the current SWM system. Citizen satisfaction with street cleanliness and the overall SWM service is very low. Twenty-seven per cent of participants are satisfied with street cleanliness and 41 per cent are satisfied with the services provided by international companies. In addition, the majority of the participants, 63 per cent, are unsatisfied with street cleanliness and 57 per cent of the participants are disappointed by the services.

CHAPTER SIX

THESIS CONCLUSION AND REMARKS

The main focus of this thesis is to identify the reasons behind Solid Waste Management failure in Egypt during the 2000s. In light of many weaknesses and drawbacks of the current SWM system and the negative impact of the solid waste issue on citizens' health and on the environment, it is important to investigate the causes of the weaknesses in order to recommend remedies. This draws the study to compare the efficiency of the current SWM providers, the international companies, with that of the traditional ones, Garbage collector, who was the main actor during the period prior to private sector participation. Therefore, the thesis studied the role and size of the most influential SWM stakeholders in Egypt, the informal sector. In addition, the thesis explored the events and circumstances that led to garbage collectors involvement in SWM. Moreover, it scrutinized the consequences of contracting international private sector companies and neglecting the informal sector while designing the SWM system in Egypt. It is important to explore the Egyptian case of SWM in light of the experiences of other developing countries to understand its impact on SWM. Further, the thesis examined the legal, institutional, and economic framework of municipal solid waste management in Egypt as it directly affects SWM in Egypt. The thesis also focused on the role and the effect of environmental laws and the behavior of citizens on SWM efficiency. Towards this end, the thesis depended on many academic books, international studies, and old and recent reports by the EEAA and private local consultancy agencies. However, the most influential tool that contributed to the goal of the thesis is the interviews with the SWM experts and the garbage collectors.

The thesis concluded that the main reason for the current SWM failure is the government's lack of integrated, holistic approach in decision-making, planning, and implementation processes. Integrated approach means the integration of different activities that guarantee sustainability in solid waste management such as collection, transfer, recycling technologies, incineration, and land filling, adjustment of the citizens' behavior, activation of current environmental policies and regulation and the cooperation between different stakeholders in SWM. Activities that are part of SWM include; collection, transfer, recycling technologies, incineration, and land filling. In addition to those crucial activities, SWM also involves all stakeholders in decision making, planning, and implementing processes.

The thesis also indicated that the decision making process in SWM was incomprehensive and unscientific and that it is considered as one of the main reasons for SWM failure. Contracting private sector was not conducted on a scientific base as it neglected important stakeholders and produced weak contracts with international companies. The contracts are of 15-year contracts that stipulated a recycling rate of 20 per cent only and included many other weaknesses, the most prominent of which is the monitoring system.

In addition, the thesis contended that the low environmental awareness of Egyptians played a crucial role in weakening any effort undertaken to achieve good results in SWM. The poor community response to environmental protection and the low level of environmental awareness results from many interrelated factors. These factors include

the unapplied policies and regulations, the unclear role of the community due to lack of clear messages with incentives for environmental protection and the level of poverty and unemployment rate. It is believed that it is very difficult for depressed people to respond to environmental aspects.

Research Outcomes

The research findings trace the inefficiencies of SWM in Egypt at the institutional, managerial, and financial levels. At the institutional level, SWM responsibilities are dispersed among the various authorities in different ministries. At the central level, some ministries are involved as technical ministries, others as financial or organizational ministries. The institutional level lacks the adequate understanding of the relationship between consumption, disposal, recycling and other related activities. In addition, at the institutional level, they lack the talented senior staff in solid waste management who can politically prioritize SWM as a top need for the state. Furthermore, they lack the understanding of the need for comprehensive plans for solid management. The implementation is usually the responsibility of the local government, which lacks a specialized unit for SWM implementation. This differs from one governorate to the other; in some governorates, SWM implementation is the responsibility of EMUs while in other governorates, it falls under the departments related to the Minister of Local Development. The role of EEAA is limited to an advisory rather than an executive role. The only exception is that EEAA approves the Environmental Impact Assessment "EIA" for any new land, new industry, or new environmental activity.

The performance of the local government in SWM is obviously inadequate. This is attributed to the fact that the development priorities for the government is highly focused on health, sanitation, education and other areas, while environment, in terms of waste management, is the least of the government's priorities. This results in the low performance and capabilities of the staff. The SWM staff lack planning, follow up, and monitoring skills. More often, they also lack a solid understanding of SWM, its scope and how solid waste management works. SWM financial resources are insufficient; the allocated budget and the available resources do not cover the SWM processes and activities.

Moreover, the research findings highlight the lack of integrated approach as a direct factor for the failure. The Integrated Approach in SWM as in the case of Graz, Austria showed that the integrated approach is instrumental in guaranteeing sustainable development, environment protection, and achieving economic benefits.

The Egyptian case lacked cooperation and planning between the various stakeholders. In addition, the relevant authorities handled each SWM process separately. For example, they planned waste collection regardless of the recycling rate and the number of landfills needed. The planning process for waste collection is done separately from the treatment and disposal of the non-recycled garbage. When contracting private sector, the contract required international companies to recycle 20 per cent of the collected garbage only. In other words, 80 per cent of the collected garbage would be landfill or dumped. The authorities did not consider the issue of citizen behavior as an

important factor that could enhance SWM. The government did not set or ask institutions to set plans to raise the awareness of people.

Nevertheless, the research findings explore that the unscientific approach that the Egyptian government followed during the process of contracting private international companies has created additional weakness in the SWM process, particularly because it ignored an important stakeholder, the traditional garbage collectors. The analysis showed that, the presence of the informal sector in SWM is a global reality, particularly in developing countries, where the informal sector shares some significant features between the countries. It is estimated that the SWM labor force in the informal sector in countries of the South, ranges from 20 to 70 per cent. Additionally, it was concluded that globally the cost of recycling at the informal sector is less than that at the formal sector. However, the activities of the formal and the informal sectors are interrelated and difficult to untangle. At national level, the informal sector is estimated to have more than 40,000 persons whether working directly or indirectly. They are involved in collection, transportation, recovery and recycling activities. The garbage collectors carry out one third of the SWM activities in Cairo. The informal sector sorts and recycles about 80 to 85 per cent of the collected garbage, which amounts to 3000 to 4000 tons daily. In other words, only 15 to 20 per cent of the collected garbage is not recycled. It is obvious that the size of garbage collectors, their technical experiences and the active role they play in SWM in Egypt should have been taken into consideration during the design of the new system. In addition, the informal sector has added socioeconomic benefits for the poor and marginalized sectors in Egypt.

Moreover, the thesis explores the incomprehensiveness of the government during the bidding and the decision-making processes as well as the formulation of contracts between the government and international companies. Contracting international companies, at the time, looked like the best alternative because the National Strategy for Solid Waste Management was frozen due to funding, technical assistance, and implementation problems. The bidding and the contracting processes followed the of the Alexandria case where SWM problems were appeared to be solved through contracting international companies. In less than one year after signing the Alexandria contract; fifteen governorates copied the Alexandria case as if it were the ideal solution irrespective of their own circumstances. The tenders were prepared by the EEAA and the different governorates and were reviewed by the Technical Secretariat. It was very obvious that all of them lacked the required skills for the preparation of international tenders. The lack in capabilities was a core reason for weak contracts. The World Bank summarized the weakness in unclear bids, inflated costs, such as in the cases of Luxor and Red Sea, and the lack of the clear legal clauses. The produced contract became one of the main challenges in achieving acceptable SWM.

One of the tools used to assess the current SWM system is the comparison between waste collection efficiency before and after PSP. This reveals that the waste collection efficiency in Cairo remained at the same level before and after PSP as it ranged between 62 and 68 per cent during 1996 and 1999 and was put at 68 per cent in 2008. Likewise, waste collection efficiency in Giza dropped from 64 percent in 1999 to 45 per cent in 2008, which reflects that the SWM problems have dramatically increased under PSP.

Alexandria is the only governorate that showed slight improvement in waste collection efficiency, which increased from 77 per cent in 1999 to 80 per cent in 2008. Nonetheless, the average percentage for waste collection efficiency did not show any increase in 2008 in all other governorates as it remained at 65 per cent, with no change from previous years. Upper Egypt collection efficiency is much lower than that of Lower Egypt. Upper Egypt is still suffering the same during the 2000s.

Community behavior, particularly community knowledge and environmental concern stands at less than 50 per cent, according to the results of the questionnaire conducted in both low and high-income areas. However, the questionnaire revealed that despite the pressures of social and economic problems, citizens are willing to participate in environmental protection programs. In addition, the questionnaire shed light on the fact that the existing environmental laws are neither effective nor applicable.

Both SWM experts and citizens are unsatisfied with the current SWM. Citizen satisfaction with street cleanliness and the overall SWM services is very low. Only 27 per cent of the participants are satisfied with street cleanliness and 41 per cent of them are satisfied with the overall service provided by international companies. The majority of the participants, 63 per cent, is unsatisfied with street cleanliness and 57 per cent of the participants are disappointed by the overall service.

To sum up, the thesis recommends the following:

- The adoption of integrated solid waste management approach is a must.

- The stakeholders and their role should be clearly specified.
- A comprehensive national program for raising citizens' awareness of SWM aspects should be planned and executed by the EEAA.
- Door-to-door collection proved to be the most suitable collection means according to Egyptian culture.
- Traditional Zabbaleen have to be formally involved in SWM system and their system must be continuously upgraded.
- A national program for waste source separation should be conducted. Citizens should be encouraged to separate their waste in two separate bags of different colors, one for organic waste and the other for the rest. The project of separation at source can be launched in the high-income areas and then regularly extended to other areas. Non-Governmental Organizations (NGOs) should be responsible for implementing this process.
- The contracts between the government and international companies should be revised and amended to include the missing items, which negatively affect the implementation. In particular, the monitoring system should be clarified in detail.
- The role of the EEAA should be more than an advisor. The EEAA should also cooperate with the Ministry of Local Development.

Thesis limitations

The first obstacle I encountered was the unavailability of data concerning SWM in Egypt. The available data is the environmental profile of Egypt, which includes the

environmental profiles of the various Egyptian governorates. This is prepared by the Ministry of State for Environmental Affairs and the EEAA in collaboration with the Information and Decision Support Center and is published on the Egypt Information Portal and the Regional Euro –Mediterranean Programme for the Environment. The available data includes information about the national plan, monitoring and technical information and information about hazardous waste.¹³⁹ The available data shows some problems such as the lack of comprehensive information about SWM concerning waste generation, the efficiency of waste collection, the coverage of waste collection and the weakness of the system. In addition, the available data randomly includes some Egyptian governorates while other governorates are neglected totally in the reports. The available reports usually concentrate on the efforts undertaken by the various authorities that contributed to the reports in each governorate. For example, the EEAA reports usually focused on their efforts on the different environmental fields. In some reports concerned with SWM, the analysis is based on old date. For example, the studies are based on data ten years old. While I was interviewing some private agencies that are concerned with SWM studies such as CID and EcoConServ, I found that they worked in SWM in certain governorates only in case the funding is available. This results in incomprehensive and unsystematic data gathering. In addition, most of the data they issue is not for public consumption; it is restricted to funding agencies only.

¹³⁹ Ministry of State for Environmental Affairs-Egyptian Environmental Affairs Agency, Egypt Environmental Profile

There are discrepancies in the available data even in the official sources, particularly when compared with the data from local district authorities. The waste collection efficiency in the official sources reveals that waste efficiency in Cairo governorate was constant between 1996 and 1999 (62 to 68 per cent) and in 2008 (68 per cent). In addition, AMA Company (one of the international companies working in Egypt) indicated that the waste efficiency in the Cairo areas they service (Cairo North and Cairo West) reaches 90 per cent while the district authorities indicated that the waste efficiency is about 75 per cent in Cairo North.

In addition to the above-mentioned limitation, I encountered limitations with the literature itself. The available literature usually lacks the technical framework of SWM, which represent a core tool to understand the issue. It was also found that some of the theories do not reflect the SWM reality. Also, the international experiences cannot be applied to the case of Egypt due to the different circumstances, culture and financial resources. However, it is believed that both the literature and the international experiences are important in providing a snapshot of the current key concepts, taking into consideration the differences in analysis.

Another limitation is the garbage collectors personalities. While I was trying to gather the information about the period before and after PSP, they used to exaggerate to attract attention to their problems. I discovered this from the inaccuracies and the discrepancies in the data they provided.

The thesis did not cover the economic and environmental impacts of the different SWM activities such as recycling. The economic and environmental impacts of each solid waste activity will help in drawing a holistic solid waste approach. In addition, the thesis lacks the study of success stories in Egypt as a guiding tool for other Egyptian areas.

ANNEX

Questionnaire

Name (optional):

Age:.....

Sex:.....M.....F

Address:-.....

Telephone Number (optional):-.....

Where do you keep your daily waste?

- Plastic garbage bag
- Used plastic bag
- Garbage basket
- Others (please mention)

How do you get rid of the waste?

- The waste collector comes and take it
- I dispose it in the street container
- I throw it in the street
- Others (please mention)

How many times do you normally get rid of the waste?

- Daily

- Every two days
- More than two days
- Others (please mention)

When do you usually get rid of the garbage?

- Morning
- Afternoon
- Evening
- At specific hour (please mention)

Who do usually get rid of the waste?

- Mother
- Father
- One of the children
- Other s (please mention)

Who do collect the waste from the area?

- Private Company
- Zabal (informal collector)
- Other s (please mention)

How many times does the waste collector come?

- Once weekly
- Twice weekly

- 3 times weekly
- Others (please mention):

When does the worker collect waste?

- Morning
- Afternoon
- Evening
- At a specific hour (please mention)

In case of being the waste collector is late more than one day what do you do?

- I wait him
- I call the hot line in the company
- I call/complain with the district/CCBA/other
- I get rid of it myself

How do you pay for the service of waste collection?

- With the electricity invoice
- I pay to the worker directly
- Both
- Others (please mention):

Where is the nearest waste box related to the company?

- Near (less than 50 meter)
- Far (less than 150 meter)

- So far (more than 150 meter)

Would you like to play a role in order to get a clean environment? Yes (.....) No (.....)

How you Imagine this role?

- Participate/coordinating cleaning campaigns with local stakeholders
- Follow up door to door collection in your building
- Raise the awareness of your neighbors to change their behavior
- Being with the responsible of the collection
- Others (please mention):

Tell us the important suggestions which can be provided to the waste company in order to improve the service as priorities?

1st.

2nd.

3rd.

What are your suggestions to change the behaviors of the people and to raise the environmental awareness?

.....
.....
.....
.....

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