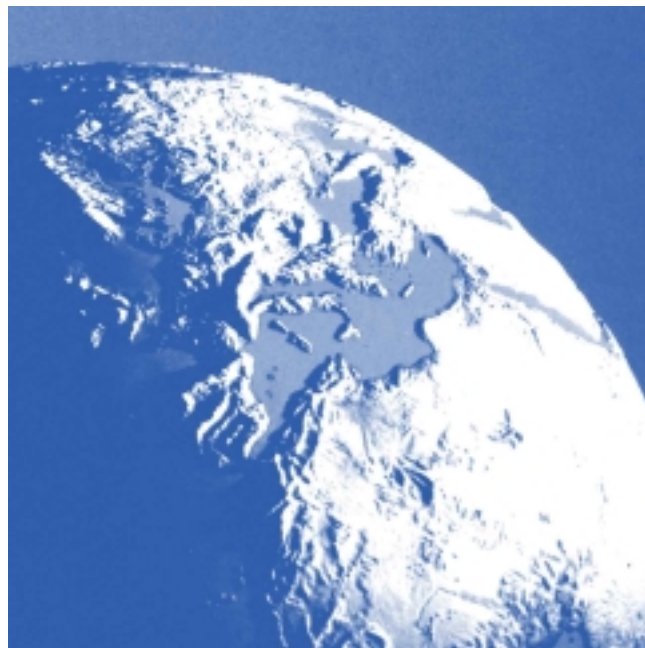




POLICY AND INSTITUTIONAL ASSESSMENT OF SOLID WASTE MANAGEMENT IN FIVE COUNTRIES

Cyprus, Egypt, Lebanon, Syria, Tunisia

REGIONAL SYNTHESIS



Cedare



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Regional Synthesis on

**Policies and Institutional Assessment of Solid Waste
Management in Five Countries**



Table of contents

	Page
Executive Summary	3
1. Introduction	7
2. Background information	8
2.1 Introduction	8
2.2 Physical geography	8
2.3 Demographic features	10
2.4 Socio-cultural characteristics.....	11
2.5 Economic conditions.....	12
2.6 Political structure	13
3. Sustainability of policy and legal frameworks	15
3.1 Introduction	15
3.2 Description of the legal and policy framework for SWM in the five countries.....	15
3.3 Performance assessment and analysis.....	16
4. Institutional frameworks and financial arrangements for solid waste management	18
4.1 Introduction	18
4.2 Institutions involved in SWM and their division of responsibilities	18
4.3 Institutional structure and contracting authority	19
4.4 Staff, salaries and training	20
4.5 Coordination and cooperation with other stakeholders	20
4.6 Financial arrangements for solid waste management.....	21
4.7 Assessment of institutional sustainability	24
4.8 Assessment of financial sustainability	25
5. Private sector performance	27
5.1 Introduction	27
5.2 Description of the formal and informal private sector in the 5 countries	27
5.3 The conditions for private sector participation	33
5.4 SWOT analysis of the formal and informal private sector	35
16. Technical performance	39
6.1 Introduction	39
6.2 Waste generation and composition	39
6.3 Collection and transfer.....	40
6.4 Recovery.....	42
6.5 Treatment and disposal.....	44
6.6 Hazardous waste management.....	45
6.7 Overall performance assessment.....	46
7. Barriers to progress in solid waste management	49
7.1 Introduction	49
7.2 Flaws in environmental and SWM legislation	49
7.3 Gaps in SWM policies and strategic planning	49
7.4 Institutional barriers to efficient and effective municipal SWM	50
7.5 Limited involvement of other stakeholders and low environmental awareness.....	51
7.6 Financial barriers and lack of cost recovery in municipal SWM	52
7.7 Deficiencies in technical and operational decision-making in municipal SWM	52
7.8 Barriers impeding private sector performance	53
8. Recommendations and Conclusions	55
8.1 Introduction	55
8.2 Reforms in legislation and policies	55
8.3 Institutional strengthening and capacity-building	56
8.4 Better coordination between stakeholders and higher awareness	56
8.5 Changes in financing and cost recovery mechanisms	57
8.6 Improvements in operational planning and management	57
8.7 Better conditions for private sector participation.....	58
References	59

List of Tables

	Page
Table 2.1	Some key geographical data for the five countries under study..... 10
Table 2.2	Some key demographic data for the five countries under study 11
Table 2.3	Population size of the five largest cities in Lebanon and Syria..... 11
Table 5.1	Characteristics of the formal and informal private sector in Lebanon, Egypt, Cyprus, Syria and Tunisia 28
Table 5.2	Types of waste management activities of formal private enterprises in the 5 countries 32
Table 5.3	Types of waste management activities of informal private enterprises in the 5 countries 32
Table 5.4	Types of private contracting arrangements for solid waste management in the 5 countries 34
Table 6.1	Waste generation and composition compared..... 39
Table 6.2	Waste characteristics for five major cities in Syria..... 40
Table 6.3	Assessment of solid waste management practices in the five countries under study 47

List of Figures

Figure 2.1	Location of the five countries under study: Egypt, Lebanon, Syria, Tunisia and Cyprus	9
Figure 4.1	Division of responsibilities of governmental institutions responsible for solid waste management in Lebanon	19

Executive Summary

This report gives an overview of the policy and institutional frameworks for solid waste management in five countries in the Mediterranean region: Egypt, Lebanon, Syria, Tunisia and Cyprus. Studies were conducted in these five countries to reveal the institutional and policy factors impeding efficient and effective solid waste management and to suggest appropriate strategies and solutions for improvement. The purpose of this synthesis report was to compare and analyse the five country reports, to highlight the differences and similarities and to identify opportunities for future strategic development in the field of solid waste management.

The **background** of the five countries differs in many aspects: geographically, demographically, socially, economically, and politically. These conditions determine policy and institutional frameworks for solid waste management. There are both similarities and differences between the five countries. For example Lebanon and Cyprus are rather similar in size and relief (many mountainous areas). They also share a relative lack of natural resources, which made their economic development efforts focus on services like trade and tourism. Egypt and Lebanon share the high population density in their capital cities, Cairo and Beirut. Other similarities are the fact that Arabic is the main language spoken in four of the five countries. All countries are started sooner or later to change from a more socialist to a more capitalist economic approach. Cyprus was the first to do so. Large differences exist in the size of the population, demographic structure, income levels and for example literacy levels between the five countries. Cyprus is different because of its relatively high GDP and high literacy level, followed by Lebanon and Tunisia, and, with some distance, Egypt and Syria. The political systems in Egypt, Syria and Tunisia resemble each other to some extent (presidential system), while in the political systems of Cyprus and Lebanon a larger role is played by the prime minister and party politics.

Assessment of the **legal and policy environment** for solid waste management found that environmental legislation is most developed in Tunisia, followed by Lebanon and Egypt. However, the existing environmental laws in Egypt and Lebanon have a purely “cleaning” or “public health” approach to solid waste management. Tunisia was the only country that seemed to include objectives like increased recycling, reuse and reduction of waste in its environmental laws and policies. It was also the only country that used economic policy instruments to reach environmental objectives. The countries with environmental laws suffered from a lack of enforcement capabilities, especially at the local level.

New environmental laws are being developed in Lebanon and Syria. Cyprus lags behind with its environmental legislation, although it should develop a legislative framework that matches with the EU Directives on solid waste management soon, as it is supposed to enter in an association with the European Union in 2003.

National solid waste management strategies exist in Egypt and Tunisia. In Cyprus such a strategy is under development. Some national policies, regulations and standards for solid waste management in Tunisia seem to be too ambitious. Local and regional plans for solid waste management are not so common in the five countries studied.

The shortage of reliable data on solid waste management hampers decision-making, policy development and performance monitoring. There seems to be a general lack of public awareness on environmental rules and regulations, including those for solid waste management in the countries studied.

Regarding the sustainability of the **institutional frameworks** for solid waste management, many governmental institutions are involved in solid waste management, especially in Lebanon and Tunisia. Coordination between these institutions is not always optimal. There is overlap in responsibilities and therefore sometimes duplication of efforts. The role of provincial governments in SWM is usually small or under-developed, like in the case of Lebanon where the Governorate was supposed to supervise the siting and operation of landfills, but did not take this task seriously.

In Syria, Lebanon, Egypt, and Tunisia the municipalities or equivalent local governments have contracting authority. In Egypt the Governorate, the provincial authority, has obtained contracting authority recently to contract out solid waste management to private companies.

The SWM departments in most countries suffered from a lack of qualified staff. In Egypt and Lebanon this was related to low salaries and a lack of incentives. The local governments in all countries also seemed in need of training, especially regarding the trend towards privatisation of SWM. Only Tunisia has set up a governmental training centre to assist municipalities in privatisation, financial administration, contract management, etc. related to solid waste management.

More coordination and cooperation with other stakeholders is deemed necessary in all five countries. Only with the formal private sector relations are relatively good. Cyprus was an exception; here even the relations between local government and the (formal) recycling sector were not well developed. Relations of local governments with other stakeholders in SWM like NGOs, the informal sector, other municipalities, citizens and customers need to be developed, to strengthen each other's initiatives.

Financial arrangements in the five countries under study to fund investments, operation and maintenance of solid waste management differed. The main sources of funding for SWM are central government transfers, local taxes and some kind of user charges either direct (Cyprus, Syria) or indirect (Lebanon with its surcharge on utility bills, Egypt with its 2% cleanliness tax on property rents). Cost recovery levels for SWM were low, except in Cyprus. In many cases this is even hard to judge, because cost analysis of SWM operations is totally lacking. Cleaning departments have often no insight in the cost of their services, because they communicate little with the financial department. There seems to be virtually no relation between costs of services and fees charged, except maybe in Cyprus.

Only in Tunisia incentives for the private sector are used by the national government to stimulate investment in environmental and SWM projects. In all countries the private sector seems to be able to cover its cost through a combination of user fees and recycling. In Egypt sometimes difficulties arise with community organisations or small-scale enterprises that offer waste collection with the willingness to pay of the customers.

An analysis of the **performance of the private sector** in SWM in the five countries showed that contracting and private subscription (or "open competition") are the most common contractual arrangements between local governments and private companies. Licensing and franchising of the informal sector occurs in a few cases (Egypt, Syria).

Both an analysis of the performance of the formal SWM sector and informal SWM sector was given. The formal SWM sector is mainly involved in collection, street sweeping, composting and in very few cases disposal. Their role is supposed to increase with on-going privatisation efforts in the five countries. For example Syria is planning to contract private companies for operation of its composting facilities. The international private sector is only involved in tendering and contracting in Egypt and Lebanon, mainly via BOO and BOT contracts. Egypt seems to go for privatisation at an exceptionally large scale and at high speed.

The informal SWM sector appeared to be involved in many SWM activities in some countries and is able to recover more waste than the formal sorting/recycling and composting factories in most countries. The sector seemed especially large and well established in Egypt and Lebanon. Development assistance programmes helped the «zabbaleen» in Cairo to develop from waste collectors to small-scale recycling entrepreneurs, a model that could be followed elsewhere in the region. The future role of the informal sector during the privatisation of SWM is unclear. They are considered a nuisance in some countries. Also a lack of information exists on their activities and potential, especially in Cyprus and Tunisia.

The **technical performance** of municipal SWM, i.e. the existing practices of collection, disposal, treatment and recovery and their environmental and technical soundness, were assessed at last. Collection rates and service coverage appeared to be very good in Cyprus, but deficient in the other countries, especially in smaller towns and secondary cities, and peri-urban low-income areas. Inappropriate equipment and inefficiencies in waste collection seem to be the rule, except maybe in Cyprus.

Egypt seemed to have the most diversified recycling sector, mainly due to its strong «zabbaleen» community that sorts and recycles waste materials on a small scale. Separation at source is at its infancy in the countries studied. Trials and pilot projects were undertaken in among others Cyprus, Tunisia and Egypt, but experiences are mixed or results unknown (Tunisia).

Composting is carried out as a large-scale venture in most cases (Egypt, Lebanon, Syria). Most of these government-run composting plants operate below capacity and are a drain on the budget of the local or provincial governments. Privatisation of these plants is seen as the solution.

Finding appropriate disposal sites is a recurrent problem in the five countries, especially in densely populated areas in Lebanon and Egypt. Regarding the operation of disposal sites, crude dumping is the rule, even in large cities. Sanitary landfills are non-existent in the countries under study, but controlled landfills, which at least include regular covering of the waste, planning of disposal in cells, use of a weighbridge, etc., are on the increase.

Hazardous waste management is a neglected issue in most cases, especially in Lebanon. Tunisia is furthest with its development of procedures and regulations on hazardous waste, followed by Egypt. Tunisia also produces most hazardous waste compared to the other four countries, followed by Egypt and Syria.

A correlation exists between the institutional and financial sustainability of SWM systems on one hand and performance on the other hand. A low level of material and managerial capacity combined with a shortage of skilled staff and training leads to inefficient performance. Inefficient performance by itself results in higher costs than necessary and low willingness to pay of the customers (if it means certain areas are left out of the service or if the service is irregular).

A number of **barriers to progress** in solid waste management were identified related to the various performance levels assessed: legal, policy, institutional, financial, and technical/operational. For each of these performance levels also **recommendations and conclusions** were given. A summary is given below:

- Deficiencies in environmental laws should be amended through the introduction of additional regulations and standards.
- Proposed environmental laws should be approved and enforced as soon as possible.
- More SWM plans should be developed at the local level.
- SWM strategies at all levels should include specific targets that need to be reached in a certain time period.
- Databases for SWM should be set up at national, provincial and local level.
- Studies should be carried out on specific issues that are neglected up till now (such as hazardous waste management in Lebanon).
- Capacity building at local and national level is necessary in all countries, especially regarding private sector participation, contract management, financial management and performance monitoring.
- The enforcement capabilities for environmental and SWM laws should be improved, especially at local level.
- Involvement of non-traditional stakeholders like informal sector, NGOs, youth, businessmen, etc. in planning of SWM should be encouraged.
- Public awareness on various issues related to the environment and SWM needs more attention.
- Cost recovery of municipal SWM should be increased through establishing innovative financing mechanisms, increasing user charges and involving the private sector.
- Economic measures to encourage environmentally sound behaviour and investment should be introduced. Tunisia is a forerunner in this respect.
- Regarding operational planning and management, a whole list of measures was proposed to improve collection, the selection of equipment, siting and operation of landfills, (preventative) maintenance, hazardous waste management, recycling and separation at source. In most cases it seemed useful to start with an accurate assessment of the current practices and to develop operational guidelines for good performance.
- Private sector performance can be improved through a combination of a reduction of institutional barriers (taxes, duties, tender conditions, etc.) and capacity-building of the local private sector, both formal and informal. Measures to support the recycling industry were also indicated.

It is a common perception that improving solid waste management means making waste collection and disposal systems more efficient, raising public awareness and enforcing environmental and SWM laws. However, prerequisites for all these factors are a capable and prepared local government,

cooperation between all stakeholders involved in solid waste management and strategic planning. That is where all efforts should start. This seems to be the main conclusion from the assessments of policy and institutional frameworks for solid waste management in Egypt, Lebanon, Syria, Tunisia and Cyprus!

1. Introduction

Solid waste management is a growing concern in many countries around the world. For the Mediterranean region it is known that available resources for urban infrastructure and services are not always spent efficiently due to the weaknesses and inefficiencies of traditional institutions. Pricing, cost recovery, partnerships with the private sector, and capabilities of local governments are some of the aspects that could be improved. In this context, this study was carried out in five countries in the region, namely; Egypt, Lebanon, Syria, Tunisia and Cyprus, to reveal the institutional and policy factors impeding efficient and effective solid waste management and to suggest appropriate strategies and solutions for improvement.

Many studies have been conducted on solid waste management in Mediterranean countries. However, this study tries to be different from previous studies by not only describing the situation and problems but by also providing an assessment of solid waste management and identifying strategic directions for the future. From the outset it was deemed impossible to carry out an assessment of the institutional and policy frameworks for solid waste management without looking at the performance of the solid waste management sector in practice, i.e. the outcome of these frameworks and policies. It was also considered necessary to look at all stakeholders involved in solid waste management, both formal and informal.

This report is based on five country studies that have been undertaken in Egypt, Lebanon, Syria, Tunisia and Cyprus in 2000 by national consultants¹, to whom our sincere thanks extend for providing the foundation for this report.

The purpose of this synthesis report is to compare and analyse the five country reports, to highlight the differences and similarities and to identify opportunities for future strategic development in the field of solid waste management. Its structure is as follows:

The report consists of 8 chapters. The first chapter is the introduction. The second chapter provides a summary of **background information** about the five countries, which includes geographic, demographic, social, economic, and political conditions, under which solid waste management is performed. Against this background the assessment starts in the third chapter with an assessment of the **legal and policy environment** for solid waste management. The fourth chapter deals with the sustainability of the **institutional frameworks** for solid waste management. It will also briefly discuss **financial arrangements** that are in place in the five countries under study to fund investments, operation and maintenance of solid waste management. In Chapter 5 the **private sector involvement** in solid waste management is analysed, both the formal sector and informal sector which is huge in some of the countries. The sixth chapter focuses on **technical performance**, the existing practices of collection, disposal, treatment and recovery and their environmental and technical soundness.

The last two chapters, Chapter 7 on **barriers to progress** in solid waste management and Chapter 8 on **recommendations and conclusions** the findings of the country studies will be summarised and future strategic directions as well as opportunities will be indicated.

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2. Background information

2.1 Introduction

In this section we will give a brief description of the five countries, their differences and similarities in geography, demographic features, socio-cultural characteristics, economic circumstances, and political structure. These differences and the different national histories of the countries form the context of the policy and institutional frameworks in solid waste management that will be described and analysed later in this report.

2.2 Physical geography

Figure 2.1 shows the location of the five countries included in this study: Egypt, Lebanon, Syria, Tunisia and Cyprus.

Lebanon and Cyprus are the smallest of the 5 countries and are rather similar in size: 10,452 km² and 9,251 km² respectively. Both countries have mountain ranges, which limit agricultural development and settlement growth. Next in area size are Tunisia and Syria. Tunisia is smaller than Syria in absolute terms (155,360 km² against 185,180 km²), but it is larger in terms of the amount of cultivated land, if one includes permanent crops and pastures such as olive trees (52% or 81,000 km² against less than one third or 60,000 km²).

The territory of Egypt is the largest in size among the 5 countries: more than 1 million km². However, 98% of the Egyptian population lives and works in 4% of this land area (or 40,000 km²), the Nile Valley. This means that Egypt with its 65 million inhabitants has in total less cultivated land than Syria with 17 million or Tunisia with 9.5 million inhabitants!

Cyprus is a special case, as it is an island state and because Turkey occupies the north-eastern part of the island since 1974.

Mountainous regions can be found in all five countries. Lebanon and Cyprus seem to be the most mountainous of the five countries. They both have two ranges of mountains cutting through the country. 73% of Lebanon is reportedly hilly and mountainous.

Soil conditions are not described in detail except for Lebanon where it is said that the soils are calcareous, relatively permeable and prone to erosion. This makes finding appropriate sites for land filling not easy.

The climate in the five countries varies, also within the countries themselves. Parts of the 5 countries have a typically Mediterranean climate with long, hot and dry summers, mild relatively rainy winters and a short spring and autumn. This holds for Cyprus as a whole and for the coastal regions of the other four countries (the North of Tunisia and Egypt and the West for Lebanon and Syria). The remainder has either a mountain climate (wet and cool) or a desert climate (dry and hot).

Rainfall varies according to these climatic conditions. Mountainous areas normally receive most rain. Then come coastal areas, after which come plains and valleys, and the driest are, finally, desert areas. The internal variation is best illustrated by Lebanon: the coastal areas catch on average 700-1,000 mm rainfall per year, Mount Lebanon receives as much as 1400 mm precipitation (mostly snow), while the Bekaa Valley (a large plain in the North-eastern part of the country) in some places rainfall is as little as 200 mm per year. In Tunisia rainfall in the North reaches 800-1000 mm, while in the South it is on average only 50-150 mm per year. Egypt reportedly has the lowest average annual rainfall (50 mm/year) of the five countries. Agriculture here depends heavily on the river Nile. Syria has more dry land agriculture and occasionally suffers from drought periods.

It is clear that these climatic conditions have consequences for agriculture, but they also influence settlement patterns. Urbanisation seems to have increased during the past decades in all five countries. Lebanon is most urbanised with 85% of the population living in urban areas, Egypt and Syria least, with 47% and 50% respectively living in towns and cities. Table 2.1 shows some key geographical data for the five countries under study.

Figure 2.1 Location of the five countries under study: Egypt, Lebanon, Syria, Tunisia and Cyprus

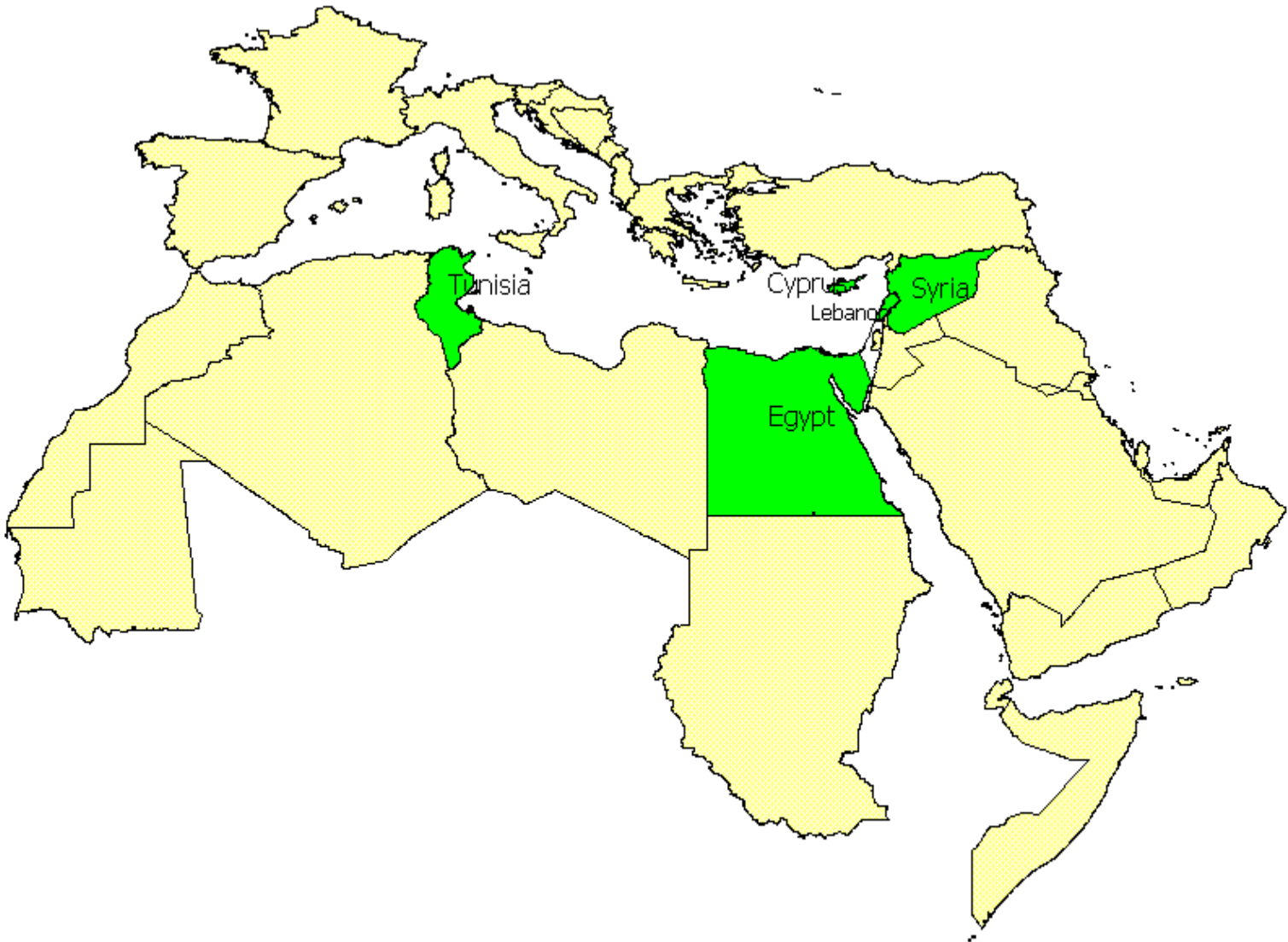


Table 2.1 Some key geographical data for the five countries under study

	Lebanon	Egypt	Cyprus	Syria	Tunisia
Size land area	10,452 km ²	1 million km ²	9,251 km ²	185,180 km ²	155,360 km ²
Size cultivated area/arable land	NA	Approx. 40,000 km ²	4,500 km ²	60,000 km ²	81,000 km ²
Size population	4 million **	65 million ****	800,000 ****	17 million ****	9.5 million ****
Population density (in persons/km ²)	380, 1,600 in coastal region, 31,350 in Beirut	65, 1,400 per km ² cultivated land, 31,000 in Greater Cairo	86, 178 per km ² cultivated land	92, 283 per km ² cultivated land	61, 117 per km ² cultivated land
Level of urbanisation	85% **	47% ***	69% **	50% ***	62%**
Administrative regions	6 Governorates	26 Governorates	6 districts	14 Governorates	23 Governorates

Source: country studies and WHO (2000)

* 1996

** 1997

*** 1998

**** 1999

The population of both Egypt and Lebanon is concentrated to a large extent in the capital cities. Greater Beirut has a population of 1.3 million, which represents 31% of the total population of Lebanon, while Greater Cairo has an estimated population that ranges from 12 to 20 million, or 18-31% of the total population of Egypt. The population densities in Greater Cairo and Greater Beirut are also comparable: around 31,000 persons/km² (see Table 2.1).

2.3 Demographic features

Table 2.2 gives basic demographic data for the five countries under study.

Egypt is with 65 million inhabitants the most populated country of the five countries under study, Cyprus with 800,000 the least. To Lebanon's population of 4 million must be added the 1.1 to 1.2 million Palestinian refugees who live on Lebanese territory. Syria hosts another 360,000 Palestinian refugees.

Population growth is highest in Syria among the five countries (3.3% per year), Cyprus it is lowest (0.7% per year). In both Syria and Egypt this population growth is closely related to natural growth, as can be concluded from the high total fertility rate in both countries (4.2 and 3.7 children per woman respectively). Lebanon has suffered from much emigration during the civil war. However, at present Lebanese expatriates are increasingly returning to their country. Therefore the population growth rate is expected to rise to 3.0 % in 2000. Tunisia has experienced much emigration to Europe in the past 25 years and still had a negative migration rate of -0.74 migrants per 1000 population in 1999.

Regarding the structure of the population, Egypt, Tunisia and especially Syria have a very young population, with around 35% or more aged below 15 years. Cyprus is the only country that has an aging population.

Adult literacy is high in Cyprus and Lebanon with 94% and 88% respectively, while it is low in Egypt (51% in 1995).

Table 2.2 Some key demographic data for the five countries under study

	Lebanon	Egypt	Cyprus	Syria	Tunisia
Size population	4 million **	65 million ****	800,000 ****	17 million ****	9.5 million ****
Population growth rate (per year)	2.1 **	2.2 **	0.7 *	3.3 *	1.2 ****
Population below 15 years	29% *	35% **	25% *	45% ***	34% **
Population between 15 and 64 years	65% *	62% **	64% *	52% ***	59% **
Population 65 years and over	6% *	3% **	11% *	3% ***	7% **
Adult literacy	88% **	51% (1995)	94% (1992)	79% *	67% (1995)
Female adult literacy	84% **	37% (1995)	90% (1992)	69% *	55% (1995)
Life expectancy	68.5 years *	66 years *	NA	NA	73 years ****
Crude birth rate per 1000 population	27.8 **	28.4 ***	14.9 *	45.2 **	19.7 ****
Crude death rate per 1000 population	8.8 **	6.4 ***	7.7 *	7.0 **	5.0 ****
Total fertility rate (no. of children/woman)	2.5 *	3.7 *	2.1 *	4.2 (1994)	2.4 ****

* 1996

** 1997

*** 1998

**** 1999

It can be concluded that the scale of the cities varies largely between the countries under study. For instance the largest city in Cyprus is Nicosia, which has 255,000 inhabitants. This is similar to the size of the 3rd city in Lebanon, the 5th in Syria and probably the 20th in Egypt! For illustration purposes the five largest cities in Lebanon and Syria and their population sizes are shown in Table 2.3. Egypt's second largest city, Alexandria has 3.5 million inhabitants, almost the entire population of Lebanon.

Table 2.3 Population size of the five largest cities in Lebanon and Syria

Lebanon		Syria	
Name city	No. of inhabitants	Name city	No. of inhabitants
Beirut	1.2 million	Damascus	1.5 million
Tripoli	823,000	Aleppo	1.8 million
Akkar	208,000	Homs	630,000
Sour	195,000	Lattakia	360,000
Chouf	194,000	Al-Raka	180,000

2.4 Socio-cultural characteristics

The five countries involved in the assessment resemble each other and differ from each other in social and cultural characteristics like the type of ethnic groups, predominant religion and language spoken. All countries have undergone various influences and are inhabited by diverse populations. In the Tunisia report it is most explicitly stated that the country is a «melting pot» of Arab, Berber, African, European and Mediterranean influences.

Some examples of this diversity will follow. As for ethnic groups the population of Tunisia and Egypt includes Berber and Bedouin people (nomadic peoples who migrate in the deserts and the Sinai). A proportion of Egyptians is of Nubian background (a people also living in Sudan). Lebanon's population is said to be for 95% of Arab and 4% of Armenian origin, while 1% belongs to another population group. Egypt's population is for 99% Arab (including Berbers and Bedouins) and 1% belongs to other ethnic groups (Armenians, Greeks, Nubians and Europeans).

Religion is a sensitive issue in the Middle East and Mediterranean region at large. Egypt, Tunisia and Syria are predominantly Muslim countries, while the majority of the population of Cyprus is Christian (mostly Greek Orthodox, some Armenian, Maronites and Catholics). The people of Lebanon have a very diverse religious background with 5 different Islamic groups (Shia, Sunni, Alawite, Isma'ilite and Druze) and 11 different Christian churches (6 Catholic, 4 Orthodox, 1 Protestant). Lebanon therefore has no state religion. Both Syria and Egypt, besides being predominantly Muslim countries have a sizeable Christian population, estimated at 10% for Syria and 6-20% for Egypt (mainly Coptic Orthodox).

Regarding the language spoken in the various countries, on the one hand there are the Arabic-speaking countries (Egypt, Tunisia, Lebanon and Syria), on the other hand Cyprus with Greek as its official language. In Lebanon and especially Tunisia French is also widely spoken.

A special social feature of Lebanon and Syria is the presence of a large number of Palestinian refugees and foreign workers since the wars of 1948 and 1967, in total estimated at 1.1 to 1.2 million in Lebanon and 360,000 in Syria. Most of them live in refugee camps, which have become low-income settlements.

2.5 Economic conditions

Countries that are doing well economically at the moment seem to be Cyprus, Egypt and Tunisia. The present economic conditions in Syria are not very clear and Lebanon is facing an outright economic crisis with stagnating growth and a crippling public debt. Differences between the five countries include Gross Domestic Product (GDP) per capita, which is high in Cyprus, medium in Lebanon and Tunisia, and relatively low in Egypt and Syria (see Table 2.4). Some caution needs to be exercised with Table 2.4, as the data do not always refer to the same year and are not derived from the same source.

Economic growth

Cyprus has experienced a high economic growth rate since the mid-1970s, on average 7% (1976-1989). Tunisia and Egypt have more recently (in the 1990s) seen a steady growth of 4-5%. Because of economic pressure both countries had to transform their centrally planned economies with a relatively small private sector into a decentralised, market-based, outward-oriented economy in which the private sector plays a leading role in economic development. Structural adjustment measures followed, cutting down government expenses, liberalising the economy and encouraging exports. It is clear that this economic growth has not trickled down to all layers of society (yet). For example in the 1990s the number of people living under the poverty line has increased in Egypt from 35% in 1990 to 40% in 1995. In Tunisia it is estimated at 14% (2000).

Tunisia was one of the first Mediterranean countries to sign an Association Agreement with the European Union, which is in force since 1998. The idea is that gradually trade barriers are removed from both sides. Other countries like Egypt are still discussing such an agreement, worried about their domestic industry.

Lebanon is a special case, as it had to recover from 20 years of civil strife. In 1990 the economy slowly recovered and economic growth reached a high 8.5% in 1994. However, since then it has steadily declined to 2% in 1998 and the economy is even expected to contract -1% in 2000. The government invested much in reconstruction of the infrastructure after the end of the civil war (1990). Because of continuing political instability in the region (Arab-Israeli conflict) and a lack of foreign and national investment this government expenditure resulted in a huge public debt. In 1999 debt servicing mounted to 130% of GDP, one of the highest rates in the world. The government has since decided to retreat more and to leave more services and investment to the private sector.

Important economic sectors

The economic foundations of the five countries vary. Cyprus has experienced a strong economic growth over the past 20 years based on services, while Egypt and Syria have focused their economic development policies on industry and to a lesser extent agriculture. In Tunisia and Egypt the tourist sector started to play a more and more important role over the past 20 years and is now a major source of foreign currency. Trade is another important engine of economic growth in Tunisia.

Natural resources play a role in the economies of Tunisia (petroleum, phosphate, iron ore), Egypt (petroleum, gas, sand, marble), and Syria (petroleum, phosphate, sand, marble).

In the two countries with limited natural resources, Lebanon and Cyprus the service sector played a major role in economic development. While in Lebanon trade, finance and services like marketing and advertising were the key factors stimulating economic growth, in Cyprus tourism, regional information provision and media played a significant part.

Unemployment

Employment is closely related to economic development. Table 2.4 shows that Cyprus reached nearly full employment in 2000. Tunisia seems to have the highest unemployment rates, but it is known that both Egypt and Syria have much hidden unemployment due to overstaffed governmental institutions.

Table 2.4 Some key socio-economic data for the five countries under study

	Lebanon	Egypt	Cyprus	Syria	Tunisia
GDP per capita, adjusted for purchasing power	US\$ 5,148 ****	US\$ 1,220 **	US\$ 12,860 *	US\$ 1,490 (1995)	US \$ 5,200***
GDP by sector	NA	Agriculture: 17% Industry: 19% Petroleum: 8% Services: 56% (1995)	Agriculture: 4% Industry: 24% Services: 72% ***	Agriculture: 23% Industry: 35% Services: 42% (1995)	Agriculture: 14% Industry: 28% Services: 58% *
Unemployment	8.5% **	9.4% *	3.0% **	5.0% (1991)	15.5% *

- * 1996
- ** 1997
- *** 1998
- **** 1999

2.6 Political structure

It is not surprising that the political setting and structure varies between the five countries, given the differences in national history. Colonial legacy for example led to the presence of French legal systems and prevalence of the French language in Tunisia and Lebanon. Egypt and Syria share the same administrative structure, because the two countries formed a federation in the 1960s. In Lebanon the civil war has left many marks by destroying almost all administrative structures as well as the economy. Cyprus lost part of its territory in 1974 due to the Turkish occupation.

The political systems in place are to some extent similar in Egypt, Syria and Tunisia. They all share a republican system in which the president has wide ranging powers and party politics are not much developed. Both Lebanon and Cyprus seem to have political systems in which parliaments have a relatively greater say and party politics are more developed. Lebanon has a special political system to keep its various religious groups in balance, which was a condition to end the civil strifes. According to the constitution the president needs to be a Maronite Christian, the prime minister a Sunni Muslim and the Speaker of the parliament (National Assembly) a Shia Muslim.

In Cyprus, Lebanon and Tunisia presidential elections are held every 5 years. In Egypt and Syria a presidential referendum is organised every 6 or 7 years. The president usually plays a central role, both in ratifying laws and in appointing the Prime Minister, ministers and Governors who rule provinces.

All countries have some kind of parliament, sometimes containing one, sometimes two chambers. For example Egypt has its Maglis el Shaab (elected members) and Shura council (appointed members), Tunisia has its Chamber of Deputies (elected members), and Lebanon its National Assembly (elected members).

Parliamentary elections are usually held every 4 or 5 years.

Syria and Egypt have a system of local councils up till village level, which are elected every four years. At city, town and village level an executive unit and a chief are in place, next to this popular elected council. In Syria the Ministry of the Interior is a key factor in local government. The whole country is divided into Governorates (mohafzat), regions (manatiq) and sub-regions (nahia), which are headed by police officers falling under the Ministry of Interior. They assist the chiefs of executive units in the implementation of laws and orders and they are responsible for security, civil registration and administration of elections.

This brief chapter has shown the differences separating the five countries under study as well as highlighted their similarities. They form the background of the assessment of policy and institutional frameworks of solid waste management that will follow in the next chapters. To start with we will focus in Chapter 3 on environmental and solid waste management policies and legislation.

3. Sustainability of policy and legal frameworks

3.1 Introduction

In this chapter the focus is on the characteristics and performance of the policy and legal frameworks with regards to SWM in the five countries under study. Factors which will be explored in this chapter include: the type of solid waste management and environmental legislation, the issues addressed; the type of national, regional and local level strategies specifically targeted for SWM, the priority problems raised and the financial means budgeted for programs to address these SWM problems; the type of prevailing economic policy; the decentralisation policy and how it affects waste management activities and finally, the type of national policies concerning privatisation of public services, public and NGO participation in infrastructure provision services and the involvement of the informal waste collection recycling sector in SWM

3.2 Description of the legal and policy framework for SWM in the five countries

Legal framework for SWM

Environmental and SWM legislation are mainly the concern of the national governments in the five countries under study. Various deficiencies in environmental and SWM legislation exist in all five countries. While there is SWM legislation in Egypt, there are still several essential issues, which the present laws do not address, issues that are strategic in ensuring the financial sustainability of SWM. Mainly, there is a lack of legal possibilities to oblige residents to pay the waste collection fees, which would enable the private waste collection services to secure their operational expenses and achieve cost recovery. This legal restriction also acts as a constraint to further expansion of the participation of private companies in SWM. In Egypt gaps also exist in the present laws and regulations concerning measures for separation at source and the allocation of waste disposal sites: legal issues which need to be addressed in order to provide a legal basis for integrated sustainable waste management.

In Cyprus similar legal restrictions to private sector participation as in Egypt are prevalent. The existing regulations and procedures for private companies regarding licensing, taxes and disposal expenses as presently formulated, hamper rather than facilitate private sector participation and an increased public-private partnership in the sector. Such is the case, particularly with the regulations concerning waste recycling businesses, where the licensing and tax regulations prevent new companies from entering this field. However, Cyprus has a general lack of a legal framework for SWM. Nevertheless, Cyprus has a formidable task ahead of it as before 2003, the government will have to integrate and transpose a whole series of EU Directives into its national legislation which deal with solid waste, packaging waste, landfills and hazardous waste in order to harmonise with EU policy (Stylianopoulou, 2000).

In Lebanon, the existing environmental laws are outdated and do not reflect an integrated approach to SWM but, dating back to the 1950s, only deal with solid waste as a public health issue. At present there is no recent SWM or general environmental law. (El-Jor, 2000). Still to be approved by the Council of Ministers, is a new "Code of Environment" recently prepared by the Ministry of Health, which addresses SWM and related environmental issues. Once the code is approved, separate decrees remain to be developed for domestic, industrial, hospital and hazardous waste and other SWM decrees. Other ongoing measures to update the environmental legislation include the UNDP Capacity 21 project, which is currently preparing a proposal for the "Basic Environmental Law for Lebanon" (El-Jor, 2000). This project should consolidate all the environmental laws and regulations related to SWM. However, past experience has shown that such projects could take a very long time leaving a void in the meantime. It is hoped that ad-hoc legislation -- a remedy often used in the past in Lebanon to fill temporary legal voids -- is not introduced, as this will only further impede the process of consolidating and updating the SWM and environmental legislations.

Environmental legislation in Tunisia is the most innovative of the five countries under study. It is the only country that has a clear «polluter pays» principle, laid down in Law no. 41 (1996). It is stated in law that «the producer, distributor, or transporter is responsible for recovering the wastes engendered by the materials or the products they produce or distribute (Law no. 96-41, art. 9). It has defined in a decree the details of a programme for the recovery of packaging waste (Decree no. 97 –1102 for

1997). It has also developed a regulatory framework for hazardous waste management, including a list of hazardous materials and registration and monitoring procedures (Baouendi, 2000).

In Syria there are no laws on SWM at all (Zeidan, 2000). The regulations in force depend at the moment on decrees and orders from the Prime Minister and Minister of Local Administration and general recommendations (Zeidan, 2000). An environmental law is being proposed and discussed in the parliament, but it does not identify solid waste as a high priority and it does not define «solid waste» and related terms so that there is room for different interpretations (Zeidan, 2000). Fines for trespassing SWM and environmental laws in Syria are reportedly too low.

Policy framework

National plans or strategies for solid waste management exist in some of the countries studied (Egypt, Tunisia) or are under development (Cyprus). In Egypt the present economic policy is one with a more capitalistic than a socialist economic approach and in this light, the national SWM policy in principle encourages privatisation and public-private partnerships. A national SWM strategy has already been drafted several times since 1992, because no agreement could be reached on its implementation resulting in a duplication of effort, time, and money. Two different donor-funded SWM national strategies are currently under preparation due to a lack of coordination between different foreign donors. At this point in time there is still no time frame set for implementation. A problem that will arise, however, once the strategy is agreed upon, is that there is no budget set aside for its implementation. Nevertheless, at present it is unclear what the ultimate objectives of SWM in Egypt are: just to get rid of waste or to maximise reduction, reuse and recycling (Bushra, 2000).

Likewise, a similar problem exists in Tunisia, where a SWM strategy and plans exist on the books but there is not sufficient budget made available for its implementation. However, at least some budget is made available. Also SWM has been institutionalised in Tunisia as a national priority at the presidential level, because of its central importance to the tourist industry, a major economic activity in the country.

In Cyprus, the government is currently undertaking a comprehensive study dealing with SWM, but it is still at its preliminary stages with no published results. No national SWM policy seems to exist. In Lebanon, the national SWM policy is considered by the author of the sector report, to be very blurry containing many grey areas, due in part to the lack of environmental and SWM legal framework (El-Jor, 2000). Local or regional strategic plans for SWM seem to be almost absent in the region.

In general, the national SWM policies lack a well-developed program for public awareness development and those measures, which do exist, are for the most part still in their infancy. Such programs are important however to ensure a successful implementation of a country's SWM system.

3.3 Performance assessment and analysis

Legal performance assessment

In general for all five countries, one can conclude that the lack of an adequate SWM and environmental legal framework is currently a major constraint hampering the development and implementation of viable solid waste management systems. This legal deficiency does not lend itself to the type of institutional sustainability necessary for the implementation of sustainable SWM.

Coincident with the gaps in environmental laws is the weakness of the means of enforcement of the existing laws and regulations. While enforcement regulations exist in theory and are written down, they are as a rule in the countries, not taken seriously. In Lebanon, for example, the Governorates have the responsibility to approve and control the operation of disposal sites but in practice, this task is not taken seriously. Municipalities have the task of enforcement of SWM regulations but lack the ability to do so. In Tunisia, the environmental legislation and regulations applicable to solid waste in municipalities are not well applied and in some cases the level of detail of these regulations is not adequate and the control measures are not prepared or adopted.

Policy performance assessment

In general the approach to SWM is not a planning approach or even a strategic planning approach.

This will mean that municipalities do need assistance from other institutions to develop this planning approach.

In Cyprus, there is “no solid waste management system”, but rather the policy is just geared towards “prevention of the accumulation of waste in the streets” (a pure “cleaning approach” to SWM) and not to a more integrated sustainable approach to SWM that includes reduction, reuse and recycling. The delay in preparing a proper policy framework is preventing a clear division of responsibilities and clear guidelines or plans for local governments to make the change from this “cleaning approach” to SWM to an approach of integrated sustainable waste management (Stylianopoulou, 2000).

A criticism of the existing SWM policy in Tunisia is that the policies, standards and regulations are said to be too ambitious and not appropriate for the human and financial resources of the various local governments.

Regarding hazardous waste management, some countries like Lebanon lack the necessary regulations (e.g. for healthcare waste). Also classification systems for hazardous waste are not legally established, except in Tunisia. Nor are there legal requirements for healthcare establishments or industries to separate hazardous from non-hazardous waste at the source. Some countries do have legislation, but it is not adequately enforced.

An important obstacle in attaining SWM objectives and implementing any kind of strategic planning for SWM is the lack of information on SWM that can be used for monitoring and assessment. In general there seemed to be a lack of reliable and recent data on waste generation and composition. Among the five reports only the Syria and the Lebanon reports produced relatively good and recent figures. This indicates the lack of data on SWM that apparently prevails in the five countries and also the lack of standardised mechanisms for collecting reliable data on SWM. According to the Lebanon report «the absence of measured information about the environment in Lebanon complicates the development of a strategic view and the checking of compliance with the environmental regulations (El-Jor, 2000).

The Tunisia report especially suffered from a lack of data, which was hard to get by according to the consultant. For example, the consultant could not get access to: financial data; data on budgets, costs and sources of funding; data on private sector performance; data on the informal sector or information on collection efficiency.

The absence of legally approved indicators and standards for assessing the performance and design of SWM facilities also acts as an obstacle in monitoring the performance in reaching SWM objectives. The lack of this type of data makes it extremely difficult to monitor the SWM performance or try to develop means of improvement.

Moreover, the lack of such data hampers any type of feedback or accountability the municipalities might want to provide to their constituents, as information on spending by government institutions should be made public to make sure public funds are wisely spent.

Improvements in SWM and investment decisions for procurement of equipment also depend on a good database and monitoring system. A lack of such monitoring data was found to be prevalent in general in all countries. In the Tunisia report for example it is suggested that the Ministry of Environment should provide this kind of assistance as it does already strategic planning for SWM at the national level.

As mentioned above, a major constraint in the implementation of an effective SWM system is the need for a viable legal and policy framework. The other side of the coin, however, is the need for a viable public awareness-raising policy promoting an awareness on the part of the population of the existing environmental and SWM policies and regulations. In general, in all the five countries, there is a deficiency in such a policy with the consequence that public awareness regarding SWM is not well developed. Moreover there is a lack of public participation, in general, in participating in the waste management system or enforcement of urban environmental regulations (illegal dumping, unwillingness to pay for waste collection services).

4. Institutional frameworks and financial arrangements for solid waste management

4.1 Introduction

In this chapter institutional frameworks for solid waste management will be analysed, including the division of responsibilities and eventual duplication in these responsibilities, institutional structures, capacities of the staff, salary and training levels, and the extent of cooperation of the local government with other stakeholders. After this, a brief assessment of the financial arrangements for solid waste management will be provided.

4.2 Institutions involved in SWM and their division of responsibilities

All five countries have an institution similar to a Ministry of the Environment, whose role is usually concerned with setting conditions and regulations, research, monitoring, public awareness-raising and preparing national plans. Egypt has an agency, called the Egyptian Environmental Affairs Agency, which is headed by the Minister of the Environment. Tunisia has both a National Environmental Protection Agency (ANPE) and an environmental ministry (MEAT). In Syria a Higher Council for Environmental Safety exists that consists of representatives from various ministries. Its role is mainly advisory.

The five reports do not elaborate much on the enforcement of environmental regulations. In the Tunisia report it is mentioned that enforcement of environmental regulations by ANPE (the National Environmental Protection Agency) is weak (Baouendi, 2000). In Syria there are no environmental or solid waste laws, so no institution is responsible for implementing or enforcing them. In Egypt it is known that not many governmental officials have enforcement authority, and the system of reporting and fining is not well developed yet.

Usually the Ministry of Interior or the Ministry of Local Administration is involved indirectly in SWM, as it is the «competent authority» that needs to supervise the municipalities in all their activities.

In all five countries there are at least three levels of government: national level (ministries and environmental agencies), regional level (Governorates/»mohafezat» in the Arabic-speaking countries, districts in Cyprus), and local level (municipalities, cities, towns, villages, local government units). Usually at all levels an executive council (headed by a mayor, Governor or other official) and an elected council exist. The authority at the provincial level, the Governorate, is in most cases not much involved in SWM. However, in Syria the Governorate is responsible for planning and implementation of regional SWM strategies. In Lebanon it officially needs to approve the siting and operation of disposal sites, but in practice it does not take this task very seriously (El-Jor, 2000). Egypt may be an exception, as Governorates there are becoming the contracting party in privatisation of SWM.

In Cairo and Giza in Egypt two special agencies for SWM were established in 1983: the Cairo and Giza Cleaning and Beautification Authorities. They are more flexible than ordinary local governments and they can set up revenue-generating activities such as collection of construction waste, desludging of septic tanks etc. against a fee. However, they suffer from the same inflated bureaucracies as normal municipalities (EAP, 1997). With privatisation their task will be restricted to monitoring of the private sector.

Responsibilities are not always clearly defined nor delineated. Overlap in responsibilities between different government institutions regularly occurs. The Lebanon report mentions it, as does the Tunisia report. Figure 4.1 shows the institutions involved in Lebanon and overlap in responsibilities (El-Jor, 2000).

Figure 4.1 Division of responsibilities of governmental institutions responsible for solid waste management in Lebanon

The Ministry of Environment prepares studies concerning solid waste treatment, participates in the preparation of tender documents for infrastructure and engineering works, advises on the construction and equipping of solid waste treatment plants.

The Ministry of Municipal and Rural Affairs processes all invoices submitted by private contractors for collection and processing and pays out of the Independent Municipal Fund on behalf of every municipality benefiting from the services.

The Ministry of Public Health is empowered to propose technical specifications and terms which should be followed in solid waste collection and disposal projects.

The Ministry of Public Works (Road Building and Sanitary Engineering Department and the Directorate General of Urban Planning), undertake the preparation of projects for collection and disposal of domestic garbage, draw up the tender documents for such projects and supervise their execution.

Municipal Unions deal with common interest projects benefiting all municipalities and in particular common garbage treatment projects. Outside Beirut, Municipalities are responsible for waste collection.

Source: El-Jor, 2000

Tunisia has a whole plethora of environmental institutions dealing with SWM, probably the largest number of the five countries under study.

In Tunisia therefore quite some overlap occurs in the work of these institutions in SWM, for example between the municipal training centre, CITET and the National Federation of Cities of Tunisia in training. Another example is research on SWM, which is carried out by three institutions: ONAS, CITET and ANPE.

In Egypt there are two institutions active in environmental management at regional level: EMUs (Environmental Management Unit) inside all Governorates and seven Regional Branch Offices of the Egyptian Environmental Affairs Agency (EEAA), which cover several Governorates and report directly to EEAA in Cairo. This situation leads sometimes to competition and overlap in responsibilities (Bushra, 2000). Duplication of efforts also occurs because of a lack of coordination between different foreign donors as Egypt's experience with different consultants preparing the national SWM strategy shows (Bushra, 2000). However, it also shows the deficiencies in coordinating capacity of the Egyptian government.

4.3 Institutional structure and contracting authority

Municipalities are in all cases responsible for day-to-day management of solid wastes. Institutional structures within municipalities vary, but usually there is a sanitation or public health department in charge of SWM. This happens among others in Syria (Zeidan, 2000). The larger the city, the higher the administrative layer in which SWM is incorporated. For example in Damascus, Syria, SWM falls under a Cleansing Directorate and a Directorate of Compost and Landfill. In smaller cities in Syria SWM falls either under a «department» or under a «section», which are lower administrative layers, with less staff. In Egypt similar divisions exist, but here the lower the department is in the hierarchy, the less funds it receives from the central government. In Syria the budget is related to city needs.

In Syria, Lebanon and Tunisia the municipalities have contracting authority. In Egypt both municipalities and Governorates have contracting authority. In Lebanon the Council for Development and Reconstruction (CDR) took over SWM in 1991 and still is the contracting party for private companies in Greater Beirut (El-Jor, 2000). Outside Beirut municipalities are the contracting authorities. However, in both Syria and Lebanon it depends on the size of the contract which institution is responsible for it. For example in Syria contracts of less than 500,000 Syrian pounds (US\$ 10,000) are handled by the municipalities, contracts of 500,000 till 5 million Syrian pounds (US\$ 100,000) are decided upon by the Ministry of Local Administration (MOLA) and the State Council, while contracts larger than 5 million need the approval of MOLA and the Economic Committee of the Presidency of the Cabinet (Zeidan, 2000). In Lebanon the same holds for mayors (municipal level), «qa»immaqam»s» (district level) and Governors (regional level) who decide on increasing sizes of contracts (El-Jor, 2000). All municipal decisions in Lebanon must be notified to the «qa»immaqam»

Only in the Lebanon report municipalities are called «financially and administratively autonomous» (El-Jor, 2000). In Tunisia municipalities are called «financially autonomous» (Baouendi, 2000).

Decentralisation is the official policy in Tunisia since the early 1990s, but in practice centralisation seems the rule. According to the Tunisia report municipalities do not participate in initiating and implementing policies for SWM, although they are responsible for day-to-day SWM operations. Exceptions are the largest cities such as Tunis, Sousse and Sfax that develop and implement their own policies to some extent. However, all the important decisions dealing with SWM are taken in cabinet meetings headed by the president (Baouendi, 2000).

4.4 Staff, salaries and training

Municipalities are understaffed in Lebanon and some parts of Egypt. In Lebanon senior and middle management levels are missing and vacancies exceed filled positions, but no reason is given for this situation. In Egypt there is in some areas a lack of labour during harvest times, when salaries are higher in agriculture than in SWM (Bushra, 2000). Many staff works on temporary contracts because of budgetary constraints and permanent staff restrictions. A lack of SWM staff is a problem that is not mentioned for the other three countries.

The level of salaries of municipal SWM employees differs between the five countries. In Egypt salaries are low, in Syria reasonable -reportedly better than in other governmental services-, and in Cyprus high. For Tunisia and Lebanon no figures were available.

Salaries of SWM workers seem to be high in Cyprus (258-285 Euro/week), but it needs to be kept in mind that costs of living are also much higher in Cyprus than in the other countries. In Syria SWM workers receive an extra allowance, because they work in SWM (50% of their basic salary). For example an engineer earns US\$104 a month, against US\$ US\$77 in another municipal sector. An average cleaning worker earns US\$75 per month in Syria plus a meal and full health insurance (Zeidan, 2000). In Egypt cleaning workers do not receive a similar «risk allowance», although sanitation workers receive it. Basic salaries in Egypt range from LE 150 to LE 200 a month (US\$40-55). Usually this includes work in two shifts. Sales of recovered materials can add an extra LE 70 (US\$19) more to their income. Permanent workers have health insurance and pension (Bushra, 2000). Municipal employees are officially not allowed to recover valuable materials, but in practice they all do it, including private sector workers. It is mentioned that municipalities have a lack of funds to pay overtime and «risk allowance».

A general complaint in the five country reports is the «a lack of human (qualified) resources» for solid waste management. This points to the larger problem of weak capacity of municipalities. For example in Lebanon 50% of municipal councils does not have an official municipal hall to meet. Generally their members are not trained in their roles and responsibilities (El-Jor, 2000). Educational levels of municipal staff are low, and local governments have few staff members that are specialised in SWM. For example in Syria only one or two engineers work in the whole SWM department and they are usually not qualified for SWM (Zeidan, 2000). It is mentioned that only Damascus has an acceptable level of SWM staff.

Training in SWM is often provided through programmes funded by foreign donors such as the World Bank, USAID and GTZ. However, this does not seem not be sufficient to fulfil all training needs. Only in Tunisia the national government provides itself training to municipalities through its ministries and the Municipal Training Centre, among others in management, finance and private sector participation (Baouendi, 2000). It is unclear how well this functions.

4.5 Coordination and cooperation with other stakeholders

Coordination and cooperation with other stakeholders refers to the relations between municipalities on one side and NGOs, formal and informal private enterprises and customers on the other side. It also refers to the relations between different municipalities and between various governmental institutions.

The activities of NGOs are in most cases not coordinated with those of government institutions. Only in Syria it is mentioned that they cooperate in environmental awareness-raising (Zeidan, 2000). For Lebanon it is mentioned that the activities of NGOs are geographically limited, that they are more «theoretically than practically oriented» and that their performance in general is not very good (El-Jor, 2000).

The local government usually has good relations with the formal private sector, through contracting arrangements. Cyprus is an exception, as few relations between (formal) recycling companies and the local government exist, although both play an important role in SWM. The separation at source experiments by the private sector may have failed partly due to this lack of coordination with and support from the government. Many institutional barriers (regulations, subsidies, taxes, etc.) exist that hamper growth of the recycling sector in Cyprus.

Relations between the government and the informal private sector are generally weak and underdeveloped. Sometimes licensing of informal enterprises exists, for example in Syria and Egypt. In Cairo, Egypt, informal entrepreneurs, «zabbaleen» and «wahi>s», can obtain licenses from the Cairo Cleansing and Beautification Authority to undertake waste collection. Hundreds of these entrepreneurs are active in Greater Cairo. In the other countries the activities of the informal sector are just tolerated and often considered a nuisance.

Regarding relations with customers, accountability and mechanisms for complaints are only mentioned for Syria. In Syria no officially established mechanisms for complaints about SWM exist. However, citizens use the general complaint offices inside municipalities and inside the Cleaning Directorate in Damascus City, or refer complaints to their local councils, parliament members or the media. It seems that Syria is the only country where complaint sections for municipal services exist at all.

Possibilities for inter-municipal cooperation are mentioned explicitly in the report on Lebanon and on Tunisia. In Lebanon municipal unions exist, which can initiate common public works among others. It is not mentioned how well these function in practice (El-Jor, 2000). In Tunisia a National Federation of Cities of Tunisia exists. However, it apparently does not function well for solid waste management, as one of the weaknesses of SWM mentioned is «an absolute lack of inter-municipal cooperation in SWM» (Baouendi, 2000).

4.6 Financial arrangements for solid waste management

Sources of funding for solid waste management

Funding for municipal solid waste management is usually provided through a combination of allocations from the central government and funds raised by the provincial authorities (Governorates) or municipalities.

In Egypt, there are two principal sources of funding:

- general funding allocations from central government
- funds raised by charges levied in the Governorate, i.e. “cleansing tax” (2% of the property rents), fines charged for violations, gate fees, waste collection licenses, dividends from private companies as well as the «local development fund» obtained from fees imposed on drivers, licenses, buildings and school fees.

The “local development fund” is a general fund used to finance municipal expenditures. It is often used to fund SWM activities. All taxes and fees that are collected by the local government go directly to a central fund, which is used for all purposes and the central government decides on financial requirements. However, the proceeds of the 2% cleansing tax go directly to the municipal cleansing fund and these proceeds are earmarked for SWM. The cleansing tax is not based on proper cost analysis of the SWM services and it was set a long time ago in the 1960s. The basis of the tax - property rents- has been frozen since the 1960s. It was mentioned that it would be difficult to increase the 2% cleansing tax to cover waste collection and disposal expenses, as it can only be modified by act of Parliament.

In Cyprus, municipal funding sources are derived from fees charged to households, shops, industries and restaurants for municipal waste collection services. The level of the fees can be changed by the municipalities themselves.

In Tunisia, the funding sources for SWM are mainly public. Municipalities finance the collection, transport and disposal of solid waste. National government subsidies and grants provide the funding for each municipality>s Municipal Investment Plan (PIC). This Municipal Investment Plan is the

principal vehicle for planning infrastructure investments at municipal level for SWM. Landfills are financed by national resources. Municipal resources for funding SWM are derived from:

- collection of local taxes
- municipal taxes, particularly sanitation taxes.

In Syria, the main sources of revenue for municipalities are:

- central government taxes and fees of Ministry of Finance;
- municipal direct taxes (construction permit licenses, road construction licenses);
- cleanliness fee (separate tariffs for households and for commercial establishments as fixed in the Law No. 1 (1994));
- fines imposed for non-observance of SWM regulations or other municipal regulations;
- local administrative units can also receive financial assistance in the form of loans and grants from the central government or other donors or organisations.

Syria faces the same problems as Egypt to the extent that maximum and minimum limits of cleanliness fees (and fines) cannot be changed, except by national law. The fees are not related to the real costs of SWM. All proceeds of local fees are collected and kept by the municipalities, but they are not earmarked for SWM.

In Lebanon, sources of revenue for municipal SWM are derived from:

- 11% municipal tax on rental values and proceeds from land sales and construction permits –direct taxes collected by municipality. While construction permits can be an important source of revenues for local governments, this tax discriminates in favour of municipalities with a high rate of land use and development;
- a share of revenues collected by Central Government (10% surcharge on telephone, electricity and water bills);
- custom duties on imported liquor and fuel constitute the main source of revenue for the Independent Municipal Fund. The funds of the Independent Municipal Fund are distributed according to a municipality's population size, level of previous year's tax collection and need for investment projects.

The flow of these municipal revenues was severely affected during civil strife leaving municipalities with an eroded resource base. Currently, due to governmental budgetary constraints, municipalities cannot depend on transfers from the Independent Municipal Fund, but they have to rely on ad-hoc advances from the Central government just to meet priority needs.

Constraints of the above are that smaller municipalities, which do not have resources for effective tax collection, receive low amounts from the Independent Municipal Fund.

Fee and pricing structures

In Cyprus and in Syria the municipalities have the authority to levy direct taxes as well as collect fees. Also in Tunisia the municipalities, being financially autonomous, have the authority to levy taxes. In Egypt local governments are allowed to collect the 2% cleansing tax.

In Cyprus, each municipality is free to fix waste collection charges. The municipality board actually establishes the waste collection fee. The level of the fee for the municipal waste collection service differs according to the type of premises served (household, industry, restaurant, etc). It is based on actual cost plus a surcharge percentage of profit in order to provide general revenue for the municipal budget. Thus the tariff is based on a cost analysis of solid waste collection and disposal.

In Syria, the fee structure for households and commercial establishments is prescribed by Law No. 1 (1994). The cleanliness fee aims to cover the cost of the municipal waste collection service as well as the cost of street lighting, road maintenance and drainage. The municipal city council decides on the cleanliness fees and service charge levels. The range of household fees is progressively higher, depending on the location (capital cities of Governorates, cities, towns or villages). Likewise the service

fee charged by municipalities for commercial establishments is progressively higher, depending on whether the premises are hotels, private hospitals, restaurants, industrial or commercial centres or offices and shops.

In Egypt, as part of the privatisation of solid waste management, Governorates will have the authority to set fees for SWM, possibly a surcharge on the electricity bill. For the time being only private enterprises and community-based organisations in Egypt collect monthly fees for waste collection ranging from 3-5 LE/month (US\$ 0.75-1.25) for urban middle- and high-income residents.

Cost recovery

It was difficult to conclude on levels of cost recovery in the five countries under study. The reports on Tunisia and on Lebanon did not provide information on this subject. Given the high cost of SWM in Beirut it is hard to imagine that the level of cost recovery will be high. In Lebanon, capital and operating costs of solid waste collection and treatment in Greater Beirut are financed through the Independent Municipal Fund. In all other municipalities, each is responsible for operational costs, but some assistance with equipment costs is provided by the central government.

The information for the other three countries suggests that only Cyprus currently covers operational and maintenance costs of solid waste management through user charges. It even collects more than what is needed and uses the extra to cover costs of other municipal services. Egypt and Syria have great difficulties in covering costs through user charges. The 2% cleansing tax in Egypt covers only a very small segment of the operation and maintenance costs of SWM. In Syria it is estimated that cost recovery in the SWM sector on the average equals about one third of the cost.

An attempt at funding of budget lines is common in Egypt, where the waste collection and disposal operational costs are financed as much as possible from the cleansing fund, while equipment is paid for from the "local development fund", which is financed by donations and other sources.

In Syria, a major problem with financial accountability and budgeting, is that the Cleaning Division, the municipal body responsible for SWM has no insight into its expenditures or income derived from collection fees. This is due to the division of responsibilities: the city council is responsible for the budget and accounting, while the Cleaning Division carries out the work --this division of responsibilities does not lend itself to efforts to economize or to achieve cost-effectiveness.

Cost recovery is a particular problem in composting plants. In Syria for example the cost of operation and maintenance of the composting plant in Damascus amounts to 15 million Syrian pounds (US\$ 300,000), while revenues are only 1.5 million Syrian pounds (US\$ 30,000). This is due to the low price of compost: 350 Syrian pounds/ton (US\$ 7) (Zeidan, 2000). On the other hand the composting plants in Egypt that operate well, such as the three composting plants in Alexandria (Abbis 1, Abbis 2 and Montazah), record net profits per year of LE 27,255 (US\$ 8,000), LE 223,260 (US\$ 66,000) and LE 4,884 (US\$ 1,400) respectively (Bushra, 2000). The price of compost is relatively high in Alexandria: LE 40/ton (US\$ 12) against LE 18 (US\$ 5) elsewhere.

Cost recovery is naturally higher among the private sector. However, private collection companies in Egypt sometimes suffer from cost recovery problems, as the local government cannot fine people or force them to pay for waste collection service provided by a private company, as people pay the 2% cleansing tax and therefore are not obliged to pay two different fees for having one service.

Financial arrangements with private sector/NGO»s involved in SWM

The financial arrangements of the Egyptian government with the private sector is such that private collection companies (both «traditional» entrepreneurs like the "zabbaleen" and the "wahi>s", as well as "modern" companies like Care Services) can obtain waste collection licenses from Cairo and Giza Cleansing and Beautification Authorities, which give the private waste collection companies the right to collect waste from residential and commercial areas for a monthly fee-for-service. In return the collection companies pay dividends to the license provider plus a sum of money as collateral for covering penalties, if these arise. Private companies also pay gate fees for the use of certain landfills.

In some cases private companies draw up contractual agreements with local authorities that ensure them that SWM fees will be collected directly by the municipality.

In Egypt, a major constraint for recovering operational expenses is that the private waste collection companies lack legal possibilities to force residents to pay for their services, which acts as a constraint to the private waste collection companies in recovering or securing their operational expenses. This legal restriction also dissuades new companies from working in this field.

In an effort to promote the participation of private environmental service providers, particularly in SWM in Tunisia, under the recent IXth Plan, a major emphasis has been placed in the Investment Incentives Code (1994) on easing the existing legislation and regulations. This Code grants benefits for environmental protection and waste treatment projects via preferential financial incentives such as:

- tax exemption of 50% of the reinvested revenues and profits from the net profits subject to corporate tax
- reduced taxation of 10% on revenues and profits
- subsidy of 20% of investment value
- suspension of the VAT on most capital goods.

In addition, the FODEP (antipollution fund) launched in 1993 by the environmental ministry (MEAT), allocates subsidies to companies to develop SWM collection or disposal infrastructure or for equipment purchase.

In Syria private sector involvement in providing waste collection and disposal has thus far not been promoted to its full potential, although it could be a viable solution in providing a more efficient system with higher financial sustainability. The main obstruction lies with the deficits in the general contracting laws. Nevertheless, a recent study carried out in Aleppo (1998) showed that private sector involvement improved the SWM due to improved performance and efficiency and greater cost-effectiveness. This improvement helped the municipalities in having a better collection rate of its cleansing fee and service fees.

4.7 Assessment of institutional sustainability

Overlap and duplication in SWM activities and responsibilities

A major barrier to efficient and effective SWM in all 5 countries is the overlap of institutional bodies responsible for the planning and implementation of SWM as well as the duplication of efforts. This has direct financial consequences with a high cost involved, for this duplication of efforts means wasting the scarce human, material and technical resources which exist and moreover this duplication means a very inefficient use of the scarce resource of the existing management capacity available for SWM. Moreover, tasks are often divided over several departments: a public sanitation/sanitation and a vehicles department, for example. In this case this can lead to conflicts as the SWM employees have two different «bosses» as was the case in Egypt or in Syria. It can also lead to a lack of cost-effectiveness, when there is a separation between the municipal cleansing department responsible for implementing solid waste activities, which had no knowledge of its budget, expenditures or accounting- and the city council that managed its budget.

Institutional framework for SWM

In some countries, an important factor influencing the degree of institutional sustainability is the lack of a legal framework, so that the roles and division of responsibilities of the different institutions and municipalities are not clearly defined. Such is the case in Cyprus and to some extent in Syria, which works against the creation of conditions necessary for the implementation of an efficient and effective SWM system.

Assessment of relations between government and formal and informal private sector

Relations between government and the formal private sector are usually good, but limited to contracting arrangements. It should be pointed out, however, that the very cumbersome contracting arrangements and regulations, which exist in Syria, act as a constraint to greater participation of the private sector. In Cyprus few relations between (formal) recycling companies and the local government exist, although both contribute to a better SWM. The separation at source experiments by the private

sector may have failed partly due to a lack of support from the government. Many institutional barriers (regulations, subsidies, taxes, etc.) exist that hamper growth of the recycling sector in Cyprus.

Relations between the government and the informal private sector are generally weak and underdeveloped. Sometimes licensing exists (Syria, Egypt), but this seems the exception. Informal sector activities are tolerated, but they are often considered a nuisance.

Assessment of technical and management capacity of local government

Municipalities are in all cases responsible for day-to-day management of solid wastes, yet in general the capacity of the municipal staff is weak due to lack of training in their roles and responsibilities. With the exception of Cyprus, one can observe a direct correlation in the other countries between the local government's low level of technical and management capacity, the lack of (skilled) staff for waste collection and disposal, and the inefficiency of their performance. Inefficiencies in performance in turn lead to limited cost recovery, as it increases costs and citizens are not willing to pay SWM fees for an inadequate service. Institutional capacity in SWM is therefore closely related to financial sustainability. Institutional strengthening and capacity building of local government SWM institutions is imperative in all five countries, especially in Egypt, Syria and Lebanon.

In Egypt especially salaries are low and other incentives are lacking. Noteworthy is the fact that here the technical and management capacity of the formal private sector, on the other hand, is efficient and of high quality and uses modern equipment and tools.

Assessment of degree of coordination and cooperation with other stakeholders

Coordination and cooperation of local government institutions with other stakeholders as NGO's, civic platform groups or CBOs (community-based organisations) with a stake in solid waste management is for the most part still in its very nascent stages. Exceptions are in Syria where NGO's cooperate with the local government in environmental awareness-raising. In Lebanon the overall activities of NGO's are limited. However, it is important to point out that in future the institutional credibility and viability of SWM-related government agencies in these 5 countries will be closely linked to their degree of coordination with the other stakeholders, their willingness to integrate various forms of public participation as well as accountability to their clients in their management systems.

Assessment of degree of accountability to consumer

Accountability and mechanisms for complaints are only mentioned for Syria. There are no established mechanisms for complaints about SWM. It seems that Syria is the only country where complaint sections for municipal services exist at all. Nevertheless, accountability to the client is a very important factor in influencing the willingness to pay waste collection fees, and, in turn increasing financial sustainability, particularly in countries like Egypt, where fee payment is not compulsory.

4.8 Assessment of financial sustainability

In Egypt the current financial system of SWM does not cover costs of collection and disposal services carried out by the local government. The costs of waste collection and disposal exceed the revenues collected.

The consequences of this lack of cost recovery are:

- insufficient coverage of many areas, particularly low-income neighbourhoods
- lack of human resources (personnel) and material resources (equipment and transport vehicles)
- inappropriate waste collection and disposal practices.

For these reasons, the current SWM system performed by the local governments is not sustainable.

However, the private waste collection system in high and middle-income areas in the main cities in Egypt is financially sustainable due to fact that:

- for non-formal private waste collection, the «zabbaleen» recover most of the cost of waste

collection and disposal from pig and goat-raising (organic waste collected is used as animal feed) or selling recyclables collected. These indirect income sources and forms of cost recovery allow those in this informal waste collection system to charge a minimal fee-for-service

- the formal private sector companies involved in waste collection recover their costs by obtaining their fee directly from residents or from municipality via a service contract.

With regard to the financial sustainability of the SWM system in Lebanon, the operational flexibility and power of municipalities is restricted due to:

- a narrow tax base and limited tax collection capacity in smaller municipalities
- local taxes derived from construction permits favour municipalities with a high rate of land development and construction---while presently major reconstruction is taking place, in future this rate of activity may decline, so construction permits are not a predictable source of revenue for municipalities
- over-dependence on funding from the central government through the Independent Municipal Fund (especially Beirut)
- slow rate of release of funds causing cash flow problems and affecting investment decisions in SWM
- surcharge of 10% of utility bills is a source of income, but the inefficient billing and accounting systems of the utility companies act as a constraint and often lead to delays in payments or no payments at all
- increases in levels of local taxes are in control of central government.

Moreover, the main sources of municipal funding for SWM (municipal taxes on rental values, land sales and construction permits and share of revenues collected by Central Government (10% utilities surcharge)) have been severely restricted due to the long years of civil strife leaving municipalities with an eroded resource base. Local governments depend on ad-hoc advances from central government as they cannot depend on transfers from the Independent Municipal Fund due to governmental budgetary constraints and because most of the Independent Municipal Fund is spent on SWM in Beirut.

The limited financial resources available to municipalities in Tunisia have resulted in their lack of a planned SWM approach. Not only the smaller cities are confronted with this problem, but also the larger cities have to face it, mainly because of the size of their territories and the competing pressures exerted on their municipal budgets for other urban services.

A major constraint in the financial sustainability of SWM in Cyprus has thus far been the fact that the government has not economically supported the private sector, which is chiefly responsible for all recycling on the island. In addition, the urgent need to construct new modern landfills and treatment facilities can best be met by private sector initiatives, yet the government has shown no initiative to provide incentives or subsidies to the private sector to support this.

Complying with the EU directives on SWM, which must take place in Cyprus before 2003, require major changes on the part of municipalities, which will be very costly and necessitate large investments. Thus far, the government has taken no initiative or measures to support or promote these changes due to the slow pace of its decision-making. However, the future of the Cyprus economy and the financial sustainability of SWM are contingent upon the rapid introduction by the national government and municipalities of an integrated SWM program that complies with the EU directives.

Cost recovery in the SWM sector in Syria on average equals about one third of the cost. The funding of SWM is suffering from revenue shortage and lack of investment in SWM in most cities. Private sector involvement in waste collection and disposal has not been developed, although it could be a viable solution in providing a more efficient system with higher financial sustainability. The main obstruction lies with the deficits in the existing general contracting laws.

5. Private sector performance

5.1 Introduction

In this chapter the focus is on the characteristics and performance of the private sector in the five countries under study. Factors like the size of sector, its structure, degree of institutionalisation, types of activities, barriers to private sector participation, involvement of international enterprises, strengths and weaknesses will be explored. Both formally registered enterprises and informal activities, large- and small-scale enterprises will be included in the analysis.

What is meant with the “formal” and “informal” private sector? With the “formal” sector is meant in the context of this report governmental and municipal organisations as well as private enterprises that are registered and have completed all formalities required in terms of licences and taxation. The “informal” sector, on the contrary, refers to business activities that are not registered, that usually do not pay taxes, have no trading licences, and are not included in any social welfare or governmental insurance scheme.

5.2 Description of the formal and informal private sector in the 5 countries

Size and structure of formal and informal sector

The overall size of the informal sector -in terms of the number of people involved- seems to be larger than the size of the formal sector in the countries studied, except probably in Lebanon where almost half of the population is served by large-scale private companies.

However, there are large internal differences in company size. For example formal collection companies in Damascus, Syria, employ 25-100 workers and drivers per area. In Alexandria, Egypt, the size of private collection companies and CBOs ranges from 30 to 180 employees. Large composting and waste processing facilities like those in Egypt easily employ 100 or more workers. On the other hand the collection and recycling companies in Cyprus only have 4-12 employees.

The size of informal enterprises varies too. In Egypt for example informal collection and recycling enterprises are small-scale (2-10 people) but numerous at the same time. In this sector also much use is made of family labour. In total it is estimated that in Greater Cairo alone 70,000 people live from the informal recovery, trade and recycling of secondary materials (Bushra, 2000), by far the largest informal sector in the five countries under study. Individual small-scale entrepreneurs carry out the various pre-processing activities like baling of paper, shredding and pelletising of plastics, etc. At disposal sites it is common to find 40-50 scavengers organised in teams, working for one dealer.

There are different groups of people active in the informal waste recovery sector in Egypt. These include:

- “wahi»s”, who control and distribute collection routes
- “zabbaleen”, “sariiha” people, who collect specific items (old paper, electrical appliances, clothes, shoes, etc.) from households and other waste generators with a handcart or donkey-cart
- waste-pickers, who pick from streets and disposal sites
- dealers, who buy materials from scavengers, “roba bekkia” people and “zabbaleen”
- pre-processing and recycling companies.

Lebanon has a similar “waste industry” as Egypt, although smaller in size and less diversified. It is “a very well organised business with a set hierarchy controlled by a few entrepreneurial individuals directing an army of scavengers” (El-Jor, 2000). The sector is concentrated in Greater Beirut, where an estimated 1,000-2,000 people are involved in the collection, sorting and selling of waste. The people in control of the recovery business are the dealers, the “owner-operators of collection points” (around 50 in Greater Beirut). Each of them owns on average 30 carts (for primary collection) and 4 trucks (for secondary collection) and employs an average 20 cart pushers (El-Jor, 2000). There are three main kinds of informal waste entrepreneurs in Greater Beirut:

- 550 “arabatji” (cart pushers), who collect recyclable items and waste from curb side bins and containers in their carts. They work for the collection point owners.
- 200 “tabbeeb” (itinerant buyers/collectors), who collect specific items (clothes, shoes, ornaments, lamps, kitchenware, etc.) from households and other waste generators
- “Freelance” waste-pickers, who collect waste from streets and sell it to the smaller dealers or to the recycling plants directly, mainly Sudanese and Egyptian.

Besides there are pre-processing and recycling enterprises like in Cairo.

The size of informal enterprises in Syria was not mentioned in the report. In total it was estimated that 800-1000 informal actors are involved in solid waste management in the whole of Syria, which seems to indicate that the sector is relatively small. However, many Syrians work in Lebanon in the waste recovery sector.

Although there are no specific data for the informal sector in Cyprus and Tunisia, it is mentioned in the Tunisia report that waste is «a source of income to a great number of households». For Cyprus it is said that the informal sector is valuable to the (semi-formal) recycling companies as they supply the national recycling companies with up to 50% of their materials, especially iron (Stylianopoulou, 2000).

Table 5.1 shows some figures about the formal and informal sector in the five countries under study.

Table 5.1 Characteristics of the formal and informal private sector in Lebanon, Egypt, Cyprus, Syria and Tunisia

	Lebanon	Egypt	Cyprus	Syria	Tunisia
Formal SWM sector					
Number of formal companies	Around 8-10 private companies involved in almost all waste activities, of which 2 are international	Around 8-10 private companies involved in almost all waste activities, of which 1 is international, many more international expected in the near future	At least 11 companies who collect recyclables and pre-process them	10-20 companies, primarily involved in waste collection	Unclear, waste collection partly privatised in some 30 cities
Size of formal waste sector	Number of employees/ company: unknown	Number of employees/ company: 30-180 in collection and street cleaning companies, 100 or more in composting plants	Number of employees/ company: 4-12	Number of employees/ company: 25-100	Number of employees/ company: unknown
Geographical concentration activities formal waste sector	In Greater Beirut, Tripoli, Chouf and Baalbek	In larger cities and tourist cities	In Damascus, Aleppo, and Tartous and possibly other cities	Unknown.	In the 30 large and medium-sized cities, especially coastal tourist cities.

	Lebanon	Egypt	Cyprus	Syria	Tunisia
Informal SWM sector					
Size of informal waste sector	1,000-2,000 «scavengers», 50 dealers in Greater Beirut, unknown number of pre-processing/recycling companies	70,000 people involved in Greater Cairo, thousands of «scavengers», hundreds of pre-processing and recycling companies	Unknown, probably small	800-1000 informal actors in the whole of Syria	Unknown. «Waste is a source of income to a great number of households »
Degree of organisation of informal waste sector	Informal organisation high, but not institutionalised	Highly organised and institutionalised	Semi-formal recycling companies organised, informal sector not organised	Informal sector «weak, irregular and unorganised », organised cooperation on disposal sites and organised door-to-door collection in Aleppo	Unknown
Perception of informal waste sector	Seen as a nuisance by some (government and police), tolerated by most, admired for their business acumen by a few. Appreciated for its SWM role during the civil strifes, when municipal services were highly deficient.	Seen by government as not modern, tolerated by most, supported and admired by many	Unknown. Appreciated as suppliers of raw materials by recycling companies.	Seen as a nuisance, except door-to-door collection in Aleppo	Seen as not modern and «a serious problem of hygiene»
Geographical concentration activities informal waste sector	Greater Beirut (most recycling), and in other large cities usually near disposal sites	Mainly in Greater Cairo (e.g. 70% of recycling) and Alexandria, elsewhere on a smaller scale	In the larger cities, especially Damascus and Aleppo	On the two large landfills close to Nicosia and Limassol, the two largest cities	Unknown

Table 5.1 shows that regarding the number of formal enterprises Syria seems to head the list with 10-20 companies, but Egypt is rapidly catching up with its extensive programme of privatisation of SWM. The size of formal enterprises varies, as mentioned above.

Regarding the size of the informal sector, the sector seems to be the largest and strongest in Egypt. This is not surprising as Egypt has the largest population among the five countries (65 million inhabitants) and its industry is relatively developed. This allows for economies of scale. On top of that a large upgrading and industrial development programme was set up in the 1980s to support the informal sector, especially the “zabbaleen. This has transformed the role of the “zabbaleen” from waste collectors to small-scale entrepreneurs. The programme greatly increased pre-processing and recycling activities in Cairo and thus stimulated the collection of and trade in waste materials. The size of the informal sector seems to be rather similar in Lebanon and Syria, and small in Cyprus. Unfortunately nothing is known about its size in Tunisia. It is only mentioned that «some private operators» are now established in recycling, and that «some companies» are involved in the collection

and recycling of waste plastic, textile, paper, used tyres, and metals (Baouendi, 2000).

Degree of institutionalisation of informal sector

As for the organisation of the informal waste sector, the sector is definitely most organised in Egypt, with at least three organisations representing it, having different target groups. In the other countries degrees of informal organisation exist.

In Egypt the informal waste sector is represented by three major organisations and a number of smaller organisations. The three main organisations sometimes compete with each other, for example for funds from foreign donors. However, when there is a serious problem, they tend to cooperate.

In Cyprus 11 recycling companies have organised themselves in an association since 1997, among others to gain support and recognition from the government. These companies are registered with the government according to the material they process, e.g. as “paper factories”, “glass factories”, etc. They are not recognised as “recycling companies” by the government, although they use only secondary materials as input (Stylianopoulou, 2000). They argue that they have specific problems that the government needs to consider. Through their association they also attempt to promote separation at source and recycling, however they seem relatively unsuccessful up till now, maybe due to their financial constraints.

Perception of the informal sector

Interestingly enough, the informal sector seems also to be perceived most positively in Egypt. In Lebanon with its entrepreneurial tradition, the informal sector is often appreciated, however the government seems to have a preference for large-scale SWM solutions and large-scale companies.

In Egypt the informal sector has been the subject of numerous studies and has been involved in a number of international development initiatives. The government perceives the sector as not modern and stresses environmental and occupational health risks associated with its practices. On the other hand it does little effort to support the sector in improving its standards. The “zabbaleen” were given the opportunity to formalise their operations in 1990 (when donkey carts, their traditional method of transport, were forbidden).

In Lebanon the sector is called a «social disgrace until it proved profitable to those practicing it» (El-Jor, 2000). The entrepreneurs are sometimes admired for their business capacities. However, the government perceives them as hindering large investment opportunities by large-scale (foreign) companies, because they salvage the valuable materials before these reach the sorting/processing plants. Police harassment and municipal intervention are common too. For example in Zahle, Bekaa Valley, street scavenging was limited because the municipality restricted it. Most scavenging took therefore place on dumpsites. In Beirut the number of scavengers and dealers greatly diminished in the past two years due to police crackdowns and municipal limitations.

The perception of the informal sector has much to do with the background and social status of its members. In Egypt the «zabbaleen» waste collectors and recyclers are mainly Coptic Christians, who migrated from the South and started to live in «garbage villages» in Greater Cairo. Among others they raise pigs on the garbage. This gives them an extra negative image in the eyes of the Muslim majority. The «wahi>s», who still control and distribute many collection routes to the «zabbaleen», are Muslims. In Lebanon almost all «scavengers» (itinerant collectors and waste pickers) are from foreign origin. They are Syrians, Palestinians (living in refugee camps) and Egyptians. The number of «scavengers» fluctuates according to season, as most Syrians go back to their villages during harvest times. The Lebanese are not involved in scavenging at all, but they form the majority of dealers/collection point owners in Greater Beirut (60%). They also run most recycling companies. In the other three country reports it was not mentioned whether any specific social or national groups are involved in scavenging or not.

Geographical concentration

The geographical concentration of the formal and informal waste sector is relatively similar. They both concentrate their activities in larger cities and tourist towns, but for different reasons. The formal sector, focus on these areas because national and city governments usually consider these areas

important and therefore contract them out to the private sector. Another reason is that in these areas the clients are located that can afford to pay the private sector fees (hotels, airports, offices, etc.). The informal sector concentrates its activities in these areas, because the waste there is more valuable. The informal sector also tends to have activities at or close to large disposal sites.

Types of activities of the formal and informal waste sector

The five countries varied too in the type of activities in which the private sector is involved. Table 5.2 and 5.3 provide an overview.

Table 5.2 Types of waste management activities of formal private enterprises in the 5 countries

Country/ Activity	Street sweeping	Primary collection	Transfer	Sorting and baling	Pre- processing	Recycling	Composting	Disposal
Egypt	X	X	X	X		X	X	Planned
Lebanon	X	X	X	X		X		X
Tunisia	X	X	X					Planned
Syria	X	X	X	X		Planned	Planned	
Cyprus		X	X		X			

Table 5.3 Types of waste management activities of informal private enterprises in the 5 countries

Country/ Activity	Scavenging in streets and at dumpsites	Household door-to- door collection	Separate collection of specific materials	Primary collection	Transfer	Sorting and baling	Pre- processing	Recycling
Egypt	X	X	X	X	X	X	X	X
Lebanon	X		X	X	X	X	X	X
Tunisia	X			X	X	X	X	X
Syria	X	X ²		X	X	X	X	X
Cyprus	X		X	X	X	X	X	

² Only in Aleppo.

In Egypt and Lebanon the private sector (formal and informal) is involved in almost all solid waste management activities.

The informal waste sector is typically involved in scavenging (waste picking from dumpsites and streets) in the five countries under study. In Lebanon most scavenging is organised around «collection points» in neighbourhoods, while in the rest of the country most scavenging is carried out on disposal sites. In Cyprus waste materials are only salvaged at the two main landfills on the island. Besides scavenging, the informal sector is usually involved in collection, sorting and pre-processing. Door-to-door collection from households by the informal sector against a fee occurs in middle- and high-income areas from households and commercial establishments in large cities in Egypt and in Aleppo in Syria. The collector's families sort out the waste, after which it is sold, pre-processed and recycled. Female family members of the waste collector usually sort out the waste, often under unhygienic conditions.

Typical formal waste sector activities are street sweeping and collection, especially from commercial areas, tourist areas, airports, hotels, etc. Street sweepers and waste collectors of formal private enterprises usually sort out recyclables from the collected waste and sell them to (informal) dealers on the road to the disposal site or on the disposal site itself. Sometimes the formal private sector is involved in sorting and baling of waste, for example in the composting plants in Egypt and in the two large-scale processing plants in Greater Beirut, Lebanon. However, these facilities usually suffer from small quantities of recyclables because of the activities of the informal sector.

Recycling is mostly undertaken by large-scale, formally registered industries, which use recovered materials supplied by the informal sector as feedstock. An exception is Egypt where hundreds of small-scale recycling enterprises exist, run by the «zabbaleen». In Syria, Lebanon and Cyprus also some small-scale recycling exists. In Tunisia 30 formal private companies reportedly take back and recycle their packaging waste as part of the government sponsored Eco-Lef programme (Baouendi, 2000). Composting and disposal, if undertaken by the private sector, seem to be undertaken by large-scale formal enterprises (e.g. in Egypt, Lebanon). It is expected that operation of the largest landfill in Tunisia for Greater Tunis will be contracted out to a (international) private company (Baouendi, 2000).

Separate collection of certain materials like electrical appliances, old paper, clothes, etc. by informal itinerant buyers is mentioned for Egypt («roba bekkia», «sariha») and Lebanon («tabbeeb»). In Cyprus recycling companies collect certain waste materials separately from commercial and industrial producers.

5.3 The conditions for private sector participation

The legal, institutional and financial conditions for private sector participation such as the contractual relations between the government and the private sector, incentives, institutional barriers and market conditions vary between the five countries. These conditions also determine the extent of involvement of international private companies.

Contractual relations between the government and the private sector

There are various types of contractual relations possible between governments and private enterprises if the goal is to reduce government activity. They differ in their organisational and financial mechanisms. For solid waste management there are basically four types: contracting, franchise, concession and private subscription (Cointreau, 2000). They will be briefly described hereafter:

- *Contracting*: Government awards a finite-term service contract to a private firm to provide solid waste services, and government pays the firm for the services delivered. Alternatively, government awards a management contract to a private firm to provide management oversight of others who are providing solid waste services.
- *Franchise*: Government grants a private firm an exclusive monopoly to provide a specific type of solid waste service within a specific zone. The firm collects its own revenues from generators within the zone (through service charges) or from the sale of solid waste by-products removed from the zone.
- *Concession*: Government allows the private sector to use one of its resources (in this case solid waste) for profit-making purposes. Concessions typically involve construction of major long-term

facilities to sort, treat, transfer or dispose of solid waste. Costs are usually covered by a combination of tipping fees, service charges and the sale of the concession's product (e.g. compost). Common type of concessions are BOO (build, own, operate) and BOT (build, own, transfer to government) arrangements. Sometimes design is included (DBOO and DBOT arrangements).

- *Private subscription*: Government licenses private firms to compete with each other in providing solid waste management services. No firm has a monopoly within a zone and price regulation is not required.

Each firm collects its own revenues from its customers or «subscribers» (also called «open competition»).

The occurrence of these four types varies among the five countries. Table 5.4 shows the presence of certain contracting arrangements in the countries under study.

Table 5.4 Types of private contracting arrangements for solid waste management in the 5 countries

	Contracting	Franchise	Concession	Private subscription
Egypt	X	X	X	X
Lebanon	X		X	
Tunisia	X			X
Syria	X			X
Cyprus				X

Contracting for collection seems to be the most common contracting arrangement among the countries under study, although it is absent in Cyprus. Egypt seems to have the most diversified contractual arrangements among the five countries.

In Egypt the government has contracted formal private companies such as Care Services for waste collection from hotels in the tourist cities of Hurghada and Sharm el Sheikh and for street cleaning in some larger cities. Recently service contracts have been awarded to private companies to operate composting facilities.

Regarding franchise arrangements, the «zabbaleen» in Egypt who collect waste from residential and commercial areas, need licenses from the government. They have to pay a license fee/dividend to the license provider and a deposit to be accessed in case of defaulting. CBOs and MSEs in other towns and villages sometimes work under a franchise type of arrangement. They may have a government license, but they usually do not pay license fees for it.

Egypt started with BOO concessions for composting (e.g. composting plant for agricultural waste in Menya Governorate) in the late 1990s. Since 1999 international tenders for the entire system of solid waste management in 10 Governorates have been issued. These include service contracts for collection, treatment and operation of existing disposal sites, and BOO and BOT arrangements for new treatment and disposal facilities.

As for private subscription, this system covers the informal sector outside Greater Cairo and all «roba bekkia» and «sariha» people (itinerant buyers and collectors), although they usually do not have a government license.

Lebanon started with large-scale international contracts and BOT arrangements earlier than Egypt, in the early 1990s. Regarding contracting in Lebanon, this seems to be the only country among the five under study where management contracts for SWM exist. Two foreign companies are contracted to supervise the local companies that carry out waste collection and disposal in Beirut (Sukleen and Sukomi). They are paid a percentage of the bill of the company they supervise. Besides this, collection contracts exist with Sukleen and other companies in Tripoli (North Lebanon), Baalbek (Bekaa Valley) and Chouf (Mount Lebanon).

As for concessions, a BOT arrangement was made in 1997 to refurbish and operate two large waste processing plants in Amroussieh and Qarantina, awarded to Sukomi.

Private subscription arrangements also exist in Lebanon, as in Egypt, for the informal sector (itinerant buyers and collectors, owner-operators of collection points), although they do not have a government license.

In Tunisia and Syria collection contracts are almost the only form of private sector participation at present. The Syria report also mentions a franchise arrangement for one entrepreneur to sort waste at a disposal site in Damascus (Zeidan, 2000). The contractor pays the city council a license fee of US\$1200 per month for this privilege. This kind of franchise with dealers working at disposal sites is also known in Egypt.

In Cyprus no contracts, franchises or concessions of solid waste management appear to exist. The relations between government and private sector seem to be entirely informal. Private entrepreneurs collect waste from commercial and industrial waste and use it as feedstock for recycling under private subscription arrangements. Collectors of old appliances, used metals etc. collect in the same way from households, while scavengers collect waste from landfills without any regulations.

Involvement of international private companies in solid waste management

Investment opportunities for foreign private companies in the five countries differ. From the five countries involved in the study Syria has the economy, which is still the most controlled by the government, while Cyprus seems to have the most open economy. However, foreign investment in SWM in Cyprus seems to be limited. At least it is not mentioned in the country report.

Tunisia, Egypt and Lebanon are all in the process of opening up their economies to foreign investors. Tunisia started this in 1994 and also revised its investment code to make private investment in general more attractive. Egypt has gradually opened up its economy since mid-1970s, but became more serious with it in the 1990s since it adopted a Structural Adjustment Programme. It is taking steps to liberalise trade and privatise public sector enterprises. Lebanon had a very lively and strong private sector before the civil war (1975-1990), but afterwards, during the reconstruction period, there was a heavy reliance on public funds and foreign donations. Only recently government policy has moved towards the private sector again, mainly because the huge public debt makes investments in environmental (and other) infrastructure impossible for the government.

Lebanon and Egypt seem to be the only countries, in which the foreign private sector is involved in solid waste management up till now. In Lebanon the involvement of the foreign private sector started in 1993, when the French company OTV was involved in administering the overhaul of the Qarantina plant in Beirut (El-Jor, 2000). Two foreign private companies (LACECO, D.G. Jones) are responsible since 1998 for supervising the two local companies involved in collection, sorting, processing and disposal of waste in Greater Beirut, Sukleen and Sukomi (El-Jor, 2000). In Egypt involvement of the foreign private sector was only introduced in 1999.

However in most of the countries studied, notably Egypt, Lebanon and Syria, conditions for qualification for SWM tenders are not easy and discourage some local private companies. In Egypt in the international tenders for SWM high bid bonds and expensive tender documents figured. In Syria contractors need to be member of the Syndicate of Syrian Contractors and of the Syrian Chamber of Commerce to be able to bid for a contract of the government. They also need to pay 5-10% bid bonds (Zeidan, 2000).

In Syria, Cyprus and Tunisia foreign companies mainly sell equipment, either through international development projects or directly to the government (e.g. Japanese collection equipment and Swiss composting plants in Syria, Zeidan, 2000).

5.4 SWOT analysis of the formal and informal private sector

A SWOT analysis refers to an analysis of Strengths, Weaknesses, Opportunities and Threats that are associated with the private formal and informal waste sector in the five countries under study.

Strengths

- Higher operational efficiency than public sector

Private sector often performs better than the public sector, especially in waste collection. For example the Syria report estimates that the private sector carries out waste collection at a cost that is 10-30%

cheaper than that of the government service (Zeidan, 2000). It is even mentioned that the increased efficiency and enhanced performance of private collection companies assisted the government in collecting a higher proportion of user charges from waste generators than before privatisation. For Egypt it is also mentioned that the private sector performs better than the government, because they pay higher salaries and give incentives according to performance. They also have more flexibility than the government in hiring and firing staff (Bushra, 2000).

- Economic strength and viability

The private sector seems to be economically viable. This seems especially to be true for the informal enterprises that work totally without government support. It is only known for (formal) recycling companies in Cyprus that they have financial difficulties.

- Provider of income and employment

Most formal private sector companies pay their employees higher salaries than the public sector and provide more incentives. The informal sector provides employment to large numbers of people and a reasonable income at or close to the average income. For example in Syria the average income of scavengers in the informal sector is US\$4-10/day for adults and US\$2-6/day for children. This means an average monthly income of US\$120-300, which is not far from the average household income of US\$200 a month. The informal collectors who collect waste from door to door in Aleppo are even better off. They earn an average monthly income of US\$300, which is higher than the average household income (Zeidan, 2000).

- Private sector expertise is being built up

Experience with private sector participation is being built up in all five countries, especially in Egypt and Lebanon, where the private sector is involved in all SWM activities. Technical and administrative capabilities are developed. There is much «learning by doing», both on the government and the private sector side. Cooperation with international companies, also mainly in Lebanon and more recently Egypt, means contact with international standards for local private companies. The formal sector in Egypt already uses «modern» equipment and protective gear for its labourers (Bushra, 2000).

Weaknesses

- Lack of qualified local private companies for international tenders

Privatisation is hampered in some of the countries, notably Lebanon, Egypt and Syria by a lack of qualified local bidders (El-Jor, 2000; Zeidan, 2000). The result is a lack of competition and many opportunities for certain large companies to negotiate expensive contracts and operate under monopoly conditions. Lebanon is a very clear example of this. Burdened by a huge public debt the government of Lebanon felt unable to deal with the solid waste problem and decided therefore in 1994 to contract SWM out, alongside with other public services. Up till recently only one major firm has been contracted for collection, processing, composting and disposal (the two companies involved, Sukleen and Sukomi, belong to the same Sukkar Group). The cost of solid waste management in Greater Beirut (including controlled disposal) amounts to more than US\$ 100 per ton, which is extremely expensive compared to other countries, even when differences in service levels are taken into account (METAP, 2000). The Lebanon report argues that it is due to an outdated legal basis and lack of competition that this kind of monopolies could come into being. In the meantime Sukleen is expanding its area of operation upon request from various municipalities. It covers now the entire Governorate of Greater Beirut as well as almost all Mount Lebanon, and a number of other towns and villages in other regions (El-Jor, 2000).

- Low recovery rate

The proportion of waste recovered by the private formal sector is very low, usually in the range of 3-7% of incoming waste. The proportion recovered by the informal sector is considerably higher, typically between 10 and 15%, but still limited, because of technological or logistical limitations. The proportion is highest for the «zabbaleen» in greater Cairo (80% of all incoming waste), which shows the benefits of formalisation of the informal sector combined with a supportive business development programme.

- Lack of recognition of informal sector

The informal sector seems to be undervalued in all countries studied. People who work in it have a low social status. Little information is known about the informal sector anyhow, except for Lebanon

and Egypt.

- Low community awareness and logistics hamper waste segregation at source
Segregation at source would be very useful to improve pre-processing and recycling. However, community environmental awareness is low in most countries under study. In Cyprus experiments showed that there was little willingness to separate waste at source. For Lebanon it is argued that separation at source is «too far-fetched» and «impractical», because of the complicated logistics involved, the large organic content (70%) and the fact that most people live in small apartments in high-rise buildings, where they have no space to keep bins for various waste fractions (El-Jor, 2000). In Tunisia El Khadra pilot project served as an example for neighbourhood-based segregation at source, sorting and pre-processing. However, it seems that other neighbourhoods or municipalities are not following its example.

Opportunities

The opportunities for increased efficiency and effectiveness of SWM through private sector involvement are manifold in the five countries under study.

- New government policies and programmes that support and encourage private sector participation
In all five countries government policies are favourable towards private sector participation in SWM since the 1990s. Tunisia already has a new Investment Incentives Code (1994), which provides the (foreign) private sector with incentives and subsidies for facilities and equipment for waste collection, treatment, and disposal (Baouendi, 2000). Syria is planning to allow for BOO and BOT arrangements for recycling and composting plants, as government policies have failed to run them efficiently (Zeidan, 2000). In Egypt the international tenders for SWM are a tremendous business opportunity for (international) companies specialised in SWM. In Lebanon a new EU-sponsored fund is being prepared, a Social Economic Fund, for micro-credit and business development (El-Jor, 2000). It is expected to operate like the Social Fund for Development in Egypt, which supports CBOs and MSEs, among others in SWM. More measures are needed, however, to improve the position of private companies, especially local private companies. For example, barriers like the high costs of freight and port fees for exporting recyclables and lack of subsidies for second hand equipment in Cyprus could be removed.
- Harmonisation with EU laws as an incentive for public-private partnerships
In Cyprus the harmonisation of its national SWM laws with EU laws on SWM will need large investments in infrastructure for separation at source and recycling, especially for packaging and biodegradable waste (Stylianopoulou, 2000). This will probably be only possible through public-private partnerships.
- “Polluter pays” principle and other policies will encourage recycling
In Cyprus and Tunisia it is expected that the «polluter pays» principle, adopted in official government policies, will encourage recycling. In Tunisia large recycling opportunities exist for the private sector with the Eco-Lef programme, which requires companies to take back and recycle their (packaging) waste.
- Planned improvements in hazardous waste management
Improvements in hazardous waste management are planned in most of the countries. This will greatly improve working conditions during collection, sorting and recycling operations.
- Tradition of private sector expertise and indigenous technology
Lebanon already had a long tradition of private enterprise, interrupted by the civil war, which can be revived, in particular since many expatriate Lebanese are coming back to the country and may be willing to invest in the country’s SWM sector (El-Jor, 2000). Cyprus has had similarly long tradition of an open economy and indigenous private enterprise. Its recycling sector only needs more support from the government. Egypt has developed indigenous small-scale pre-processing and recycling technology and started also manufacturing its own (large-scale) composting plants.
- Opportunities for organising and formalising the informal sector
The informal sector can keep its role in spite of increasing formal privatisation, if they formalise their operations, if they are seen as necessary or if they are well organised and can articulate their position towards the government. This is what happened in Cairo, Egypt, where «zabbaleen»

operations were formalised, increased in scale and diversified into other recycling activities. However, the latter requires a strong business development programme, combined with social programmes to support the groups that risk being left out (the poor, illiterate, women, etc.). Harmonisation with EU laws will probably lead to formalisation of the waste sector in Cyprus as the government will have to license all waste dealers and recyclers (Stylianopoulou, 2000).

- Foreign donors supporting privatisation efforts
Foreign donors like USAID, GTZ, EU, and the World Bank are promoting privatisation of SWM in some of the countries under study, notably in Lebanon, Egypt and Tunisia. Their support to these governments facilitates privatisation and provides a lobby for changes in unfavourable legislation and institutional frameworks.

Threats

Private sector performance, especially performance of the local private sector, is also threatened by a number of factors.

- Risk of expensive contracts and monopolies for large-scale foreign companies
Because of the lack of competition the risk of expensive contracts and monopolies for large-scale foreign companies is high. This will result in high costs for the governments concerned and will limit their investments in other sectors and areas (e.g. collection in low-income areas). In Lebanon the Beirut Emergency Plan, which funds private solid waste management in Greater Beirut, already faces financial problems (El-Jor, 2000). Political resistance also increases against the use of general government funds for municipal development only for Greater Beirut. In Egypt and Lebanon it is expected that foreign companies will bring in expertise and high standards. However, because of the weakness of supervising governmental institutions this optimism is questionable.
- Difficulties in finding labour
In Egypt and Lebanon local governments have difficulties in finding sufficient staff for SWM, especially during harvest times, due to the low level of salaries and incentives as well as the low status of the work. The recycling companies in Cyprus also have difficulties in finding labour. Cypriot labour is hard to find because of the low status of the work, although the salary is reportedly higher than in other similar positions. Hiring foreign labour instead faces bureaucratic obstacles such as obtaining residence permits (Stylianopoulou, 2000).
- Vulnerability of recycling sector to international prices of secondary materials
Most informal sector companies, especially pre-processing and recycling companies as well as traders in waste materials are affected by the fluctuating world market prices of secondary materials. In Cyprus this led to a precarious financial position of its formal recycling enterprises, combined with their use of expensive imported equipment (Stylianopoulou, 2000). Its island position and small domestic market makes the situation worse, as its recycling sector depends to a large extent on export.
- Environmental and occupational health risks of the informal sector
Some informal sector activities such as waste picking, sorting and certain pre-processing and recycling operations lead to occupational health and environmental risks. This is known for Egypt, but most probably also true for the other countries.

6. Technical performance

6.1 Introduction

This chapter describes and analyses solid waste management practices in the five countries under study: Egypt, Lebanon, Syria, Cyprus and Tunisia. It will look at the quantities and composition of waste, collection and transfer practices, recovery, treatment and disposal, and hazardous waste management. The performance of the overall waste management sector will be based on these elements of the solid waste management systems in the countries. The safety and environmental soundness of existing practices as well as their efficiency and effectiveness will be considered in this performance assessment.

6.2 Waste generation and composition

The waste generation rates in the five countries studied vary from 0.3 to 1.5 kg/capita/day. Table 6.1 clearly shows that the differences inside the countries themselves are large. Waste generation ranges of 0.6 to 1 kg/capita per day are typical for middle-income countries.

Table 6.1 Waste generation and composition compared

	Lebanon	Egypt	Syria	Cyprus	Tunisia
Size population	4 million (1997)	65 million (1999)	17 million (1999)	800,000 (1999)	9.5 million (1999)
Total amount of waste generated in tons per year	NA	15 million (1992)	3,285,000 (1999)	530,200 (projection for 2007)	2,300,000 (1998)
Waste generation (kg/capita/day)	0.67-0.92	0.3-1.5 0.6-0.8 (cities)	0.3-0.5 0.4-0.5 (cities)	NA	0.5-1.5
Population capital city	1.2 million	12 million	1.5 million	255,000	900,000
Waste generation in capital city (kg/capita/day)	0.76	1.3	0.52	NA	NA
Amount produced in capital city with suburbs (tons/day)	1,000	9,000	1,135	100 (697/week)	NA
Composition of waste					
% organic waste (food, garden/yard waste)	62%	60%	72.5%	41%*	68%
% paper and cardboard	14%	10%	5%	29%*	11%
% plastic	11%	12%	5%	12%*	7%**
% metals	3%	3%	1%	2%*	4%
% glass	5%	2%	0.5%	1%*	2%
% textile	3%	2%	2%	7%*	3%
% other	2%	11%	14%	8%*	5%

* Data on the composition of waste in Cyprus are projections for the year 2007!

** Includes leather and rubber

Only Tunisia provides figures for waste generation over a number of years: it ranged from 0.4 kg/capita in 1977, 0.56 kg/capita in 1980, 0.62 kg/capita in 1984, 0.60 kg/capita in 1988, 0.85 kg/capita in 1992, to 0.5 kg/capita in 1993. Apart from the figure for 1993, the generation rate steadily increases, as expected (Baouendi, 2000).

An example of the local differences in waste generation is Lebanon where waste generation differed

from 0.67 to 0.92 kg/capita/day between different cities and towns. Differences in waste generation were due to rural-urban differences, different income levels, industrial and agricultural production patterns, and the like. The Syria report clearly shows the presence of different sources of waste and their influence on the composition of waste. For example in Damascus only 3% of all waste is industrial, but 23% comes from «public facilities» (parks, streets, schools, government offices). In Aleppo the situation is almost the reverse: 18% is industrial and 15% is from public facilities. Only in the Lebanon report a differentiation is made between waste quantities in the dry and wet seasons. Waste generation varied from 0.75 kg/capita/day in the dry season to 0.91/capita/day in the wet season.

Waste quantities in rural areas were usually far lower than those in urban areas because of differences in income and more recovery by waste producers themselves. Waste in rural areas is fed to animals, used as fuel in traditional ovens, or composted and used as soil conditioner.

Regarding the composition of waste, it was not always clear when the composition of waste was determined: at point of generation, at a transfer station or at the disposal site. Only in the Lebanon report it was mentioned that measurements were made «after collection», which means in this case at the disposal site, and not at the point of generation. Local differences in waste composition exist, for example in rural areas in Egypt a high proportion of the waste is «dust» (fine inorganic particulate matter), often 25 to 50%. The Tunisia report shows very clearly the difficulties and uncertainties surrounding waste generation and composition data. It gives the results of five different studies undertaken between 1977 and 1995 and the figures do not seem to be compatible at all (Baouendi, 2000). Cyprus had the lowest organic content, which is not a surprise as it also has the highest average income. There is usually a correlation between the proportion of organic waste generated and the level of income.

The Syria report points to the fact that waste quantities, waste density, moisture content and organic content vary per city. Table 6.2 shows detailed waste characteristics for five major cities in Syria. Organic content is expressed as percentage food waste.

Table 6.2 Waste characteristics for five major cities in Syria

	Damascus	Aleppo	Homs	Lattakia	Al Raka
Waste generation (kg/capita/day)	0.52	0.46	0.42	0.42	0.39
Waste density (kg/m ³)	205	250	325	348	350
Moisture content (in %)	53%	60.5%	62.5%	63%	64%
% food waste	52%	65%	71%	72%	76.5%

6.3 Collection and transfer

Types of technologies used

The types of technologies used vary from tractor-trailers to large compactor trucks. In Cyprus it seems that only compactor trucks are used, while in the other countries various combinations based on the local circumstances are in use. The informal sector uses handcarts, donkey-carts and trucks.

In Lebanon in the past mule-carts were commonly used to collect waste. Since the end of the civil strife various kinds of trucks, pick-ups and containers (in rural areas oil drums) are used. Problems hampering collection efficiency in Greater Beirut are (El-Jor, 2000):

- Mixing different kinds of containers requiring two types of trucks to visit the same area
- Shortage of suitable locations for placing containers resulting in traffic obstruction and pick up difficulties due to parked cars
- Insufficient capacity of certain containers and inadequate frequency, resulting in spillage and area littering
- Absence of lids on most containers resulting in odours, flies and other insect infestation in the

container area.

For sorting, processing and composting in Beirut capital-intensive, highly mechanised technologies are used.

In Egypt also various types of containers and collection trucks are used, which often do not match with each other. These vehicles are a legacy of different foreign donors! The trucks usually have high loading heights, resulting in unhygienic and impractical practices. Large trucks and compactor-trucks are used in major cities. The «zabbaleen» use large baskets to collect waste door-to-door and they store the waste in large nylon sacks in the streets till their trucks arrive. One of the main limitations that municipal waste collection has, is the lack of preventive maintenance and the large number of vehicles that are out of order (e.g. 42% in Fayoum) and that operate at low efficiency. Tractor-trailers, animal-drawn carts, mini-trucks/dumpers are used in villages and low-income urban areas.

In Cairo a government decree was issued in 1990 forbidding donkey-carts in Greater Cairo, which were mainly used by «zabbaleen» for waste collection. At the same time the relations between government and «zabbaleen» were formalised through license agreements. These developments needed investment from the «zabbaleen». The result was formalisation and an increase in the scale of operation of «zabbaleen» who started to use trucks to collect the waste. Some could not cope and now work for the larger companies and took on other work. Others continue to collect waste with donkey-carts, but at night.

In Cyprus municipalities use capital-intensive equipment to collect household, commercial and industrial waste. For example in Nicosia 15 collection teams consisting of 2 collectors and one driver collect waste using compactor trucks. Waste is collected from kerbsides and households put it outside in plastic bags and plastic containers (Stylianopoulou, 2000).

In Syria waste collectors collect waste in handcarts and motor-tricycles and bring it to containers or small open stations inside cities. The containers are then emptied mechanically into compactor trucks and the waste is transferred to the final disposal site. If there are no containers, the waste is loaded mechanically from the open stations on the trucks by wheel loaders. In small cities and rural areas tractor-trailers are used.

In Tunisia no information is given about collection technologies used, except for the fact that containers are frequently used, especially in the large cities. Maintenance is reportedly good (METAP, 2000).

It appears that in the five countries municipalities make little use of transfer stations. In Beirut, Lebanon, there are no transfer stations at all, nor are there in Cyprus. In Cairo large trucks are used as «mobile transfer stations» (Bushra, 2000). In Syria some kind of transfer stations (small open stations) exist and containers are used as transfer points between primary and secondary collection. For Tunisia it is not known whether there are transfer stations.

Time and frequency of collection

Regarding the timing and frequency, only for Beirut it is mentioned that waste is collected in the evening to avoid traffic jams. In Egypt collection is daily or every other day in high and middle-income areas, less frequently in other areas such as villages and peri-urban areas. Containers are set on fire, if waste is not collected regularly, which is especially the case in low-income areas. Private contractors collect construction/demolition waste and bulky waste whenever needed. In Cyprus municipal waste collection takes place 2-6 times a week, depending on the season and the amount of the waste. Bulky waste is collected once a week. The frequency of the collection of recyclables is not mentioned. In Tunisia collection is at least once a week in cities (METAP, 2000).

Collection rate

The «collection rate» refers to the percentage of waste collected as compared with the amount of waste generated. Except for Cyprus, where overall collection rates seem to be good, the collection rates appear to be quite good in capital cities, good in the most important secondary cities, acceptable for capitals of Governorates, and unacceptable for most small cities and rural areas. In Cyprus collection rate is said to be high both in large municipalities and smaller communities.

For Lebanon collection rates are not mentioned explicitly, although it indicates that Beirut enjoys

considerably better waste collection services than the rest of the country. Houses on the outskirts of towns are usually left out from the waste collection services.

In Egypt the collection rate varies from 0% in rural areas to 90% in high-income areas in large cities. In Fayoum City it is for example 60-70% (Bushra, 2000). In poorer areas often the only means of solid waste management is informal scavenging by people and animals, natural degradation and dispersion, burning at the primary point of disposal or local self-help initiatives for waste collection.

In Syria the collection rate is relatively high in large and medium-sized cities (Zeidan, 2000). For Damascus the collection rate is 90%, for Aleppo, Homs and Lattakia 80%, and for Al-Raka 60%. However, collection is reportedly irregular in low-income urban areas and slums or they are left out at all. In medium-sized to small communities the collection rate is 40-60%. The situation in most small cities is called «unacceptable» (Zeidan, 2000).

In Tunisia collection is adequately managed in the major cities. Reportedly more than 90% of all waste is collected. However, collection coverage (the number of peoples served) varies from 60 to 90%, depending on the city location (coastal city or not), municipal revenues and level of infrastructure (METAP, 2000; Baouendi, 2000).

6.4 Recovery

Types of recovery activities

Recovery includes activities such as waste-picking, selective collection, sorting after collection, pre-processing (shredding, pelletising, baling, etc.), trade, reuse and remanufacturing of new products out of waste materials. In all the five countries both formal and informal waste recovery exist. The sources of recyclable materials are varied and include households, commercial establishments, industries, institutions as well as street containers and disposal sites. In Tunisia an innovative programme for recovery and reuse of used packaging materials was introduced in 1998, called Eco-Lef. 30 companies were member of the Eco-Lef programme by the end of 1998, covering packaging of bottled water, soft drinks, juice, and milk products.

Types of materials recovered

In Lebanon and Egypt the range of materials that are recovered seems to be especially broad. It includes plastics, cardboard, water bottles, glass bottles, scrap iron, tin, copper, aluminium cans, car batteries, household appliances, and styrofoam trays (El-Jor, 2000; Bushra, 2000). Organic waste is composted in Egypt, Lebanon, Syria and Tunisia. In Cyprus a recycling plant is being constructed to recover used car batteries and waste oils (see Section 5.6 on Hazardous waste management). In Tunisia plastics, textile, paper, used tyres and metals are reportedly collected and recycled. In Tunisia hazardous waste such as medicines, dry batteries and detergents is also stored in containers at the El Khadra project (Cité El Khadra near Tunis). Collection and sorting of these materials are «not subject to formal regulations», which probably means that they are recovered by the informal sector (Baouendi, 2000).

For certain secondary materials there is no recycling industry available in country. This holds for example for metals in Lebanon. Recycling in Lebanon itself is limited to paper, plastics, and glass. Egypt seems to have the most diversified recovery sector with recycling of materials such as metals, textile and bones. In Cyprus most «recycling» is limited to pre-processing of paper, plastics, glass and metals before export. For Syria it is not known which materials are recycled or pre-processed and which materials are exported. Tunisia has a pilot sorting and pre-processing centre in Cité El Khadra, close to Tunis, where paper, plastic and metals are sorted and pre-processed. It is unclear whether the resulting materials are sold in-country or exported.

Informal versus formal recovery

Recovery rates are much higher for informal than for formal recovery operations. This rate is also linked to the type of collection technologies used, as compactor trucks (used by the formal sector, especially the public sector) damage recyclables and limit their recovery. An example of the low recovery rate of formal enterprises are the two large-scale sorting and processing plants in Beirut, Lebanon. They recover less than 1% and compost 7% of the waste that enters the plants. They dispose of the remainder, which amounts to almost 90% of the waste. This low recovery rate is due to the fact that the informal sector has already recovered most of the valuable materials before it reaches

the plants. At the same time these plants are very capital-intensive and expensive to operate and maintain. The amount of waste materials recovered by the two formal plants in Beirut amounts to 4,329 tons/year, while the amount of waste materials recovered by the informal sector in Lebanon, which is concentrated in Beirut, is estimated at 74,322 tons/year plus 719,500 pieces of styrofoam and 31,500 tyres (El-Jor, 2000). As the Lebanon report states it: «Major players in this [recycling] network are the scavengers who contribute tremendously to the [recycling] industry» (El-Jor, 2000). In the Bekaa Valley more than 10% of all waste on disposal sites is recovered by the informal sector, while at disposal sites in South Lebanon this figure is almost 15% (El-Jor, 2000).

Another clear example is the informal sector in Cairo Governorate, Egypt, the *zabbaleen*, who recover 80% of the waste they collect, which amounts to 864,000 tons/year. Only 3% of waste generated in Cairo Governorate is treated in formal composting plants, which consequently recover 4,320 tons of waste per year (Bushra, 2000).

In Cyprus all recycling is carried out by semi-formal recycling enterprises. The amount of waste recovered by the 11 «recycling» enterprises that are member of the Recyclers» Association in Cyprus was 44,414 tons per year in 1999, mostly iron (Stylianopoulou, 2000).

In Tunisia most recovery is informal and takes place at disposal sites. Tunisia has one formal pilot sorting and pre-processing centre in Cité El Khadra, near Tunis. There are no data on its performance. Apart from this, the government plans to establish 29 household waste processing centres in the main cities and tourist towns. Nine of these plants will be established in the period 1997-2001, notably in Bizerte, Djerba, Gabes, Karouan, Mednine, Monastir, Nabeul, Sfax and Sousse. The capacity of these plants was not mentioned in the report. Other formal recovery efforts include the Eco-Lef programme of used packaging material. According to the Tunisia report the Ministry of Environment and Land Use Planning is encouraging municipalities to increase reuse and recycling, but this is at a very preliminary stage.

In Syria one licensed dealer exists who organises (manual) sorting at the major disposal site in Damascus and recovers 5 tons a day (around 0.5% of all waste produced in Damascus). In total it is estimated that the informal sector in Syria recovers 50 tons of recyclable materials per day, which would mean around 15,000 tons per year or 0.5-1% of all waste produced in Syria. Apart from this, around 1% of all urban waste is recovered by farmers and rural residents to feed their animals. These percentages are low compared to the other countries and they seem to indicate that the informal sector in Syria is in need of development. The total recovery rate for Syria is estimated at 5.6%, but this includes the production of (formal) composting plants. The recovery rate is highest in Damascus (36% of all waste is recovered), with Lattakia coming second (10% of all waste recovered). In Aleppo only 1% of the waste is recovered.

Separation at source

Separation at source has been tried in a few locations in Egypt, notably Nuweiba and some parts of Cairo (separation into wet and dry waste in separate plastic bags or bins). Problems exist with influencing and changing the behaviour of households. Some upper-class hotels in Cairo and the Sinai and Red Sea tourist zones successfully separate waste out of a concern for the environment and to gain a «green» image. Attempts in Cyprus with drop-off sites (recycling bins) by the recycling enterprises have failed; the population used them as ordinary waste disposal bins. In Tunisia a project exists since 1994 for selective collection of waste (El Khadra project near the capital Tunis, in Cité El Khadra, a neighbourhood of 20,000 inhabitants). It includes a sorting and pre-processing centre, which contains a conveyor belt, metal compacting and paper baling machines, and plastic shredding machines. It also has a composting unit attached to it. According to the report this project has raised the awareness of the residents about the advantages of selective collection, the composition of household waste is better known now, and the amount of waste to be disposed has been reduced through composting and recycling of paper, metals and plastic (Baouendi, 2000). However, it is unclear how many households actually participated and how much waste is being recycled right now. In Cyprus a separation at source pilot project, funded by the EU, just started in January 2000.

6.5 Treatment and disposal

Composting

Composting as a form of treatment (and recovery of waste) is common in Egypt and Syria, and to a limited extent in Lebanon and Tunisia. The practice of formal large-scale composting is most widely established in Egypt. The Egyptian government plans to establish 56 composting plants (150 tons/day capacity, windrow system) in the coming years, which would be able to treat 22% of all waste produced in Egypt. Among these 56 plants, 18 plants are already in operation, which would mean that -if they all operate at full capacity- they would treat 2700 tons/day. Locally manufactured equipment is used since 1995. The private sector operates some of the plants, among others a plant to treat agricultural waste and one for market waste. In Egypt some composting plants seem to be able to cover their operation and maintenance costs and even run at a (small) profit, but they cannot cover the cost of investment or depreciation of equipment.

Syria has around 5 composting plants, all of which are operated below capacity. For example the one in Damascus produces 400 tons per day instead of the 700 it is designed for. The one in Aleppo operated at 5 tons/day instead of 80, the one in Lattakia at 30 tons/day instead of 100. The plants are considered old and poor quality (Zeidan, 2000). They operate below capacity because operational costs are high (US\$ 300,000 per year on average) and revenues low (US\$ 30,000 per year on average), mainly because of the low price of compost. This means that only one tenth of the operation and maintenance costs is covered by the sales of compost. The composting plants in both Syria and Egypt use the same open windrow system combined with picking belts and trommel screens.

Lebanon has only one large composting plant in Beirut, which is relatively capital-intensive. It treats 125 tons of waste per day, while its capacity is 300 tons a day (El-Jor, 2000). It suffered from odour problems and had therefore a bio-filter odour control system installed. It also makes use of a turning machine for turning the waste in the windrows. Reported difficulties with composting in Lebanon are insufficient maturation, large quantities of waste that need to be handled and leachate problems. It is assumed it suffers from marketing problems as a study is being conducted by the World Bank-funded SWEMP project to identify markets for compost.

Tunisia has two pilot composting units, one in Cité El Khadra near Tunis, the other in Bèjà, which are used to demonstrate the advantages of composting. Another two composting units are planned. No data are available on the performance of these units.

Incineration

In the five countries incineration was only used for healthcare waste, usually on the hospital grounds. Lebanon had two large incineration plants for municipal waste, but they had to be shut down during the civil strifes because of lack of maintenance. Since then incineration is banned in Lebanon (El-Jor, 2000). In Damascus, Syria, three incinerators with a capacity of 2 tons/day are operated near the main landfill site for hazardous healthcare waste.

Disposal

In all countries but Cyprus uncontrolled dumping of waste was the most common way of waste disposal. Cyprus has two main landfills, which are controlled landfills with regular covering of the waste, a fenced entrance, and a gas collection system. On the sites equipment like bulldozers, compactors, dumpers and workers are permanently available. However, they do not have a weighbridge, a registration system for waste nor liners against leachate. In one of the two disposal sites a liner was considered necessary, however, as there was a risk of soil erosion and even landslide because of leachate accumulation. In smaller towns in Cyprus uncontrolled dumping is common.

Siting of landfills

In Lebanon the siting of landfills is a major problem because of the high population density and the characteristics of the soil. The presence of limestone and a lack of topsoil cause much run-off and

leachate from open dumps that can easily contaminate groundwater sources. The use of an EIA is becoming common practice for the siting of landfills in Lebanon, although their use is not (yet) legally obliged, as in Egypt. For example the government of Lebanon had an Environmental Impact Assessment (EIA) conducted before it selected its latest landfill (Nameeh) for Greater Beirut. The siting of landfills is a politically sensitive issue in Lebanon. Each «caza» (district) has its own landfill, although the whole of Lebanon could do with 6 or 7 landfills. However crossing district borders is in some areas still not easy (El-Jor, 2000). In Lebanon waste is sometimes dumped in the sea. In Egypt drainage canals are used for waste disposal, which can have negative effects in summers with water shortages when farmers need to use this water. Siting of landfills is a problem in the heavily urbanised areas of Egypt, the Nile Delta and other areas that are far from the desert. Siting of disposal sites in Tunisia is also reportedly environmentally unsound, leading to public health problems. For Syria and Cyprus siting problems were not mentioned.

Operation of landfills

Operation of landfills means usually just crude dumping. However, the practice of controlled landfilling with at least regular covering of the waste, and sometimes planning of cells, use of weighbridges and gas collection systems, is on the increase. Lebanon has one controlled landfill (Naameh) for Greater Beirut since 1997. Egypt has recently established controlled landfills in Cairo, Giza, Alexandria and Aswan. As mentioned above Cyprus has two controlled landfills. Syria has one controlled landfill in Damascus. Tunisia does not seem to have any controlled landfills at the moment, but it has a sanitary landfill planned for the Greater Tunis area, in Djebel Chekir, which will be operated by the private sector. According to the Tunisia report disposal of waste is a problem in all cities outside the Greater Tunis area. The government of Tunisia has decided to improve the present situation of crude dumping and has listed 400 «illegal» tips to be rehabilitated. However, funds for their actual rehabilitation are not yet available. Although it is illegal, disposal sites are still set alight in Egypt, Lebanon and Tunisia to reduce the volume of waste. This even occurs in Cyprus on the disposal sites in smaller towns.

Sanitary landfill rate

It can be concluded that 0% of the waste in the five countries is disposed in sanitary landfills. Tunisia has a sanitary landfill planned for the Greater Tunis area, in Djebel Chekir. In Aleppo, Syria, a sanitary landfill and transfer station are under construction. Egypt is studying appropriate sites for several sanitary landfills using GIS. It is expected that the private sector will provide the funding for their actual establishment and operation.

6.6 Hazardous waste management

Status quo

Hazardous waste is considered by all national reports an important but unfortunately neglected subject. Most hazardous waste is collected and disposed with non-hazardous municipal waste. The situation for healthcare waste is called «alarming» in Egypt and this seems to hold for the other four countries too. In Lebanon the issue is «taboo». According to the Lebanon report the issue is rarely discussed and in practice ignored (El-Jor, 2000). Little is known about the amount and types of hazardous waste in the countries studied, there is no classification system (except in Tunisia), few industries and institutions practice separation of hazardous and non-hazardous waste at source, and treatment facilities for hazardous waste are limited. For example in Cyprus some hazardous industrial waste is collected in a «responsible manner», but other industries lack awareness about proper hazardous waste handling (Stylianopoulou, 2000). In Syria most liquid industrial waste is discharged directly to the sewerage system and industrial producers are not aware of the need to separate hazardous from non-hazardous waste.

Amounts of hazardous waste

Tunisia reportedly produces most hazardous waste of the five countries studied, an estimated 320,000 tons of hazardous waste a year (Baouendi, 2000). It is followed by Egypt and Syria. In Egypt it is estimated that hospitals in Egypt nation-wide generate 200 tons of waste per day (approx. 73,000 tons/year), of which 75 tons (38%) is hazardous (approx. 27,375 tons/year). Hazardous industrial waste is estimated at 150,000-175,000 tons a year (Bushra, 2000). Together this would mean that

Egypt produces almost 200,000 tons of hazardous waste a year. In Syria the amount of hazardous industrial waste produced is estimated at 33,650 tons per year, with an additional 48,050 tons per year of waste with low hazardous risk (from slaughterhouses, cement factories, etc.), in total amounting to 81,7000 of industrial hazardous waste. Most hazardous industrial waste seems to be produced in Aleppo. Healthcare waste is estimated at 3300 tons per year, most of which is produced in Damascus (1,000 ton/year). The total of hazardous waste for Syria is thus 85,000 tons a year (Zeidan, 2000). For Lebanon and Cyprus the amounts of hazardous waste were not mentioned.

Treatment of hazardous waste

If hazardous waste is treated before disposal, the most common treatment method in all five countries appears to be incineration, especially for healthcare waste. However, in Lebanon healthcare waste is not subject to any specific treatment regulation. In Egypt incineration is the mandatory treatment for healthcare waste and other hazardous waste since Law no. 4 for 1994. Still it is not very common because of the high operation and maintenance expenses, a limited range of treatment facilities available in Egypt, and sometimes outdated equipment that causes in some cases air pollution (Bushra, 2000). In Syria many hospital incinerators were not working anymore because of lack of maintenance.

In Cyprus the accession to the EU provides an incentive to take action in the field of hazardous waste management. However, not much action is taken so far. Only a factory is being constructed in Cyprus that will recycle used car batteries and waste oils, but probably mainly because of the favourable economic prospects and not so much for environmental reasons (Stylianopoulou, 2000).

Good practices and future developments

Awareness on the issue of hazardous waste management seems to be on the increase. For all countries but Lebanon it is known that efforts are made to improve hazardous waste management. Tunisia has a classification system for hazardous waste since 1996 and registration of hazardous waste during production and transport is obligatory (Baouendi, 2000). Regulations for collection and transport of healthcare waste are reportedly also well applied. Also a centre for treatment of hazardous waste with a capacity of 85,000 tons/year is planned in Jrada as part of PRONAGDES, the national plan for solid waste management launched in 1993 (Baouendi, 2000). An incinerator for healthcare waste is planned at the new landfill for Greater Tunis (Djebel Chekir). However, at the moment hazardous industrial waste is still mixed with municipal waste at the same disposal site and other hazardous waste is informally recovered in El Khadra project (Baouendi, 2000).

In Egypt incineration is the mandatory treatment for healthcare waste and other hazardous waste since Law no. 4 for 1994. At present a national management information system for hazardous waste is being developed. Two treatment plants for hazardous industrial waste are planned in Greater Cairo and Alexandria. Special landfills for hazardous industrial waste are being established in some new industrial cities.

In Cyprus the government has planned to study the impact of hazardous waste on the environment. This study would also present a hazardous waste management system for the country. Dyeing and bleaching companies in Cyprus have their own incinerators. However, no other facilities for the collection and treatment of hazardous waste exist, because the environmental legislation is said to be not strict enough (Stylianopoulou, 2000).

Syria has also some good practices in place that need reinforcement. For example in Damascus healthcare waste is separated at source and subsequently incinerated. Tanneries waste is collected separately in Aleppo, but unfortunately it is disposed of with other municipal waste. A national strategy for medical waste management in Syria is under preparation.

6.7 Overall performance assessment

In this section we will summarise and assess the performance of solid waste systems against measures such as safety, efficiency, effectiveness, environmental soundness, etc. Table 6.3 gives an overview.

Table 6.3 Assessment of solid waste management practices in the five countries under study

	Lebanon	Egypt	Syria	Cyprus	Tunisia
Collection efficiency	Beirut good, rest considerably less	90% in high-income areas in cities 60-70% in capitals of Governorates 0% in rural areas	80-90% in large cities 40-60% in medium-sized cities and capitals of Governorates Unacceptable in most small cities and rural areas	High in both large municipalities and small communities	Adequately managed in the major cities
Separation at source	Called «too far-fetched» and «impractical»	Pilot projects in a few places and hotels, success rate unknown	Not mentioned.	Pilot projects failed	One pilot project, success rate unknown
Amounts of waste recovered per year	Beirut: Formal sector: 4,329 tons Informal sector: 74,322 tons plus 719,500 pieces of styrofoam and 31,500 tyres	Cairo: Formal sector: 4,320 tons Informal sector: 864,000 tons	Whole Syria: Formal sector: 185 tons per day (55,500 tons a year) Informal sector: 50 tons per day (15,000 tons a year)	Whole Cyprus: Formal sector: 44,414 tons	Unknown
Recovery rate (amount of waste recovered as % of waste generated)	Unknown.	Overall recovery rate: 5-10% Cairo: Formal sector: 3% Informal sector: approx. 25% of total waste generated, more than 80% of incoming waste	Overall recovery rate: 5.6% of all waste generated Formal sector: 3-4% Informal sector: 0.5-1% of all waste generated plus 1% fed to animals	Approx. 10%	Unknown
Extent of controlled disposal	One in Beirut (Nameeh)	4-5 in Cairo, Giza, Alexandria, and Aswan	One in Damascus	Two near Nicosia and Limassol	None so far
Sanitary landfill rate	0	0, but siting sanitary landfills has started, funds for construction and operation should come from the private sector	0, but sanitary landfill being constructed in Aleppo	0	0, but sanitary landfill planned for Greater Tunis

	Lebanon	Egypt	Syria	Cyprus	Tunisia
Safe hazardous waste management	NA	Many hospitals have incinerators National management information system for hazardous waste planned Two treatment plants planned Special landfills for industrial hazardous waste under construction	Separation at source and incineration of HCW in Damascus, tanneries waste collected separately in Aleppo National strategy for HCW planned	Dyeing and bleaching companies have incinerators Study of environmental impact hazardous waste planned Design national hazardous waste management system planned	Classification system in place Regulations for HCW implemented Treatment centre planned Incinerator for HCW planned in Tunis

HCW = healthcare waste

Regarding collection and disposal Cyprus seems to be performing the best, while regarding recovery Egypt has the highest recovery rate due to its vibrant informal recovery sector. However, its composting plants threaten to become a drain on government resources. As for hazardous waste management, Tunisia seems to be prepared the best and to be the furthest in encouraging proper practices.

7. Barriers to progress in solid waste management

7.1 Introduction

This chapter will describe a number of barriers related to legislation, policies, institutions and cooperation between stakeholders that cause operational inefficiencies and that threatens the environmental, financial and social sustainability of solid waste management systems in the five countries under study. These barriers ultimately lead to limited waste collection coverage in low-income areas and practices like uncontrolled dumping.

Some of the barriers to progress in solid waste management are inter-related: e.g. insufficient cost recovery leads to a lack of finance and therefore a lack of funds for training, to pay staff well, and to upgrade SWM technologies. However, not all problems with municipal solid waste management are related to lack of funds or lack of equipment, as this chapter will demonstrate. Most of this chapter will focus on inefficiencies in the use of existing resources, be they financial, human or technical. These inefficiencies will point to the possibilities for the use of these resources in more efficient and effective ways. The next chapter will focus on solutions and recommendations for the problems mentioned in this chapter and address these inefficiencies again from a positive perspective.

7.2 Flaws in environmental and SWM legislation

Flaws in environmental and SWM legislation concern mainly the national government.

Various deficiencies in environmental legislation are mentioned for the five countries. In Tunisia environmental legislation is not considered detailed enough (Baouendi, 2000). In Syria there are no laws on SWM at all. An environmental law is being proposed and discussed in the parliament, but it does not identify solid waste as a high priority and it does not define «solid waste» and related terms so that there is room for different interpretations. Fines for trespassing SWM and environmental laws in Syria are reportedly too low (Zeidan, 2000). Cyprus also lacks a legal framework for SWM, although it needs to establish soon legislation that is compatible with EU Directives. Private recycling companies in Cyprus also suffer from certain legal restrictions. Egypt has an environmental law and SWM laws, but these do not provide the conditions for financial sustainability and they hamper rather than facilitate private sector participation.

Regarding hazardous waste management, some countries like Lebanon lack the necessary regulations (e.g. for healthcare waste). Also classification systems for hazardous waste are not legally established, except in Tunisia. Another deficiency is the lack of legal requirements for healthcare establishments or industries to separate hazardous from non-hazardous waste at the source. In some countries that have environmental and SWM legislation, this legislation is not adequately enforced, as will be discussed later in section 7.4.

7.3 Gaps in SWM policies and strategic planning

These barriers concern especially the local, regional and national government in the five countries under study.

National plans or strategies for solid waste management exist in some of the countries studied, for example in Egypt and Tunisia, or are under development as in Cyprus. Local or regional strategic plans for SWM, however, seem to be almost absent in the region. In general the approach to SWM is not a planning approach, let alone a strategic planning approach. Municipalities need assistance from other institutions to develop such a strategic planning approach. In the Tunisia report for example it is suggested that the Ministry of Environment should provide this kind of assistance to municipalities, as it is already involved in strategic planning for SWM at the national level.

Even if national SWM plans exist, they sometimes just remain plans, because no agreement can be reached on their implementation as in Egypt, or insufficient funds are made available for the implementation of these national plans, which is known for Egypt and Tunisia. In the case of Egypt two different national SWM strategies are being prepared at the moment because of a lack of coordination

between foreign donors and the Ministry of Environment. In addition it is unclear what the ultimate objectives of SWM in Egypt are: just to get rid of waste or to maximise reduction, reuse and recycling (Bushra, 2000).

In the case of Tunisia policies, standards and regulations are said to be too ambitious and not appropriate for the human and financial resources of the various local governments (Baouendi, 2000). For Cyprus it is mentioned that there is «no solid waste management system», with which is meant that the policy is just geared towards «prevention of the accumulation of waste in the streets» (a pure «cleaning approach» to SWM) and not to a more integrated sustainable approach to SWM that includes reduction, reuse and recycling. The delay in preparing a proper policy framework prevents the development of a clear division of responsibilities and proper guidelines for local governments to make the change from this «cleaning approach» to SWM to an approach of integrated sustainable waste management (Stylianopoulou, 2000).

Strategic planning for SWM is seriously hampered by the lack of information on SWM that can be used for monitoring and assessment. In general there seemed to be a lack of reliable and recent data on waste generation and composition. Only the Syria and the Lebanon reports produced good quality and relatively recent figures. This indicates the lack of data on SWM that apparently prevails in the five countries and also the lack of standardised mechanisms for collecting reliable data on SWM.

Lack of environmental monitoring data, measures and indicators was mentioned by the Lebanon report. According to the report «the absence of measured information about the environment in Lebanon complicates the development of a strategic view and the checking of compliance with the environmental regulations (EL-Jor, 2000).

The Tunisia report especially suffered from a lack of data, which was difficult to access according to the author. For example it could not access:

- financial data, data on budgets, costs, sources of funding
- data on private sector performance
- data on the informal sector
- information on collection efficiency.

It also mentioned the absence of legally approved indicators and standards for assessing the performance and design of SWM facilities. If this kind of data is missing, it is hard to determine the performance of SWM, let alone to suggest ways to improve it. It also points to a lack of accountability of the municipalities to their constituents, as information on spending by government institutions should be made public to make sure public funds are wisely spent. Data on SWM are the basis for a good monitoring system as well as the basis for improvements in SWM and major decisions on for example purchase of equipment.

7.4 Institutional barriers to efficient and effective municipal SWM

These institutional barriers also refer to local, regional and national governments.

A major barrier to efficient and effective solid waste management in all five countries is the overlap of institutional bodies responsible for the planning and implementation of SWM as well as the duplication of efforts: this has direct financial consequences with a high cost involved, for this duplication of efforts means a waste of the scarce human, material and technical resources which exist and an inefficient use of the scarce management capacity available for SWM. The lack of a clear division of responsibilities between the various agencies and institutions involved in SWM can also lead to conflicts and inaction, as is the case in Tunisia and Cyprus.

Sometimes there is no clear separation in roles. For example in Tunisia the National Environmental Protection Agency (ANPE) seems to be managing and controlling SWM facilities at the same time, which will hardly make it an independent controller (Baouendi, 2000).

Weaknesses in public administration and in management capacity of local governments in SWM and especially in managing private sector participation are mentioned for Lebanon, Syria and Egypt (El-Jor, 2000; Zeidan, 2000). The role of local and regional governments is kept small in certain cases. For example in Tunisia municipalities are not involved in initiating and implementing SWM policies except

in the largest cities, because all decision-making is centralised. The role of the regional government is to monitor municipal SWM plans and operations, but even this role it cannot fulfil, as it does not have any indicators to use to monitor. For Cyprus it is mentioned that most municipalities are unwilling to change from the «cleaning» approach to the integrated sustainable waste management approach, because they do not have clear guidelines and the new approach requires large investments from their side, e.g. in recycling and sorting equipment.

Inter-municipal cooperation and the exchange of technical and financial data also seem to lack in most cases, notably in Tunisia, in spite of the existence of a National Federation of Cities of Tunisia.

The capacity of local governments to enforce environmental regulations and SWM regulations is limited, as is explicitly mentioned for Lebanon, Tunisia and Syria. For example in Lebanon the municipalities can only give fines, but need to revert to the national police («gendarmes») to arrest someone for an environmental offence. National environmental ministries are also sometimes crippled by a lack of executive authority. This is known for Lebanon and Egypt. For example the Ministry of Environment in Lebanon can only send inspectors and submit a report to the competent authority in case of infractions on environmental laws. This situation requires the Ministry of Environment to have good relations with the executive authorities and to convince them of the necessity to implement environmental laws. In Egypt environmental and SWM laws are not adequately enforced, because of a lack of human resources to enforce the law, a lack of funds and equipment to enable institutions to enforce the law and political unwillingness to enforce the law on everyone regardless of his or her background or connections (Bushra, 2000).

A lack of human resources at local government level is mentioned for Tunisia, Syria, Egypt and Lebanon. It refers to a lack of staff and in particular a lack of technically qualified staff. The difficulties in attracting (qualified) staff by local governments are directly related to the low salaries and limited incentives that municipalities usually provide to their SWM employees. It is also related to the low social status of SWM work, in particular in Syria where salaries are reasonably high.

7.5 Limited involvement of other stakeholders and low environmental awareness

This barrier to effective and efficient SWM concerns all stakeholders in SWM.

There are few linkages between governmental and non-governmental actors, be they private companies, informal sector entrepreneurs, NGOs or CBOs. Usually the only linkage that exists is between formal private companies and municipalities via contracts. Because of this lack of relations there is little coordination between the various stakeholders involved in SWM.

The five countries seem all to suffer from a lack of public environmental awareness to some extent, probably the least so in Cyprus. A lack of awareness of proper waste handling, separation at source, recycling etc. is mentioned in all reports. Much of the industrial sector does not seem to be aware of proper hazardous waste handling. Sometimes occasional campaigns are held to inform citizens about SWM and environmental regulations, such as in Tunisia, but they do not seem to have the desired effects. Many negative practices such as dumping waste next to containers, putting it out at the wrong time, lack of participation in separation at source programs, setting waste on fire in containers, are related to a lack of public awareness.

The other face of lack of public awareness appears to be a lack of accountability from the side of the government. The government is not open about its policies and expenditure on SWM. Complaint mechanisms are unclear or not developed at all. Only in the Syria report it is described in detail what citizens can do if they have a complaint. What is mentioned for the enforcement of environmental regulations and fines, is probably also true for complaints: only citizens with connections or influence are listened to. It is unclear how complaint mechanisms are organised when the private sector carries out solid waste management.

7.6 Financial barriers and lack of cost recovery in municipal SWM

Financial barriers are hampering the activities of local governments especially.

Financial barriers are probably the most frequently mentioned obstacles for efficient and effective SWM in the five countries under study. «Where to obtain the funds from to establish sanitary landfills, hazardous waste treatment facilities and composting plants», this seems to be the eternal question (Bushra, 2000). Cyprus should comply with EU laws as a condition for its accession to the EU, but where do the municipalities obtain the funds from to finance the major changes in infrastructure and to fund awareness campaigns?

However, as is mentioned rightly in the Egypt report, lack of funds is directly related to a lack of cost recovery (Bushra, 2000). If user fees do not cover any significant part of the expenditure on SWM and the national government is expected to fill the gaps all the time, it is hard to imagine how there will ever be sufficient funds. Lack of funds just means that there is a large agenda, but resources (financial, human, institutional, technical) are limited. Judicious use of these resources is the real root of the problem.

Cost recovery mechanisms are insufficient in at least Egypt, Syria, Lebanon and possibly Tunisia. In Egypt for example the official source of funding for SWM is the 2% tax on property rents. However, the rents have been frozen since the 1960s (only since the late 1990s newly rented apartments may raise their rents with each new tenant), while the costs of operation and maintenance of SWM have soared. It is politically difficult to raise rents and it is a decision that should be taken at the level of the national government. This is therefore an inappropriate cost recovery mechanism for SWM. In a few places in Egypt so-called «gate fees» need to be paid by municipalities, private companies, and CBOs for disposal of solid waste at municipal landfills. This was not mentioned for the other countries.

The «polluter pays» principle is recommended as cost recovery mechanism in all the reports, however it is currently only part of legislation in Tunisia. It is the basis of the Eco-Lef programme.

In Lebanon lack of funds for SWM is related to excessive costs, especially of SWM in Beirut, which robs other municipalities of sources of income, because of the use of the Independent Municipal Fund to finance SWM only in Beirut. This is all the more difficult for municipalities in Lebanon as they are still recovering from a severely eroded financial resource base during the civil war. The excessive costs of SWM in Beirut seem to stem from the use of capital-intensive equipment and facilities with high operational and maintenance costs and the existence of expensive contracts with the private sector. The capacity to select appropriate equipment, to operate it efficiently, to design appropriate cost recovery mechanisms as well as to negotiate fair and reasonable contracts with the private sector are typically factors that still need to be developed in many municipalities. Lack of funds in this case actually points to a lack of capacity of the local governments.

Private sector investment has only recently been discovered as a source of investment in SWM facilities in the five countries under study, in particular in Egypt, Tunisia and Lebanon. Therefore public-private partnerships are still very uncommon.

The private sector usually works on a cost recovery basis by charging fees to the users of their services, or it is contracted by the government and paid a monthly sum that covers its costs. Sometimes the private sector recovers part of its costs through the sales of sorted waste materials or the sales of by-products such as compost.

7.7 Deficiencies in technical and operational decision-making in municipal SWM

Deficiencies in technical and operational decision-making pertain mainly to local governments.

Collection efficiency is hindered by a number of factors that have to do with decision-making and especially decisions on selection and purchase of equipment. For Lebanon and Egypt for example it is mentioned that

- Mixing of different kinds of containers that do not match trucks.
- Insufficient capacity of containers so that waste overflows from them (which points also to an

- insufficient collection frequency! This occurs mainly in lower income areas).
- Absence of lids on containers.
 - High loading heights which lead to unhygienic and impractical waste loading.
 - Multiple handling (e.g. manual emptying of containers, which results in waste thrown on the ground, and then lifted into the truck (Egypt).
 - Lack of protective gear for staff and lack of tools.
 - Lack of preventive maintenance and therefore long out-of-service periods of vehicles.
 - Use of old, obsolete equipment that has high operation and maintenance costs.

Transfer stations are rarely used, although they can considerably increase the efficiency of waste collection. However, a lack of space in densely-populated cities like Cairo and Beirut are major factors impeding the establishment of transfer stations.

Sometimes the choice of equipment is based on the integration of the equipment with the whole solid waste management system. Examples are containers that do not match trucks, but also the use of compactor trucks in cities where waste recovery after collection is one of the goals of the government policy, as compactor trucks damage recyclables (Bushra, 2000).

These are all operational management questions that are not adequately solved. The reasons for these faults in decision-making are not really mentioned in the five reports, but they may refer to non-technical decision-makers who do not consult technical staff before taking decisions on equipment or they may be caused by the general lack of qualified technical staff in municipalities.

Another operation deficiency is the limited coverage and low frequency of waste collection in lower income areas, which seems to be a common situation in all countries but Cyprus. In the report on Egypt this low collection coverage is attributed to a lack of funds, however it is more likely that this is a politically motivated policy (Bushra, 2000). Another indication that politics can determine SWM decisions is the siting of landfills in Lebanon, which is not the most efficient one according to the author of the country report (6 or 7 landfills would be enough for the whole of Lebanon), but because of political and social sensitivities each district («caza») has its own landfill.

7.8 Barriers impeding private sector performance

Finally we will look at the barriers hampering the SWM activities of the private sector.

In general it is mentioned for Lebanon, Egypt and Syria that there is a significant shortage of qualified local SWM companies, which is apparent during tenders. This leads to a waste of local human resources and expertise and it increases the risk of (foreign) monopolies, expensive contracts and high costs of municipalities. Lebanon seems to have the most negative experiences in this field and the highest cost of SWM: US\$100 per ton.

The reasons for this lack of qualified local SWM companies are a combination of institutional barriers and a lack of capacity of the sector itself. Institutional barriers obstructing the involvement of the local private sector in SWM refer to high bid-bonds, tender fees, letters of guarantees from banks, etc during tender and contracting processes. Recycling companies are sometimes affected by high taxes, fees and custom duties, codes of industrial production that prohibit the use of recycled materials, etc. On the other hand the private SWM sector itself often lacks capacity and experience to operate and manage SWM services at an adequate level. This is due to the fact that SWM is a new field and educational and vocational training systems are not adequate to prepare them for managing a similar business in many cases.

In Egypt the formal private sector is hampered in its financial sustainability by the fact that user fees collected under a license or franchise agreement are not obligatory. Many potential and actual users of the service do not pay. The private company does not have any legal authority to oblige them to pay nor has the local government (Bushra, 2000). The performance of formal recycling companies in Cyprus is hindered by a lack of labour because of the low status of waste-related work.

The private formal sector in Cyprus and the informal waste sector in all other countries appear to lack governmental support or even recognition, in the case of the informal sector. This results in limited cooperation and coordination and therefore leads to a waste of human and technical resources. The

informal sector reportedly has a low status in most of the countries under study. In Egypt environmental and occupational health risks related to the sorting and recycling activities of the informal sector are explicitly mentioned as problems hindering the development of this sector and its image in the eyes of the government.

The various barriers mentioned in this chapter altogether hold back the development of an efficient and effective SWM in Egypt, Lebanon, Tunisia, Syria and Cyprus. Particularly relevant barriers seem to be the ones impeding the performance of the private sector, the limited management capacity of municipalities and the lack of proper cost recovery mechanisms. In the next chapter we will look at some possibilities that were mentioned in the country reports to reduce these barriers and to make SWM more efficient and effective.

8. Recommendations and Conclusions

8.1 Introduction

In the final chapter of this synthesis report all findings of the previous chapters will be summarised, and recommendations and conclusions will be drawn up to reflect the outcome of this analysis of the policy and institutional frameworks of solid waste management in Egypt, Lebanon, Syria, Tunisia and Cyprus. The chapter will describe suggested reforms in solid waste management policies and legislation, ways to strengthen institutions and build capacities, more coordination between various stakeholders and higher awareness of proper solid waste management, necessary changes in financing and cost recovery mechanisms, improvements in operational planning and management of municipal solid waste management as well as in the conditions for private sector participation. The proposed changes do not only indicate strategic directions but also point to possible interventions by international donors.

8.2 Reforms in legislation and policies

Gaps in environmental laws need to be filled and proposed environmental laws approved as soon as possible to encourage implementation. In Cyprus a legislative framework for SWM needs to be established in accordance with EU guidelines and directives. In Syria a comprehensive environmental law is still pending and needs to be approved by the parliament. It is already in its 8th draft form. It is further suggested that the Prime Minister's cabinet in Syria should approve a clear and comprehensive set of standards, regulations and orders for SWM. Penalties for environmental and SWM offences should also be adapted to equal the damage afflicted or size of the offence (Zeidan, 2000). The Lebanon report suggests that consolidation of environmental and SWM laws is also a major priority in Lebanon, but it is mentioned that this process could take years. In the meantime it is suggested that at least guidelines for best practices are developed, in particular for industrial establishments in residential areas (El-Jor, 2000).

The recently introduced tradition in Lebanon to conduct an Environmental Impact Assessment (EIA) before major development projects (public or private) including the siting of landfills seems to be a step in the right direction. It will have stronger effects if it is included in the environmental legislation and becomes legally obligatory, as in Egypt.

Strategic planning is a key condition for more efficient and effective SWM systems. The Cyprus report recommends the planning and design of a SWM system for the whole country with a clear definition of roles of each actor. This should be developed by the national government in collaboration with municipalities, the private sector and NGOs. It also recommends the planning of a hazardous waste management system for the whole country together with the national government, municipalities, industries and local recycling companies (Stylianopoulou, 2000). For Syria it is suggested that local SWM plans should be developed, using local waste surveys and data (Zeidan, 2000). For Egypt it is suggested that new cities, tourist resorts and public development projects should develop SWM plans prior to their implementation. It is also suggested that national, regional and local SWM plans and strategies should include specific targets for SWM, e.g. X% increase in recycling of glass (Bushra, 2000).

A basic requirement for strategic planning is reliable, up-to-date data. Setting up databases on solid waste management is therefore a much-recommended measure in the five reports. The report for Egypt suggests a database per Governorate on solid waste generation and composition figures, human and mechanical resources, SWM technologies, as well as markets for recycled products and market prices. The Lebanon report suggested setting up a database for the monitoring of environmental conditions (air, water and soil quality, biodiversity, etc.).

Studies are needed to collect the required data. For Syria for example it is proposed that the Ministry of Local Administration conduct a national study on final disposal, assessing current practices and exploring the possibilities for regional disposal sites shared between various municipalities. Also studies are proposed on composting in agricultural cities like Aleppo, Edlep, Hama and Homs, as well as studies on industrial and hazardous waste management in cities with a large industrial concentration such as Damascus, Aleppo and Homs. For Lebanon a study of sources and quantities of

hazardous waste is also suggested, as hazardous waste, in particular healthcare waste is considered a «taboo», which is not addressed in current SWM policies. A study to compare private sector performance with public sector performance may be a good idea for some countries like Tunisia to obtain accurate data on success factors and reasons for failures.

In some cases foreign donors have already funded studies in particular fields, which could be used as a point of departure for a SWM project.

Data on SWM should be available to all parties involved, also to researchers, NGOs and citizens. The Syria report especially calls for openness and freedom of information on SWM.

8.3 Institutional strengthening and capacity-building

Strengthening existing capabilities for the enforcement of environmental and SWM laws is a top priority, among others for Lebanon, Syria and Egypt. More on-site inspections are suggested by the Syria report (Zeidan, 2000). The Egypt report proposes to create an «environmental police» to deal with all environmental offences (Bushra, 2000). The Lebanon report indicates the necessity for delegating enforcement responsibilities to local governments. Also it pleads for more separation between regulatory/enforcement and operating responsibilities.

The Syria report mentions that environmental authorities need a clearly defined mandate to avoid overlap between local and national authorities.

Building institutional capacities and training of SWM staff at national, regional and local level is considered crucial for improving SWM in all countries. The Egypt report proposes that environmental management units at Governorate level and regional branch offices of the Egyptian Environmental Affairs Agency (EEAA) receive training on SWM. The report for Egypt further indicates that the performance of municipal SWM can be increased by providing training, raising salaries, providing SWM staff with protective gear, and purchasing appropriate tools and equipment. The Syria report suggests that municipalities should appoint sufficient staff to match the new organisational structure recently introduced for SWM. It is unclear whether this needs additional funds or just approval from higher authorities of additional staff positions at municipal level.

For Lebanon it is suggested that the capacities of the Ministry of Environment in policy formulation and legislation should be built, as well as those of the Ministry of Municipal and Rural Affairs in strengthening local governments and the knowledge and capabilities of the Ministry of Agriculture in composting.

8.4 Better coordination between stakeholders and higher awareness

The coordination and cooperation between stakeholders in solid waste management can be improved in all cases. This could start with recognition of the existence of other stakeholders and their contributions to SWM (e.g. the informal sector). Stakeholders that have not been actively involved in SWM up till now need to be found and included in SWM planning. The Lebanon report for example suggests involving youths in the preparation and implementation of any new SWM project or plan. In Lebanon the youth is more concerned about environmental issues than the older generations (El-Jor, 2000). This seems to be a suggestion that is valid for at least four of the five countries studied (excluding Cyprus), because of their young populations. The Egypt report suggests the involvement of non-traditional stakeholders such as businessmen associations, trade unions, religious institutions, etc. in SWM plans and projects.

A better coordination between governmental institutions is necessary in many cases too, to avoid duplication of efforts that seems to be common in some of the countries under study. The Egypt report suggests that environmental management units and regional branch offices of the Egyptian Environmental Affairs Agency (EEAA) should be linked in a network.

According to the five country reports next to local governments other stakeholders like private companies, NGOs, CBOs and citizens could be involved in diagnosis of SWM problems and identification of solutions, planning and design of SWM systems, monitoring of environmental conditions and SWM performance, and the like. Planning committees, in which various stakeholders

are involved, could be established for this purpose.

The Cyprus report suggested a SWM system for the whole country should be planned and designed by the national government in collaboration with municipalities, the private sector and NGOs. A hazardous waste management system for the country should be developed in a similar participatory way by the national government in cooperation with municipalities, industries and local recycling companies (Stylianopoulou, 2000).

Capacity building of other stakeholders (private formal sector, informal sector, NGOs) who work in environment and SWM is needed in some cases: it is at least mentioned for Egypt and Syria. The Egypt report suggests that existing initiatives in SWM by NGOs, schools, etc. should be encouraged as well as the establishment of environmental groups in schools, companies, and the like. It also proposes the establishment of labour unions and chambers of commerce for those who work in the waste collection and recycling business (Bushra, 2000). The Syria report suggests that foreign donors assist in establishing new environmental NGOs.

Environmental awareness-raising and empowerment of citizens and local groups also belongs to improved stakeholder participation. Environmental awareness-raising and public education on proper solid waste handling is recommended in all country studies. Periodical awareness campaigns should be organised to make people aware of SWM rules and regulations, to encourage them to participate in private waste collection systems, to minimise waste, to separate waste at source, to recycle, etc. (Bushra, 2000; Stylianopoulou, 2000; Zeidan, 2000).

8.5 Changes in financing and cost recovery mechanisms

Cost recovery seems a key to improving the efficiency and effectiveness of SWM in the five countries, as reducing costs and increasing revenues will free funds for improving performance and increasing collection coverage. Ways to increase cost recovery as described in the country reports, are outlined below. For Egypt it is suggested to conduct an in-depth investigation of different financing tools and cost recovery methods, for example surcharges on utility bills. Also it is proposed that the 2% cleaning tax should be raised (Bushra, 2000). For Lebanon it is suggested to introduce mandatory charges for waste collection and treatment, especially for hazardous waste. The Lebanon and Syria reports also propose to introduce economic measures that encourage waste minimisation, the use of cleaner technologies, and reuse and recycling. These measures could include tax rebates and tax exemption for the use of recyclable materials in industry and low interest loans for environmentally friendly projects.

The Syria report suggests that fees should be adapted to cover the full costs of SWM, reflecting the «polluter pays» principle. A technical committee of the Ministry of Local Administration should review and revise fees in various cities.

Sometimes more assistance from the national government is suggested. The Cyprus report for example states that municipalities need to receive financial-economic incentives from the national government to implement the necessary changes in the current SWM systems and to make them comply with EU laws (Stylianopoulou, 2000). The Egypt report pleads for allocation of a higher SWM budget from national governments to municipalities.

The opportunities for public-private partnerships could be explored in all countries.

8.6 Improvements in operational planning and management

Improvements in operational planning and management of SWM are needed in all five countries, as it seems especially in Egypt, Syria and Lebanon. They are usually the result of changes in institutional and policy frameworks. Some proposed measures to increase operational planning and management are listed below. Sometimes these are relevant for all countries. In other cases they are mentioned for one particular country. In that case the country is mentioned in between brackets:

- Improve the selection of technology and for example match containers with collection equipment (Egypt, Lebanon).

- Set up preventive maintenance programs for SWM equipment.
- Study the performance of separation at source (pilot) projects, especially in Tunisia, Cyprus and Egypt, and adapt or expand projects accordingly.
- Encourage separation at source in high and middle-income neighbourhoods (Egypt).
- Experiment with small-scale composting.
- Improve siting landfills (Egypt).
- Improve landfill practices.
- Prepare appropriate guidelines for (controlled) landfilling and for gradually upgrading existing landfills.
- Rehabilitate closed landfills.
- Study hazardous waste.
- Register sources of pollution and hazardous waste (Lebanon).
- Introduce a deposit-refund system for polluting materials and substances.
- Prepare guidelines for appropriate treatment of healthcare waste with low operation and maintenance costs, building on existing practices and international experience (Syria).

Improvement of hazardous waste management seems to deserve priority attention in Tunisia and Egypt among the five countries, as there the largest amount of hazardous waste is being produced at present.

8.7 Better conditions for private sector participation

Better conditions for private sector participation involve both measures to reduce institutional barriers to private sector participation and measures to increase the capabilities of local private companies.

According to the reports on Egypt and Syria contractual conditions for private sector participation could be improved and private sector participation made easier. Details are not given. However, this could refer to changes in the high bid-bonds and tender fees, fees and taxes that inhibit local private companies from tendering. Incentives could be introduced to stimulate the performance of the private sector such as reduced custom duties, fees and taxes, subsidies on second-hand equipment, etc. according to the particular situation in the country.

For Egypt it is suggested that participation in private waste collection service could be made compulsory for a whole area or zone, so that economies of scale can be achieved and revenues of private companies increase.

A clear strategy to support recycling and recovery is suggested for Egypt. Measures that can be taken to encourage recycling are (Bushra, 2000):

- Revise Egyptian codes of production to allow for more recycled products and recyclable materials to encourage the recycling industry.
- Encourage use of recyclable packaging materials.
- Set up drop-off system for the collection of plastic or glass bottles.
- Coding of plastic polymers according to international system.
- Establish revolving fund for recycling enterprises.
- Set up a business development programme like for the «zabbaleen» in Cairo in other countries, for example in Lebanon and Syria.

Capacity-building and training of local private companies has already been briefly mentioned in section 8.4. These are essential to improve private sector performance and to reduce the risk of (foreign) monopolies and expensive contracts.

It can be concluded that the common perception is that improving solid waste management means making waste collection and disposal systems more efficient, raising public awareness and enforcing environmental and SWM laws. However, prerequisites for all these factors are a capable and prepared local government, cooperation between all stakeholders involved in solid waste management and strategic planning. That is where all efforts should start. This seems to be the main conclusion from the assessments of policy and institutional frameworks for solid waste management in Egypt, Lebanon, Syria, Tunisia and Cyprus!

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