THE FEASIBILITY STUDY ON REFUSE COLLECTION, TREATMENT AND DISPOSAL IN ALEXANDRIA OF THE ARAB REPUBLIC OF EGYPT

SUPPORTING REPORT

MARCH 1986

JAPAN INTERNATIONAL COOPERATION AGENCY

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CHAPTER 1. PRESENT SITUATION OF ALEXANDRIA

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1.1 Alexandria 2005, Comprehensive Plan

This is prepared by Alexandria University upon contractual agreement with the Governorate of Alexandria and published in January 1984. University of Liverpool contributed great deal with the financial aid by the British Government.

The key issues of the Comprehensive Plan are;

a. The growth in population
b. Deteriorating housing conditions
c. Increasing land values and construction costs
d. Prevention of the historical heritage
e. Protection of agricultural land
f. Management of industrial expansion
g. Control of environmental pollution and the erosion of beaches

Among the strategies of the Comprehensive Plan matters closely related to this Study are as follows;

(1) The fundamental concern of the Alexandria Comprehensive Plan is how best to deal with the anticipated growth in population of approximately two million people above the present population of about three million inhabitants within favorable environmental conditions.
(2) The intention is to develop an extensive expansion area to the west of the city. This decision was taken in order to preserve the valuable agricultural land located southeast of the city.
(3) The southern limit of Alexandria's expansion is to be defined by a "green-belt." This buffer zone will protect the agricultural land and restrict industrial expansion. The geeen-belt will also act as the southern boundary for the western expansion zone.
(4) The Comprehensive Master Plan establishes a comprehensive network of circulation systems that links the city from east to west, and provides for a number of axes from which the city can be approached and tied to regional circulation networks.

(5) The Plan proposes major programs for housing developments, serving a variety of population groups especially the Low and Limited-income groups.

(6) The Comprehensive Master Plan bans or controls water pollution of waterfront beaches and recreational lakes. It proposes the use of primary treated waste-water as a major resource in land reclamation to increase agrarian production and employment opportunities.

(7) To overcome the existing lack of adequate open and recreational space, the Comprehensive Master Plan proposes a hierarchical system of playgrounds, parks and exposition facilities to be planned city-wide.

(8) Downtown Alexandria is revitalized through the widening of some streets, pedestrian zones, parcking garages and urban renewal projects of inner-city districts in addition to the provision of an efficient urban transport system.

(9) The city is subdivided into various zones of definite building heights and floor area ratios depending on location, character and intensity of activity.

(10) The Comprehensive Plan is a continuing process that should be periodically monitored, reviewed and updated taking into account the human and material resources which are always in flux.

The Comprehensive Plan includes the diagrams which illustrate the principal proposals of the Plan, i.e. Historical Background, Environment, Regional Context, Planning Strategy, Population Studies, Manpower Resources, Economy and Industry, Road Networks, Public Transportation both existing and proposed, Utilities, Residential area, Commercial areas, Agriculture, Tourism and Recreation, Public Facilities and Services, Pollution and Ecology, Density, Conservation and Visual Aspects, and Land use.

1.2 Laws and Regulations Related to Solid Waste Management

1.2.1 Laws

Basic laws relating to solid waste in the Arab Republic of Egypt are Law No. 38/1967 and Law No. 129/1982 which is a partial revision of the former. These Laws are governed by the Ministry of Housing and Utilities. An outline of the Law is given below, the details of the Law being designated in Decree No. 134/1968.

(1) Generators of Waste

The subject waste of this Law shall mean all kinds of solid and liquid forms of waste and their generating sources shall include not only ordinary households but also all commercial as well as industrial activities (Art. 1).

(2) Obligations of the Generators of Solid Waste

All generators of waste shall have the responsibility of providing waste storage (Art 2). Those renting buildings or houses shall pay the rate in view of waste disposal to the local government, where the rate determined by the local government shall be not more than 2% of the rent. Those found in violation of this regulation shall be fined not more than 100LE (Art. 8).

(3) Obligations of Local Governments

Local governments shall direct the generators of waste to provide waste storage (Art. 2) and shall direct in such a way that the designations of the Law concerning the collection and haulage of waste are adhered to (Art. 3). In addition, local governments shall decide the places of disposal for waste and shall prohibit the dumping of waste at other than these designated places (Art. 1). Local governments may collect the fee from the occupants of buildings or houses for the purpose of waste disposal and may set up a cleansing fund. Fines and subsidies, etc. may be added to this fund to provide public cleansing expenses (Art. 8).

1.2.2 Regulations

The following is an outline of Decree No. 134/1968;

(1) Organization Responsible for Waste Disposal

It has been designated that local governments shall bear the final responsibility for waste disposal. Although local governments will bear the responsibility for the collection, haulage and disposal of waste, they may commission contractors to perform all or a part of this work in accordance with the regulations designated by local governments (No. 134 Art. 5). Contractors commissioned to perform the collection, haulage and disposal of waste shall bear the responsibility to carry out the work properly. Should these contractors fail to perform their responsibilities properly, local governments may perform the work at the expense of the commissioned contractors (No. 134 Art. 7 and Art. 8).

(2) Storage

Local governments shall decide the standard for waste bins and shall determine the model. Local governments may make it obligatory for generators of waste to purchase waste bins at a price fixed by the local government. Generators of waste shall keep these waste bins inside the buildings except when they are used to discharge waste for collection (No. 134 Art. 6).

(3) Discharge of Waste (Refuse Stations)

Local government shall determine refuse stations in view of the convenience for collection and haulage of waste. When the location of stations is not decided by local government, the occupants of buildings or land owners shall decide these refuse stations.

In addition, local governments shall install waste bins at roadsides, squares and other sites (No. 134 Art. 5).

(4) Collection and Haulage

Local governments may decide the maximum number of outside contractors and their own employees who will actually perform the collection of waste for each city district and may also decide the regulations designating the scope of work for these two groups. Contractors and city employees may not operate outside their given areas (No. 134 Art. 9). Local governments shall decide the schedule for collection based on the situation of the areas concerned (No. 134 Art. 11).

(5) Processing

Public or private waste processing plants shall satisfy the following conditions.

(1) Composit Plant
An appropriate site shall be selected for the sorting of glass, metal, rubber and rock, etc. When sewage water, etc. is to be poured over waste, a suitable site shall be selected.

(2) Incineration Plant
An incinerator shall have adequate capacity for complete burning. Sorting shall be carried out prior to burning in order that pollution of the air due to waste gas does not occur.

(3) Sorting
Sorting shall only be carried out at designated sites. Sorting shall not be carried out on trucks or carts (No. 134 Art. 17).

(6) Final Disposal

Public or private disposal sites shall be selected in places that have easy access, where wind can be prevented and at a distance of 250m or more from the nearest house. A fence of 1.5m in height or more shall be provided around disposal sites. It is further designated that sand be placed over pressed waste to a thickness of 15cm or more and that water be sprinkled over it before compacting.

1.3 Organization

This Chapter aims at the presentation of a comprehensive picture of the solid waste management organization in Alexandira. This section provides also some information on operational and financial aspects, which seems to be helpful for better understanding of the organizations.

1.3.1 Organization and their activities involved in the solid waste management

The main purpose of this section is to show what are the activities involved in the solid waste management in Alexandria and which organizations are responsible for the activities.

Tab. 1-3-1 ACTIVITIES RELATED TO THE SOLID WASTE MANAGEMENT AND RESPONSIBLE ORGANIZATIONS [SUMMARY]

TYPE OF ACTIVITIES	RESPONSIBLE ORGANIZATIONS
1. Cleansing	
(1) Street sweeping	Districts
(2) Collection, haulage & dumping	Districts, ADS* & Zabbaleen
(3) Maintenance of collection vehicles and equipment	Central Workshop & District garages
2. Final disposal	
(1) Levelling dumped waste at dump sites	Central Workshop
(2) Dump site management	General Follow-up Dept.
3. Compost plant management	General Follow-up Dept.
4. Recovery of reusable materials	Zabbaleen and the existing Abis Compost Plant
5. Inspection, following up & reporting of cleansing activities	General Follow-up Dept.
6. Planning for solid waste management	Secretary General & General Follow-up Dept.

* ADS stands for Association for Development of Society.

1.3.2 Cleansing Service

The principle service in the solid waste management in Alexandria is the cleansing service, which consist of

- street sweeping*
- waste collection, haulage and dumping

Note: In Alexandria, all street sweeping is done manually though 35 or 40 years ago some mechanical trucks were used. A few mechanical sweeping trucks are scheduled to be procured in 1985.

The former service is provided exclusively by the districts. The latter service is provided by the districts, ADS and Zabbaleen. In order to understand the volume of the latter service provided by each party, the following figures may be helpful:

Tab. 1-3-2 AMOUNT OF WASTE COLLECTED

	WASTE AMOUNT COLLECTED PER DAY	SHARE
- 6 districts	780 ton	72.4%
- ADSs of 6 districts	227 ton	21.1%
- Zabbaleen	71 ton	6.5%
- Total	1,078 ton	100.0%

Source: According to the field survey made by the JICA study team for the period 16 Sept. 1984 - 22 Sept. 1984.

As is shown in the table above, Zabbaleen's share is much less than ADS's share in terms of garbage collection amount. However, in terms of amount of collection fee collected from residents, Zabbaleen's share is about same as ADS's share. According to the results of the interview with 600 households conducted by JICA Study Team in October 1984, the number of households who pay garbage collection fee to Zabbaleen is almost same as the number of those who pay the collection fee to ADS. (161 and 164 respectively out of 600 households interviewed. There are 163 non-payers, 56 who pay to doorman, 3 who pay to others. The remaining with no answer.) The tendency is that in the case of higher income faily, more number of family pay the collection fee to Zabbaleen rather than to ADS. (86 and 24 respectively out of 192 high income households interviewed.

There are 30 non-payers and 31 who pay to doorman. The remaining with no answer.) On the other hand, the situation is converse in the case of lower income households. (27 and 101 respectively out of 216 low income houehold interviewed. There are 68 non-payers, 3 who pay to doorman and 2 who pay to others. The remaining with no answer.) This proves that there are many household who receive garbage collection service of ADS without paying collection, fee, while Zabbaleen collect successfully collection fee from residents for whom they serve with garbage collection.

Total number of personnel engaged in the cleansing service is estimated at around 2,400, of which breadkown is shown in the table below:

Tab 1-3-3 NUMBER OF PERSONNEL ENGAGED IN CLEANSING SERVICE

- Street sweeper	1,660
- Truck assistants for collection	400
- Drivers	130
- Inspectors of the 6 districts	50
- Inspectors of the General Follow-up Dept.	50
- Zabbaleen	130
- Total	2,420

Source: Monthly Report prepared by the General Follow-up Dept. for October 1984.

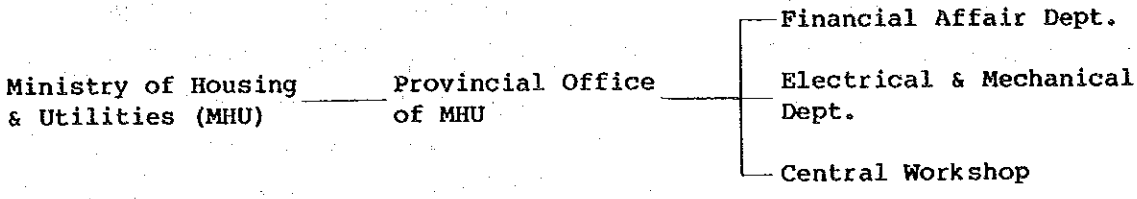
Out of 1,660 street sweepers and 400 truck assistants (total: 2,060), 452 workers, which represent 28% of the total, are absent. Most of them are on long leave of 2 to 4 years or more. This is quite common phenomenon in many of the Governorate offices.

1.3.3 Central Workshop

(1) Position

There are two major workshops for vehicles in Alexandria Governorate; one for passenger cars which is located in East District, the other for cleansing vehicles, other non-passenger cars, buldozers, etc. located in Middle District. The latter is called "Central Workshop". As shown in the chart below, Central Workshop legally, is under the control of the provincial office of Ministry of Housing and Utilities. In addition to Central Workshop, thre are Financial Affiar Dept. and Electrical & Mechanical Dept. under the said provincial office.

Fig. 1-3-1 POSITION OF CENTRAL WORKSHOP



Although the provincial office and Central Workshop is under the control of the Ministry of Housing & Utilities, all the budget (for salary, maintenance and investment) required by this provincial office (other ministries' provincial offices as well) and its sub-organizations are provided in the Governorate budget, not in MHU's budget.
Partly due to this, it seems the relation between the provincial office of MHU and its sub-organizations are not clearly understood by even concerned offcials. Regarding the position of Central Workshop, some officals said it belongs to Electrical & Mechanical Dept. which, they say, also belong to the Governorate, while other officals said Central Workshop belongs to Transportation Dept. of the Governorate.

A head of any provincial office is sent by the ministry to which it belong to. Position of the Head is undersecretary who follows a deputy minister of the ministry. Provincial offices have to follow policy and strategy set by the ruling ministries. In these context, provincial offices are certainly under the control of their ruling ministries. However, in reality, the provincial offices are very closely related to the Governorate and function actually as a part of the Governorate administration. It seems that this tendency has been further strengthened by "Decentralization Policy" of the central Government.

(2) Responsibility

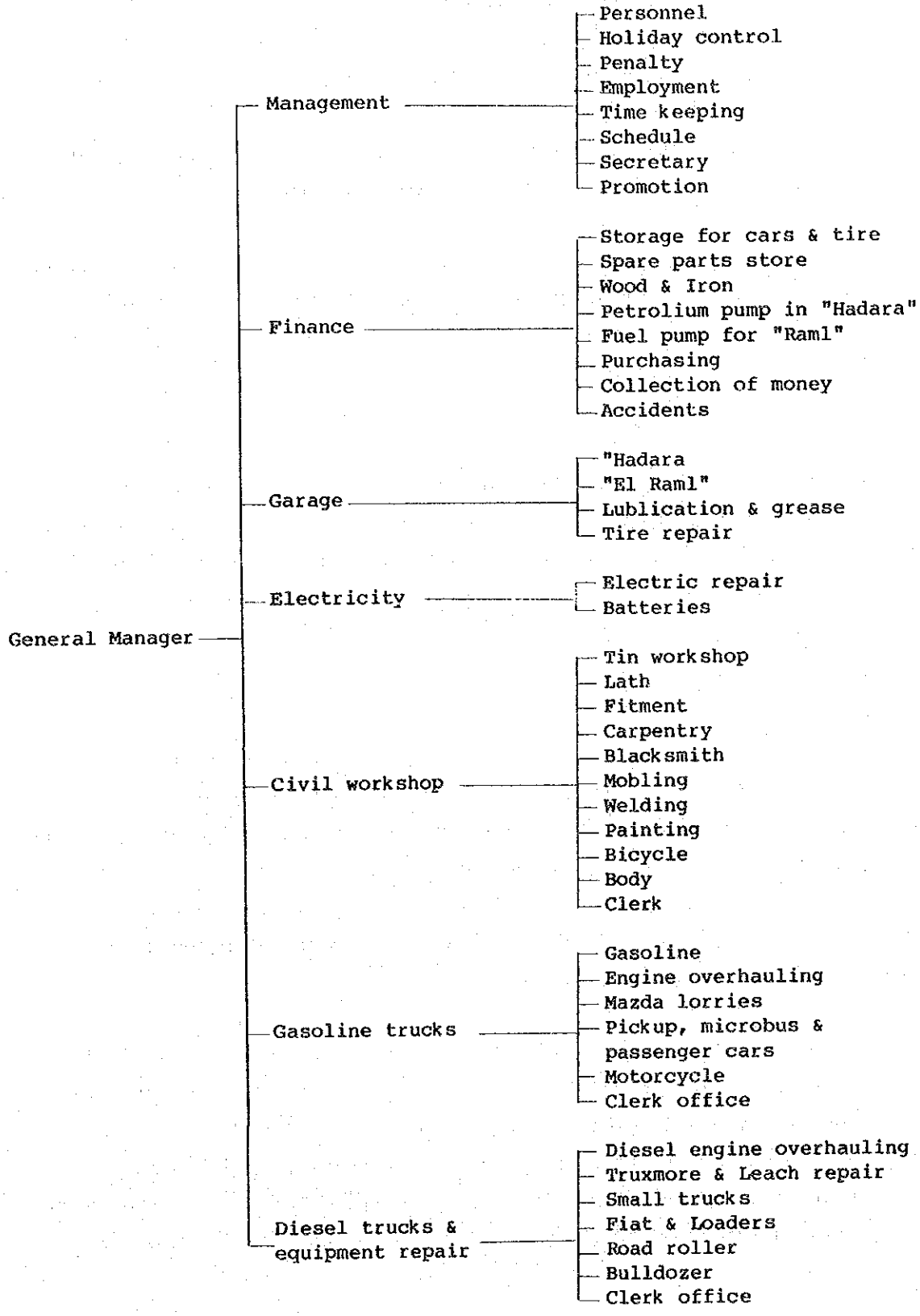
Central Workshop has the following major responsibilities:

- To provide maintenance service for cleansing vehicles and other non-passenger vehicles and some equipments which belong to Governorate and districts. (Other public authorities are responsible for maintenance of their own cars.)

- To produce and repair traffic signs, fences, communal containers and spare parts for vehicles and woodenworks such as desks and chairs.

- To prepare vehicles and equipment procurement plan. (There is a 5 years plan for the vehicle procurement starting in 1981/82.)

Fig. 1-3-2 ORGANIZATION CHART OF CENTRAL WORKSHOP



Note: The procurement plan has to be approved by a committee comprising of the following persons:
- Manager of the provincial office of Central Workshop
- Financial supervisor of the Governorate
- Manager of General Follow-up Dept.

In the case procurement is done with foreign loans or grant, approval by the Central Government is required.

In addition, Central Workshop is responsible for levelling dumped wastes at the dump sites. Central Workshop has a few bulldozers, operators and labors serving this purpsoe.

(3) Organization

Central Workshop has about 600 employees. It is divided into such departments as Management, Finance, Garage, Electricity, Civil Workshop, Gasoline trucks, Diesel trucks & equipment repair. Each department is further divided into sections as shown below.

1.3.4 Secretary General

Secretary General of the Governorate is very influential in the strategy formulation and decision in respect of solid waste management. Being a chairman of Executive Council of the Governorate, he plays very important role, among other things, in selection of foreign loan projects. As a matter of fact he is directly involved in discussion and negotiation of, for example, procurement of cleansing vehicles wiht USAID and other international agencies.

Furthermore, he has prepared a few important reports concerning solid waste management in Alexandria such as "Cleansing Plan of the Year 1982" and "The Essentials of Cleansing Campaign in Summer 1982". In these reports, he discusses, in detail, existing problems, defines the roles to be performed by concerned parties, and suggests initiation of ADS waste collection service and some other solutions to the existing problems.

1.4 Budget and Finance

In this section, findings of the financial conditions obtained through the study and process of calculation of estimated cost of each services for solid waste management were described.

1.4.1 Outline of Total Budge of Alexandria

The total budget of Alexandria has increased as shown in Table 1.4.1.

In the 84/85 budget, the revenue and expenditure amount to 143.8 million L.E., however in the provisional budget for the year 85/86, the expenditure is proposed at 176.1 million L.E. 9increased about 23%), while the revenue is estimated at 48.1 million L.E.

The reasons of this extream shortage is that the major revenues have not decided at the end of the field study. The budget of the Running Sovereign Services, Aids and the Financing the Investment Usages will be decided under the condition of local revenue and expenditure of each period.

From this table, several points are pointed out and summarized as follows.

- Actual revenue collected in 83/84 exceeded more than the estimated revenue, while the actual Running Sovereign Services' Aids is decreased from estimated one

- Half of the revenue depends on the Running Sovereign Services' Aids

- Provisional budget in 85/86 indicates that the Running expenses and the Investment Expenses increase more than the Wages in the rate

In this point, the salary of employees in 85/86 is equal to that of 84/85 as shown in Table 1.4.2.

Concerning the investment budget of Alexandria Governorate, the total including the Housing Section has increased as shown in Table 1.4.3.

This table indicates that the major project of Alexandria is allocated to the Housing Sector, and to the Industrial and the Utilities Sectors depending on the amount of foreign funds obtained.

From the viewpoint of relations between the Governorate and the Districts, the money flow has a following characteristics.

Tab. 1-4-1 TOTAL BUDGET OF ALEXANDRIA GOVERNMENT

(LE 1000)

	in the last 3 years			budget		
	81/82 *1	82/83	83/84	83/84	84/85	85/86
Revenue						
Sovereign revenue	25673	26679	34983	31070	34090	33589
Local running revenue	5376	7250	12217	10973	11971	13545
Running suvereign service aids	29387	51891	48105	63832	76778	-
Capital transfer revenue	2331	8429	2295	2256	2889	1005
Budgeting for investment use	-	19480	19717	17503	18040	-
Total of revenue	62768	113730	117227	125633	143768	48139
Expenditure						
Wages	51972 (8143)	*2		86690 (12644)	102746 (16000)	114010 (15761)
Running expenses	10898 (5135)	(7119)	(10317)	19184 (11001)	20093 (11723)	30863 (16080)
Investment expenses	- *3			17503 (17503)	18040 (18040)	27887 (27887)
Capital transfer	1223 (1223)			2256 (2256)	2889 (2889)	3388 (3388)
Total of expenses	64100			125633	143768	176147

Note: *1) Expenditure in 81/82 represents budget

*2) ( ) means the expenses for the General Office included in total Alexandria budget

*3) Investment expenses are not included in the Governorate Budgett in 81-82

Tab. 1-4-2 SALARY OF THE GOVERNMENT EMPLOYEES BY RANKS

(LE/Year)

Rank	85/86	84/85	81/82
1st rank	1,600	1,600	1,400
2nd rank	1,400	1,400	1,100
3rd rank	1,100	1,100	900
4th rank	800	800	600
5th rank	700	700	500
6th rank	600	600	400

Source: The Governorate Budget in 1985/86, 1984/85, 1981/82

Tab. 1-4-3 INVESTMENT BUDGET OF ALEXANDRIA GOVERNORATE

(LE 1000)

Sector	1981/82	1984/85	1985/86	share %
People's development				
Agricultural sector	1,700	3,150	1,555	2.3
local	800	3,150	1,555	
foreign	900	-	-	
Industrial sector	1,000	2,695	5,656	8.3
local	750	2,695	2,326	
foreign	750	-	3,330	
Infrastructure projects				
Electricity sector	1,500	1,385	2,075	3.1
local	965	1,355	2,030	
foreign	535	30	45	
Transportation & Communication sector	4,195	2,760	5,644	8.3
local	3,275	2,621	5,544	
foreign	920	139	100	
Utilities sector	6,517	6,690	10,612	15.6
local	4,401	3,302	7,732	
foreign	2,116	3,388	2,880	
Services sector	1,901	1,360	2,345	3.5
local	1,246	1,192	2,195	
foreign	655	168	150	
Housing sector	13,122	26,000	40,000	58.9
local	13,122	26,000	40,000	
foreign	-	-	-	
Total	30,435	44,040	67,887	100.0
local	24,559	40,315	61,382	90.4
foreign	5,876	3,725	6,505	9.6

Source: The Governorate Budget 1981/82, 1984/85/,1985/86

- The pratical business of waste collection is carried out by the cleansing section of each district, though the district itself has very little financial resources.

- Wages and a part of running cost are distributed through the budget of Governorate, though the Cleansing Fund is distributed upon the decision of the Fund Board.

- Each District Chief is assigned a post of the head of ADS in each district takes charge of various activities in the district in addition to cleansing services.

Regarding the Governorate budget, the Budget Chapter 1 (wages) and the Budget Chapter 2 (running cost) to Middle District in 84/85 is shown as below.

- Chapter 1:	2,095,000 LE	13.3% of the Budget Chapter 1 for the General Office including the budget for 6 districts
- Chapter 2:	54,000 LE	0.5% of the Budget Chapter 2 for the General Office

The expenditure of the spare-parts including in the Budget Chapter 2 was allocated with only 5,000 LE.

1.4.2 Financial Resources and Revenue

The financial resources for solid waste management in Alexandria consist of the Governorate Budget, the Cleansing Fund and the revenues of the Cleansing project of the ADS.

1) Governorate Budget for Solid Waste Management

The Governorate Budget for solid waste management, comprising three items; wages of employees (Chapter I), budget for running and maintenance (Chapter II) and investment for facilities and vehicles (Chapter III), were not stated in the lucid table.

Especially, the Budget Chapter 1 distributed from the Central Government for S.W.M. services was not separated from the Governorate Budget Chapter 1.

The wages for cleansing was estimated from the number of workers taking into consideration that the Budget Chapter 1 is generally equals to 1.2 times of the wages for permanent job.

Tab. 1-4-4 ESTIMATED GOVERNMENT BUDGET FOR WAGE OF CLEANSING PERSONNEL

(LE/year)

	Number of workers (1985)				Annual wage per person (LE)
	Total	Collection & Sweeping	Compost	Final disposal	
Managerial supervisor	66	48	10	8	1,100
Inspector & technical personnel	142	124	6	12	800
Driver & operator	182	160	6	16	800
Clerk & worker	655	549	52	54	700
Sweeper & other	1,652	1,652	0	0	600
Total	2,697	2,506	74	90	178,500

Source: Followup Department

On the other hand, most of the Budget Chapter 2 related to the S.W.M is taken into the Cleansing Fund as mentioned herein latter.

The Budget Chapter 3 related to the general cleansing operation is shown in Table 1.4.5, which includes investment costs other than S.W.M.

In the 85/86 provisional budget, investment cost for composting has increased eight times comparing to the previous year. This means that the Budget Chapter 3 could be increased when the Central Government recognizes the project requiring large investment cost.

The Budget Chapter 3 for cleansing was estimated from the number of vehicles allocated for cleansing services as shown in Tab. 1-4-6.

2) Cleansing Fund

Major sources of the Cleansing Fund consists of the revenue collected from the residents and business establishments and of the subsidy from the Governorate Budget Chapter 2 as presented in Tab. 1-4-7.

- The main portions of the financial resources collect from the residents and other consist of 2% of the house rent and 10% of the registration charge of large-sized trucks.

- The funds allocated within the Budget Chapter 2 are used to cover mostly for fuel and spare-parts costs and has not been increased.

The table indicates that Cleansing Fund has increased though the revenue in 84/85 has decreased by 35% from 82/83.

The balance of the Cleansing Fund are filled up by the transferred money hints that assets of the Cleansing Fund has decreased.

The 85/86 Budget indicates that the basic problem showing the tendency of shortage of the Revenue is not solved.

From these facts, it is required to establish more stable financial base for achieving adequate services for S.W.M.

Concerning the relations between the Cleansing Fund and the district cleansing section, there is no definite rules to distribute it to each district. It is merely distributed upon the decision of the Fund Board depending on the situation.

Fee-collection of 2% of the house rent in Middle District summed up 271,905 LE (25% to the Revenue of the Cleansing Fund) in 83/84 as shown in Table 1-4-8.

Tab. 1-4-5 BUDGET CHAPTER 3 RELATED TO SOLID WASTE MANAGEMENT

(LE 1000)

	81/82	82/83	83/84	84/85	85/86
General Cleansing	2350	2420	2655	2978	2893
Collection Vehicles	1020	1668	1500	1820	2310
Pick-up & Motorcycle	190	80	-	55	163
Bulldozer	300	-	655	480	-
Loaders	260	350	470	548	-
Cleansing Equipments	580	100	30	30	-
Containers	-	162	-	-	200
Scales	-	60	-	-	-
Microbus	-	-	-	45	220
Compost Plant Project	500	150	150	570	4980
Abis compost plant				570	1006
Total	2850	2570	2805	3548	7873
Local	1570	770	805	1160	2743
Foreign Grant	172	-	60	68	-
Loan	1108	1800	1940	2320	5130
Estimated Budget for cleansing			2330		

Tab. 1-4-6 NUMBER OF VEHICLES ALLOCATED FOR THE SOLID WASTE MANAGEMENT

Items	Alexandria (Unit)	Project Area (Unit)	Estimated Price per Vehicle
Collection vehicle			
Container collection	46 units	12 units	80,000 LE
Compactor	51	12	48,000
Open dump & etc.	87	22	28,000
Sub-total	184	46	
Compost plant			
Truck	2		42,000
Tractor	2		42,000
Loader	2		61,000
Turning	1		265,000
Sub-total	7		
Final Disposal			
Bulldozer	12	6	59,100
Sub-total	12	6	
Total	203	52	

Tab. 1-4-7 REVENUE OF THE CLEANSING FUND

	Settling Account			Budget		
	80/81	81/82	82/83	83/84	84/85	85/86
2% of house rent	659.7	639.3	832.5	750.0	750.0	1000.0
Fine	0.4	0.6	47.7	25.6	30.0	55.0
Miscellaneous	-	-	-	1.0	1.0	1.0
10% of Vehicle Registration	213.4	150.0	200.0	210.0	300.0	300.0
Sewage Suction	1.5	5.7	1.7	6.0	6.0	6.0
Sub-total	874.9	795.7	1081.9	992.6	1087.0	1362.0
Raw Material Supply	3.0	3.0	3.0	3.0	3.0	3.0
Fuel	20.0	20.0	20.0	20.0	20.0	20.0
Oil & Lubricant	3.0	3.0	3.0	3.0	3.0	3.0
Spare parts	12.0	12.0	12.0	12.0	12.0	12.0
Maintenance	3.0	3.0	3.0	3.0	3.0	3.0
Other Revenue	0.2	1.2	0.5	0.1	0.5	0.4
Land Fencing	1.0	-	-	-	-	-
Sub-total	42.2	42.2	41.5	41.1	41.5	41.4
Reserve	-	-	584.0	-	236.1	-
Total	917.1	837.9	1707.4	1033.6	1364.6	1403.4

Source: Finance & Follow-up Department

Tab. 1-4-8 REVENUE OF 2% OF HOUSE RENT IN MIDDLE DISTRICT

Year	2% of House Rent	Comments	
1983/84	271,905 LE	Subject (number	
		Business	50,254 places
1984/85	237,518	Flat	137,324
		Building	25,514

Source: Finance Section of Middle District

3) ADS Cleansing Budget

Major sources of ADS cleansing budget consist of the charging fee of waste collection and plastic bags sales revenue.

- From interviews carried out with each ADS, the revenue of 4 districts (East, Middle, West and Ameriya) are identified. They mount to LE 420 thousand; average revenue of district is LE 100 thousand approximately. From this viewpoint, the revenues of the ADS of the 6 districts are estimated LE 600 thousand.

- According to the financial statement of the ADS of the Middle District, the cleansing project is deficitary and is supplemented by the earnings from other activities.

- The ADS budget in Middle District is shown in Table 1-4-9.

- From the table, it is considered that the financial system of ADS is not well established in the point of the charging system.

- The charging fees are collected mostly by the fee collectors, but because of the limited number of fee collectors, they can collect only 20% of the total fee.

- The collector can receive 7% of the fee actually collected for his salary though it is very low.

4) Total Resources for Solid Waste Management

In view of the afore considerations, it is assumed that the annual financial resources for the solid waste management will mount to LE 6,433,000, which means that the revenue for the solid waste management equals to LE 13.6 per one ton of solid waste.

Tab. 1-4-9 CLEANSING REVENUE & EXPENDITURE OF ADS IN MIDDLE DISTRICT

(LE 1000)

	Settling Account		Budget	
	1984	1984	1984	1985
Revenue				
Cleansing Fee	73.8	247.3	500.0	330.0
Plastic Bags Selling	92.9	34.0	150.0	100.0
Total	166.7	250.7	650.0	340.0
Expenditure				
Incentives	161.9	234.4	209.0	175.0
Social Insurances etc.	0.0	0.0	-	-
Spareparts	4.7	7.4	8.0	10.0
Stationary etc.	5.9	4.6	4.0	6.0
Collection Commission	-	-	35.0	20.0
Miscellaneous Spents	0.0	-	1.0	1.0
Plastic Bags Purchasing	95.0	76.5	101.0	96.0
Car	-	-	95.0	40.0
Sub-total	267.5	323.2	453.0	348.0
Reserve for Shortage	-	-	-	50.0
Reserve for Emergency	-	-	-	30.0
Total	267.5	323.2	453.0	428.0
Balance	-100.8	-72.5	197.0	-88.0

Source: ADS of Middle District

Tab. 1-4-10 TOTAL ESTIMATED REVENUE FOR SOLID WASTE MANAGEMENT

(LE 1,000)

Resource	Item		%
Central Government	Chapter 3	2,330	(36.2)
	Wages	2,138	(33.2)
Cleansing Fund	2% of house rent	750	(11.7)
	Governorate	42	(0.7)
	Others	573	(8.9)
ADS	Residents	400	(6.2)
	Business Establishment	200	(3.1)
Total		6,433	

1.4.3 Expenditure

It is assumed that all the subsidy provided by the Central Government is consumed. On the other hand, the expenditure structure of the Cleansing Fund has the configuration shown in Tab. 1-4-11.

The expenditures for the cleansing project of the ADS of Middle District is shown in Tabl 1-4-9. Apparently, large portion of the budget is alloted to pay incentive money for workers.

There was no exact data about the annual cost such as the services for collection & sweeping, intermediate treatment and final disposal. These data could be estimated from the relating data on the solid waste management.

The annual cost of each service was calculated on the assumption mentioned below.

- Average wage for each rank shown below is used for the calculation of the personnel expenditure.

Supervisory and managerial personnel	1,800 LE
Technical staff	1,800 LE
Driver	2,400 LE
Worker	1,440 LE
Sweeper	960 LE

Tab. 1-4-11 EXPENDITURE OF CLEANSING FUND

(LE 1000)

	83/84	84/85 Budget	Spent	85/86
Chapter 1	560.4	709.3	645.2	799.5
1) Cash Wages & Allowance	492.4	632.3	629.5	
2) Material & Cash Advantage	68.0	77.0	15.7	
Chapter 2	473.2	555.3	434.9	638.3
1) Necessary Commodities				
Raw Material	16.0	14.0	5.9	
Fuels & Oils	150.0	200.0	222.1	
Spareparts	240.0	240.0	149.2	
Stationary & Books	1.0	1.7	0.5	
Equipment & Small Tools	12.5	12.5	2.4	
2) Necessary Services				
Maintenance	50.2	80.2	17.8	
Others	3.2	6.6	37.0	
3) Running Transfer	0.3	0.3	0.0	
Chapter 3		100.0	395.5	278.0
Total	1033.6	1364.6	1475.6	1715.8

Source: Finance & Follow-up Department

- Following life is adopted to each facilities and equipment for the calculation of depreciation cost.

Facilities	Useful life	Scrap value
Building & civil work	30 year	0%
Machinery & equipment	15 year	0%
Vehicle	5 year	10%

- Maintenance cost was considered to depend on the cost for construction or purchase as mentioned as below.

Collection & sweeping vehicles	8% of purchase cost
Compost plant	2% of plant equipment
Final disposal site	0% because disposal period is very short comparing to the life
Other items	15% of depreciation cost

- To calculate other running cost, unit price as mentioned as below were adopted.

Fuel	15 PT/lit for light oil
Electricity	4.82 PT/kWh
Water	15 PT/m^3

- The base number to be ultipled was shown as Tab. 1-4-4, and Tab. 1-4-6 and Tab. 1-4-12.

The annual cost including depreciation cost is indicated in Tab. 1-4-13.

1-4-4 Free-collection system and Financial Problems

Present fee-collection system consisting of 2% charging to house rent and the fee-collection by ADS.

Most of the former fee is collected by official collectors who belong to the Districts.

The latter was collected by ADS fee-collector, workmasters, sweepers and others.

The total amount of fee collected by ADS is shown in Tab. 1-4-14, which indicate that total amount was very smaller than the expected amount and that the fee-collectors obtain very low salary from the collection work.

These facts pointed out the some financial problems mentioned in the followings.

Tab. 1-4-12 CONDITIONS FOR CALCULATION OF ANNUAL COST FOR EACH SERVICE

Collection & sweeping		
Average fuel comsumption per working vehicle	4.87 kl/year/vehicle	
Compost		
Fuel consumption of vehicle	811 lit/day	(Multiplied by 1.2 times of unit price)
Fuel consumptin of facility	30 lit/day	(Multiplied by 2.5 times of unit price)
Water	60m^3/day	
Electricity	840 kWh/year	
Final Disposal		
Fuel consumption of vehicle		
Bulldozer (14 ton)	60 lit/day	
Bulldozer (17 ton)	84 lit/day	
Oil consumption	20% of fuel cost	

Tab. 1-4-13 ESTIMATED ANNUAL COST

(LE 1,000)

Items	Collection	Compost	Final	Total
Depreciation				
Civil work	-	43	-	43
Facilities	-	231	-	231
Vehicle	1,542	115	236	1,785
Sub-total	1,542	389	236	2,059
Personnel Expenses	3,070	118	152	3,340
Maintenance Cost	685	102	106	893
Fuel & Others	89	11	50	150
Total	5,386	620	544	6,442
Cost per solid waste (LE/ton)	11.4	1.3	1.2	13.7

- The actual two-system financial scheme consisting of the Cleansing Fund and the ADS can not be regarded as necessarily efficient from the managerial point of view. However, considering the fact from the standpoint of the charging system, the relations between the contents of the services and burden is very ambiguous. In other words, it is not clear whether the charge paid to ADS is related to the door-to-door collection services or to the S.W.M. project of the city.

- Problems similar to above have arised as a consequence of the fact that collection of commercial waste and collection of the corresponding charge are being carried out by the ADS.

The result of interviews indicated that there are possibility to establish the financial basis by the residents burden when the collection services and the charging system are practiced, therefore, the improvement of fee-collection system shall be executed with urgent measures, including motivation of fee-collectors.

Tab. 1-4-14 PRESENT SITUATION OF COLLECTION FEES BY ADS IN MIDDLE DISTRICT (19850

Area	Number of Fee Collector	Actually Collected Nos. of Flats*1 (Estimation) 0.35	0.50	Sub-total	Shops	Total
8th	10		(20735)	(20735)	(14915)	(35650)
			10367	10367	29830	4019
			15603	15602	7444	23046
6th	6	*2				
						28700
4th	15	(8454)	(8465)	(16930)	(8465)	(25395)
		2962	4232	7194	16930	24124
		876	6260	7126	17750	24876
7th Moharam bey	9	(37565)		(37565)	(18785)	(56360)
		13146		13146	37570	50716
				9500	38275	47775
7th East	7	(13330)		(13330)	(3670)	(17000)
		4365		4365	13340	17705
				19357	9377	28734
Total	47	(59360)	(29200)	(88560)	(45835)	(134395)
		20473	14599	35072	97670	132742
				51584	72840	153230 *3

Note: *1 The fee represents the sum from January to August. Upper amount represents estimated fee and amount means real collected. ( ) means number of subject to be estimated.
Maximum amount to be collected is 1,500,000 LE though expected amount to be collected sum up to 500,000 for a year.

*2 The area 6th was deemed to be included in the area 7th Moharambey for estimation.

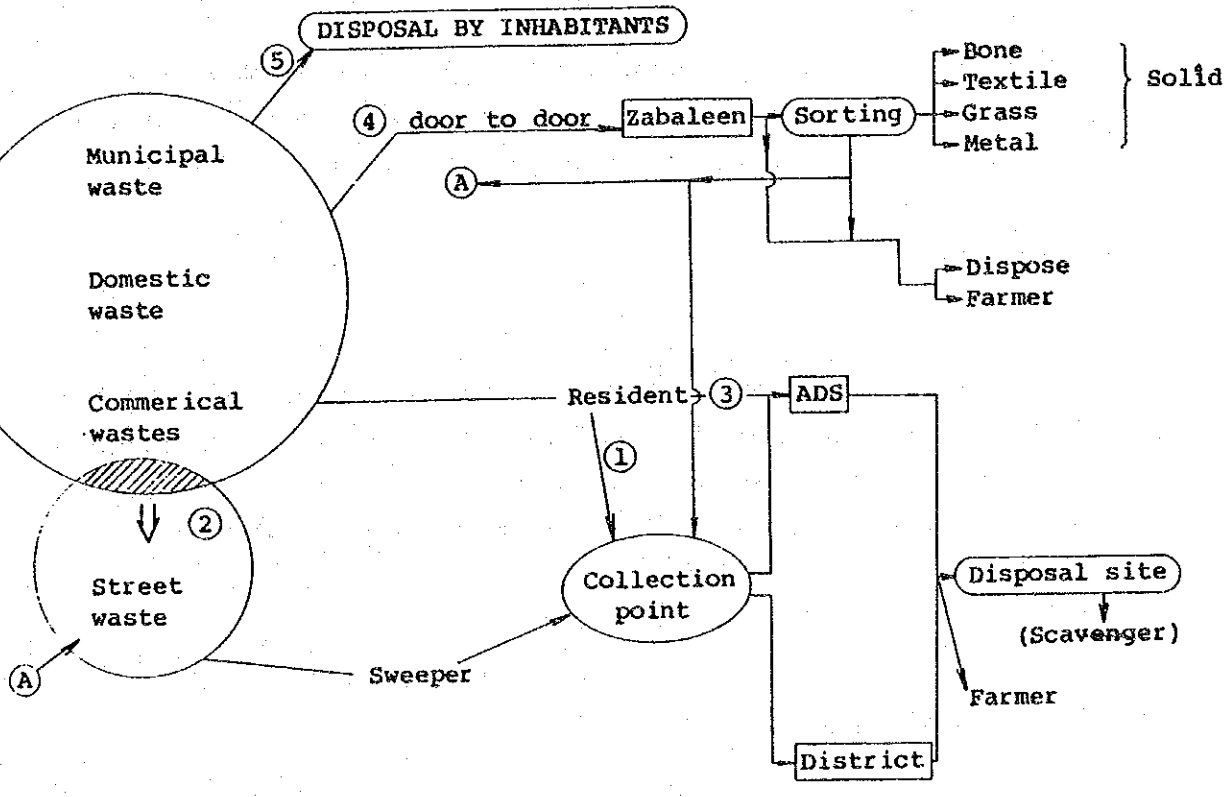
*3 Total amount includes miscellaneous amount collected.

1.5 Collection Haulage and Street Sweep n

1.5.1 General

Urban solid waste mainly consists of solid waste of households, office and commerce, and street rubbish. Street rubbish generated by automobiles, pedestrians and sand clouds can be divided into the one collected by sweeping on the main streets, and the one collected from the areas not on the courses of the waste collection vehicles. The latter rubbish contains much domestic waste.

S.R. Fig. 1-5-1 is a flow chart of the disposal channels for urban solid waste.



S.R. Fig. 1-5-1 SCHEMATICAL REPRESENTATION OF SOLID WASTE FLOW IN ALEXANDRIA

Solid waste is currently collected through four different channels. In the first channel, solid waste is taken to the collection points by the generators of the waste and is collected from there by either the District authorities or ADS. The second channel is that the waste or rubbish along

streets other than collection streets is gathered and taken to the collection points by street sweepers for pick-up by the District authorities of ADS. The third channel is the collection by the direct contact between the generators of the waste and ADS and the fourth channel consists of the direct collection from households by Zabaleen.

While the first channel is the major collection channel in Alexandria, the flow of solid waste can be characterized by the fact that much solid waste is collected as street rubbish, and the fact that two organizations other than the public organization are also engaged in collection services.

In all the channels, separation of resource waste and other waste is not put into practice.

Street rubbish is swept by the District authorities and is taken to the collection points. The rubbish is only collected and transported by the District authorities to the disposal sites along with the solid waste.

1.5.2 Street Sweeping

Street sweeping is traditional work succeeded from the era of British reign and the basic method of sweeping has never been changed. Since the city of Alexandria is the second largest city in Egypt, street sweeping is important work in order to maintain the city's appearance and prestige with long tradition and the proper conditions as a tourist city.

1) Subject Streets and Frequency of Sweeping

(1) Subject Streets

The basic principle of street sweeping in Alexandria is that all the paved streets should be subject to sweeping. Almost all the streets in the Mid, Gomrok and West Districts are, in fact, now subject to sweeping. In the East, Montazah and Ameriya Districts, the ratio of streets subject to sweeping are low since many of them are not paved (S.R. Tab. 1-5-1).

S.R. Tab. 1-5-1 RATIO OF STREETS SUBJECT TO STREET SWEEPING

District	Ratio of Streets Subject to Sweeping (%)
Montazah	30
East	70
Mid	99
Gomrok	95
West	100
Ameriya	35

(2) Frequency of Sweeping

In the main streets, sweeping is generally carried out once a day. In some cases in the commercial areas, additional sweeping is carried out during the night. For streets other than the main streets, sweeping should be carried out once a day in principle. But, the principle of sweeping once a day is not necessarily kept for minor streets, due to a shortage of sweepers.

2) Situation of Street Sweeping

All street sweeping work is carried out manually and an area or street(s) are given to each sweeper for sweeping.

There are two categories of streets for sweeping. One consists of the main streets and the other consists of the streets off the main streets. Main streets are those of trunk roads connecting different Districts and streets which are important for traffic within the districts. The rubbish collected by sweeping along these main streets appears to generally qualify the description of street rubbish. The rubbish along the minor streets. The work of the sweepers in these minor streets is the collection of the solid waste which is deposited at places other than the collection points.

In the case of sweeping along the main streets, the collected rubbish is taken into a push cart and is then brought to a communal container. In the minor streets, however, the collected rubbish and solid waste is taken to the collection points by green buckets.

3) Organization and Management System

(1) Organization

The overall management of street sweeping work is the responsibility of the supervisor of each district's General Cleansing Division. Day-to-day instructions, however, are given by inspectors at the District Cleansing Offices.

Street sweepers are attached to these District Cleansing Offices and receive their daily instructions there. Two street sweepers and a work master form a team responsible for a designated area or street(s).

(2) Management and Supervision

The basic management system of street sweepers is to check their work attendance by sub-district inspectors and to check the content of their work by inspectors and work masters. The results of these checks are reported to the general supervisors, who in turn report to the Chief of the District concerned. In addition, inpsectors are appointed for each District and they monitor the situation of the sweeping work in the sub-districts.

An inspector for each sub-district is also appointed by the Follow-Up Department of the Governorate and these inspectors are responsible for monitoring the situation in their sub-districts.

On the employment of a sweeper, an agreement is made and the sweeper pledges neither to enter a building in order to collect waste nor to sort out the waste.

(3) Sweepers

As shown in S.R. Tab. 1-5-2, the total number of sweepers is 1,668. The ratios of sweepers to the District populations are 1 in 1,200 in Middle District and 1 in 1,500 - 2,700 in other districts. Middle District has the highest number of sweepers and Montazah District has the lowest. There is a shortage of sweepers in all the Districts and the total number of sweepers additionally required for the six Districts is nearly 1,700.

Many women also work as sweepers and their ratio is 15-20% in each District. The age distribution of these sweepers is not really known although the ratio of relatively old sweepers is 50% or more in Montazah and East Districts.

At S.R. Tab. 1-5-3 shows, the fixity of these sweepers is quite weak, possibly due to their low wages.

S.R. Tab. 1-5-2 NUMBER OF STREET SWEEPERS

District	Population 10^3 A	Area km^2 B	No. of Sweepers C	Shortage of Sweepers D	Total No. of Required Sweepers E	A/C	A/E
Montazah	356	108.6	130	400	530	2.74	0.67
East	666	19.4	436	600	1,036	1.53	0.64
Middle	719	10.9	586	400	986	1.23	0.73
Gomrok	306	4.5	175	150	325	1.75	1.06
West	506	19.0	267	120	387	1.90	1.31
Ameriya	107	105.5	74	15	89	1.45	1.20
Total	2,660	267.9	1,668	1,685	3,353	1.59	0.79

S.R. Tab. 1-5-3 RESIGNATION OF STREET SWEEPERS

District	Present Number	Annual No. of Resignation	Rate of Resignation
Montazah	130	(65)	50
East	436	29	7
Middle	586	(176)	30
Gomrok	175	40 to 50	23 to 28
West	267		30
Ameriya	74	12	16

4) Equipment

Theree types of push carts are used, i.e. two-barrel push carts, metal push carts and wooden push carts with respective capacities of $0.11m^3$, $0.3m^3$ and $1.0m^3$.

These carts are distributed based on the street conditions and the sex of the sweeper. Sweepers are responsible for their own carts and keep them in the streets of their own work area.

When the carts break down, they are sent to the Central Garage for repair. Most failures are related to wheels and axes.

5) Actual Conditions of Sweeping Work

(1) Hours of Work

Work starts around 6:00 - 6:30 a.m. and ends around 2:00 - 2:30 p.m. In some commercial areas, etc. there is a night shift from 3:00 - 8:00 p.m. The morning work actually starts one hour before the commencement of collection work.

(2) Work Method

A survey on the actual work method and its procedure was carried out. The common method of sweeping the main streets is to sweep the rubbish on a pedestrian way to a carriageway and then to collect all the rubbish, where the pedestrian way and carriageway is clearly separated.

In case of minor streets, sweeping is carried out regardless of pedestrian ways or carriageways. When the rubbish reaches a certain amount, it is put into a green bucket and taken to a collection point.

(3) Work Assignment

The length of the street(s) assigned to sweepers varies from District to District, but in general is thought to be 500 - 1,500m. No standard exists to designate either the length or size of the area per sweeper.

The reason why an assigned length is sometimes as short as 500m is two: (i) the length was traditionally decided and (ii) many sweepers are aged people.

(4) Reloading Method

A reloading haulage method is employed by the regular collection channels for solid waste in two ways and street sweeping work is affected by these. The container method, one of these two collection methods, pays no particular attention to coordinating with collection times. In case of the open collection point method, problems may arise where the waste accumulates after collection if the time of the collection is not properly coordinted.

6) Measures for Inhabitants

Appeals are made to inhabitants in each district through a cruising car speaker for the inhabitants not to throw away rubbish onto streets. The effect of these appeals, however, is questionable as all districts consider them to be ineffective except Middle and West Districts which say that it is 50% effective.

Law 129/1982 permits the authorities to fine anyone throwing away rubbish onto the street.

7) Work Conditions

(1) Tools

Apart from cart, the only tools supplied to sweepers are brooms and green buckets. In addition, sweepers must prepare their own tin plate sheets to scoop the rubbish.

(2) Outfits

As no official outfit is supplied, sweepers must work in their own clothes which in general are of a rather shabby condition. Neither gloves nor shoes are provided.

(3) Work Environment

As sweepers use their hands to load rubbish onto the push carts or into the green buckets, a sanitary problem exists.

No specific instructions are given concerning the safe conduct of the work, such as a method of lifting up things, the provision of safe sweeping routes (in view of the direction of traffic and crossing streets), etc. Additionally, no shower facilities at the Cleansing Offices are provided for sweepers and the sweepers are responsible for their own health.

1.5.2 Solid Waste Collection

Solid waste collection is carried out by three organizations, i.e. the District authorities, ADS and Zabaleen. The District authorities and ADS employ the same personnel and equipment.

1) Actual Conditions of Services

(1) Service Area

80% of the total population of Alexandria receive solid waste collection services by either the District authorities, ADS or Zabaleen. The non-served area are found over three fourths of the population of the Montazah District, a recently developed area, and a half of East District.

(2) Collection Frequency and Collection Points

In principle, the District authorities, ADS and Zabaleen carry out collection services once a day. In some of the commercial areas, however, two collections are carried out, once in the morning and once at night.

With regard to the collections by the District authorities, generators may be obliged to take their solid waste a long distance to a collection point, especially when a communal container is provided. In the case of open collection points along the streets where collection vehicles run, additional points may be spontaneously made if the distance to the nearest point is too far. The solid waste at these unofficial points is taken by the street sweepers to the nearby collection points.

In short, the distribution of the collection points seems to be not based on the carrying distance from the household to collection point. The distribution density and mode is different in each district.

In case of ADS, they provide a collection service closer to the inhabitants. They whistle as a sign of their arrival in front of a building and move deeper into the minor streets.

Zabaleen may even go inside buildings to conduct door-to-door services.

2) Collection Methods

(1) Collection by the District Authorities

All the Districts are divided into 37 collection areas. The criteria for this division varies from District to District. In Ameriya District for example, each area responds to one collection vehicle. West District is divided into very small areas. Each collection area is provided with a Cleansing Office which is used as a base for sweepers and collection assistants.

Both the container collection method and the open collection point method are employed.

a. Container Collection Method

The container collection method is employed in all the Districts. The container capacity is about $2m^3$, corresponding to nearly 0.7 tons of solid waste. Each container can serve some 1,600 people when the quantity of solid waste generated per person is assumed to be 440g/person/day.

Although container collection method is applied in all the Districts of Alexandria, these containers are provided only in main streets due to the accessibility of the large collection vehicles.

Therefore, some areas, such as the Ibrahim area in Middle District, etc., have no containers.

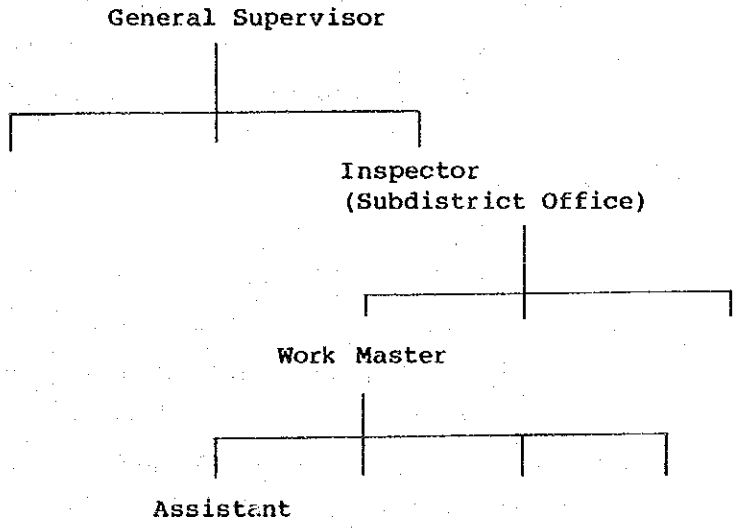
The total number of containers is about 1,300 and their distribution is shown in S.R. Tab. 1-5-4.

S.R. Tab. 1-5-4 DISTRIBUTION OF CONTAINERS

	Number of Containers	Storage Capacity	Solid Waste Quantity	Number of Container Collection Vehicles	Number of Collectable Containers based on Working Capacity of Vehicles
Montazah	401	281	225	5	72
East	342	293	350	11	360
Middle	273	191	382	11	288
Gomrok	90	63	183	7	216
West	168	117	165	6	180
Ameriya	30	21	50	2	72
Total	1,301	966	1,356	42	1,188

* Vehicles out of order have been excluded.

** It has been assumed that 12 containers are collected in one trip.



S.R. Fig. 1-5-2 MANAGEMENT SYSTEM

b. Open Collection Point Method

In the Ibrahim area, collection points were observed some 30 - 40m apart along the streets. These points are spontaneous and not the official collection points authorized by the District authority.

Most of the solid waste observed at these points is loose although some of it is in vinyl bags. Since a strong wind often blows from the sea, it may well disperse the solid waste, thus putting an additional burden on the street sweeping.

In addition, it is often seen that household waste, etc. and rubbish collected by the street sweepers is discharged at these points right after collection.

In the Moharan Bey area, where the container collection method is employed, unofficial collection points can be observed due to the long distances. The present distribution of containers may have necessitated the provision of these collection points. As these unofficial collection points have become an established fact, the authority is obliged to employ a different method from container collection to dispose of the solid waste accumulating at these points.

(2) Collection by ADS

The collection services by ADS are carried out by District vehicles and personnel. No regular collection method exists. Solid waste from a shop may be collected individually and a whistle may be used to announce the arrival of a collection vehicle in a residential area. People will then take their own solid waste to the vehicle and assistants will load it. Waste left behind by the District authorities may also be collected.

(3) Collection by Zabaleen

Donkey carts or trucks are used for the collection services by Zabaleen. Zabaleen may also perform door-to-door collection even inside buildings.

3) Equipment Used by District Authorities

(1) Types and Number of Vehicles

S.R. Tab. 1-5-5 shows the number of collection vehicles by their types. Out of 188 vehicles, 51 (27%) are not in good conditions.

S.R. Tab. 1-5-5 NUMBER OF COLLECTION VEHICLES

Type	Total	Fit	Unfit
Container Collection Vehicle			
Truxmore	42	33	9
Compactor Vehicle			
Fiat (84) Leach	51	42	9
Rotary Compactor Vehicle			
Fiat Mince	6	2	4
Large Disposal Vehicle			
Isuzu, Fuso, Mitsubishi, Nissan	45	39	6
Small Disposal Vehicle			
Mazda, Daihatsu	44	21	23
Total	188	137	51

(2) Current Capacity for Solid Waste Collection

The collection capacity of the vehicles depends on the number of trips they can make a day and on their loading capacities. District authorities working hours are 7 hours from 7:00 a.m. to 2:00 p.m. The time required for the collection and haulage of solid waste can be divided as follows:

A: Time required to move from the garage to the collection area (including time to drop into sub-districts)
B: Loading time in the collection area (including moving time)
C: Time required to move from a collection area to a disposal site
D: Unloading time at a disposal site
E: Time required to move from a disposal site to a collection area
F: Time required to move from a disposal site to a garage (last trip)

The time consequently required for waste collection is, therefore, determined by the following formula.

$$H = [A + S(B + C + D) + (S - 1)E + F] \times$$

S: Number of trips

: Time margin coefficient (given as 1.2)

A - F are determined based on the survey results and the topographical map. The number of trips of each vehicle was also determined by using A - F. The resulting collection capacities are shown in S.R. Tab. 1-5-6. When these capacities are compared to the solid waste quantities in summer in all Districts except Montazah, the capacity exceeds the actual quantity generated. However, if a fluctuation of waste quantity to be generated is taken into account, only the Ameriya District appears to have adequate capacity to deal with any situation.

S.R. Tab. 1-5-6 QUANTITY OF SOLID WASTE TO BE GENERATED IN SUMMER AND COLLECTION CAPACITY

District	Collection Capacity X	Quantity of Solid Waste Y	$\frac{Y}{X}$
Montazah	200	225	1.13
East	450	350	0.78
Middle	480	382	0.80
Gomrok	310	183	0.59
West	300	165	0.55
Ameriya	190	51	0.27
Total	1,930	1,356	0.70

Note: The calculation of the collection capacity is based on vehicles in a good (fit) condition.

(3) Situation of Vehicle Operation

S.R. Tab. 1-5-7 shows the number of vehicles operating during District collection hours between September 15 and September 22. The operation rate was approximately 50% against the number of vehicles and against vehicles that were considered to be fit the rate was 66%. The average number of trips per vehicle was 2.6.

S.R. Tab. 1-5-7 SITUATION OF COLLECTION VEHICLE OPERATION
(during Districts' Collection Hours)

District	Number of Vehicles	Vehicles in Operation during District Collection Hours	Average No. of Trips per Day	Average No. of Trips per Vehicle
Montazah	17	10.6	10.6	1.6
East	30	20	65.4	3.3
Middle	35	25.6	75.5	2.9
Gomrok	23	15.6	40.6	2.6
West	21	14.0	25	1.8
Ameriya	11	48	11.6	2.4
Total	137	90.6	234.7	2.6

Based on the record of disposal sites

4) Organization and Management System

(1) Organization

Various organizations are involved in the execution of solid waste collection by the District authorities.

The necessary functions and organizations in relation to solid waste collection work are summarized as follows:

S.R. Tab. 1-5-8 FUNCTION AND ORGANIZATION OF SOLID WASTE MANAGEMENT

Item	Contents
Finance	Financial Affair Division of the Governorate is in charge of all financial matters
Employment	Worker Affair Division of the Governorate is in charge of employing officers. Worker Affair Department of the District is in charge of employing workers.
Purchase of Equipment and Materials	Workshop Division of the Governorate purchases vehicles and Purchase and Contracts Materials Department of the District purchases green buckets, push carts, etc.
Repair	Vehicles are repaired by the Central Garage of Workshop Division of the Governorate and simple maintenance work such as tyre exchange, oil exchange, etc. are carried out by the District Garages which are branches of the Workshop Division.
Vehicle Purchase Plan	The Vehicle Purchase Plan is prepared by the Workshop Division. The Chief of the District and not the Follow-up Department of the District is responsible for the planning of collection areas, collection methods, etc.
Management	District Cleansing Division gives daily instructions to vehicles and assistants concerning the areas to be collected from and the routes to be followed.
Labour Management	District Cleansing Division is in charge of recording workers' attendance.
Supervision	Supervision of the collection services is carried out by the Follow-up Department of the District and the Follow-up Cleansing Division of the Follow-up Department of the Governorate.

In ADS, the collection organization is unified with the Cleansing Department of the District except the management section which is responsible for the collection of charges, sales of plastic bags and the payments for workers.

(2) Management System

The organization of the Cleansing Division of the District in view of solid waste collection is shown in S.R. Fig. 1-5-2. A general supervisor performs various work, including the allocation of vehicles and the patrol of the main streets. The daily work of Montazah District's general supervisor is described below as an example.

Daily Work of General Supervisor

7:00- 8:00	Instruction of the allocation of vehicles at the garage
8:00- 9:30	Patrol of the main streets
9:30-10:00	Instructions on problems at sub-district Cleansing Offices
10:00-15:00	Administrative work Dealing with complaints (1-3 times a month)
15:00-15:30	Instruction on the provision of sweeper assistants at sub-district Cleansing Offices
15:30-	Back to the office. Instruction of the allocation of collection vehicles

An inspector patrols the collection spots after giving instructions to the sweepers and allocating assistants to the collection vehicles at sub-district Cleansing Offices in the early morning.

A work master gives concrete instructions concerning the sweepers and informs the drivers of any problems for collection. He then patrols the streets on a bicycle.

(3) Personnel

S.R. Tab. 1-5-9 shows the number of personnel employed in each district. There are 400 assistants in all, 3.2 persons per vehicle. The quantity of collected solid waste, excluding the waste collected by ADS, per assistant varies from the highest figure of 2.31 tons/person in Middle District to the lowest figure of 1.38 tons/person in East District, showing an unbalanced volume of work in the different districts.

S.R. Tab. 1-5-9 TOTAL NUMBER OF CLEANSING STAFF AND LABOURS IN ALEXANDRIA GOVERNORATE

	Budget in the Governo-rate	General Super-vision	Inspec-tor	Work Master	Both	Sweep-er	Assist-ant	Other	Total
Montazah		1	6	17	17	144	39	14	238
East		1	9	27	20	351	83	14	505
Middle		1	8	33	20	560	117	45	784
Gomrok		1	3	18	15	251	76	23	387
West		1	10	22	20	248	60	25	386
Ameriya		1	9	10	16	74	25	15	150
Total	7,170	6	45	127	108	1,678	400	136	2,450

	Driver	Car	Assistant/ Car	Assistant/ Population (10^3)	*Ton/ Assistant	Assistant/ Population
Montazah	11	15	2.6	0.110	(1.9)	2.74
East	23	23	3.6	0.125	1.38	1.53
Middle	33	33	3.5	0.163	2.31	1.23
Gomrok	24	24	3.2	0.248	1.99	1.75
West	21	21	2.9	0.119	2.09	1.90
Ameriya	10	10	2.5	0.233	1.56	1.45
Total	122	126	3.2	0.152	(1.95)	1.59

* Collected by District Authority 1984.9

5) Survey on the Actual Conditions of Solid Waste Collection

A survey was conducted in Middle District on September 24 and 25 while following collection vehicles in order to understand the collection hours, collection points, road conditions, work behaviour and work efficiency. Although the survey results are currently being compiled, S.R. Tab. 1-5-10 gives the results on work efficiency.

S.R. Tab. 1-5-10 EFFICIENCY OF COLLECTION VEHICLE

		Leach	Truxmore	Large Dump T.	Small Dump T.
Collected Waste Quantity (tons)	A	12.2	25.3	4.9	1.2
Collection work time (minutes)	B	1,110	880	696	138
Working hours (minutes)	C	2,100	2,100	1,680	-
Net - E	B/A	91	35	142	115
Total - E	C/A	172	83	343	-

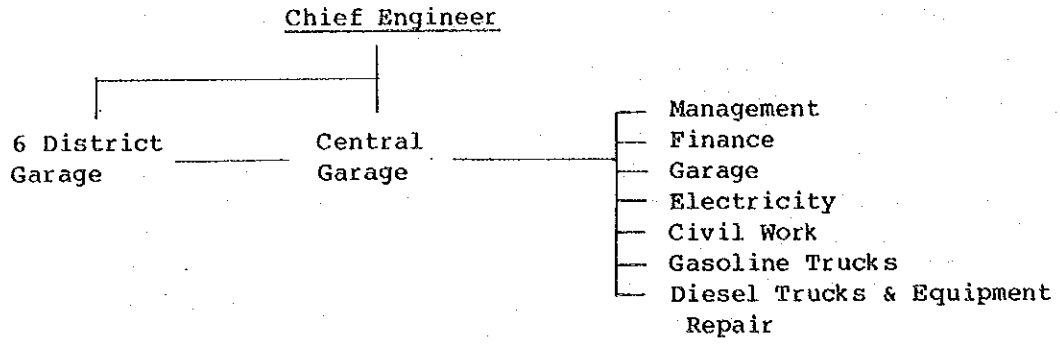
6) Maintenance and Control of Collection Vehicles

(1) Maintenance and Control System

The purchase of vehicles and their maintenance/control are carried out by the General Workshop Department which is a separate organization from the District's Cleansing Division or the Follow-up Department of the Governorate.

This General Workshop Department is a local branch of the Ministry of Housing and is independent to the Governorate or the District in terms of its administrative structure. The Department's major responsibilities are (i) the repair of vehicles, (ii) the purchase of vehicles and the preparation of the Purchase Plan and (iii) civil work (manufacture of parts, desks, etc.)

The organizational structure of the General Workshop Department consists of one central garage and six local garages. The central garage has six sections.



S.R. Fig. 1-5-3 ORGANIZATION OF GENERAL WORKSHOP DEPT.

(2) Manpower Management

It is not easy for the Department to recruit skilled labours and engineers due to the insufficient salary. In fact, several engineers often leave for more attractive job.

The Workshop Department has not organized training system and only on-the-job training is conducted.

(3) Maintenance

Although corrective maintenance is conducted in the District garages, preventive maintenance has not been introduced. The Central Garage distributes maintenance guidelines to the engineers of the District garages when new vehicles are delivered. Although the District garages are considered to be responsible for preventive maintenance, a sufficient number of mechanics are not allocated to carry out this responsibility. In addition, since preventive maintenance is not established as a part of the regular work, it is considered that preventive maintenance has not been put into practice.

All General Supervisors of the Follow-up Cleansing Divisions in the Districts point out the shortage of spare parts allocated to the District garages.

7) Collection Quantity

The collection quantity of solid waste by the different collecting bodies is given in S.R. Tab. 1-5-11, based on the survey on the collected solid waste quantities at disposal sites during September 16 to September 22 and the estimated collection quantity by Zabaleen.

S.R. Tab. 1-5-11 QUANTITY OF COLLECTED SOLID WASTE BY COLLECTING BODIES (SEP. 16 TO SEP. 22)

District	District Authority	ADS	Zabaleen	Total
Montazah	81	5	26	112
East	114	58	45	217
Middle	270	102		372
Gomrok	151	32		183
West	125	22		147
Ameriya	39	8		47
Total	780	227	71	1,078
%	72.4	21.1	6.5	

1.6 Processing

1.6.1 General

Of the solid waste generated in Alexandria, the waste collected by the District authorities and ADS is directly transported to disposal sites where it is dumped to fill in the land. The solid waste collected by Zabaleens is mostly transported to Zabaleen garbage stations where it is sorted out for goods of value. Most of it is then sold to farmers.

The only functioning processing facilities are, therefore, the Zabaleen garbage stations where manual sorting is carried out.

1.6.2 Processing Facilities

(1) Zabaleen Refuse Stations

Table 1-6-1 and Fig. 1-6-1 give the names and locations of the 5 Zabaleen refuse stations in the City. The current activities in these stations are described below.

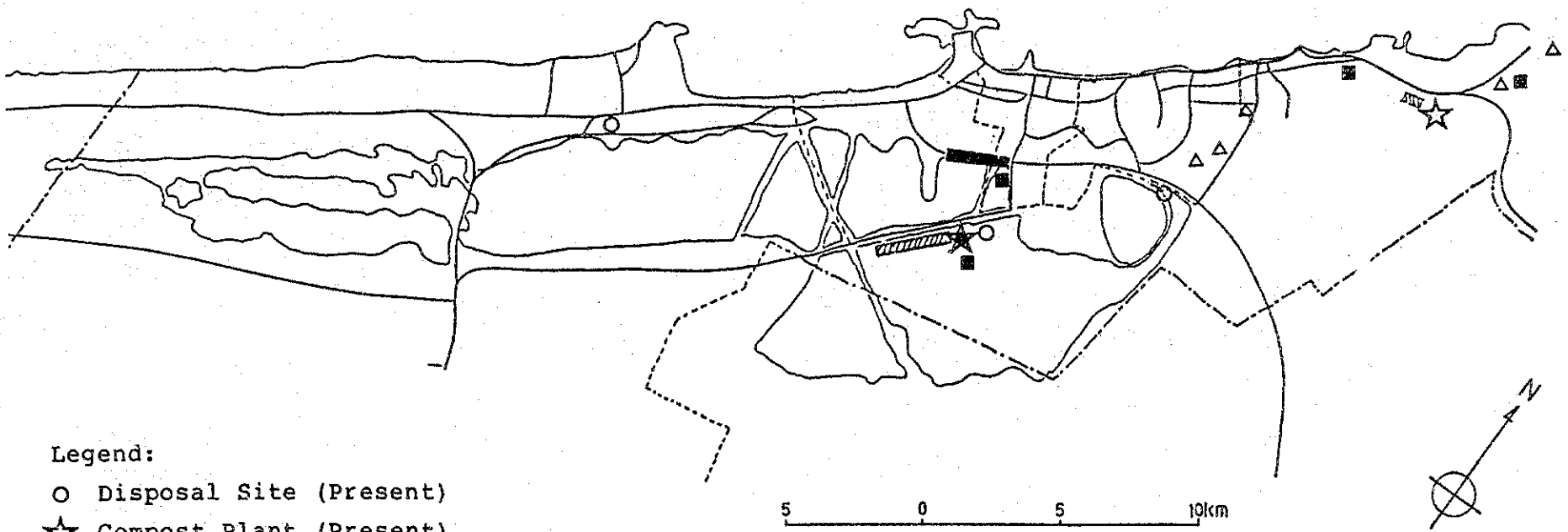
(1) Manual sorting is carried out.

(2) Although the materials that are sorted out are usually common to each station, those actually sold vary from station to station.

(3) The waste sold to farmers is, in essence, the domestic waste itself except at a few stations. Obstacles such as plastic sheets, etc. are inadequately removed and at certain stations the farmers themselves sort out the waste.

(4) The method of disposal for the remaining waste is unknown.

(5) Sorting and making of compost are conducted in open spaces, thus creating an unhealthy environment. The Abou Kir Refuse Station in particular is quite unsanitary, as it is located right next to houses and sewage water tends to accumulate.



Legend:

- ○ Disposal Site (Present)
- ☆ Compost Plant (Present)
- ★ Compost Plant (Planned)
- ▨ Disposal Site (Planned)
- ● Incinerator (Past)
- ■ Disposal Site (Past)
- △ Zabaleen Disposal Site (Present)

Fig. 1-6-1 LOCATION OF DISPOSAL SITE AND PROCESSING FACILITIES

Table 1-6-1 Zabaleen Refuse Stations

Name	Location	Areas (Approx.)	Remarks
Abu Qir	Montazah D. Abuqir		
Sea	East D. Ard El Mofty	700 m^2	
Baharaiya	East D. Bahraiya		
Moharam Bey	Middle D. Moharam Bey		Belong to Middle D.
Ard El Mofty	East D. Ard El Mofty		Illegal

Table 1-6-2 Processing Plants

Name	Location	Capacity	Remarks
Incinerator	Montazah D. Abu Qir		Not operated
Abis Compost	Abis N1	10 t/h	Under construction

(2) Old Incinerator Plant

This incinerator plant is located in Montazah District and the surrounding area was formerly the disposal site for Montazah District. However, It is not currently used for dumping of waste, as waste has accumulated even on the access road.

(3) Compost Plant

Using a loan from the World Bank, the construction of a compost pilot plant is currently underway at Abis, which is the southern part of the Middle District. It will have a processing capacity of 10 tons/hour and operation is expected to commence in January, 1985 for the purpose of evaluating composting system for one year.

1.6.3 Recycling Flow

Fig. 1-6-2 shows the flow of recycling. Glass bottles, news- papers, books, clothes and plastic bins, etc. are recovered at households as valuable items.

Sorting and recovery from solid waste are carried out both at the garbage stations by Zabaleens and at disposal sites by scavengers. Metals, paper, plastic, glass, bone, textiles and vegetables are revovered.

1.6.4 Recovery of Valuable Items at their Source of Generation

Table 1-6-3 shows the types and prices of those items recovered at households as valuable items.

Four different types of recovery exist and each channel has different items to be recovered and different places to be transferred.

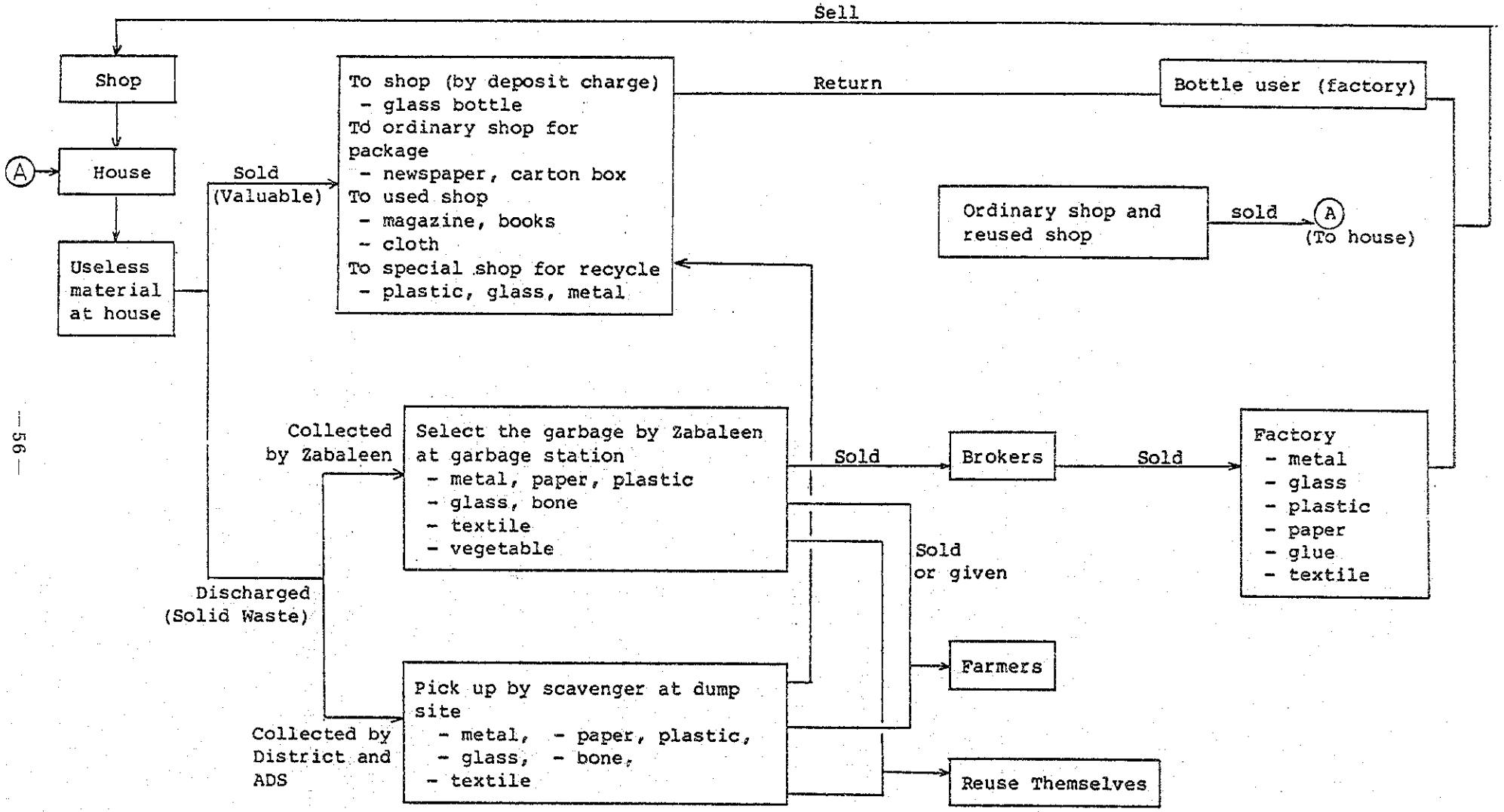


Fig. 1-6-2 RECYCLING FLOW

Table 1-6-3 Recycle Materials in the House (1)

Type	Item	Original Cost	Selling Cost	Sold to
Glass bottles	Beer	70 PT	50	Unbroken bottles are exchanged in order to buy the content. Broken bottles are sold by weight to special shops at 5PT/kg (white glass) and 2-3 PT/kg (coloured glass)
	Wine	1 LE	75	
	Coca Cola & Others	15 PT	10	
	Other bottles (ex. jams)		2 PT/kg	
Paper	Newspaper	5 PT	15-20 PT/kg	To grocery shops, green groceries, restaurants or other shops which use newspapers to pack their goods.
	Magazines	20-30 PT	15-25 PT/kg	Magazines and books can be sold to second-hand book shops to resell them for lower prices.
	Books	-	10-20 PT/kg	
	Carton Boxes	-	15-20 PT	Sold to shops such as grocery shop, etc. as packaging material.
Clothes	Shirts Others	-	-	The price depends on whether the condition is good or not. Can also be sold in a special market in Attasina and Manchia. If condition is bad, can only be sold by Zabaleen.
Metal	Copper Buckets & Water pipes Iron (water pipes) Lead (sewage pipes) Aluminum (Dishes, etc.)			It can be sold by kgs to special shops. Also can be sold to special shops by kgs. Iron is the least in price while lead is more expensive than iron and copper.
Plastics	Buckets Bottles		3 PT/kg	Sold to special shops.

Recycle shops are gathered at following places.
1) Allatin Market
2) Mansheiya Market (used cloth shops)
3) Beside the Airport disposal site

Note: Sometimes Zabaleen buy the used goods from houses for chiep prices.

1.6.5 Compost Programme in Alexandria

The Follow-Up Department of the Governorate has a programme to construct a compost plant in each of the six districts. It is said that the designed total processing capacity is 1,800 tons/day (input volume).

A pilot plant is at present under construction at Abis with a loan from the World Bank and it is expected to start operation in January, 1985.

The following is an outline of the processing at this compost plant according to the document "The Market for Compost and Recovered Materials to be Produced by the Abis Composting Facility" (November, 1983).

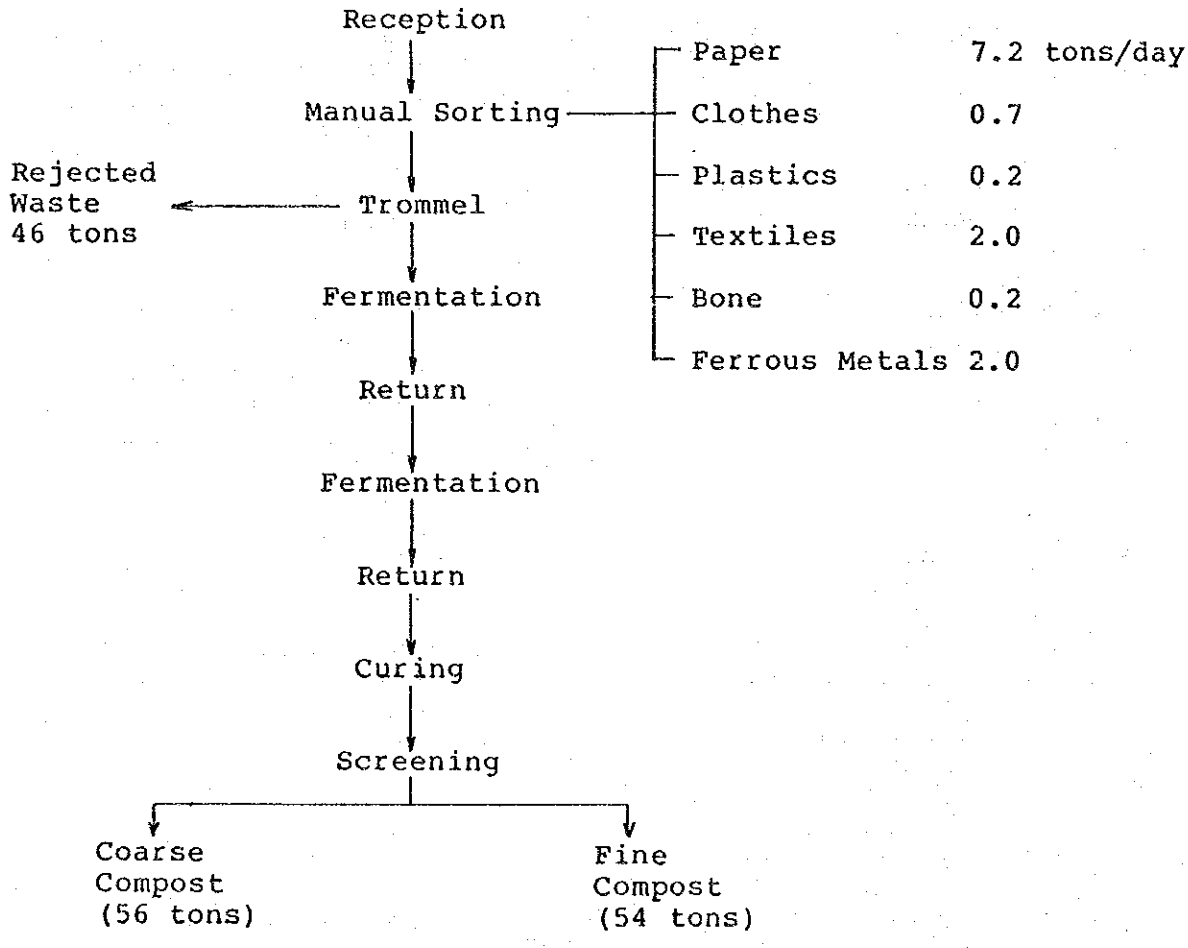


Fig. 1-6-3 PROCESSING SYSTEM AT THE ABIS COMPOST PLANT

Within the daily 160 tons of solid waste, 10 tons are manually sorted out as valuable items and 101 tons are transformed into compost. 46 tons (28%) are rejected as useless waste.

The ratio of end product against the raw amount of solid waste is fairly high at 63%.

The prices of compost are set at 11 LE/ton for coarse compost and 15 LE/ton for fine compost. Even if all the compost is sold at these prices, the plant will still generate an annual deficit of 159,648 LE. In order for the operation to break even, the price of compost must be increased by at least 5 LE/ton.

The Governorate will supplement the deficit for the first two years and the price of compost is expected to increase in the future as the reputation of these compost products will then be established.

While the evaluation of this pilot compost plant will be made through its future performance, the Governorate is currently preparing the construction of the next plant which will have a production capacity of 300 tons/day.

1.7 Final Disposal

1.7.1 General

There are three dump sites being used in September 1985. No dump site satisfys the conditions required as a sanitary landfill, that is, the traditional open dump is applied to the final disposal in Alexandria at present.

The spontaneous combustion often occurring at the dump sites is causing the volume reduction of waste and the life extension of the disposal site. However, as the result of field survey on the environment shows, the air pollution in and around the present dump sites has reached an alarming level, and blowing solid waste, malodor, insect and rodent infestation and the attraction of wildlife are also observed. Therefore, it is desired to change from the method currently used to the sanitary landfill method.

The situation of solid waste disposal in the Governorate of Alexandria is shown in Fig. 1-7-1. Most of the approximately 1,000 tons/day solid wastes collected by the District authorities and ADS gfo to the three dump sites, Awayed, Moharam Bey Square and Gate No. 8 Dump Site for open dumping. A small portion of this waste is either sold to farmers or is simply dumpted onto open spaces. Solid waste collected by Zabaleen is disposed of after ssorting.

Solid waste that is not collected in areas where adequate collection services are unavailable is simply dumped into swamps, open spaces (for example, the sites of demolished buildings) and public open spaces such as canals, etc. In newly developed residential areas where collection services are inadequate, swamps tend to appear due to the lack of a sewage system and solid waste is often dumped into these swamps causing an unsanitary situation for the surrounding area.

Waste such as industrial waste, etc. generated by the private sector is mostly transported to one of the three dump sites jointly controlled by the Governorate and the District.

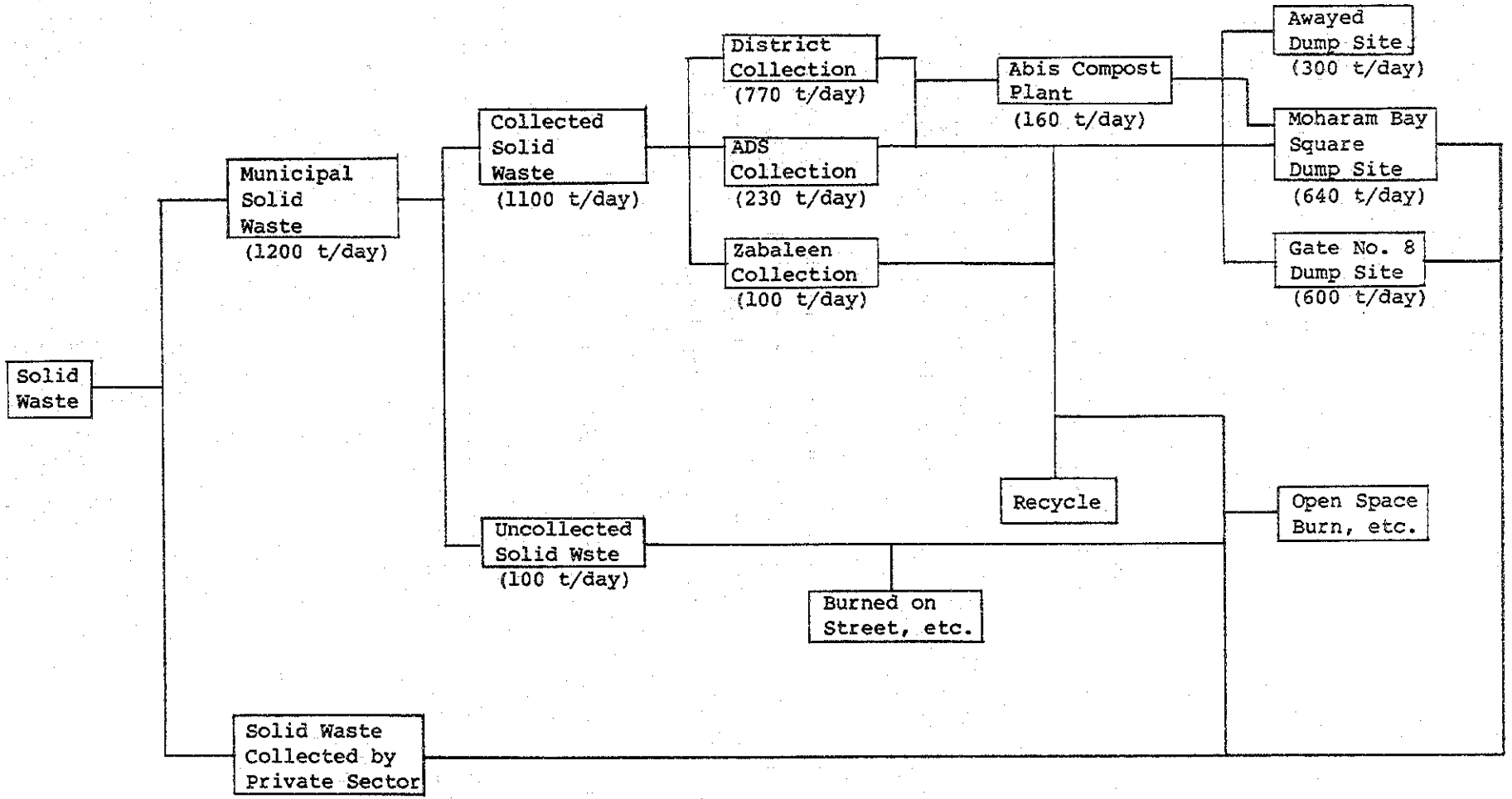


Fig. 1-7-1 FEATURE OF SOLID WASTE DISPOSAL (September, 1985)

1.7.2 Haulage frequency and type of solid waste hauled

1) Haulage frequency

A survey was carried out to investigate haulage frequency at the Airport and Gate No. 8 Dump Sites for the period of September 15 - September 22, 1984. As the study period was at the end of summer the survey results seem to represent the usual situation of haulage. The results of the survey are given below.

(a) The average haulage frequency is 283 trucks/day at the Airport Dump Site and 35 trucks/day at the Gate No. 8 Dump Site.

(b) The weekly fluctuation of the frequency is shown in Fig. 1-7-2. The range of fluctuation is rather small over the week. The peak day is not a day following holiday (Saturday), but Tuesday. The peak fluctuation coefficient is 1.12.

(c) The hourly distribution of the transport volume at the Airport Dump Site is shown in Fig. 1-7-3. The peak time is 11:00 - 12:00 AM. The number of the vehicle trip during the peak hour shares, in average, 12.7% of the daily trip numbers. This figure varies from 12.3% to 14.5% daily.

2) Type of solid waste hauled to disposal sites

Apart from the solid waste that is collected and transported to the dump sites by the Districts' Cleansing Divisions and ADS, the following types of waste are also sent to the disposal sites.

(a) Sewage sludge

(b) Solid waste of private companies, including industrial waste

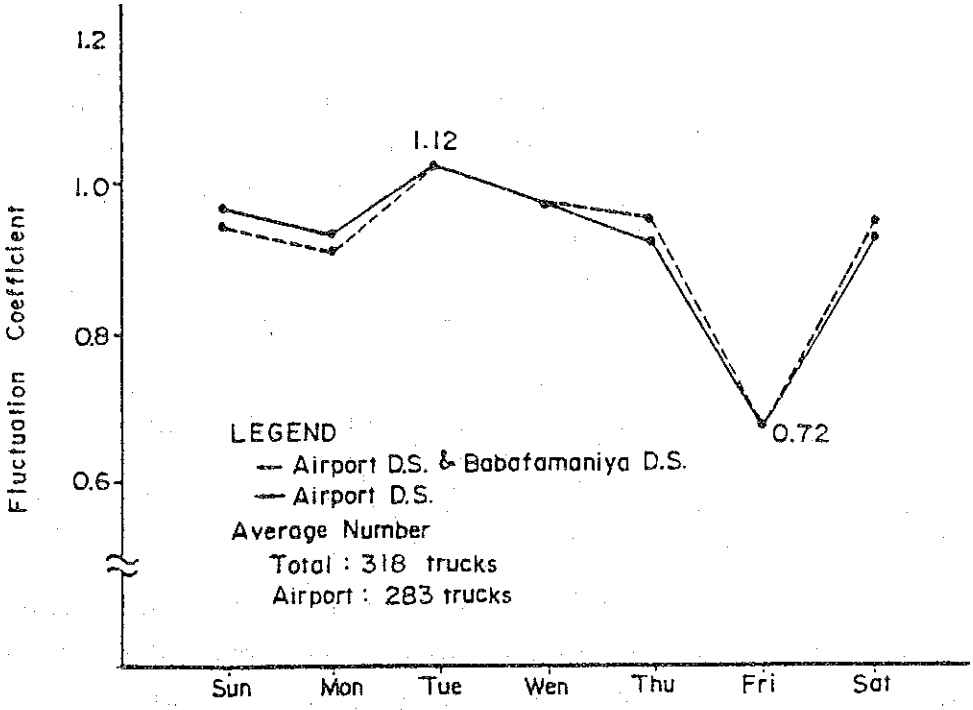


Fig. 1-7-2 WEEKLY FLUCTUATION OF TRUCK NUMBER

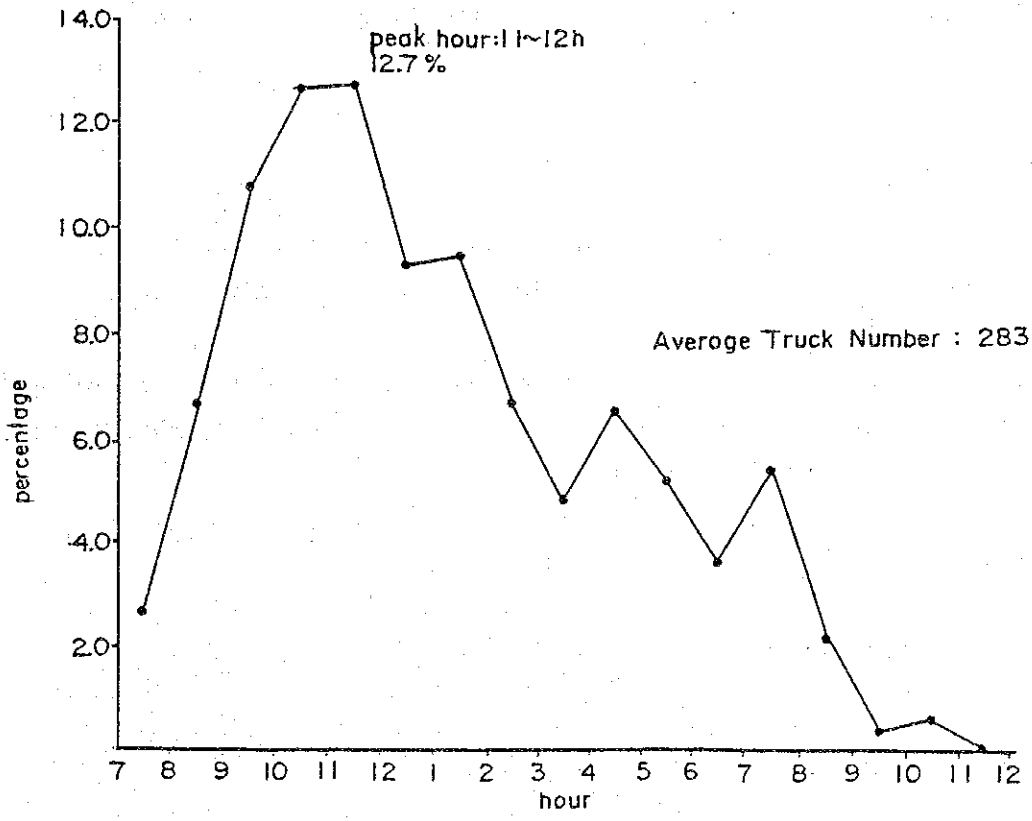


Fig. 1-7-3 HOURLY DISTRIBUTION OF THE TRUCK NUMBER COUNTED AT AIRPORT DISPOSAL SITE

1.7.3 Dump site inventory

Dump site inventory survey has been carried out in November 1984 and September 1985 the cooperation of the Egyptian counterparts. The result of the inventory survey is summarized in Tab. 1-7-1. Location of dump site is illustrated in Fig. 1-7-4.

1) Present Dump Site

The brief information on the 6 present dump site is described a to f.

a. EL Maharaquah Dump Site

The dump site is located in the agricultural land. When it was opened for dumping, the open air burning always occurred because of traditional open dumping. The smoke of burning did damage to the crops of surrounding agricultural land. Then the dump site was often closed by the farmer by force. The close of it made lack of disposal site in Montazah District, specially in Abu Air and El Mamoura. Therefore, Islah dump site was used as an exception. it is strongly required to apply sanitary landfill method in this site.

b. Islah Dump Site

This dump site is not specialized as a public dump site. Because of no other dump site in the Montazah District, it was used as an exception.

According to the instructions of the Follow-up General Administration and the Secretary General and complain of the WAKFS Directorate, the operation in it was stopped from August 1985.

The site was unused agricultural land before.

c. Awayed Dump Site

The Site is located in the marsh just beside the Awayed Bridge in the East District. The solid waste of the East and part of Montazah is disposed in it from July 1985. Although the size of it not measured yet, this triangular land is approximately the area of 15,000 m^2 (250m*200m*150m).

d. MBSDS (Moharam Bey Square Dump Site)

This dump site was a part of the Lake Meryut. It is in the Middle District and opened in November 1984. It was closed from 10th of June to 8th of July. The detailed feature is mentioned later.

e. Abis Dump Site

This is specialized by the Follow-up Department as an emergent dump site. Therefore it was used for the period of time when the MBSDS was closed. The site is a borrow-pit of the bank embankment and a depression along it.

f. Gate No. 8 Dump Site

This dump site is used by the Ameriyah and part of the West District from 1982. Formerly it was a quarry remains. Since disposed waste are always burning naturally, it can be used over the life expectancy.

2) Previous Land Use of Dump Sites

Concluding previous land use of past and present dump sites, from the inventory survey, it can be said that it has the following tendencies according to districts.

a. Montazah and East District

Dump sites were small depressions and unreclaimed agricultural land.

Tab. 1-7-1 DUMP SITE INVENTORY (September, 1985)

	Name	Location	Area (ha)	Owner of Land	Land Use			Period of Operation		Approximate (m3) Landfill Volume	
					Past	Present	Future	From	To	Landfilled	Remaining Capacity
PAST	EL HALAKAAT	Montazah District	1.3	Governorate	Marsh	Open Space	Main Road in the district	1970	1984	not available	0
	EL GEZERAH	East District	1.5	Governorate (past) Private (present)	Marsh	Residential Area	-	1985	1976	not available	0
	KAHARABET EL REEF	Middle District	4.1	Governorate	Part of Lake Maryut	Open Space	Garage and Workshop	1977	1982	not available	0
	MOHARAM BEY EL KABARI	Middle&West District	248.7	Governorate (past) Partly Private (present)	Part of Lake Maryut	Factory and Warehouse	-	before 1952	1977	not available	not available
	AIRPORT	East District	10.8	Governorate	Drainage Canal	Dump Site	Residential Area	1982	1985	250,000	0
	ARD EL MOUZ	West District	26.0	Governorate (past) Private (present)	Marsh	Residential Area	-	1952	1963	not available	0
	EL METRAS	West District	16.0	Governorate (past) Private (present)	Marsh	Residential Area	-	1979	1981	not available	0
	EL MAX	Ameriyah District	4.1	Ameriyah District	Marsh	Public Park	-	1979	1981	not available	0
PRESENT	EL MAHARAQAH	Montazah District	1.0	Directorate of Wakfs	Unused Formland	Dump Site	Not Decided	1974	Operating	20,000	0
	AWAYED	East District	1.5	Governorate	Marsh	Dump Site	Not Decided	1985	Operating	14,000	91,000
	MOHARAM BEY SQUARE	Middle District	52.8	Governorate	Part of Lake Maryut	Dump Site	Public Park & Residential Area	1984	Operating	90,000	925,000
	ABIS	Middle&West District	16.0	Governorate	Drainage Canal	Dump Site	Not Decided	1983	Operating	60,000	260,000
	GATE NO. 8	Ameriyah District	1.4	Governorate	Quarry of Lime Stone	Dump Site	Not Decided	1982	Operating	not available	112,000
SUSPENDED	ISLAH	Montazah District	2.3	Directorate of Wakfs	Unused Formland	Unused Space	-	not available	not available	5,000	30,000
	EL ASAFRA KEBLI	Montazah District	19.8	Private Sector	Quarry of Soil	Unused Space	-	1970	1983	15,000	579,000

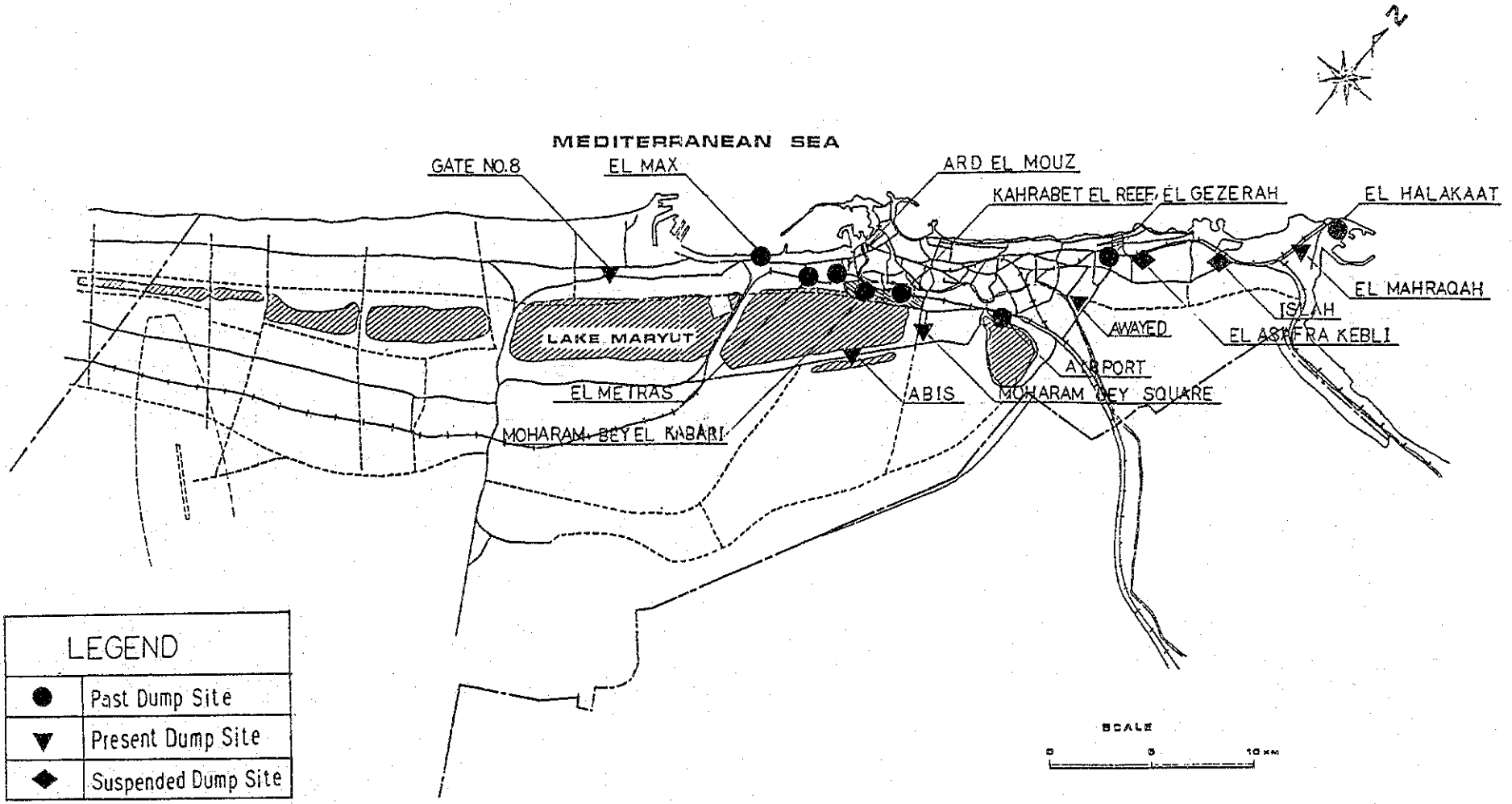
b. Gomrok, Middle and West District

Those were mainly part of the Lake Maryut.

c. Ameriyah District

Only quarries remains are used.

S.R. Fig. 1-7-4 LOCATION OF DUMP SITE



1.7.4 Life expectancy of existing dump site

1) Capacity

No topographical and cadastral survey has been done except field reconnaissance. In order to estimate the capacity of the existing dump site, the following methods are adopted.

(a) Dump site areas are defined on the existing map by approximation.

(b) A dump site area is divided into landfilled and remaining area on the map. Each area is measured by planimeter.

(c) Approximate average depths are decided by eye-measurement in the site.

The capacity of the existing dump site in September 1985 is shown in Tab. 1-7-2. The table also shows the capacity for landfilled waste in the case of sanitary landfill with covering soil.

2) Life expectancy

In order to estimate the life expectancy of the existing dump site, the following assumptions are adopted.

(a) The unit weight of landfilled waste without any treatment and compost rejects are 0.8 ton/m^3 and 0.6 ton/m^3 respectively.

(b) All of the municipal waste generated in Alexandria is landfilled in the dump sites including compost rejects and vacationer waste.

(c) The final disposal volume in 1985 is 587,000 m^3/year.

(d) The coefficient of equivalent volume of the combusted waste in the field is 0.3 ton/m^3.

(e) In case of open air burning continuing, the final disposal volume in 1985 is 151,000 m^3/year.
(1,293 ton x 365 day + 360 ton x 90 day = 504,000 ton/year
504,000 ton x 0.3 ton/m^3 = 151,000 m^3/year)

The life expectancy of the existing dump site (E) is estimated for the following cases.

Case 1; Sanitary landfill excluding suspended dump sites

$$E = 1,190,000 (m^3) \div 587,000 (m^3/year)$$
$$= 2.03 \text{ year}$$

Case 2; Open dumping with open air burning excluding suspended dump sites

$$E = 1,388,000 (m^3) \div 151,000 (m^3/year)$$
$$= 9.19 \text{ year}$$

Case 3; Sanitary landfill including suspended dump sites

$$E = 1,712,000 (m^3) \div 587,000 (m^3/year)$$
$$= 2.92 \text{ year}$$

Case 4; Open dumping with open air burning including suspended dump sites

$$E = 1,997,000 (m^3) \div 151,000 (m^3/year)$$
$$= 13.23 \text{ year}$$

Tab. 1-7-2 CAPACITY OF EXISTING DUMP SITE (As of August, 1985)

	Name	Dump Site Area (ha)	Approximate Remaining Area for Landfill (ha)	Approximate Average Depth (m)	Approximate Capacity (m3)	Rate of Cover Soil	Volume of Covering Soil (m3)	Capacity for Landfilled Waste (m3)
Present (Used presently)	El Maharaqah	1.0	0	0	0	-	-	0
	Awayed	1.5	1.3	7	91,000	1/7	13,000	78,000
	Moharam Bay Square	55.2	46.2	2.0	925,000	1/7	132,000	793,000
	Abis	16.0	13.0	2.0	260,000	1/7	37,000	223,000
	Gate No. 8	1.4	1.4	8.0	112,000	1/7	16,000	96,000
	Sub-Total	82.0	-	-	1,388,000	-	198,000	1,190,000
Suspended (Not used at present)	Islah	2.3	2.0	1.5	30,000	1/7	4,000	26,000
	El Asafra Kebli	19.8	19.3	3.0	579,000	1/7	83,000	496,000
	Sub-Total	22.1	-	1	609,000	-	87,000	522,000
Total		104.1	-	-	1,997,000	-	285,000	1,712,000

1.7.5 Site Slection and Land Acquisition

Proper site selection of disposal sites are one of the most important factor in final disposal. There is neither well-organized site selection nor any section in the Follow-up General Administration which should execute it and acquire a land for disposal. Consequently, there is no land acquisition plan for final disposal site in Alexandria.

Therefore, a request to acquire a land for disposal is sent to the Secretary General from districts concerned and the Followup when a new site is required.

Basically it is free from charge to acquire a land for disposal, if the land belongs to the Government or Governorate. Because it is considered as a public use. Consequently, any private land was not used as a dump site up to now.

In order to acquire a public land as a disposal site, it is required to get permissions from governmental organizations concerned by the Secretary General.

1.7.6 Incoming Solid Waste Amount

In order to find incoming solid waste amount, hauled waste amount survey was executed at the El Maharaqah, Airport and Gate No. 8, Dump Site.

The quantity of solid waste at the each dump sites was calculated, based on the number of vehicles coming to the sites and their respective loading weights. Tab. 1-7-3 and Tab. 1-7-4 show the loading weights of the different vehicles and calculation results of solid waste amount hauled from each district to disposal site, respectively.

Tab. 1-7-3 RESULTS OF VEHICLE SCALE SURVEY

	Load Capacity m^3	Loading Weight Ton	Density kg/m^3	Average Loading Weight Used ton
Truxmore*	16.1	6.35	395	6.5
Fiat*	11.2	6.27	560	6.3
Leach*	9.1	4.00	460	4.0
Isuzu	(6.0)	2.44	407	2.5
Mitsubishi	(6.0)	2.68	447	2.5
Nissan	(4.0)	1.62	405	1.2
Daihatsu	(3.5)	1.17	334	1.2

* Compactor vehicle

Tab. 1-7-4 SOLID WASTE AMOUNT HAULED FROM EACH DISTRICT TO DUMP SITES

(ton/day)

District	Day/Month 16/9	17/9	18/9	19/9	20/9	21/9	22/9	Average
Montazah	45.6	43.3	41.4	41.6	49.8	37.8	60.1	45.7 (85.7)
East	191.6	166.9	187.2	163.2	189.1	105.2	202.1	172.9
Middle	376.8	384.7	386.5	427.2	340.7	342.3	345.6	372.0
Gomrok	201.0	186.8	196.8	195.7	223.6	82.5	194.9	183.2
West	150.6	125.4	158.2	146.2	154.5	121.1	171.1	146.9
Ameriya	50.3	46.3	52.7	50.1	36.6	42.3	53.3	47.1
Total	1015.7	953.4	1022.8	1024.0	994.3	732.2	1027.4	967.1 (1007.1)

Note: * Survey was carried out at the Airport, Gate No. 8 and El Maharaqah Dump Site, from 16 to 20 Sept., 1984.

* Disposal quantity hauled by the ADS is included.

* ( ) shows the reference value; some 40 ton/day of waste discharged from Montazah district is disposed at the other places.

1.7.7 Present problems and improvement subject

1) Present problems

a. Environmental damage

The final disposal method employed currently in the City of Alexandria is the open dumping method. This method has an advantage of not only being the cheapest but also resulting in volume reduction if open air burning is done. However, the environmental survey has made it clear that open air burning brings about air and smoke pollution to the surrounding areas.

Moreover, open dumping is not desirable from public health and scenic and touristic point of view because of insect and rodent infestation, blowing paper, the attraction of wildlife, the release of gas and odors, and ugly scene.
Considering that the Moharam Bey Square Dump Site, which opened in November, 1984, is situated along the Drinking Water Canal and just close under the El Nazha Airport. The block of birds and fires are specially dangerous to airplanes.

Therefore, there is a sense of urgency to take an effective measure to improve the situation. In addition, a service water contamination prevention measure is required to protect the water canal along this dump site from waste littering, pleachate and blowing wastes.

b. Difficulty in securing a disposal site

In the past few years, Alexandria has experienced a rapid increase in population, naturally accompanied by an expansion of urban areas to the neighboring farmlands, Lake Maryut and southwest desert. With the promotion of Egypt's national policy of increase in food production and desert greening efforts, greening of the southwest desert is progressing at a rapid pace. Under these conditions, securing a suitable dump site within Alexandria is proving to be even more and more difficult in recent years due to the following reasons:

Owing to the fact that the urban area of Alexandria is very densely populated, there is virtually no suitable open space which can be designated as a dump site.

- Because land use for Lake Maryut has already been fully assigned as salt fishery, fish culture, farms, industrial zone, etc., its additional assignment as a possible dump site would be difficult. In addition, rules and regulations concerning the prevention of environmental pollution of the lake have been getting ever more strict every year.

- Use of unused farmlands such as El Maharaqah and Islah as dump sites has been strictly controlled by law, and even temporary use of these lands as dump sites is difficult at present situation.

- Since the desert in Alexandria Governorate has already been assigned to be used mostly as farmlands, there is virtually no open desert with no future plan of use.

c. Lack of plan for final disposal

Up to the present day, since securing a dump site has been always relatively easy, final disposal in Alexandria has not been well planned. However, in order to deal with the above-mentioned problems described in the items (a) and (b) which are getting serious, in the future it would be important to propose a final disposal plan including a final disposal method as well as the securing of land. Furthermore, undisciplined use of the former dump site as may be seen in Moharam Bey El Kabri is not desirable from the view point of effective use of the limited land resources. Considering the fact that there is not much open space such as public parks especially in the urban area of Alexandria compared to other cities, the effective use of former dump site is advisable.

c. Dump site and residential area in close proximity

The dump site in Alexandria is not isolated from the general residential area. Thus, frequent entry into dump sites by scavengers and domesticated animals are hindering the dumping operation. Their entering into sites is dangerous. There were many houses constructed in the close proximity of the Airport Dump Site without building permits. This phenomenon is common with other dump sites. This is proving to be a serious impediment to dumping as well as to the future utilization of this dump site. in addition, their living circumstance was very bad from viewpoint of public health.

2) Improvement subject

This section presents the course of solution of the problems as explained in the above section.

a. Environmental damage

To improve the environmental condition deteriorated by open dumping, it would be advisable to switch over to the sanitary landfill method from the present open dumping method. When converting to the sanitary landfill method, however, a number of problems as described below must be resolved.

- Disposal cost of sanitary landfill is considerably higher than the cost involved in open dumping. This is because landfill disposal requires landfill equipment, disaster prevention facilities, cover material, etc.

- Furthermore, open air burning would not be done in sanitary landfill. This will result in no reduction of volume. Life expectancy of disposal site will be shortened to one fifth of that of open dumping with open air burning. (Refer: 1.7.4)

- Therefore, securing new disposal sites becomes necessary.

Sanitary landfill is desirable, however, it would be advisable to cope with the situation after careful consideration of the budget scale of solid waste management of Alexandria and availability of future disposal sites.

b. Difficulty in securing disposal sites

Measures to cope with the increasing difficulty in securing a dump site are described as follows:

- To secure and to use unused open space found in the Governorate as disposal sites. For example, quarries of limestone and soil for brick, the Mahmudia canal and other unused canals.

- Re-examine the possibility of using unused farmlands as temporary disposal sites.

- To reduce the waste volume through the intermediate treatment facilities such as compost, incinerator, shredder, etc.

c. Reinforcement of planning capability for final disposal

In order to reinforce planning capability for final disposal, the followings are recommended.

- To establish a planning section within the General Follow-Up Department.

- Planning section shall prepare plans for:

  . Securing dump site
  . Final disposal facility
  . Landfill operation
  . Land use of the reclaimed land

d. Dump site and residential district in close proximity

Dump sites should be protected from entry by scavengers and domesticated animals which pose danger and impede dumping operation. Also, it is undesirable to have private dwellings in close proximity to dump sites. Therefore, immediate provision of fence to enclose dump sites would be desirable. On the other hand, to discourage squatters, it would be desirable to enforce legal procedures prohibiting new dwellers from settling near dump sites. Efforts must be made to secure dump sites away from residential area.

1.8 Social Conditions

1.8.1 National economy

1) General

Since 1976/77, the Egyptian economy has registered a sustained improvement. It is now emerging as a free market economy entering the eighties with growth rates as high as 10% annually. The performance is staggering given the high rate of population growth (close to 3%) and the associated expenditure of LE 2.0 billion on subsidies which have provided the framework for social stability and maintained a peaceful and productive working environment. Yet, Egypt must create some 500,000 jobs each year and import as much as 40% of its food requirements to meet a population growing by more than a million every year. World inflation has been problematic to Egypt's economic management, but it has been successfully contained in the vicinity of 12% domestically.

The below table shows the GDP, population and labor force during 4 years from 1980.

Tab. 1-8-1 GDP, POPULATION & LABOR FORCE

	1980	FY 1980/81	FY 1981/82 Pre-liminary	FY 1982/83 Target
GNP (Market prices - million LE)	16,384.0	19,209.8	21,592.0	23,357.0
GDP (Market prices - million LE)	15,884.0	18,373.8	20,726.0	22,562.0
GDP (Factor cost - million LE)	15,639.0	15,929.9	19,639.4	21,316.0
GDP Per Capita (LE)	376.0	429.0	471.0	501.0
Population (million)	42.2	42.8	44.0	45.0
Labor force (million)	11.0	11.3	11.7	12.1

Source: Economic Trends Report, September 1982, American Embassy

Though the Egyptian economy has been growing very rapidly, there exist many problems to be solved. In his first major statement of policy, President Mubarak outlined seven main points to set the economy back on its feet.

(1) Reducing consumption and increasing savings for use in productive investment.

(2) Building more houses.

(3) Ensuring that subsidised commodities go only to those for whom they are intended.

(4) Eliminating extravagance in both the government and private sector.

(5) Solving the shortage in skilled labour.

(6) Revising the import policy.

(7) Improving public sector industries.

2) Gross domestic product (GDP)

The GDP of Egypt in the fiscal year 1982/83 reached LE 21,316, of which the commodity sectors share 54.3%, the distributive sectors 26.8% and the service sectors 18.9%.

Tab. 1-8-2 SECTORIAL DISTRIBUTION OF GDP IN THE FISCAL YEARS 1982/83

Unit: million LE

			(%)
A. COMMODITIES SECTORS	11,584.9		(54.3)
a. Agriculture		4,000.0	(18.8)
b. Industry & mining		2,905.8	(13.6)
c. Petroleum		3,547.6	(16.6)
d. Electricity & public utilities		126.8*	(0.6)
e. Construction		1,004.7	(4.7)
B. DISTRIBUTIVE SECTORS	5,703.8		(26.8)
a. Transport & communications		916.0	(4.3)
b. Suez canal		719.6	(3.4)
c. Trade, finance & insurance		3,828.7	(17.9)
d. Hotels & restaurants		239.5	(1.2)
C. SERVICES SECTORS	4,027.3		(18.9)
a. Tourism		-	-
b. Housing		401.0	(1.9)
c. Other services		3,626.3	(17.0)
G.D.P. at factor costs	21,316.0		(100.0)

* Only available figures are for electricity sector.

Source: Ministry of Planning

3) National budget

The national budget for the fiscal year 1984/85 is LE 18,277 million, which is 12.6% increase over the previous fiscal year budget, LE 16,231.

Tab. 1-8-3 NATIONAL BUDGET FOR THE FISCAL YEAR 1984/85

Unit: million LE

			(%)
A. EXPENDITURE			
a. Wage (Chapter 1)	3,295		(18.0%)
b. Running expenditures (Chapter 2)	8,059		(44.1%)
c. Investment (Chapter 3)	4,865		(26.6%)
d. Subsidy	2,058		(12.3%)
Total (A)	18,277		(100.0%)
B. REVENUE			
a. Soverign revenue (taxes & customs)	7,647		
- Income tax		2,852	
- Customs		2,400	
- Consumption tax		1,600	
- Others		795	
b. Revenue from other sources	5,230		
Total (B)	12,877		
C. DEFICIT [(A - B)]	5,400		
- To be covered by local savings & foreign loan		4,200	
- Net deficit		1,200	

Source of information: Egyptian newspapers issued in September & October, 1984

The above-mentioned newspaper also disclose the 1984/85 budget amounts for the following organizations:

Unit: million LE

- Cairo Cleansing Authority 1.0
- Giza Cleansing Authority 0.81
- Alexandria Water Utility 40.0
- Cairo Water Utility 48.0
- Alexandria Cleansing 0.655 (according to other information source)

Note: The above-indicated amounts do not include wages.

4) Foreign debts

The total foreign debts have reached US dollar 16,645 million in the fiscal year 1981/82. This represents about 55% of the GNP of the same year.

Tab. 1-8-4 FOREIGN DEBTS IN 1981/82

Unit: million US dollars

A. MIDDLE & LONG TERM DEBTS	15,475		
a. Official debts		15,020	
- International organization			3,220
- Foreign government			8,777
- Supplier's credit			2,270
- Financing organization			753
b. Private debts		455	
B. SHORT TERM DEBTS	1,170		
TOTAL	16,645		

1.8.2 Subsidies

1) Subsidies in the Egyptian Economy

(1) History:

In Egypt subsidies have rapidly increased during the past 40 years. In 1945 in order to overcome the effects of World War II, the stated subsidies were LE 2 million. In the 1950s this figure developed to LE 6 million, reaching LE 50 million in the mid 1960s. In 1975 stated subsidies were LE 630 million. In September the government announced that for the 1984/85 budget the figure reached LE 2,058 million.

(2) Type of subsidies:

In addition to the above mentioned "stated" subsidy, subsidies appear in two other forms, as follows;

a. Implicit subsidies found in the governmental budget which are used for covering the difference in production costs and the prices specified for selling to consumers.

b. Hidden subsidies in the sale of some products that have a big exporting value when sold in international markets, such as petroleum.

(3) Total subsidies:

An estimate of the total amount for the three types of subsidies within the 1984/85 budget is approximately LE 5 billion. This figure, representing about 27% of the national budget, is equivalent to the total defecit in the national budget for the same year.

(4) Direct effects of subsidies:

There are basically two direct effects that result when applying the policy of subsidies, one being social and the other economical.

a. The social effect is found in the aim at helping low-income families.

b. At the same time realization of the social goal produces economic effects on the state's general budget, especially if the budget is suffering from defecits in payments, due to allocating large amounts to finance imports of subsidized goods from abroad. Furthermore the resulting defecit in the general budget effects the inflation rates in the national economy, which in the end negatively effects the same low-income families by inflation rates and rise in prices.

(5) Disadvantages of subsidies:

In addition to the above mentioned negative effect subsidies have on the low-income families sector which they were originally established for, other disadvantages are as follows;

a. The Egyptian economy has suffered for a long time from the system of double pricing. Having more than one price for the same product has lead to wasting the economic resources at the time when the state needs money to develop basic services such as water, sewage and transportation, at present in such a bad state that the citizens suffer daily.

b. Due to having more than one price for some goods, a black market has flourished for each commodity sold at prices less than its economic value. Consequently certain sectors of the society have grown rich due to application of subsidies, and in the process the state's treasury has lost a great deal of money for which it very much needs to decrease its defecit.

c. By 1970 the total subsidies for food goods had not exceeded LE 12.0 million, however in the past 10 years this figure has swelled to LE 2000 million (1984 budget). This growth is not due to natural factors such as increase in population or the levels of living, however it may be traced to the new consumption habits which developed from extravagence and waste, imitation and other bad habits.

d. The state financed the greater portion of the subsidies in the past by issuing more currency notes which are not met respectively with goods or services. This resulted in the increase in prices as well as inflation rates. In addition the government was unable to provide funds necessary for investment projects or spending on basic services and public utilities.

e. The application of subsidies negatively effects some units of the industrial public sector which are forced to sell their products at prices less than the economic prices prevailing in the market. This leads to decrease in these units' profits, increases their losses and gradually results in low productivity.

f. In many cases the subsidized goods produced are of low quality due to the fact that the consumer does not pay the actual prices.

g. In short, within the open-door economic policy applied in Egypt, subsidies may be considered the primary reason for the disturbances in wages and prices, and the untolerable gaps in income levels, low rates of production, substandard goods, fall in services levels, inrease in general budget burdens and defecit in the balance of payments.

(6) Riots and changes in subsidies policies in 1977:

In January 1977 the government adopted a policy of limitting subsidies in line with a general policy of improving the country's economy. However riots resulted and the government within 4 days of announcing its new policies retreated from implementing them.

Towards the end of 1977 much discussions were held centering on issuing financial aid from the government to low-income families and at the same time abolishing subsidies. These discussions led to the introduction of a new system of coloured ration cards under which low-income families, holders of red cards receive basic goods fully subsidized, while others, holders of green cards receive these goods half subsidized.

2) Subsidies in the various fields:

(1) The subsidies allocated for bread reach about LE 800 million per year. Egypt's total production of wheat covers its needs for only three months of the year and for the remaining nine months it is necessary to import wheat paying for it in hard currency. The loaf of bread is sold to the consumer for 1 PT, however actual costs are around 2.5 PT.

(2) LE 1.7 billion annually subsidizes wheat, sugar, flour, rice, tea, edible oil, butane gas, meat and corn.. a group considered as basic commodities.

(3) An example of subsidies on goods having negative influence are the LE 140 million that will be allocated to cigarrette factories in 1984/85 to cover their losses.

(4) Subsidies in agriculture are reflected in subsidizing the crop production requirements such as local and imported fertilizers, seeds, and agricultural plaster. They are also reflected in some agricultural services provided by the government to farmers such as participation in costs of combating cotton crop insects. Subsidies may also be indirect by reducing custom taxes levied on agricultural equipment and other

necessities for production. However subsidies in the agricultural sector are basically a means of compensating farmers for pricing their products at prices lower than their actual values.

(5) Agricultural subsidies represent 7% of the total subsidies. The government receives a subsidy of LE 389 for each feddan of cotton planted from the farmer (total return on one feddan of cotton in 1979 reached about LE 259 while according to world market prices the value was LE 648).

(6) On the other hand the ratio of subsidy to selling price for some food products during the period 1973 - 1979 was 211.5% for wheat, 79.2% for flour, 165.8% for lentils, 104.3% for rice, and 671.8% for frozen meat.

(7) The need for subsidies on food items can be understood from the fact that a study conducted in 1975 showed that families with incomes less than LE 2,000 annually spend about 64% of their income on food, while those families above LE 2000 spend only 34% of their income on food.

1.8.3 Utilities charging system

The present utilities charging system is as follows. Source of the information is the General Cleansing Follow-up Dept.

1) Water

Tab. 1-8-5 WATER CHARGE RATE

	FOR HOUSE	FOR OTHERS*
- The First 10 m^3 :	1.7 pt/m^3	10 pt/m^3
- Over 10 m^3 :	1.0 pt/m^3	10 pt/m^3

Note: "Others" include shops, factory and offices or any other parties except for houses.

2) Electricity

Tab. 1-8-6 ELECTRICITY CHARGE RATE

(1) For houses	
- The first 80 kwhs:	1.6000 pt/kwh
- The following 20 kwhs (from 80 to 100 kwhs)	1.8700 pt/kwh
- The following 150 kwhs (from 100 to 250 kwhs):	2.2627 pt/kwh
- Over 250 kwhs:	3.1104 pt/kwh
(2) Commercial offices and shops using 10 ampere	
- The first 75 kwhs:	2.0000 pt/kwh
- The following 25 kwhs (from 75 to 100 kwhs):	2.9255 pt/kwh
- The following 150 kwhs (from 100 to 250 kwhs):	3.1620 pt/kwh
- Over 250 kwhs:	4.8200 pt/kwh

Note: (1) In addition to the above-mentioned charges, users have to pay 0.2 pt/kwh as radio and television tax according to the amount of electricity consumption. The maximum tax is 9 pt (up to 45 kmh.)

(2) Any shops, offices and factory use over 10 ampere are charged as different rates, which differ according to voltages and other factors.

3) Telephone

Users pay the minimum charge of LE 24 per year. This includes 1.500 times of the inside city call. This amount is paid either at one time of in 4 times installments.

Available telephone lines are very insufficient. There are so many applicants on the waiting list that the average waiting period is 10 to 15 years. There are some applicants who have been waiting 20 years. At present, if applicants pay LE 1,000, the applicants may get telephone more quickly, but still it takes several months.

4) Propane gas

Propane gas contained in a cylinder (30 cm diameter, 50 cm high approx.) available at LE 0.65 from gasoline station.

Residents, however, buy propane gas from seller who pass streets for about LE 1.0.

(file b: quest 28a)

1.8.4 Employment situation in Egypt

1) General

In Egypt, employment is one of the big problems. Job opportunity is not sufficient enough to absorb all the potential Egyptian employees although the Egyptian government offers job opportunities more than it actually needs. Millions of Egyptians have been working outside Egypt: mostly in the neighborhood countries such as Saudi Abrabia and Iraq, etc. Remittance from the Egyptians working outside is ranked in No. 4 in the non-trade activity incomes in the international balance of payment.

In the recent years, over half million job seekers appear in the labor markets every year. Domestic employment has been increasing at steady 4% annually since 1980. It is estimated that there are about 14 million employees at present which is about 30% of the total population of Egypt.

2) Employment situation in public sector (government)

(1) Number of public sector establishments

In Egypt, public sector job opportunities are provided by the following establishments:

- 30 ministries and their relevant establishments.
- 125 authorities (of which 45 are public economic authorities and 80 are public services & independent authorities).

Although, there are only 933 thousand people working for the public sector in the fiscal year 1965/66, the number of has increased to millions in the fiscal year 1984/85, which represent about 25% of all the Egyptian manpower though much higher percentage of university graduates work for the government. (The above mentioned figures are accordings to the study made by the Scientific Research Academy & Public Mobilization Agency as quoted in the Egyptian newspaper dated on 7th December 1984.)

(2) Recruit and allocation of freshmen

The ministry of manpower and its provincial offices are responsible for recruit and allocation of new employees to each government establishments. In principle, those establishments have to accept what are allocated by the ministry.

In the Alexandria governorate, the personnel department is responsible for allocation of new employees to each department as well as to the 6 districts. Each district has its own committee responsible for allocation of freshmen to its departments.

(3) Characteristics of employment in public sector

The important characteristics of the employment in the public sector may be summarized as follows:

- Guaranteed job opportunity and long waiting period before recruitment
- Excessive overstaffing
- Low salary
- Un matchness of employees' qualification and type of job
- Women's participation in the work
- Job security & pension benefits which is one of the market distinction between the public & private sectors.

These points will be explained as follows:

a. Guaranteed job opportunity and long waiting period before recruitment.

The present Egyptian law allows any qualified Egyptians to get job in the public sector if they wish to work and apply for an employment and wait for certain period. This follows that employment opportunity of all the applicants are guaranteed provided they wait for certain period. As is indicated in the below table, all applicants have to wait 3 or 4 years before being recruited.

Waiting period before employment

	1984	1980
- University or high institutes graduates:	3 years	2 years
- Applicants with less qualification:	4 years	3 years

Note: Graduates of the faculties of medicine, dentist, pharmacy and engineering as well as those who wish to work as arabic teachers can get jobs without waiting at all.

As is shown in the above table, the waiting period is longer at present (1984) than before (1980). This is because the rate of increase in the number of applicants are greater than the rate of increase in the job opportunities in the government offices.

The applicants have no choice of selection of their favorite establishments. Sometimes, applicants are sent to other governorates offices. The applicants have to either accept the offer or refuse it. In the latter case, they will not have another chance again.

It is said that the percentages of job seekers who try to find jobs at the public sector are: 60% of university graduates and 40% of people with less qualifications.

During the waiting period, it is common for the applicants to get temporary works in private companies such as shops or restaurants.

b. Excessive overstaffing

Because of the government policy by which the governments recruit automatically all qualified applicants. Most of the government offices are excessively overstaffed. And this has been causing the following problems and situation:

1) Indivisual's small share of work (responsibility)
2) Overlapping responsibility
3) Complicated inspection and supervision system
4) Frequent delegation of personnel from one office to another
5) Existance of many employees who are on long leave

The above-mentioned points are explained the notes below:

Note 1) In March 1984, 10 freshmen joined the General Follow-up Dept. 6 of them joined the Follow-up Cleansing Section, the remaining 4 persons joined the Follow-up Site. It seems, however, total work volume of the department has remained the same as before.

Note 2) In the case an Egyptian wishes to get a passport or identification card, start a business, hold a supply card and apply for university entrace, etc., he has to go through a long procedure for collecting many signitures from officials in different authorities. Lack of one responsible body to issue such documents may be blamed on bureacracy and overstaffing.

Note 3) One street sweeper may be liable to receive direct instructions from district leansing personnel, district follow-up inspectors, inspectors of the General Follow-up Dept., Alexandria Health Directorate inspectors, utilities police members, and perhaps others. Also within the same unit, more than one inspector or supervisor may be covering the same subject.

Note 4) Delegation of personnel from one office to another is very common. For example, there are many personnels in the middle district office who were delegated from the Directorate (provincial office of ministry) of housing and utilities as well as from the central work shops.

Delegation is reported to a committee in the governorate. But, actually, there is not much control over the delegation business. Some of the delegated employees return to the original places, but some do not if they found the place comfortable.

Salary of delegated employees are paid from the original place.

Note 5) In the case of the Follow-up cleansing section. Out of 51 employees (most of them are inspectors), 10 inspectors have been on long leave.

In the meantime, it is said about 25% of the whole employees (16,000) of the Alexandria governorate are on long leave. Most of them are working outside Egypt. The average period of long leave is 4 years. There is no limit to the period. Some people take over 10 years of leave. The Egyptian law in force stipulates that the number of long leave taker should not exceed 25% of whole employees of a section. (like the Follow-up cleansing section).

During long leave, no salary is paid. When a long leave taker returns to his or her work, they, however, get salary increase and promotion as those who have worked continuously without taking long leave. Thus the long absent period is counted in the calculation of salary increase and promotion.

c. Low salary

Law salary is natural consequence of the over-employment. Private sector offers, in general, higher salary than public sector do. It is rather common for a freshmen (university graduate) to get LE 150 to LE 200 per month as a starting salary, while in the public sector establishments, a person with a same qualification get only LE 43 plus some kind of allowance. (LE 20 or so)

It is said many of people with higher qualifications are drained to private sector. But is also true that many Egyptians still wish to work for public sector because they offer health care and security after retirement which private sector do not yet provide.

For more information, please refer to the next section "Salary System for the Employees of Non-Private Sector".

d. Unsuitableness of employee' qualification and type of job

Due to obligatory primary education and free education from primary school till university, the number of blue collar type job seekers decreased, while the number of white collar type job seekers increased sharply in recent years, and many of them have to work in places as cooperative or general shop sellers. And many of graduates who studied engineering take up desk work that do not require engineering knowledge.

e. Women's positive participation in the work

Egyptian women are provided with completely equal opportunity of employment and equal salary standard as those for men.

The trade of working women has started in 1960's. At present, almost all the women work after finishing schools. Even after marriage and having babies, most women employees in the public sector continue their works; But this is not the case in the private sector as their work land is much heavier.

3) Sectoral distribution of employment

The below table shows the sectoral distribution of employees. Agriculture shares one third of the employment. Industry and mining employ one eighth of the labor force. 30% of the employees work for housing and other services.

Tab. 1-8-7 SECTORAL DISTRIBUTION OF EMPLOYMENT

Source: Ministry of Finance

Unit: thousand persons

	NUMBER	PERCENTAGE
COMMODITIES SECTORS	6,591.9	54.5
Agriculture	4,296.4	35.5
Industry & Mining	1,514.2	12.5
Petroleum	25.2	0.2
Electricity	68.7	0.6
Contracting	687.4	5.7
DISTRIBUTIVE SECTORS	1,859.0	15.3
Transport & Telecommunications	446.3	3.6
Suez Canal	18.9	0.2
Trade & Finance	1,393.8	11.5
SERVICE SECTORS	3,659.8	30.2
Housing	179.9	1.5
Services	3,479.9	28.7
TOTAL	12,110.7	100.0

1.8.5 Rank promotion system

1) Promotion method

Each establishment of non-private sector has certain number of positions or (seats) in each rank according to budget. Promotion to one step higher rank is possible only when there are some vacancy.

Rank promotion is based on both seniority order system and work performance evaluation system. The below table show the number of service years before promtotion as well as percentage of employees promoted according to work performance evaluation.

In principale, there is no discrimination by sex as regards to rank promotion.

Tab. 1-8-8 MINIMUM SERVICE YEARS BEFORE PROMOTION

PROMOTION TO	MINIMUM SERVICE YEARS BEFORE PROMOTION	% OF EMPLOYEES PROMOTED BY WORK EVALUATION
A	Not fixed	100 %
B	Not fixed	100 %
C	Not fixed	100 %
1	5 years	100 %
2	7 years	50 %
3	3 years	25 %
4	3 years	20 %
5	3 years	10 %

Note: A: First undersecretary of equivalent
B: Undersecretary or equivalent
C: General 1 manager or equivalent

It may be interesting to note that laws concerning requirements for rank promotion have changed from time to time. During the period 1960 to 1970, when the Law 46 article 22 was in force, promotion was made possible only for the employees who served 15 years or more in a rank. In the period

1968, 1969 and 1972 to 1975, when the Law 53 was in force, most of the employees with 3 to 6 years service in a rank got promotion to next rank. In 1975, when another law came in force, many employees got promotion.

2) Promotion according to educational qualification

Starting and reachable ranks differ according to educational qualification of employees as shown below.

Tab. 1-8-9 REACHABLE RANKS ACCORDING EDUCATIONAL QUALIFICATION

EDUCATIONAL QUALIFICATION	RANKS 6	5	4	3	2	1	C	B	A
University or High Institute				3 *	----------	----------	----------	----------	A *
Secondly school			4 *	----------	----------	----------	----------	C *	----------
Preparatory school		5 *	----------	----------	----------	2 *	----------	----------	----------
Primary or none	6 *	----------	----------	3 *	----------	----------	----------	----------	----------

Note: It is said that promotion up to the 2nd rank is not so difficult.

3) Ranks of personnel engaged in cleansing activity

The below table shows most common ranks (upper lines) as well as starting and reachable ranks (lower line) of the personnel who are engaged in the cleansing activities.

Tabl. 1-8-10 REACHABLE RANKS OF THE PERSONNEL

TYPE OF POSITION	RANKS 6	5	4	3	2	1	C	B	A
General Supervisor				*3-------*2					
			4*-------------------*1						
Inspector			4*-----------*2						
		5*-------------------------*1							
Work-master		5*----------*3							
		5*-------------------------*1							
Driver		5*----------*3							
		5*-------------------------*1							
Assistant & Sweeper	6*---------*4								
	6*----------------------*2								

Note 1: The upper lines show the ranks where most of personnel belong to.

2: The above-inspectors include both those belong to the district cleaning section and the general follow-up dept. All the other type of personnel belong to the districts.

4) Employees' work performance evaluation

(1) Evaluation method

According to the regulation in force, evaluation of employees' work performance is made once in 3 months by general manager of each department. However, in reality, yearly evaluation is common. Every employee is evaluated and classified into the 4 grades as shown below:

GRADES	SCORE RANGE
Excellent:	90 - 100
Good:	70 - 89
Normal:	50 - 69
Poor:	0 - 49

Actual evaluation is commonly done by middle class managers, and then smoothly approved by the department managers later.

Those who scored "poor" as an average of a year, is given a warning letter. If the employee got "poor" again in the following year, he would be fired.

On the other hand, those who scored "Excellent" for 2 consecutive years may be given a special salary increment as explained in the following section.

(2) Personnel affairs committee

In the Alexandria governorate, all the evaluation records of work performance are submitted to the Personnel Department. The record of the employees who were evaluated as excellent for 2 consecutive years are forewarded to the Personnel Affair Committee, through which meeting, the "excellent" employees may be given a special salary rise.

The members of the committee are appointed by the undersecretary of the governorate. At present, committee members comprise of:

- Governor
- Undersecretary
- Some of the district chiefs
- Director of the department of organization and management
- Director of personnel dept., who is responsible for preparation of meeting minutes
- Others

This personnel affair committee decides on not only the above-mentioned special salary increase and dismiss of employees but also deals with any matters related to personnel's promotion and incentive business. The committee has control over the same matter of the employees of the district office as well.

1.8.6 Salary System for the Employees of Non-private Sector

1) Salary rate

The below table show the salary system applicable to all the non-private sector employees; i.e. the employees of the following establishments:

(1) Central and local (governorate, district and village) governments

(2) Independent authorities such as Alexandria Sewage Authority

(3) Public sector establishment (in the narrow sense) such as factories and shops which belong to ministries

Tab. 1-8-11 MONTHLY SALARY AND YEARLY RISE ACCORDING TO DEGREE

Unit: LE

	MINIMUM	MAXIMUM	YEARLY RISE
A. First Undersecretary or equivalent	212		
B. Undersecretary or equivalent	135	202.666	6.25
C. General Manager or equivalent	120	192	6
1st Degree	90	174	5
2nd Degree	65	159	4 (5)*1
3rd Degree	43	134	3 (4)*2
4th Degree	33	101	2
5th Degree	31	77	1.5
6th Degree	30	62	1.5

Note 1.

*a: If the salary of the 2nd degree employee exceeds LE 73, yearly rise rate is LE 5 per month.

*b: If the salary of the 3rd degree employee exceeds LE 55, yearly rise rate is LE 4 per month.

Note 2.

If an employee has obtained a master's degree (MA) or Doctor (PHD) from a university, his or her salary increases by LE 3 and LE 5 respectively.

Note 3. Allowance for family support
If an employee has a wife, LE 2 is added, and another LE 2 for each child. The payments of the allowance stop if the wives or children die or children reach 21 years old or start working.

Note 4. Yearly rises take place in the beginning of fiscal year (1st July).

2) Allowance and incentives

The employees of independent authorities (the above item 2) and public sector establishments (the above item 3) receive the below-shown payments in addition to regular salary, while the government office employees do not.

(1) Allowance according to nature work
(2) Incentives for production
(3) Share of profit

Note: Source of finance for the above-mentioned allowance (item 1) and incentives (items 2) is the government budget.

It may sometimes happen that the total salary is doubled by receiving the above-mentioned additional salary.

3) Minimum salary

According to the law in force, the minimum rate of salary is LE 30 per month. In reality, however, this is rarely applied for the private sector employees.

4) Salary of women employees

In Egypt, there is no sexual discrimination in respect fo salary.

1.8.7 Personal income tax system in Egypt

1) Tax exemption limit

Tax exemption limit is as shown in the table below.

Tab. 1-8-12 TAX EXEMPTION LIMIT

		As of 1982
(1) Bachelor:	LE 720 /year	(LE 60/month)
(2) Married taxpayer without supporting:	LE 840/year	(LE 70/month)
(3) Married taxpayer with supporting:	LE 960/year	(LE 80/month)

2) Rate of taxation

Tax is imposed on any amount exceeding the above-mentioned limit according to the following rates:

Tab. 1-8-13 TAXATION RATE

			As of 1982 (EXAMPLE) IN THE CASE OF BACHELOR WITH LE 1,040/YEAR (LE 86.6/M)
- The first LE 40	:	2%	LE 0.8/YEAR
- The following LE 40 (from LE 40 - LE 80)	:	5%	LE 2.0/YEAR
- The following LE 80 (from LE 80 - LE 160)	:	10%	LE 8.0/YEAR
- The following LE 80 (from LE 160 - LE 240)	:	15%	LE 12.0/YEAR
- The following LE 80 (from LE 240 - LE 320)	:	18%	LE 14.4/YEAR
- Any amount over LE 320	:	22%	LE 0.0/YEAR
TOTAL			LE 37.2/YEAR
		=	(LE 3.1/MONTH)

As shown in the above table, in the case of bachelor with the yearly salary of LE 1,040 (LE 86.6 per month), he has to pay LE 37.2 per year or LE 3.1 per month as a personal income tax.

1.8.8 Pension, compulsory saving and health insurance

1) Rates of charges for pension, saving and health insurance

All the Egyptian employees and employers must pay the charges for pension, saving and health insurance according to the following rates (percent born to employee's salary):

Tab. 1-8-13 RATES OF CHARGES FOR PENSION, SAVING AND HEALTH INSURANCE

	EMPLOYEES	EMPLOYERS	TOTAL
- Pension :	10%	15%	25%
- Saving :	3%	2%	5%
- Health insurance :	1%	3%	4%
TOTAL	14%	20%	34%

Note:

(1) In addition to the above-mentioned charges, employees must pay income tax. (Refer to the quest 31 a for taxation rates.)

(2) All the Egyptian can have medical services free of charges at government hospitals, while private hospitals charge medical fee.

(3) All the savings may be received back at the age of 60 years wihtout interest.

2) Pension

(1) This is stipulated in the Law 79/1975 which was modified by the Law 25/1977.

(2) Employees of the both central and local governments (except for the employees of both factories and commercial shops of public sector) pay the charges to "General Authority for Insurance & Pension for Workers of Government and Administration, while all other employees pay the charges to "Authority of Social Affairs."

(3) Laborers are entitled to receive pension after 65 years old, while other workers receive after 60 years old.

(4) Amount of pension received by employees

a. Persons who served and paid the charges 36 years or more

80% of the average amount of salary received during the last 2 years.

b. Persons who served and paid the charges 20 years or more but less than 36 years.

Monthly amount = A x B - 45

Note: A. The number of years served and paid the charges
B. The average amount of salary received during the last 2 years.

c. Persons who served and paid the charges less than 20 years

They may get some money or their pension may be sent to their new work places.

Note:
(1) Minimum pension amount is LE 30/month
(2) A person may receive the pension until the end of life.
(3) In the case the person died:

i. His or her children may receive 50% of the pension, and the wife or wives receive the rest (50%), of which one eighth goes to the parents.

ii. If there are no children, the wife or wives may receive two third of the pension.

iii. If there are no wife, a child, if alone, can receive 2 thirds, while if there are 2 or more children, total pension to be received by the children is half of the pension.

iv. In the above-mentioned cases, wives may receive pension until next marriage, while children may receive until they start working.

1.8.9 Education

1) Education system

(1) School system

The Egyptian school system consists of the following:

	STUDY PERIOD	NUMBER OF SCHOOL (1980/81)
- Primary School :	6 years	12,120
- Preparatory School :	3 years	3,511
- Secondary School :	3 years	1,785
- University :	4-5 years *1	12 *2
- Military College :		

Note: *1 Study period of the students in the faculty of medicine is 7 years.

*2 In addition to the 12 universities, there is the American University in Cairo (AUC). The students of AUC have to pay tuition.

All curriculums of the first 12 years of school are prepared by the Ministry of Education, and all schools have the same curriculums.

Education in all levels is free of charge. There are however some private schools for those who wish to pay.

(2) Compulsory education

Compulsory education is applied for primary school. According to the World Bank report, 76% of the people who have reached to the primary school admission age have been to primary schools in 1980, while it increased to 85% in 1981/82 according to the Egyptian government statistics.

(3) Preparatory school

According to the Egyptian government statistics, 52% of the people who have reached to the preparatory school admission age have been to preparatory school in 1980.

(4) Secondary school

There are different types of secondary school as shown below:

- General secondary school
- Industry secondary school
- Commerce secondary school
- Agriculture secondary school
- Military secondary school

Students of the general secondary school have to choose one of the following courses when they start their 2nd year in the school.

- Mathematics course
- Science course
- Arts course

(5) University

15% of the people in the ages of 20 to 24 have been to universities in 1980 according to the Egyptian government statistics.

2) Illiteracy and educational qualification

The illiteracy rate was about 56% in 1976 as shown in the table below. The rate dropped to 53% in 1982.

Tab. 1-8-14 ILLITERACY AND EDUCATIONAL QUALIFICATION OF THE EGYPTIANS OF 10 YEARS OLD AND OVER

As of 1976

EDUCATIONAL STATUS	MALE NUMBER	%	FEMALE NUMBER	%	TOTAL	%
Illiterate	5,731,838	41.9	9,377,846	71.0	15,109,684	56.2
Able to Read & Write	3,839,489	28.1	1,696,179	12.8	5,535,668	20.6
Primary School Qualifications	1,398,073	10.2	732,649	5.5	2,130,722	7.9
Preparatory School Qualification	893,624	6.5	464,006	3.5	1,357,630	5.1
Secondary School Qualification	1,153,556	8.4	544,405	4.1	1,697,961	6.3
University and higher degree	446,414	3.3	128,726	1.0	575,140	2.1
Not known	214,217	1.6	281,310	2.1	495,527	1.8
Total	13,677,211	100	13,225,121	100	26,902,332	100

Source of Information: Statistic Year Book, August 1983 issued by the Central Agency for Public Mobilization and Statistics

1-8-10 Housing conditions

1) Extent of the problem

Housing shortage is one of the major problems in Egypt. It is said that the shortage is about 2 million housing units, for which construction costs are at least LE 20 billion.

In Cairo many people live in old dilapidated houses, cemeteries, and on building roofs. The situation is further aggravated by the annual migration of around 75 thousand rural areas inhabitants to the capital. This situation is common for all Egypt's major cities.

The population density for 1 square kilometer is highest at El Gomrok district in Alexandria, reaching 130,000 (1976 census). The average occupancy per room is 2.5 persons.

The housing conditions in the rural areas and villages are very poor. Many villages lack important utilities and the housing environment are in most cases unhealthy.

In 1976 the Minister of Housing explained that in Egypt 300,000 housing units must be renovated, of which 130,000 units are liable to collapse at any time. Indeed throughout the past decade many buildings, old and recently constructed, have collapsed causing much human and material losses. The Minister also stressed the need to build 100,000 units annually to meet the natural population growth.

Other problems related to housing are:
- poor workmanship in many buildings
- shortage in construction materials
- lack of skilled construction labourers
- delay or failure of provision of utilities to newly constructed buildings
- adverse effects arising from the laws controlling house rents

2) Housing regulations and their adverse effects

Consecutive laws and regulations were issued in 1952, 1958 and 1961 aiming at regulating the relationship between landlords and tenants, and controlling house rent rates. These laws and regulations, insuring the tenants of the life-long occupancy at fixed low rent rates, brought much benefit to many people. On the other hand, these laws and regulations brought about adverse effects explained as follows:

(1) Neglect of buildings

The rents fixed over 20 years ago have failed to cope with the the increase in prices due to inflation over the past years, hence the landlords receive very little money from the tenants. Consequently landlords cannot or fail to maintain or renovate their buildings. In addition they try various methods to evict tenants and demolish the building either to sell the land or to rebuild modern buildings and sell the apartments.

(2) New landlords' abstention from leasing

Due to low rents, new investors and landlords directed their attention to building for selling and not renting. This phenomenon of landlords hastening to make speedy profits and washing their hands off buildings once completed and all units sold, led to collapse of some new buildings due to cheating in materials use and not complying with engineering standards, or poor maintenance of buildings. Of course there are many buildings that were well constructed and subsequently maintained, but the prices of the apartments were much higher than the average-income people can afford.

(3) Inavailibility of cash liquidity (capital) for constructing units with the aim of leasing

This is due to the fact that this feild does not entice investment money, since the state has set a 7% interest on invested capital as a satisfactory profit. This appears to be unrealistic as banks offer higher interest, and there are other projects that can produce far better profits.

(4) Occupancy of multiple apartments

Many affluent families, while buying new apartments, maintain their old ones as the rents are so low they hardly effect the family's income. Although there are laws forbidding a person to own numerous units, they are not tight enough and can involve years in the law courts and much fees and expenses before an eviction ruling is passed.

(5) The presence of hundreds of incompleted buildings

Some landlords are driven by greed and a desire to wait for a while before selling units, in anticipation of increasing prices. This is a very big contradiction since at the same time there are very long lists of names of people waiting for economical or middle level units.

3) Government's efforts to solve the housing shortage problem

The government although aware of the problem, has only belatedly put strong emphasis on solving it comprehensively from all its angles. During the past 30 years the government was preoccupied with the turbulent political conditions of the Middle East region, with all its financial resources thrown into many wars. Some of its efforts are shown below;

(1) In the first two years of the government's 5-year plan (1982/83 - 1986/87), the government successfully completed 337.8 thousand units. This figure far exceeds the number of all the units constructed between 1970 - 1980.

(2) For the second year of the plan alone, 167 thousand units were constructed. Out of these 55% are economical units, 28% are medium, and the remainder are above-medium and high units.

(3) During 1982/83 the investments in the housing and utilities sector amounted to LE 721 million representing 13.2% of the total national investments. The share of the public sector was LE 38 million, equivalent to 5.2% of the total investments of this sector. This shows the significant role of the private sector in the feild of housing.

(4) In the figures released for the 1984/85 budget, investments for the housing and utilities sector are planned to be LE 4.8 billion.

(5) The government has established and runs the Egyptian Real Estate Bank. This bank was established in order to provide citizens with loans for construction of housing units, adding extra stories to existing houses, or renovating housing units. The bank has recently reveiwed many of its policies with the aim of attracting more citizens, and taking a more active role in solving the housing problem. Foremost of these policies was increasing the estimated land value on the basis of market prices, thus increasing the value of the loans possible. The bank also previously calculated the cost of 1 square metre of construction at LE 70, which has been subsequently increased to the more realisitc figure of LE 120 for economical housing. The bank has put no ceiling on loans operation, which are repaid over 25 years at an interest of 10.5%.

(6) Embarking on the construction of new communities as satelites, some of which to serve as bed towns for large cities, and others to be independant industrial communities. Examples of these are Tenth Ramadan City, Sadat City, El Salam City, etc..

(7) The government provides loans for societies formed by groups of people seeking housing units, and also by the different trade unions desiring to implement housing projects for their members.

(8) The government subsidizes important construction materials such as cement and reinforcement steel. With each building license issued a quota of the cement and rebars needed, according to the drawings and other conditions, are established and sold at subsidized prices. However it is necessary to add that these materials are usually not all immediately available, and in the interest of finishing construction quickly, the builder often must resort to the free market for purchase of most of his materials at much higher prices than the subsidized prices.

1.8.11 Employment, industry and commerce in Alexandria

The subjects discussed in all the preceeding sections in this chapter are those on the level of Egypt. But, the subject discussed in this section is that of Alexandria.

1) Sectoral distribution of employment

According to the 1972 statistics, nearly 300,000 persons have jobs in Alexandria, which represent about 14% (one seventh) of the total population in 1972, which is estimated as 2.1 million. The statistics shows that the manufacturing industries use 57.6% of the manpower, while the 23% work for commerce, restourants and hotels.

Tab. 1-8-15 SECTORAL DISTRIBUTION OF EMPLOYMENT IN ALEXANDRIA

As of 1972

TYPE OF BUSINESS	NUMBER OF EMPLOYEES	RATIO (%)
1. Manufacturing industry	172,418	57.6
2. Commerce, restaurant & hotel	68,879	23.0
3. Services (community, personal and others)	28,002	9.3
4. Transportation, storage & communication	13,356	4.5
5. Agriculture, fishery & hunting	8,074	2.7
6. Finance, insurance and business services	4,825	1.6
7. Construction	3,064	1.0
8. Mining & quarrying	842	0.3
Total	299,460	100.0

Source of Information: Alexandria Statistics Book 1978 issued by the Central Agency for Public Mobilization and Statistics.

The present manpower may be estimated at about 420 thousand if it has increased by the same rate as an estimated population growth rate (40%) during the same period.

2) Number of company, factory and shop

(1) Number of factory and company with 10 or more employees

The below table shows the number of factory and company related to industry with 10 or more employees. The total number is 1,091, of which only 83 belong to the public sector. However, the gap between the public and private sector may be much less in terms of production. Weaving and spinning (mainly cotton) shares the largest number 315 (28.9%) engineering with 180 (16.4%) comes in the second.

Tab. 1-8-16 NUMBER OF FACTORY & COMPANY WITH 10 OR MORE EMPLOYEES IN ALEXANDRIA ACCORDING TO TYPE OF INDUSTRY

	TYPE OF INDUSTRIES	PUBLIC SECTOR	PRIVATE SECTOR	TOTAL	RATIO (%)
1.	Weaving and spinning	14	301	315	28.9
2.	Engineering	10	170	180	16.4
3.	Food	10	122	132	12.1
4.	Printing, book binding & paper	5	117	122	11.2
5.	Chemical	10	94	104	9.5
6.	Leather	2	67	69	6.3
7.	Building & construction	7	47	54	5.0
8.	Wood products	3	49	52	4.8
9.	Cereals & its related industry	6	23	29	2.7
10.	Mining & petroleum	13	5	18	1.6
11.	Metallic	3	13	16	1.5
	Total	83	1,008	1,091	100.0

Source of information: The Chamber of Commerce in Alexandria in 1984

(2) Number of shops

In Alexandria, there are about 65 thousand shops as shown in the table below. This follows that there is one commercial or industrial or some other business unit per 40 person or 8 families.

Tab. 1-8-17 NUMBER OF SHOPS IN ALEXANDIRA

As of 1981

		NUMBER OF SHOPS
1.	Car workshop	1,492
2.	Metal workshop, Iron Smith welding	3,931
3.	Grocery, butcher, vegitable, fruit, fish, ham	12,990
4.	Electric appliance, ironing	3,036
5.	Coffee house (shop)	2,229
6.	Barbar, beauty salon	2,515
7.	Beans hop	1,829
8.	Benzine garage (gasoline stand)	768
9.	Hotel, theater, movie, casino, clubs	451
10.	Carpenter shop, manual shop (by hands)	5,919
11.	Storage (ware house)	5,720
12.	Small factory, grinding, mincing	2,901
13.	Cattle stable (horse, baffalo, cows)	500
14.	Sugar cane, grinding shop	277
15.	Hospital (special)	75
16.	Pharmacy	169
17.	Bakers	1,553
18.	Candy shop (water melon seed and coconut)	2,730
19.	Stables (horses and donkeys)	254
20.	Small commercial shop	10,000
21.	Shops and restaurants without license	5,000
22.	Tourist Office	133
		64,427

(Note: Total income 1,984,848 LE)

Source of information: The General Followup Dept.
(Received in September 1984)

3) Industrial output

The following table shows industrial output according to type. Food and drinks industry shares 30%. And another 30% is shared by weaving & spinning.

Tab. 1-8-18 INDUSTRIAL OUTPUT IN ALEXANDRIA

As of 1972

Unit: 1,000 LE

	TYPE OF INDUSTRY	AMOUNT	RATIO (%)
1.	Food & drinks	99,176	29.6
2.	Weaving & spinning	97,637	29.1
3.	Chemical & petrtoleum products	50,704	15.3
4.	Paper production, printing & publication	30,327	9.1
5.	Equipment & machinery	23,718	7.1
6.	Basic metallic industry (iron & steel)	20,416	6.2
7.	Metallic & glass production	7,318	2.2
8.	Timber production	2,597	0.8
9.	Mining and quarry	1,710	0.5
10.	Other processing industry	173	0.1
11.	Total	332,066	100.0

Source of Information: Alexandria Statistics Book 1978 issued by the Central Agency for Public Mobilization and Statistics.