Arab Republic of Egypt

Ministry of State for Environmental Affairs

EGYPT STATE OF THE ENVIRONMENT REPORT

2006

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May God Guide Our Steps

Minister of State for
Environmental Affairs

Eng. Maged George Elias

Foreword

It gives me great pleasure to foreword the "State of Environment Report" of the Arab Republic of Egypt for 2006, which is issued for the third time successively as a significant step in the political environmental commitment of the Government of Egypt (GoE). This comes in the framework of the keenness of Egypt's political leadership on incorporating the environmental dimension in all fields for achieving sustainable development, and from its belief that protecting the environment has become a necessary requirement to protect the People's health and empower it to achieve optimum utilization of natural resources.

This Report is issued in compliance with Law no. 4/1994 on Environment Protection, which stipulates in its Chapter Two on developing an annual "State of Environment" report to be submitted to the President of the Republic and the Cabinet, with a copy thereof deposited in the People's Assembly.

This report comes as an outcome of efforts of many competent experts and those concerned with the environment in Egypt, as well as institutions, ministries, and authorities concerned who collectively collaborated in developing this report with the Ministry of State for Environmental Affairs (MSEA).

State of the Environment Report for 2005 included a comprehensive analysis of all available data and information about the elements of the environment in Egypt, which were represented in four parts: Air, Water, Land, and Urban Environment.

It was agreed that a comprehensive report, similar to that of 2005, could be issued every five years. For the intermediary years, the report would address one of the four chapters in detail, while presenting a summary of the most significant changes that occurred to the environmental elements included in the other three parts.

In light of this agreement, this report aims at highlighting in details the most important changes that occurred during 2006 in all components of the first chapter i.e. Air. This element includes air quality, noise, climatic changes, and ozone layer protection.

The report then reviews in less detail the key changes during 2006 in the other three elements, namely, Water, Land, and Urban Environment.

This year's report includes, in addition to issues addressed in 2005 report, a new issue which is the expansion of the urban area and informal settlements.

We all know that Egypt, as most of the countries seeking economic and social development, faces a number of environmental problems. This is the result of significant population increase and expansion in industrial, agricultural, and tourism activities to achieve economic development that meets the needs of such population growth. This has placed a significant pressure on natural resources and was coupled with increased rural-urban internal migration tripling urban population in Egypt over the last two decades, which represents more pressure on the urban environment in general.

Currently, environment preservation dialogue focuses not on pollution issues, but

rather on the rational utilization of different natural resources and the prevention of practices and activities likely to result in depleting them. These resources actually constitute the main stock for development processes and one of the rights of future generations. To this effect, Egypt has devoted unfailing interest in environment issues.

Meanwhile, environment preservation issues have topped world concerns as one of the crucial questions at stake locally, regionally and globally.

The President of the Republic has thus vested great interest in the environmental preservation issue during recent years. It began with his Excellency's words in one of his speeches inaugurating a People's Assembly session that preserving the environment has become a necessity not a luxury. It has become an issue on which relies the ability of Egyptian citizens to lead a safe life and enjoy good health enabling them to produce and innovate. The President has crowned his support to environmental issues by his request to the People's Assembly to amend a number of articles in the Egyptian Constitution so that the amended constitution would incorporate an article stipulating environmental preservation.

Having been approved by the People's Assembly in a public poll, the amended constitution was then issued including Article 59 stipulating that "Environment preservation is a national duty", and that "the Law shall regulate measures needed to maintain sound environment". Stipulating in the constitution that environment preservation is a national duty will undoubtedly promote all State efforts represented in government agencies, NGOs, civil community organizations, and the private sector towards achieving a sound environment for decent life for Egyptian citizens.

The Philosophy of environmental action in Egypt briefly rests on striking a balance between economic and social development requirements, on the one hand, and rational utilization of natural sources and wealth on the other.

The Ministry of State for Environmental Affairs (MSEA) has a clear vision of the accumulated environmental problems in Egypt and is fully aware that they need to enlist the cooperation of the various organizations and institutions in Egypt, particularly civil society organizations.

The Ministry is doing its utmost to ensure environmental preservation and pollution prevention in the light of many challenges for safekeeping the health of the Egyptian citizen and the rights of future generations to our natural resources.

MSEA hopes to improve the state of the environment year by year.

I hope that this report would communicate in part of the improvement achieved in 2006.

May God Guide our way

Minister of State for Environmental Affairs

Eng. Maged George Elias

Methodology

Report Objectives

1. Implementing an important article in Environment Law 4/1994.
2. Delineating a clear and accurate picture of one element of the environment (Air), while identifying its negative and positive changes, with a brief presentation of changes that took place in the other three elements (Water, Land, and Urban Environment).

To achieve these objectives, the methodology pursued in developing this report depended on three fundamental principles:

First Principle:

Transparency: It is to this effect that the real image of environmental status in the Arab Republic of Egypt has been displayed using updated data available to MSEA – Egyptian Environmental Affairs Agency (EEAA), in cooperation with all ministries, organizations and research centers. The government thinks that this Openness Principle would allow the people to know the nature and magnitude of impacts the environment is exposed to as well as the State's efforts in mitigating them.

Second Principle:

Participation: The report relied in its development and revision on the participation of experts, researchers and environment stakeholders representing various executive sectors such as line ministries, research centers, universities, environmental information experts, and representatives of the private sector and Non-Governmental organizations and associations.

Third Principle:

Adoption of internationally recognized standards in developing state of the environment reports: Towards this end, a scientific approach has been applied in this report's writing including in each area: (sources, harmful impacts, efforts in mitigating negative impacts, and future visions.)

1 Air Pollution

Introduction

Clean air consists of many gases, most important of which are Nitrogen and Oxygen; they represent around 78% and 21% of air weight respectively, in addition to some other gases that exist in small amounts such as Carbon dioxide, helium, neon, argon and others. Life on earth depends on this natural composition of air

Air is considered polluted if it undergoes a change in its composition, or if it contained other impurities or gases in amounts harmful to the life of organisms inhaling it or living on it. Air pollution occurs either due to natural factors or as a result of different human activities. In the former case (for example, dust emissions by storms such as Khamasin and others) where pollution is transient with limited impacts and returns back to its normal state quickly after the departure of such natural factors. While in the latter case, air pollution continues with the continuity of different human activities, and its sources are usually divided into two types: stationary sources (such as factories, power plants operating on fossil fuel, open burning of wastes…etc.) and mobile sources (different means of transport using gasoline or gas as fuel).

Egyptian industry consists of mining industries (extracting crude oil and natural gas and some crude minerals), and processing industries consisting mainly of: food products industry (37% of total processing industries added value), spinning and weaving industry (21%), metallurgical and engineering industry (20%), chemical and pharmaceutical industries (14%), construction materials and theramics industry (8%).

Type and volume of pollutants emitted from industry differ widely from one in-

dustry to another and depend on many factors, most significant of which are:

1. Industry type;
2. Facility size, age, and maintenance system;
3. Factory work system and production quantity;
4. Technology used in industrial processes;
5. Fuel type and primary materials used;
6. Availability and efficiency of different pollutants prevention methods.

As for the transport sector, passengers and goods transport by land routes is of the most frequently used types of transport in Egypt. Expansion of land transport during the last decades led to high rates of increased number of cars in Egypt. In 31/12/2006, the number of registered vehicles in Arab Republic of Egypt governorates, according to the Central Agency for Public Mobilization and Statistics (CAPMAS) has reached 3,953,811 vehicles versus 3,662,888 vehicles end of December 2005, i.e. a 7.95% increase in one year. Governorates with the largest number of vehicles are Cairo (29.5% of total registered vehicles in Egypt until last December 2006), Alexandria (12.9%), Giza (12%), Sharqya (4.7%), Daqahlia (4.5%), El Gharbya (4.1%) and Qalbubia (3.3%). It is estimated that there are 2 million vehicles in Greater Cairo area. Table (1-1) shows the main types of registered vehicles in Cairo governorates only until last December 2006.

Table (1-1) types of registered vehicles in Cairo governorate Until last December 2006

Type of vehicle	Numbers of vehicles	Percentage
Private	796692	68.4%
Taxi (all types)	72091	6.2%
Buses (all types)	30099	2.6%
Trucks	110851	9.5%
Tractors	442	0.04%
Motorcycle	121854	10.5%
Public and government sector	33208	2.8%
Total	**1165237**	**100%**

Source: Central Agency for Public Mobilization and Statistics (CAPMAS)

Common pollutants emitted from these sources are Sulfur and Nitrogen oxides, Total Suspended Particles (such as dust, smoke, different chemical compounds sprinkles), Carbon monoxide, and Hydrocarbon. However, the distance of pollutants emitted in the air differs from one place to another according to its natural and chemical characteristics and the weather circumstances prevailing around the pollution sources; wind speed in some areas could help carry and spread the pollutants to far distances, thus help reduce its concentration. Thereby, pollutants concentrations in the air do not depend on the amount emitted only, but on the weather circumstances surrounding the sources as well. Additionally, some natural and chemical interactions may often occur between some pollutants, which may increase or decrease the acuteness of the effects. For example, Sul-

fur oxides interacts with the water vapor to form Sulfuric acid which may agglutinate to the acute particles suspended in the air, and NO_2 interact with Hydrocarbons under the sun light and certain weather circumstances to form a number of poisonous chemical compounds such as the ground Ozone. Some pollutants may also concentrate around its emission sources; For example, some chemical compounds may concentrate in the air around some industries (organic compounds around Petrol refinery, Cement dust around cement factories, Lead around lead foundries…etc.). Some insecticides concentrate in the air in the areas neighboring agricultural fields sprayed with insecticides.

Air Quality in 2006

Concentrations of different pollutants in air – as abovementioned – depend on their natural and chemical characteristics and on prevalent weather conditions around pollution sources. Thus, pollutants' concentrations in air differ from one city to another according to their geographical location, size and type of industry in and around it, traffic movement and other factors that affect the type, amount and destination of pollutants. Pollutants' concentrations inside the city also differ from one place to another. They reach their maximum in industrial areas, and are less in residential areas located far from pollution sources.

For identifying air quality, EEAA is monitoring key pollutants in ambient air by 54 monitoring stations established under The Egyptian-Danish Environmental Information and Monitoring Project. Twenty Seven of these stations are equipped with automatic monitoring devices, while the other 27 stations are equipped with sampling equipment for further analysis. Monitoring stations monitor one or more pollutant, e.g. Sulfur dioxide is monitored by 24 automatic stations and 12 sampling stations, while inhaled particulates less than 10 micron (PM_{10}) are monitored by 14 automatic stations and the 27 sampling stations. As for Nitrogen Oxides, they are monitored by 18 automatic stations and 7 sampling stations. Table (1-2) shows the distribution of air pollutants monitoring stations countrywide.

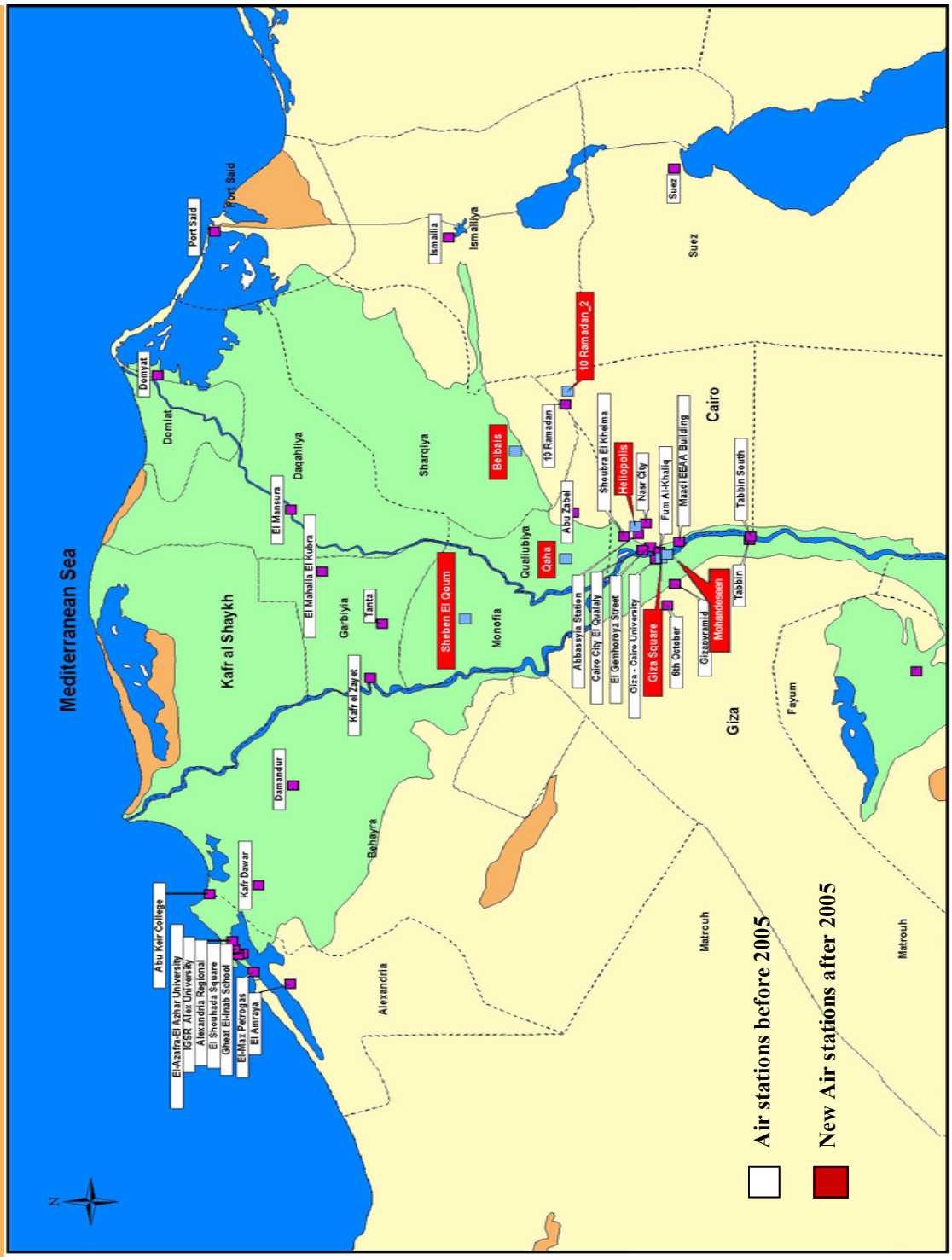
Table (1-2) Monitoring Stations and Site Types

Distribution of Operating Stations

Site Type	Cairo	Alexandria	Delta	Upper Egypt	Sinai and Canal Cities	Total
Industrial areas	4	3	3	3		**13**
Urban areas	2	1	3	7		**13**
Residential areas	6	2	2	2		**12**
Traffic dense areas	5			1		**6**
Remote areas	1	1		1	1	**4**
Areas of mixed use	2	1	2	1		**6**
Total	**20**	**8**	**10**	**15**	**1**	**54**

Map (1-1) shows air monitoring station sites in Egypt.

Air monitoring stations in greater Cairo and Delta



Map (1-2) shows the Greater Cairo map with 20 monitoring stations monitoring chest dusts and Lead pollutants.

1 – Sulfur dioxide (SO_2)

SO_2 is often a product of oxidizing sulfur residues of liquid petroleum fuel during combustion in the stationing sources or the mobile sources, especially those operated by solar.

Using mazot as a fuel in industrial operations causes the emission of Sulfur oxides largely in the air due to increase of sulfur substance in mazot.

Monitoring results indicated that average Sulfur oxide concentrations in the air per day in Greater Cairo were high (exceeded the limit defined which is 150 microgram/ square meter) during few months in 2006 and in some stations (three months on El Qalaly station, six months in Shoubra EL khaima station). Generally, there is improvement in SO_2 concentrations in comparison with year 2005 in all monitoring stations in Greater Cairo, except for Shoubra El khaima which became worse than it was in 2005; this situation needs to be checked at the table (1-3).

Figure (1-1) shows average annual SO_2 concentration during 2005 and 2006.

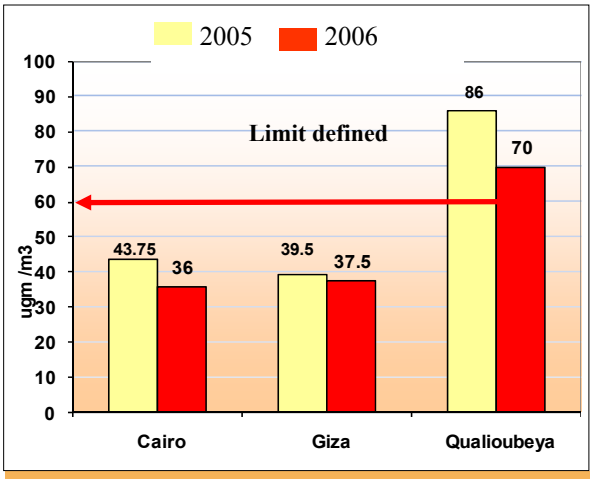


Figure (1-1) Annual Sulfur Dioxide Average Concentrations in Greater Cairo 2005-2006

Table (1-3) annual average of SO_2 concentration in Greater Cairo During 2005-2006 (µg/m_3)

Station		Months											
		1	2	3	4	5	6	7	8	9	10	11	12
Qulaly	2006	160	100	108	104	42	92	81	177	241	123	158	158
	2005	132	163	199	248	185	256	276	133	101	136	186	140
Nationwide	2006	123	151	70	75	111	43	61	41	74	131	128	188
	2005	124	285	66	154	70	107	79	54	72	129	186	119
Abassya	2006	95	78	81	40	41	48	44	32	43	62	64	107
	2005	89	83	115	134	72	69	62	36	52	70	216	90
Maadi	2006	83	77		15	6	28	24	59	40	54	62	59
	2005	27	29	42	60	40	57	70	43	60	41	50	56
Tibbeen	2006	43	27	58	79		39	47	33	55	111	125	111
	2005	126	54	86	58	59	31	23	25	62	33	41	22
Fum El-Khalig	2006	44	84	78			49	41	37	60	73	90	118
	2005	88	104	96	115	96	42	33	61	56	56	182	
Shubra El-Khaima	2006	145	99	84	281		274	126	172	195	180	115	253
	2005	151	128	98		128	180	153	110				164
Giza	2006		114	100	98		50	71	72	57	59	47	107
	2005	18	69	83	109	86	128	105	48	52	31	43	44

Black squares: measures NA

Grey squares: concentration exceeds permissible limit (150 µg/m_3)

Annual average concentrations of Sulfur Dioxide in air in all monitoring stations Gumhureya - table (1-4) – witnessed increased concentrations in 2006 in Tibbin, Fum El-Khalig, 10th of Ramadan, Luxour, Asafraa, Kafr El-Zayat, Tanta, Mahalla Kobra, Mansoura and Damietta as compared to 2005. However, concentrations in all cases did not exceed permissible limit (60 µg/m^3). Although SO_2 concentrations in Kulaly, Shubra El-Khaima and Kom Ombo in 2006 were less than that of 2005, concentrations are still higher than permissible limit. SO_2 concentrations significantly decreased in Suez, Aswan, Max and Beni Sueif.

Table (1-4) annual average of SO_2 concentration in air During 2005-2006 ($(\mu g/m_3)$)

Station	2005	2006
Qulaly	121	84
Nationwide	59	52
Abbassya	36	32
Nasr City	12	13
Maaddi	27	25
Tebbeen	19	31
South Tebbeen	14	12
Fom El-Khalig	40	43
Shoubra El-Khaima	86	70
Giza	29	27
6^{th} Oct.	5	5
10^{th} Ramadan	5	8
Suez	20	9
Luxour	11	15
Koum Ombo	89	92
Aswan	35	13
Shohadaa'	16	27
Max	26	8
Alexandria 1	13	9
A'safraa	3	5
Ghaiet El-Enab	8	7
Kar El- Zaiat	24	25
Tanta	5	6
Mahalla Kobra	4	9
Mansoura	8	12
Damietta	3	5
Kafr El-Dawar	6	7
Giza, Koleyet El-Zeraa (Faculty of	50	48
Heliopolis	36	32
Bani-Sweif (down town)	41	30
Bani-Sweif (Government Bldg)	32	24

Figure (1-2) shows SO_2 concentration annual average in all monitoring stations during 2006.

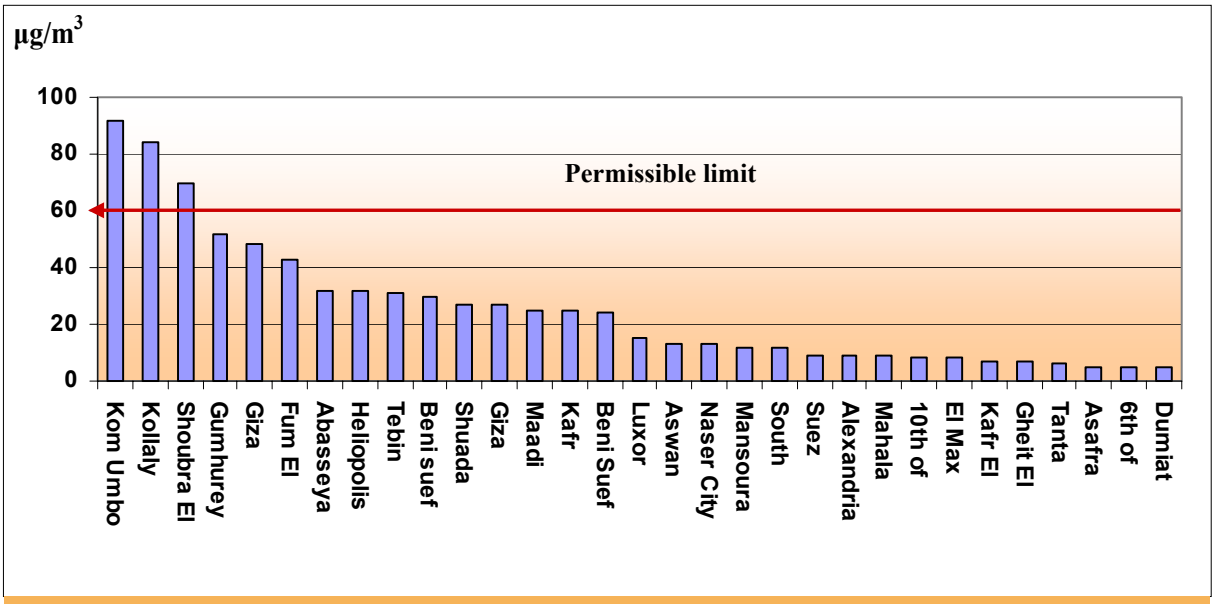


Fig (1-2) annual Average SO_2 Concentration during 2006

Figure (1-3) shows the annual average of SO_2 concentration in some Greater Cairo GC monitoring stations during the period from 1999-2006.

Figure (1-4) shows as well the monthly average of SO_2 concentration in 2005-2006 in a station at a traffic dense area (Qulaly Square) illustrating the clear improvement in SO_2 concentration in most 2006 months as compared to 2005.

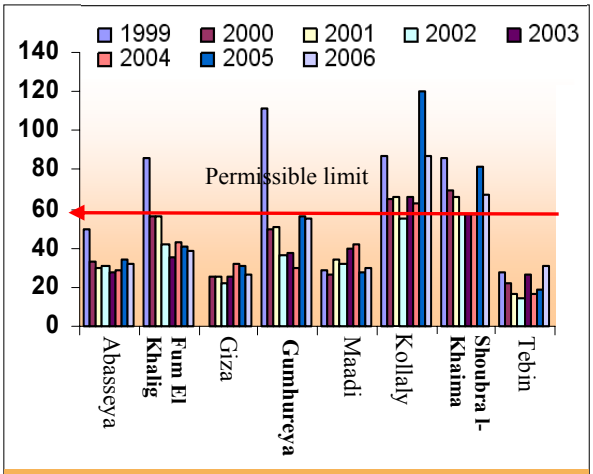


Figure (1-3) annual average of SO_2 concentrations in some Greater Cairo monitoring stations

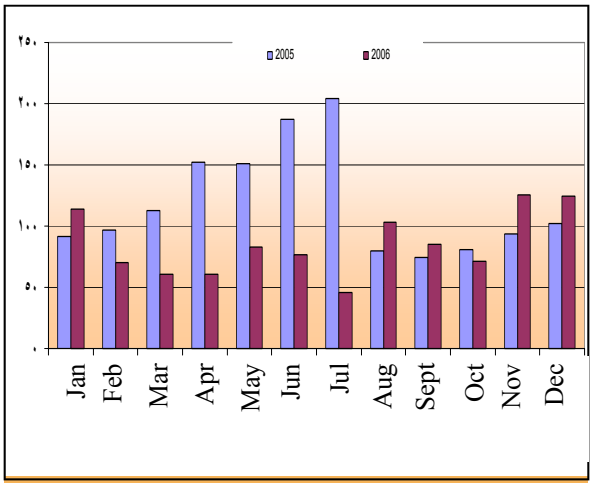


Figure (1-4) monthly average of SO_2 concentrations in 2005-2006 in Kulaly Square (Traffic station)

Figures (1-5, 1-6, 1-7) show a change in SO_2 concentrations in Alexandria, Delta, Suez and Aswan respectively during 2000-2006, illustrating clear improvement in SO_2 concentrations in different areas such as Aswan, Suez, Delta, Mansoura and Alexandria (Oceanography Institute), whereas other station, findings indicate some increases in 2006 compared to 2005.

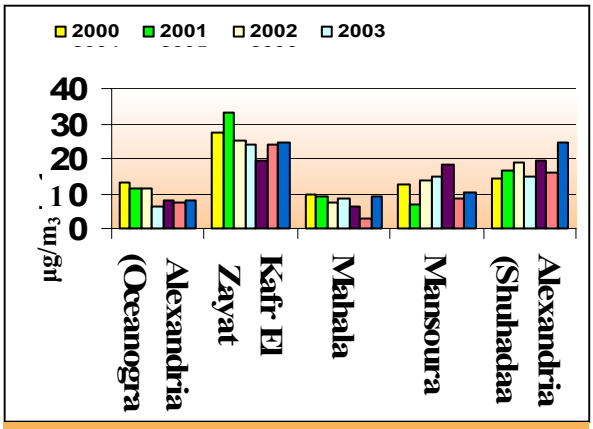


Fig (1-5) average SO_2 concentrations in Alexandria and Delta during 2000-2006

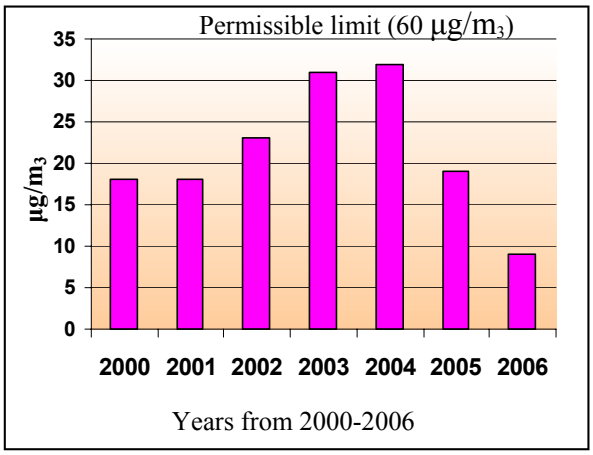


Fig (1-6) average of SO_2 concentration in Suez during 2000-2006

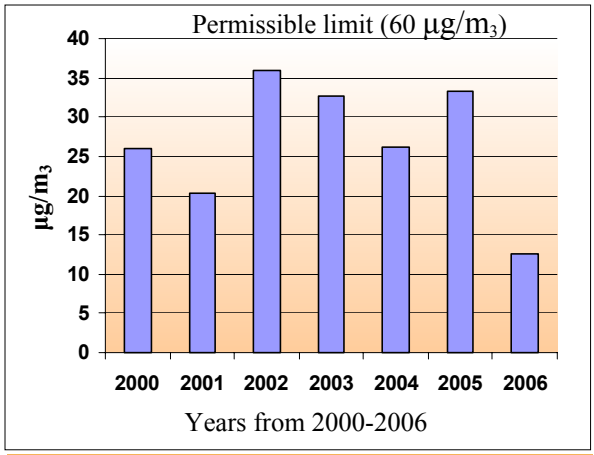


Fig (1-7) SO_2concentration average in Aswan during 2000-2006

2- Nitrogen Dioxide NO_2

NO_2 produced from fuel combustion under high temperatures as a result of oxidation of nitrogen found in fuel and in the air entering the combustion chamber. About 55% of NO_2 emitted in air are from the exhaust of different vehicles. 2006 monitoring results illustrate that daily NO_2 average concentrations in GC do not exceed the permissible level (150 $\mu g/m^3$; according to Law 4/1994 executive regulations and WHO guidelines), except in Shoubra El-Kaima Station where NO_2 increased in August 2006. Table (1-5).

Table (1-5) Daily NO2 average concentrations in Greater Cairo During 2005-2006 (µg/m^3)

Station		Month											
		1	2	3	4	5	6	7	8	9	10	11	12
Qulaly	2006	70	114	121	110	84	90	103	107	126	97	99	188
	2005	106	138	115	99	92	97	98	77	90	90	146	122
Nationwide	2006	63	72	78	95	63	65	69	109	120	97	90	81
	2005	76	104	58		102	101	82	73	96	67	156	97
Maadi	2006	77	69			6	114	76	57	68	77	83	83
	2005						59	65	59	62	57	95	144
Tibbeen	2006	18	56	58	42	34	42	32	22	30	36	81	73
	2005	89	69	61	58	46	37		29				
Fum El-Khalig	2006	49	135	144	145	122	110	115	109	100	93	104	124
	2005	75	93	69	90	83			78	126	95	58	
Shubra El-Khaima	2006	113	85	49	41	28	48	40	169	37	39	13	
	2005	102	64	46		65	80	55				212	160
Giza	2006	111		68	54	46	36	51	45	69	66	77	123
	2005	106	118	93	121	93	90	62	48	76	72	112	99

Black squares: measures NA

Grey squares: concentration exceeds permissible limit (150 µg/m$_3$)

Figure (1-8) shows Annual average of NO_2 concentrations Countrywide in 2006. Highest concentrations were recorded at dense traffic areas.

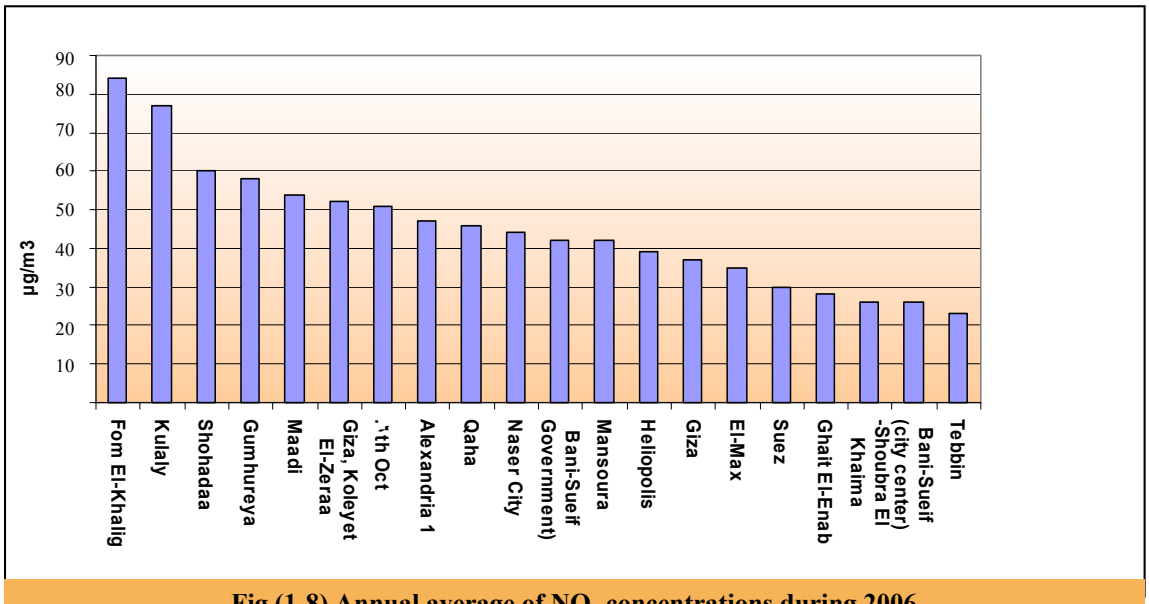


Fig (1-8) Annual average of NO_2 concentrations during 2006

Figure (1-9) shows NO_2 concentration annual average in some Greater Cairo stations during 1999-2006; the state in 2006 is somehow similar to that of 2005.

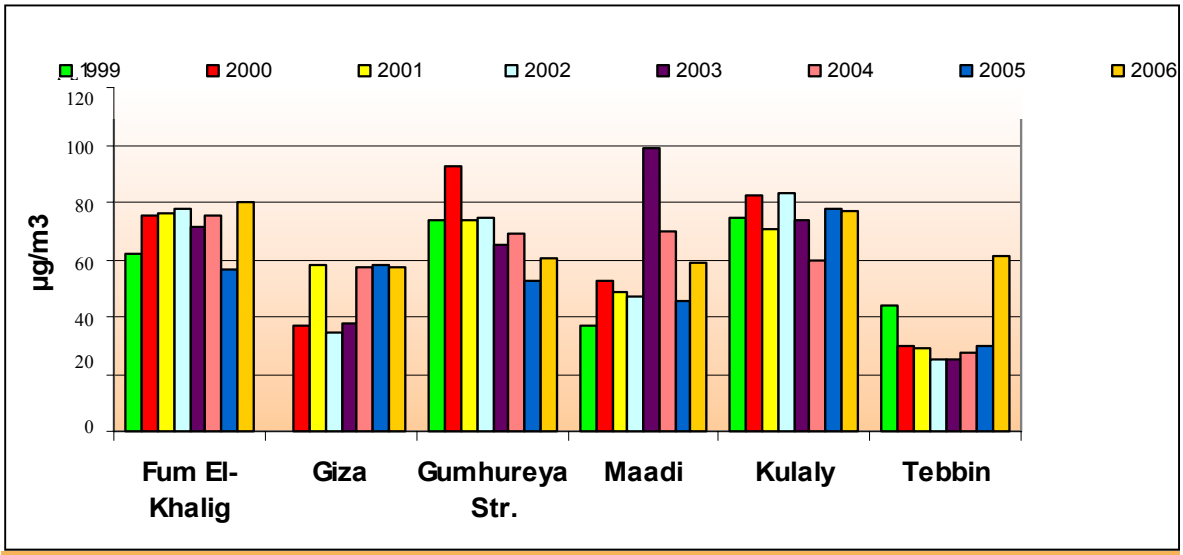


Fig (1-9) Annual average of NO2 concentration in some Greater Cairo stations during 1999-2006

Figure (1-10) shows NO_2 concentration annual average in Alexandria, Delta, and River Nile during 2000-2006; illustrating that the concentration in 2006 is more that that of 2005 in addition there were no note worthy improvement in the previous years, this fact leads us to review necessary procedures again.

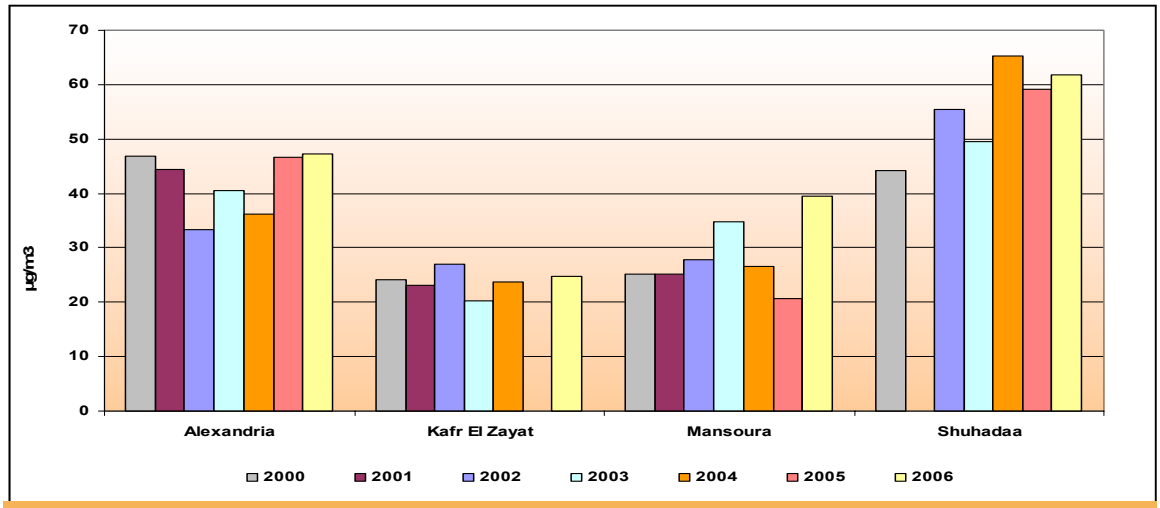


Fig (1-10) Annual average NO_2 concentrations in Alexandria, River Nile Delta during 2000-2006

3- Inhaled Particulates (PM_{10})

Inhaled Particulates (PM_{10}) are parts of total suspended particulates TSP in air. PM_{10} are currently monitored as being the part inhaled by Man which reaches the lungs. Monitoring results showed that daily average of PM_{10} concentrations in all GC stations is higher than the permissible limit (150 µg/m_3, - table (1-6)) according to amendments of Law 4/1994 executive regulations, given that WHO and EU recommended daily average limits are 70 µg/m_3 and 50 µg/m_3 respectively.

Table (1-6) PM_{10} concentration in GC (daily average during 2005- 2006 in (µg/m3))

Station		Month											
		1	2	3	4	5	6	7	8	9	10	11	12
Qulaly	2006	450	388	616	370	394	337	192	198	178	333		
	2005	297	199	51	22				76		250	605	408
Abassya	2006	377	338	711	391	376	201	120	164	134	194		
	2005	221	249	284	387	269	120	244	198	186	209	409	384
Tebbeen	2006	424	320	657	543	465	226	182	213		584		
	2005	154	103	139	160	117	69	90	83	270	283	533	627
Fom-Khaleig	2006	527	434	514	66	497	210	264	525	267	297		
	2005	224	222	244	332	163	113	99	99	173	297	831	501
Mo-handseen	2006	282	204	210	213	388	178	125	139	157	186	188	303
	2005				114				197	374	233	369	192
Heliopo-lis	2006	88	256	655		294	162	159	383	201	184	190	237
	2005	98	57	485	281	463	203	68		200			
Giza (Qoliet Al-Zeraa')	2006	283	327	394	358	365	194	159	198	173	190	187	336
	2005										114		

Black squares: measures NA

Grey squares: concentration exceeds permissible limit (150 µg/m_3)

Table (1-7) shows a comparison between PM_{10} annual average in some stations for 2005 and 2006; PM_{10} annual average in all stations is higher than the maximum limit (70 µg/m_3) stipulated in Law 4/1994 executive regulations.

The table also illustrates the increase in PM_{10} annual average during 2006 as compared to 2005 in more than 60% of the monitoring stations.

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Table (1-7) annual average PM_{10} concentration during 2005- 2006 in µg/m3

Station	2005	2006
Qulaly	129	165
Abassya	118	91
Tebbeen	96	167
Fom Khalig	122	170
Shubra Khaima	131	189
Qaha	99	211
Alex. 1	101	97
Kafr Zaiat	132	132
Tanta	153	141
Kafr Dawar	124	154
Kom Ombo	270	214

Figure (1-11) shows the annual average of inhaled particulates (PM_{10}) in GC during 2005-2006 showing increased concentrations in 2006 compared to 2005 except for Abbaseya area.

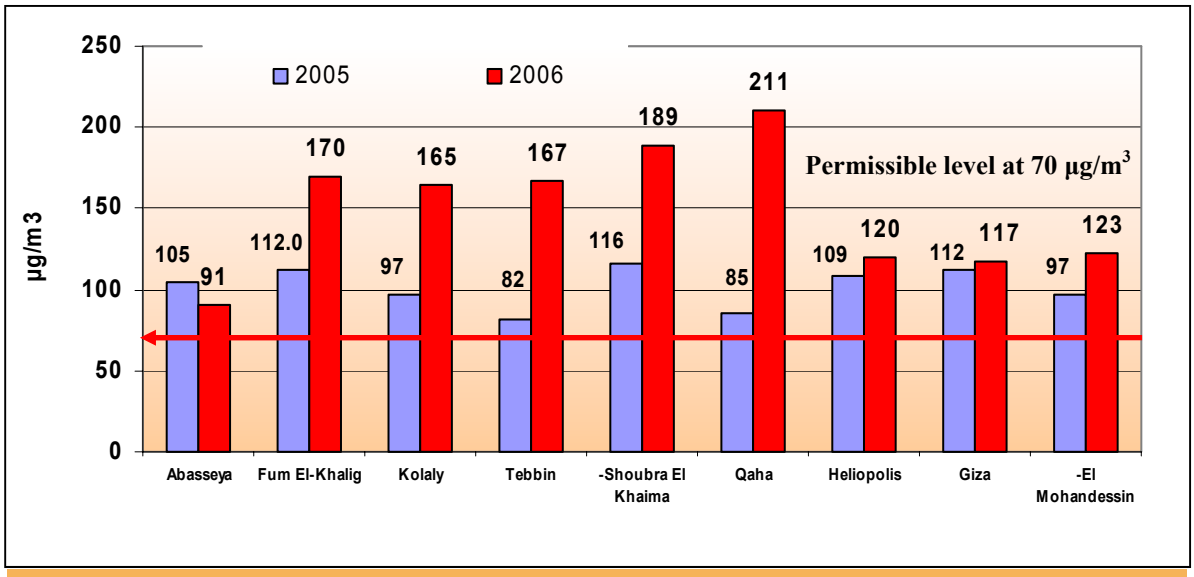


Fig (1-11) Annual average chest dusts up to 10 microns in GC during 2005-2006

Fig (1-12) provides a comparison between inhaled particulates concentrations less than10 µ and less than 2.5 µ in Greater Cairo during the period from 1998 to 2006. This indicates significant improvement in these concentrations except for particulates less than 2.5 µ in 2006, which showed slight increase than 2005 .

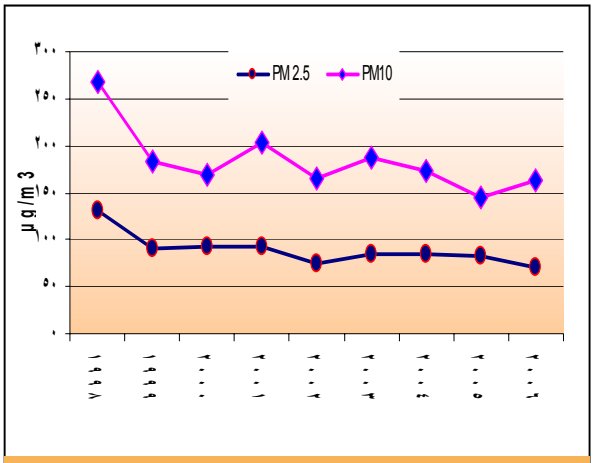


Fig. (1-12): Comparison between inhaled particulates (PM_{10}) ($PM_{2.5}$) concentrations in Greater Cairo during several years from 1998 to 2006

Fig. (1-13) shows the annual average of inhaled particulates up to 10 µ in Alexandria station during 2000 – 2006.

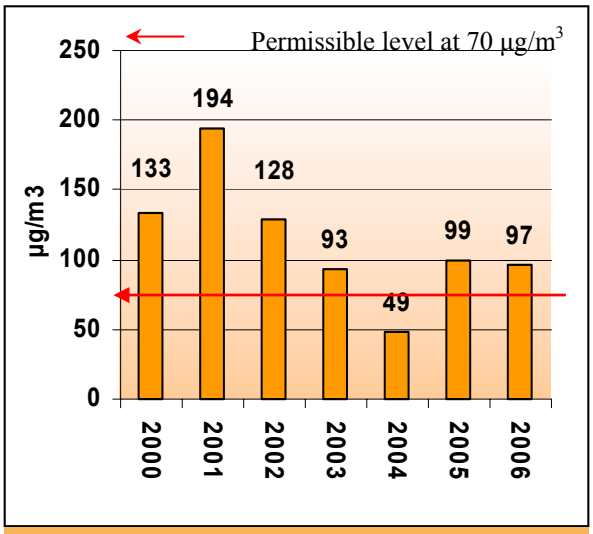


Fig. (1-13): Annual average of suspended dust particulates up to 10 µ in Alexandria station dur-

Fig. (1-14) shows the annual average of inhaled particulates up to 10 µ in Canal and Sinai area during 2000 – 2006 showing significant increase in 2005 and 2006 compared to

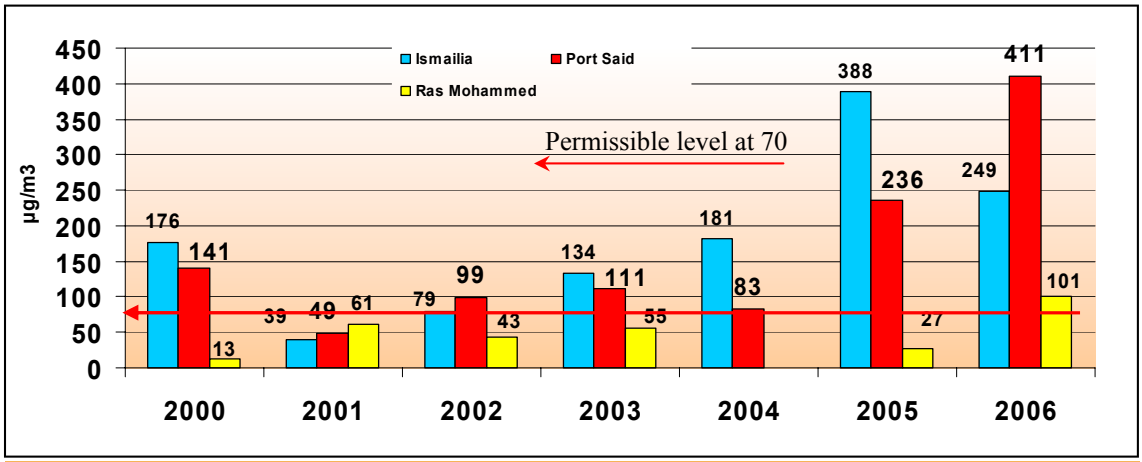


Fig. (1-14) shows the annual average of suspended dust particulates up to 10 µ in Canal and Sinai area during 2000 – 2006

4- Smog (Black Smoke)

Smog monitoring results showed that its concentrations in air during 2006 did not exceed permissible level of annual average provided for in the Executive Regulations of Law 4/1994 except in Kom Umbo and Gheit El-Enab (Alexandria) (Fig. 1-15).

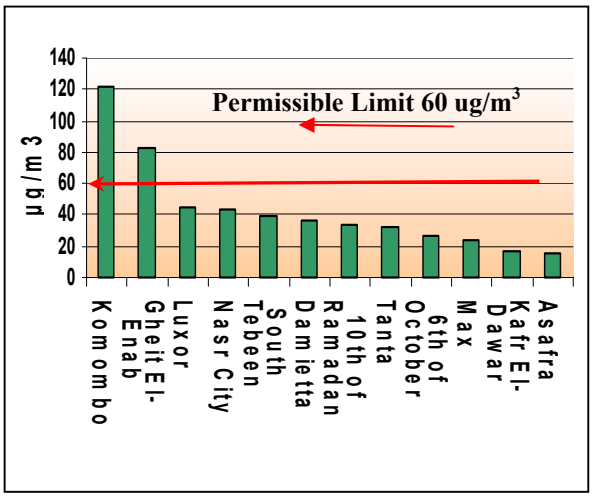


Figure (1-15) Annual Average of Smog Concentrations in some monitoring sites in Egypt during 2006

Comparing 2005 and 2006 results, it was clear that smog concentrations were less during 2006 than 2005 in most sites except Gheit El-Enab, Asafra, and Nasr City (see Fig. 1-16).

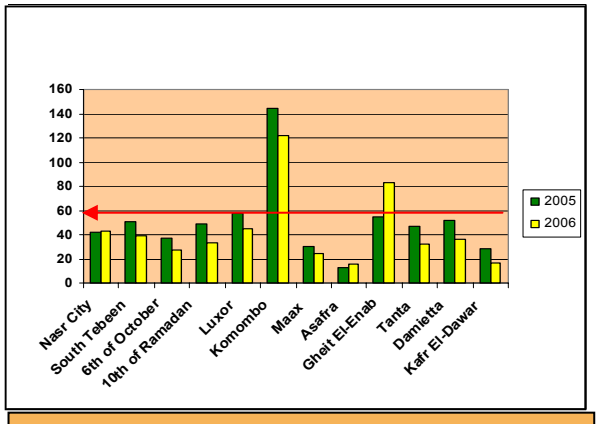


Figure (1-16)Annual Average of Smog in Some Monitoring sites in Egypt during 2005 and 2006

Figure (1-17) shows the annual average of smog in some monitoring stations in Greater Cairo area during 2006 indicating that it exceeds permissible limits in 50% of stations.

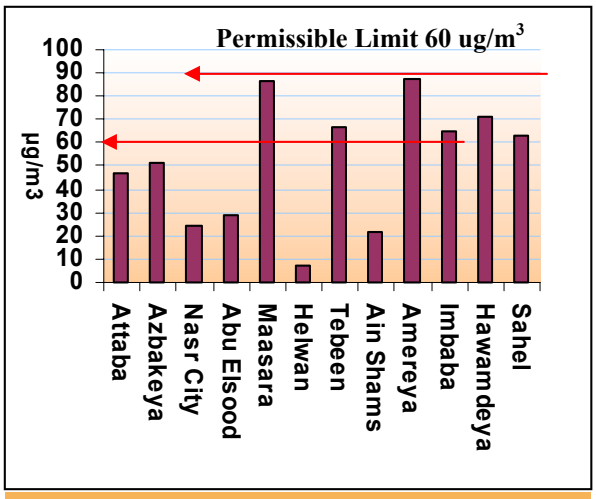


Figure (1-17) Annual Average of Smog Concentration in some monitoring stations in Greater Cairo During 2006

5. Lead

Monitoring results show that lead concentrations have decreased during 2006 compared to 2005 in Greater Cairo (see Table 1-8 and 1-18). This decrease is the result of the relocation of most lead smelters outside residential agglomerates and cleaning up five smelter sites. Highest lead concentrations in 2006 were recorded in Shubra El-Kheima Industrial Area (1.37 µg/m^3).

Table (1-8) Annual Average of Lead Concentrations during 2005 and 2006 (µg/m^3)

Area	2005	2006
Industrial Areas	2.31	0.73
Residential Areas	1.01	0.59
Traffic Areas	1.09	0.68

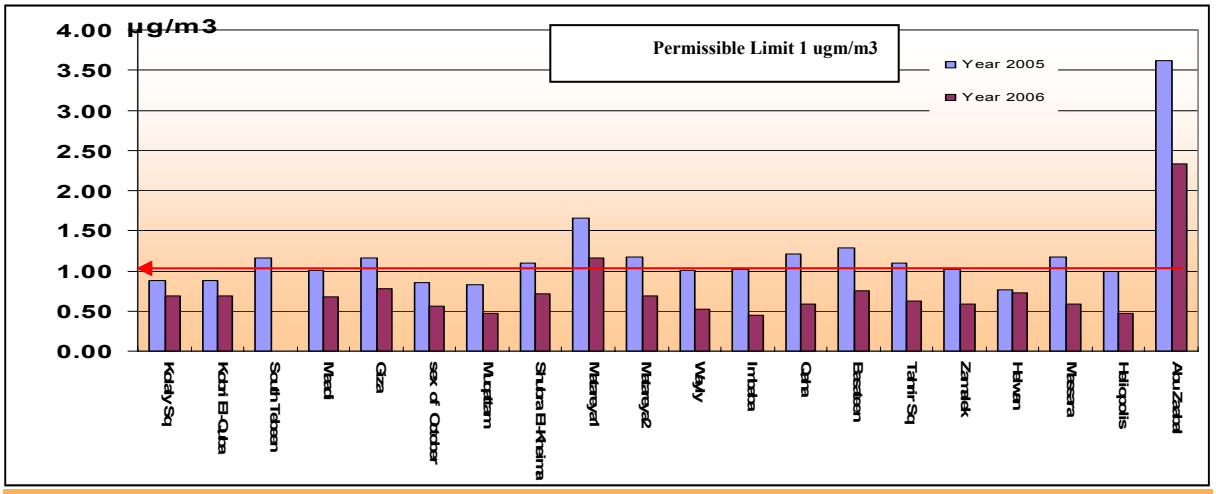


Figure (1-18) Annual Average of Lead Concentrations during 2005 and 2006

Figure (1-19) illustrates lead concentrations change rate in inhaled particulates up to 10 µ during 1999–2006 (annual average for Greater Cairo). Significant improvement in these concentrations during this period could be noticed.

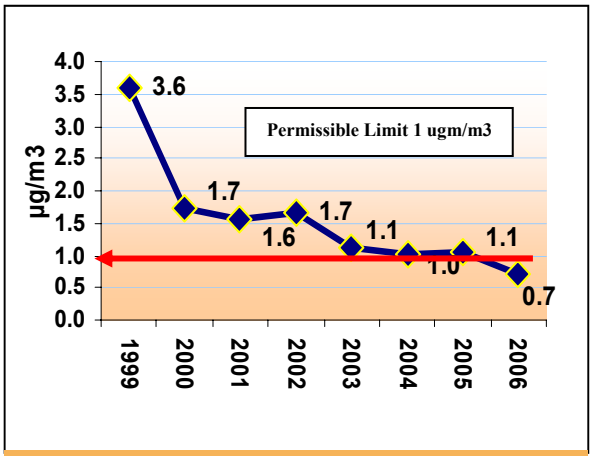


Figure (1-19): Change Rate of Lead Concentrations in Inhaled Particulates PM$_{10}$ during 1999-2006 (Annual Average for GC)

6. Ozone

Ozone is formed in the troposphere as a result of the reaction of pollutants emitted from transportation means or appliances containing hydrocarbons (Freon) used in manufacturing refrigerators, ACs, and other industries. Ozone is considered a hazardous component to human health.

Environment Law Executive Regulations do not stipulate any daily, monthly, or annual limits of Ozone concentrations.

Environment Law executive regulations specify the maximum limit of exposure to surface Ozone to be one hour and not to exceed 200 µg/m^3. Permissible limit during 8 hours should not exceed 120 µg/m^3.

Figure (1-20) shows the annual average of Ozone concentrations during 2005 and 2006.

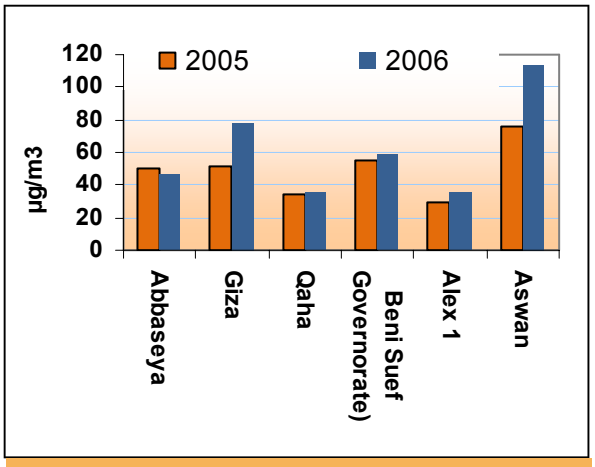


Figure (1-20) : Annual Average of Ozone Concentrations during 2005 and 2006

The above figure shows that Ozone concentrations have increased (as an annual average) in all sites in Egypt, except for Abbaseya station. The only reason for this increase is the significant increase in the number of vehicles during 2006.

7. Carbon Monoxide Gas

Carbon monoxide (CO) is emitted from vehicle exhaust and burning coal or wood in heaters. It is considered one of the most dangerous and toxic pollutants affecting both human beings and animals. CO reacts with hemoglobin forming carboxi-hemoglobin preventing oxygen from combining with hemoglobin, depriving the body from oxygen resulting in suffocation.

Environment Law executive regulations stipulate that the maximum permissible limit of exposure to CO for one hour and eight hours is 30 mg/m^3 and 10 mg/m^3 respectively. The Executive Regulations do not specify any daily, monthly, or annual limits for CO concentrations.

Figure (1-21) clarifies the annual average of CO concentrations during 2005 and 2006 in the three working stations measuring CO in Egypt. It is clear that concentrations in 2006 were less than those in 2005 in most of the stations. All concentrations are less than permissible limits.

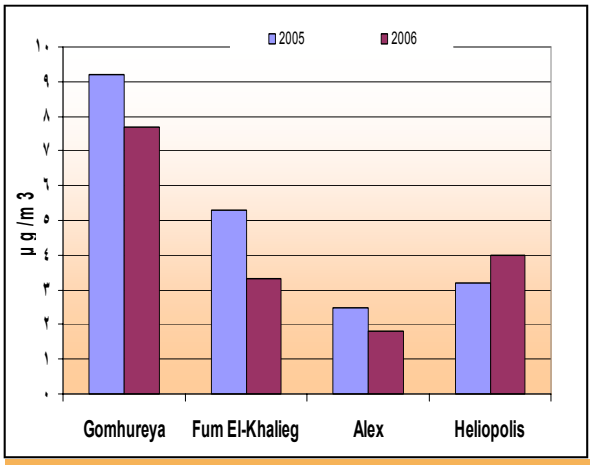


Figure (1-21): Annual Average of CO Concentrations during 2005 and 2006

Figure (1-22) shows average CO change per day in Alexandria monitoring station (Institute of Oceanography). Concentration levels monitored during any time of the day did not exceed 4 mg/m^3; which is less than permissible limits.

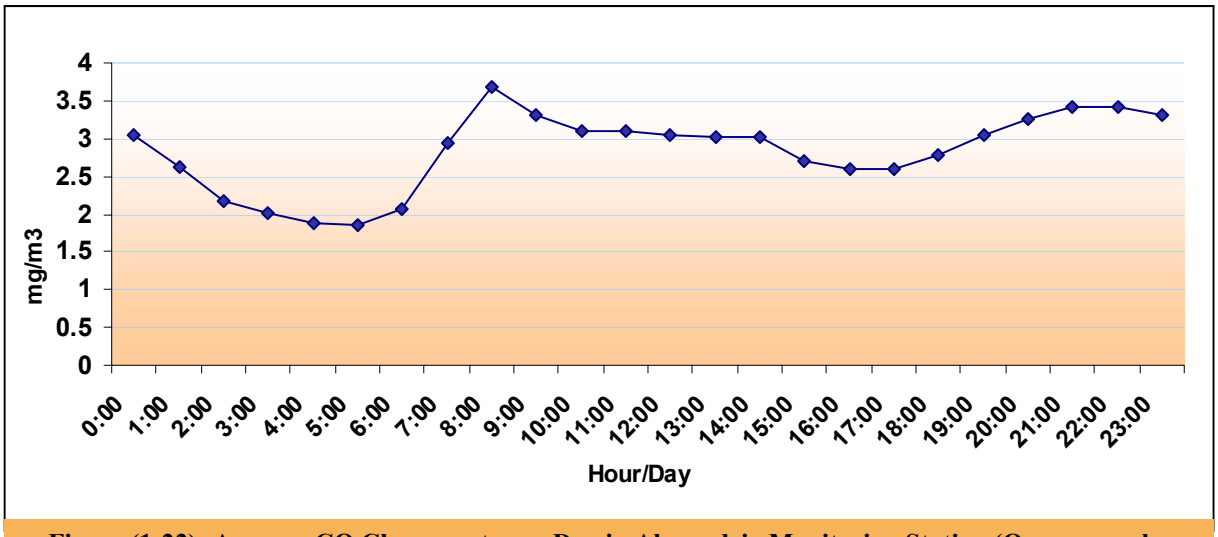


Figure (1-22): Average CO Change rate per Day in Alexandria Monitoring Station (Oceanography Institute)

Severe Air Pollution Episodes (Black Cloud)

In autumn 2006, sever air pollution episodes (black cloud) occurred, repeating annually in autumn since this phenomenon started in 1999. It is well known that these episodes occur due to the accumulation of air pollutants' loads over Greater Cairo coinciding with the meteorological phenomenon known as thermal inversion in autumn. Citizens often feel the accumulation of particulates in air accompanied by the smell of "burning" particularly after sunset till the dawn of the following day. These episodes usually extend for separate periods (days) during September, October, and November.

Results of inhaled particulates monitoring from September to mid-November 2006 show that number of hours during which concentrations exceeded 300µg/m^3 have increased in some monitoring stations in Cairo (see Table (1-9)).

Table (1-9): Number of hours during which Concentrations Exceed 300 µg/m^3 for Suspended Chest Particulates in some Monitoring Stations in Cairo

Area	2005	2006
Kolaly	33	64
Abbasseya	18	28
Tebbin	94	155
Heliopolis	3	25
Muhandeseen	24	34

Considering SO_2 and NO_2 concentrations during the same period, there were no tangible change between 2005 and 2006.

Reasons for high inhaled particulates percentage monitored in October 2006 Compared to October 2005

1. Meteorological Factors

a. From 1 to 9 of October, 2006, for seven successive days wind direction was North to North-East, wind speed was calm, and burning rice straw was intensified. This lead to concentration of pollutants from Delta governorates during this period.

b. In 12 and 13 of October, 2006, thickness of thermal inversion layer was less than 15 m for 10 and 12 hours, respectively. Accordingly, citizens felt the crisis.

c. Traffic volume in 22 and 23 of October, 2006, had a great impact in increasing dust concentrations for only two hours (just before Bayram).

2. Human Activities

Increased emission loads lead to polluting the air in Greater Cairo this year compared to previous years due to:

a. Areas cultivated with rice increased in 2006 compared to 2005 by approx. half million feddans. Total area cultivated by rice was 2 millions feddans in 2006, while it had been 1.5 million feddans in 2005. As a result rice straw volume increased by around 1 million tons.

b. Large traffic jams in various Greater Cairo regions especially after "Iftar" (breaking Fast) till the early hours of the following day. Accordingly, pollutant concentrations increased in stations at dense traffic areas, such as Kolaly and Fum El-Khaleig Squares.

c. Some foreign garbage collecting and cleaning companies stopped working, and garbage accumulated inside residential agglomerates in Cairo and Giza. Accordingly, self burning rates increased producing polluting emissions. This is one of the factors contributing largely to feeling such phenomenon. MSEA, however, made great efforts to collect 15 million tons of historic accumulations surrounding Greater Cairo by the end of 2006.

d. Dumpsites are not tightly controlled. As a result they burn in e.g. El-Wafaa Wal-Amal dumpsite in Cairo and Shubramant dumpsite in Giza.

Results Analysis

1. What Greater Cairo air witnessed during October, 2006, when meteorological factors combined with increased pollution loads from human activities, had a clear impact on feeling such phenomenon. However, MSEA bodies in cooperation with other authorities exerted many efforts to control different pollution sources and reduce the crisis' intensity and duration.

2. These efforts succeeded in limiting the hours during which Greater Cairo was exposed to high pollution concentrations, reaching to just 6% in total monitoring hours during October.

3. These efforts have also participated in reducing concentration intensity during crisis periods preventing them from reaching an alarming state. All concentrations were within average and more than average limits.

4. Monitoring results during Bayram vacation showed significant improvement in pollutant concentrations. This phenomenon could be eliminated and air quality

of Greater Cairo could be improved if pollution loads produced by different pollution sources are decreased, particularly vehicular emissions, open burning of wastes, and industrial emissions.

5. All concerned ministries should collaborate, namely Ministries of Agriculture, Interior, Local Development, Investment, Petroleum, and Irrigation. The objective is decreasing pollution loads from all pollution sources. All ministries should be committed to executing and prioritizing this plan's programs.

Under the Greater Cairo Air Improvement Project, EEAA studies have indicated that air pollution sources in Greater Cairo due to suspended particulates **Under Normal Conditions** are: burning solid wastes, industry, transport, and burning agricultural wastes.

Figure (1-23) represents proportional distribution of each of these sources.

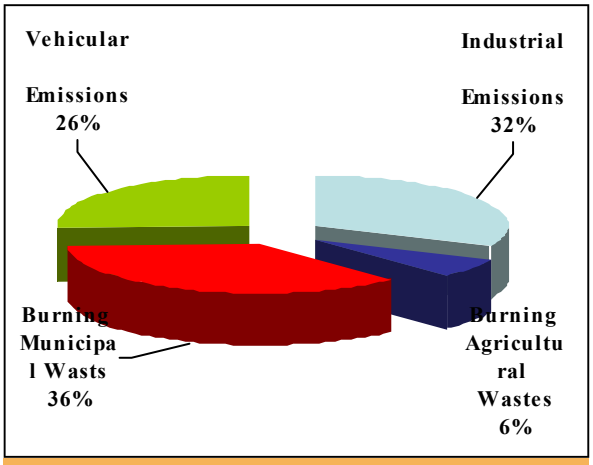


Figure (1-23): Annual Average of Pollution Ratios by Suspended Dust from various sources

A detailed study made through this project during the black cloud of 1999 show that burning agricultural wastes occupied the highest percentage among suspended particulate sources.

Figure (1-24) represents the sources of these particulates in this year during sever pollution period.

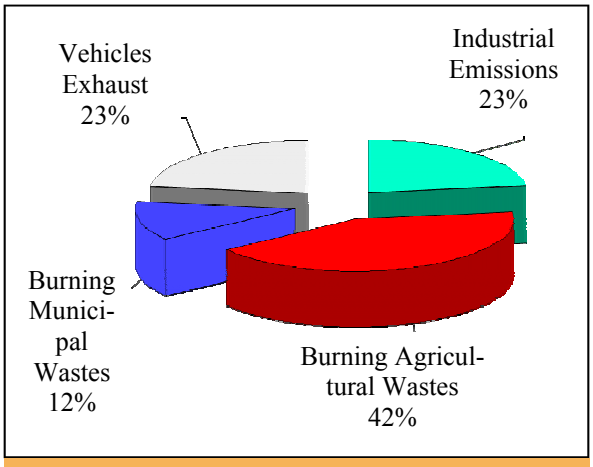


Figure (1-24): Rates of suspended chest dusts pollution from different sources (during severe

MSEA Air Quality Improvement Efforts

1. Environmental Impact Assessment Studies

Environmental Impact Assessment (EIA) is the regular inspection of unintentional impacts resulting from a developmental project or program. EIA aim is to minimize or mitigate negative impacts and maximize positive impacts. From practical side, this means studying and analyzing the environmental feasibility of a proposed project, since execution and/or operation of this project can affect environment safety, natural resources, and/or human health.

MSEA reviewed 345 major industrial projects to limit negative impacts on air quality which may be produced by these activities (see Table 1.10). This process is among 12,332 EIA studies which were reviewed during 2006 (see Table 1.11).

Table (1-10): Industrial projects with EIA studies reviewed during 2006

Metallurgy Plants	4
Cement Plants	11
Clay Brick Plants	311
Petrochemical Plants	2
Fertilizers Plants	5
Foundries	5
Chemical Plants	7
Total	**345**

Table (1-11): Number of EIA Studies during 2006

A	8959
B	3193
C	180
Total	**12332**

2. Cement Factories

MSEA concern to monitor emissions from major industrial sources was one of the most important steps for controlling and preventing pollutants' risks. Accordingly, a national network for monitoring emissions from cement plants and companies was established. This network links self-monitoring systems in these companies with EEAA where emissions are constantly monitored.

Cement industry in Egypt represents an important part of Egyptian economy. It is characterized by abundance of production and raw material sources. This industry has witnessed great developments allover the last decades. Cement plants increased from 4 plants in 1975, with 4 million tons/year production capacity, to 15 plants by December 2006, with more than 35 million tons/year total production capacity. These plants cover wide areas in Egypt, in addition to investments intended to be directed to establishing new cement companies which, if approved, are expected to double production capacity.

The study on identifying the sources of each pollutant shows that current cement

companies in Greater Cairo are responsible for about 6% of suspended chest dusts in Greater Cairo generally. This ratio reaches 30% in the environs of these plants and companies.

Cement companies shifted from wet process to dry process with the purpose of rationalizing energy, water consumption, and maximizing production. However, the problem of emitted dusts and By-Pass dusts appeared. These dusts are estimated at hundred thousands tons per year, which gives a kind of warning of significant problems in production sites as well as environmental problems in the surrounding areas (it is well-known that the dry process produces tripled amount of dust compared to the wet process).

Cement Plants Monitoring Results Indicators during 2006

Daily round-the-clock monitoring for ensuring emission compliance with maximum levels stipulated in Law 4/1994 has shown the following:

- 1228 violations were recorded due to dust emissions from some cement plant stacks, which exceeded maximum limits all the year round (2006).
- Highest number of violations (63% of violations) was recorded at the beginning of 2006, during January, February, and March, due to application of new strict maximum limits, amended at the end of 2005. Companies within Greater Cairo recorded the largest number of violations (65% of total number of violations).
- Significant reduction in the number of monitored violations was recorded by the end of 2006 as a result of EEAA efforts to ensure compliance of such companies with the new maximum limits. Rate of violation reduction during 2006 was 97%.

On comparing cement plants monitoring results in 2006 versus those of 2005, the Following was found:

- Total number of emission violations of cement companies monitored in 2006 exceeded those of 2005 by five folds.
- Clear and significant reduction (37%) in number of violations monitored in December 2006 compared to December 2005 as a result of EEAA's efforts with these companies to comply with the new maximum limits. Thus, reducing the number of monitored violations.
- By the end of 2006, monitored violations of factories within Greater Cairo had decreased significantly. The number of these violations was near that recorded in 2005 despite difference in maximum permissible limits of dust emissions (500 mg/m^3 in 2005 and 300 mg/m^3 in 2006).

3 – Control of Mobile Sources of Pollution:

A –Vehicular Emission Testing as Part of Licensing Requirements:

Completing MSEA's plan to associate vehicle licensing with exhaust testing, the third phase, in 6 new governorates involving Menia, Fayoum, Beheira, Qena, Sohag and the Red Sea, has been implemented. Thus, the program would have been implemented in 12 governorates by the end of 2006, which represents 77% of total number of vehicles in Egypt (figure 1-25).

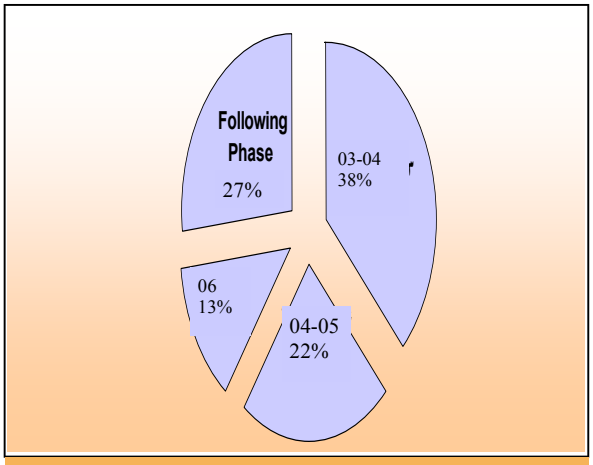


Figure (1-25) Vehicular testing program as part of vehicles licensing

B – On-the-Road Vehicle Emissions Testing:

In 2006, technical testing of vehicle exhaust on roads has been implemented in several Greater Cairo areas for 56430 vehicles (Gasoline and diesel) through joint campaigns by the traffic departments in governorates and the EEAA. Results indicate that almost 72% of the vehicles passed the test (figure 1-26).

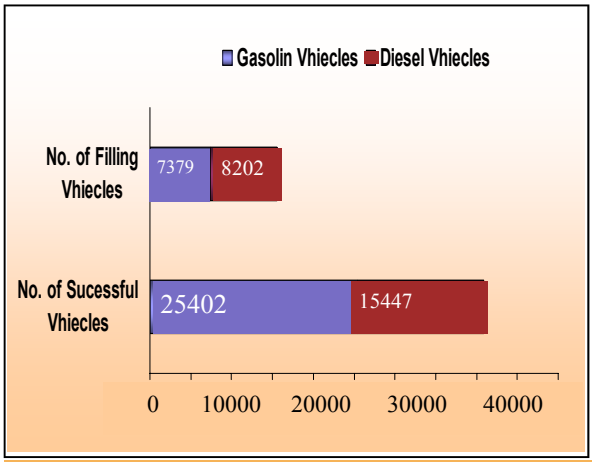


Figure (1-26) Results of technical testing of vehicle exhaust on roads in 2006

Public Transportation Authority Bus Inspection Program

A bus inspection program was implemented for testing Public Transportation Authority buses in garages in 2006. Results indicate that almost 36% of total numbers of Public Transportation Authority and Greater Cairo Co. buses have passed the test (figure 1-27).

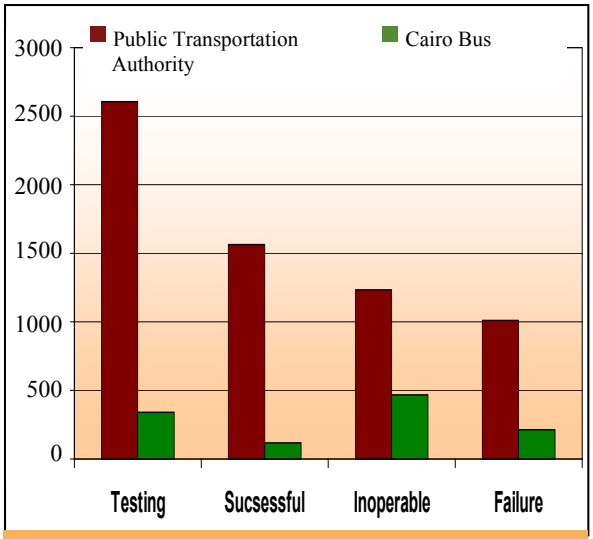


Figure (1-27) Results of technical testing of Public Transportation Authority and Greater Cairo Co. buses exhaust on roads in 2006

C – Reducing Pollution from Motorcycles:

Studies conducted worldwide concluded that hydro-carbons emitted from one motorcycle with binary vapor engine equate emissions from 10 – 15 gasoline operated cars. In Egypt, there are 500,000 motorbikes, 95% of which have binary vapor engines. In Greater Cairo alone, there are 200,000 motorbikes emitting 120,000 tons of air pollutants per annum, thus adversely impacting on air quality.

Within the context of efforts directed to reduce motorcycle emissions, importing of used motorcycles with binary vapor engines has been prohibited. Likewise, production of motorcycles with binary vapor engines not equipped with oil injecting pumps has been banned. Using motorcycles with binary vapor engines of all types and sizes in Egypt will be prohibited starting 31/12/2007.

D- Phase-2 of the program to turn 5000 governmental vehicles to run on Compressed Natural Gas (CNG):

A. All agencies involved have been addressed, governmental vehicles that work with Gasoline have been scanned and a relevant database established. Moreover, a committee has been established for following up the project, and studying the results of this phase to follow up on the requirements and standards for the switching process.

B. In the framework of completing the project phase I, 87 vehicles have been fuel-switched to work with natural gas in Greater Cairo during the period from September 2006 – December 2006.

C. This represents 33.9% of the whole plan until December 2006. By that time, the number of vehicles, being turned since the beginning of phase 1 reached 1943.

D. 800 vehicles had been surveyed in the period from September 2006 – December 2006, 698 of which in Greater Cairo, representing 87.3% of total surveyed vehicles, Alexandria came second with almost 84 vehicles, i.e. 10.5 % of total vehicles. While 18 vehicles have been surveyed in the rest of the governorates. Therefore, the number of scanned vehicles since the beginning of the project's phase-1 reached 2800.

4- Surveying Pollution Spots at the National Level:

A. Smelters that require development to work with natural gas instead of mazot (1408 smelters) have been identified. Currently technologies used in foundry work are being modified, in addition to the possibility of changing the fuel used to natural gas or solar.

B. Brick factories that require improvement by atomization of mozat have been scanned, and 546 factories identified. ("50" factories of the total number of factories in Arab Abu Sa'ad area have been developed). Violating factories are being closed down and legal measures against them taken, while coordination with such factories to comply is being carried out. Development costs reached 50,000 Egyptian pounds per factory.

C. Potteries that require improvement to operate on natural gas have been surveyed and a total of 665 identified. Measures have been taken to improve such potteries by experimenting many models of such potteries that meet the specifications required for safe operation and product quality. Currently, a study is being conducted on providing the financial source for funding and rolling on pottery development.

D. Klins needed to be developed into closed buring were surveyed and 675 kilns identified. Kilns standard specifications are currently being endorsed to issue standard specifications for the

first time in order to allow for approving the development of all kilns.

5- Relocating and Developing Polluting SMEs in Greater Cairo Region:

SMEs that impact air quality in Greater Cairo region include potteries, kilns, smelters, brick factories, quarries, and crushers. In dealing with these activities, MSEA depends on two main axes:

Urgent Plan

To reduce emission from these activities through implementing quick measures, with the knowledge of facility owners, to control pollution sources while implementing Environmental inspection plans to address violating cases and taking respective legal measures.

Long-term Plan

Relocating and developing such activities according to their respective types and geographical location through providing financial packages in coordination with the Ministry of International Cooperation and governorates. The following describes the current situation:

Potteries

Potteries's activities are concentrated in Batn El Baqar and El Mothalatha areas in Old Cairo district. 179 facilities are currently being developed in the same site; 29 has been developed in El Mothalatha, and developed pottery units are currently being established in Batn El baqar, in addition to building an exhibition and occupational training center to preserve this heritage craft.

Smelters

Since their establishment, smelters are found in GC governorates and are spread inside residential blocks. Due to their environmental impacts, coordination between the Ministry of International Cooperation and the governorates has been implemented to provide the funding required for relocating such activities to safe sites that comply with environmental requirements, allocated by the governorates. The following is the current situation of relocating such activities:

Shobra El Khaima Smelters in Qaliubya Governorate (99 Smelters)

Safa industrial zone (142 feddans) has been allocated for this purpose. The Governorate has provided basic utilities and services to the allocated zone. A MSEA/ Qaliubya Governorate/IDA agreement has been signed on technical requirements, financial obligations and time plan to relocate all Smelters to Safa industrial zone. To date, 6 Smelters have been relocated and another 35 are underway.

Giza Governorate Smelters (41 smelters)

An area of 1500 feddans within to the Industrial zone on Cairo-Fayoum road has been allocated for relocating these smelters. The infrastructure and utilities are currently being connected. Development operations will include establishing model units that comply with environmental requirements appropriate to the type, area and volume of current Smelters to be relocated.

Cairo Governorate Smelters (569 Smelters)

They are planned to be relocated to Be'r Gendali area on Qatamya/Sokhna road, which was allocated to relocate the Cairo

Governorate polluting activities. Land use plans and EIAs are currently being undertaken for relocating these activities in order to satisfy sound specifications and environmental requirements.

Kilns

Such activities are concentrated in Qaliubya Governorate (166 Klins), most of them are in Tukh Markaz. Through joint coordination between MSEA, Qaliubya Governorate and the Egyptian General Authority for Standards and Quality, a standard specification for the improved klin model has been completed based on sound environmental and industrial basis. Currently and agreement for implementing the development plan is being developed.

Brick Factories

Those activities spread in Giza Governorate (418 factories) and Qaliubya Governorate (12 factories). However, in order for such factories to comply, and in the framework of international efforts to address climatic changes, 50 factories have been developed to work with natural gas. Preparations are underway to develop another 300 factories in Giza Governorate. The remaining factories are being developed using atomization to minimize gaseous emissions. In case of violation, necessary legal measures are adopted.

Marble workshops and Stone Crushers

Shaq El Thu'ban industrial area in East North Cairo was allocated for relocating and developing these activities. Currently there are 250 marble and granite workshops and 4 crushers. Utilities and services are currently being extended to the area. A special area has also been allocated for the disposal of industrial solid wastes as well as another area for establishing industrial effluents treatment plant to prevent environmental impacts resulting from these activities.

Quarries activities

Those activities are concentrated in Giza Governorate (294 Quarries), in Cairo Governorate (50 Quarries) and in Qaliubya Governorate (3 Quarries). For those activities to achieve environmental compliance according to their type and location, quarry regulatory environmental requirements have been established in the framework of environmental law 4/1994 and the Mines and Quarries law. In addition, a decision has been issued to close down some Quarries having direct environmental adverse impact and to stop granting licenses to environmentally non-compliant Quarries. Halting Quarry activities 30 km around Greater Cairo is currently being considered. As for the Cement companies' quarries, there is an ongoing monitoring plan associated with the implementation of strict controls and requirements for minimizing their impacts on the ambient environment.

Cleaning Up Lead contaminated areas in Shobra El Khaima:

In the framework of activating State policy to relocate environmentally polluting industries outside residential blocks, MSEA in cooperation with Qaliubya Governorate has implemented the closure of 5 Lead smelters in Shobra El khaima, considered the largest in Egypt, whose production represent over 70% of total national production. These were relocated to Safa industrial zone and 10th of Ramadan city and provided with advanced technologies to minimize their polluting emissions. This step has reduced Lead concentrations in

Shobra El Khaima by more than 80%, compared to estimated concentrations before relocation.

For completely eliminating the lead pollution problem in Shobra El khaima, MSEA has implemented a project in cooperation with Qaliubya Governorate and the USAID for cleaning Lead contaminated areas in the region, whose soil and walls are soaked in lead dust. Over the past two years, the project has cleaned and treated the locations of the five relocated smelters with a total area of 7,984 m^2. Other two sites were treated as well, and are being utilized as Lead melting sites in the same area. The project has also cleaned two schools in the area as well as a medical center in Kablat area.

These efforts have led to success in eliminating Lead pollution sources in Shobra El Khaima area.

To ensure ongoing success and avoid re-exposure of treated sites to pollution, Qaliubya Governorate has prepared Al Safa industrial zone to relocate all Shoubra El Kheima foundries. To encourage smelter owners to relocate, The Governor of Qaliubya has approved lowering the price of the land in this area from LE 175 to only LE 100/m^2, while providing payment facilities. This contributed in encouraging smelter owners to participate in a group initiative led by FEI Foundries Department, to relocate these smelters to Al Safa zone. An agreement has been developed to regulate the relocation process.

6- Minimizing Industrial Emissions

The importance of industry lies in its representation of 35.5% of the national income in Egypt, and around 25% of manpower are working in industry in 2006. The concern to achieve high industrial development rates without full awareness of the resulting environmental pollution risks has led to deteriorating environmental conditions and pollution of some natural resources leading to increased health risks.

Total number of industrial facilities in Egypt is around 27,600. Greater Cairo encompasses half of these industrial facilities (13,840 facilities), where large industrial facilities that produce huge loads of air and water pollutants, like Cement, Iron, Steel, Chemical industry and Tanning factories are concentrated.

Industrial Pollution Prevention Programs

1- Industrial Pollution Prevention Project (Phase 2):

- Due to the importance of pollution control, in addition to SMEs, a field survey has been developed focusing on the largest polluting industries in Greater Cairo and Alexandria Governorates.

- Investments required for large establishments to comply (200 industrial facilities) have been estimated at LE 2 billion. MSEA has provided around LE 1 billion Egyptian pounds funding donors (our partners in development) to support industrial compliance projects:
- In collaboration with our partners in development, MSEA has started implementing Industrial Pollution Prevention Project phase 2 (2007 – 2012), which was announced in December 7, 2006 with total funding of LE 1 billion.

Table (1-12) Investments required to achieve Industrial Compliance

Governorate	Number of proposed projects	Investment cost (LE million)
Qaliubya Governorate	35	294.34
Alexandria Governorate	20	458.6
Cairo Governorate	139	1057.462
Giza Governorate	6	126.94
Total	**200**	**1937.342**

The Final Beneficiary:
Large, Medium and Small Industrial Enterprises

Project Objectives:

- Industrial facilities compliance with environmental laws.
- Reducing pollution load generated by industrial facilities to improve air quality and prevent severe pollution episodes.
- Establishing permanent mechanisms to activate pollution prevention projects, enhance environmental compliance capacity and to encourage Egyptian industry so that their products would be compatible with export requirements and competitiveness in international markets.
- Supporting cleaner production projects, as such environmental projects contribute in reducing the use of raw materials and generated wastes, thus increasing production.

Projects Proposed for Funding:

- Supplying industrial pollution prevention equipment (air pollution, water pollution, work environment pollution).
- Supplying new production lines with modern and clean technologies in compliance to Egyptian environmental requirements.
- Supplying hazardous wastes treatment equipment within industrial facilities.

2- Noise Pollution

Introduction:

Noise is defined as unwanted sound. It is considered one of the most widespread environmental issues all over the world. For Egypt, the noise issue, as environmental pollution, ranks second among environmental pollution issues according to the complaint survey (received by EEAA) for 2006. It is considered a serious issue because of its harmful impacts on citizens and public health. The impact of noise may cause permanent hearing loss due to the exposure to noise levels exceeding 90 dB (where dB is the noise measurement unit). Noise adversely impacts development as a result of its direct and indirect effects on life activities (education, production, economic processes, and social aspects, etc). Exposure to high noise levels is among the key causes of human mistakes leading to increased accident rate. Egypt road accidents survey shows that human error accounts for 73% of accidents. Disturbing environmental noise produced by car horns, loudspeakers, and the high sound of TV sets and cassette players, which the citizens are exposed to, affects man's psychological and nervous health leading to annoyance and restlessness. This is considered a violation to the human right to rest and quietness. In addition to the abovementioned impacts, noise disturbs pregnant women putting them in an unstable state, accordingly impacting the fetus health.

In the last years, it has been noticed that noise levels in Egyptian streets are disturbingly increasing. These levels have reached unacceptable limits locally and internationally. Measurements indicate that noise levels in major squares and streets may reach approx. 75–85 dB, violating permissible limits stipulated upon in Law 4/1994 on the Environment and its executive regulations

not to exceed 60 dB by day, 55 dB in the evening, and 50 dB by night. High noise levels in major cities and governorate capitals are due to population growth and associated activities as well as the lack of sound urban planning.

Thus, development of a national plan for combating noise was a mandatory, with the participation of all concerned ministries, according to Cabinet directives. The plan included identifying roles and responsibilities of each ministry in light of the MSEA's strategy to mobilize efforts to face one of the most hazardous pollutants and identifying scientific solutions to combat it.

Noise Sources in Egypt

Egypt has recently witnessed increasing development of new projects in all activities, particularly in major cities, without prior planning. This is one of the outcomes of increased population, requiring more commercial and industrial activities in the residential areas, in addition to high traffic density resulting from increased number of vehicles. All these factors combined together lead to increased noise level. Major noise sources in Egypt include:

1.Noise from Transportation Means and Traffic Roads

Noise produced by means of transportation and traffic roads is considered to be the prime cause of environmental noise in Egypt. This type of noise contributes around 60% to noise causes. All areas at the level of major cities are exposed to this type of pollution. Citizens, in their workplaces, homes, roads, etc. are exposed to such type of noise. Noise from transportation means and traffic roads include the following sources:

A. Vehicles Noise

Noise from vehicles is produced by:

- Vehicle engines
- Exhaust pipes
- Horns
- Sounds of cooling fans, gearboxes, and brakes
- Tire-road friction

B. Railway Noise

Train noise affects the inhabitants adjacent to the railway lines within a distance of approx 150 m.

C. Aircraft Noise

The increase in air traffic in airports impacts urban and housing areas which have marched around airports through high levels of noise, especially for areas near runways.

2. Noise from Power Stations

3. Noise from Industrial Facilities

There are some industries which are considered major sources of noise such as textile, metallurgical, and wooden industries, as well as some equipment such as compressors, boiler chambers, and power generators.

4. Noise from Commercial and Human Activities

Commercial activities under residential blocks are considered one of uncontrollable noise sources. Therefore markets and commercial activities should be transferred away from residential areas and new licenses should not be issued inside these areas.

5- Construction and Demolition Noise

Noise from construction and demolition is produced by equipment used for these purposes. This, however, is a temporary source of noise in certain areas which ends by the termination of construction works.

6- Noise from Central Cooling Systems and Air Conditions

This is due to the absence of Building Noise Code as well as acoustic abatement design for places of AC installation and central air conditioning systems.

Demonstration Monitoring of Environmental Noise Levels for 2006

1. Noise Levels in South Cairo

Completing the studies made during 2005 which clarified noise levels in South Cairo region, noise levels were monitored 24 hours in Nile Corniche road through a mobile noise monitoring station installed in the building of Environment and Water Police General Department. This was the trial stage of permanent noise monitoring process as an arrangement to start operating environmental noise monitoring network. Monitoring aims at the following:

- Assessment of noise levels resulting from traffic, to which the Egyptian citizen is exposed.
- Preparation of an exhaustive report about noise sources levels and the proposed solutions to improve the current status which will be submitted to decision makers.

These measurements are executed on three stages:

- Monitoring and analysis of noise data.
- Preparation of environmental noise maps of such area according to measurement results.
- Development of necessary recommendation.

a. Noise Measurements

As shown in next figrs ((2-1),(2-2), (2-3)) and table (2-1).

Monitoring Results Analysis

1. Results show that L(A)eq levels exceed permissible limits stipulated in the Executive Regulations of the Law of Environment during the three periods of the day: 60 dB during day, 55 dB during evening, and 50 dB during night, throughout the monitoring period (October, November, and December). Noise levels were higher by approx. 16 dB during day, by approx. 20 dB during evening, and by approx. 25 dB during night.

2. Analysis of measured sound frequencies show that the frequency of the highest measured sound level ranges between approx. 400–4000 Hz during the three periods of the day throughout the monitoring period. Noise sources of this frequency range could be identified as a group of sounds produced from horn and car engine sounds.

3. Analysis of monitoring results show that the main source of sound which increases noise rates in this region is increased traffic volume in addition to

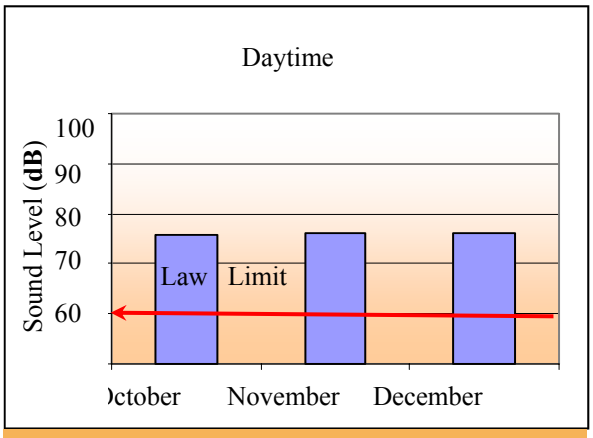


Figure (2.1) $L_{(A)}$ eq during day

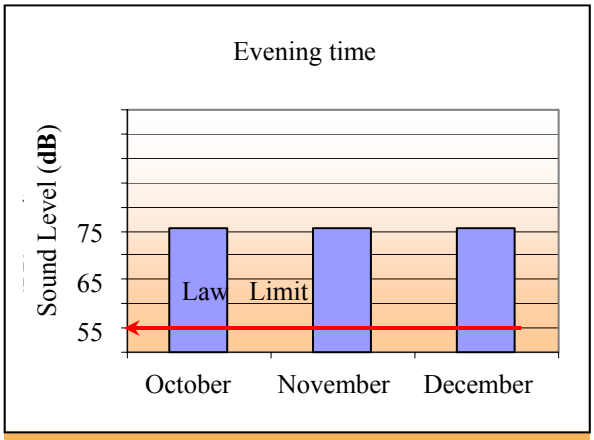


Figure (2.2) $L_{(A)}$ eq during evening

Table (2.1) $L_{(A)}$eq during different periods of the day for three months at Nile Corniche road (Maadi–Helwan)

Month	Day $L_{(A)}$ eq		Evening $L_{(A)}$ eq		Night $L_{(A)}$ eq	
	Measure-ment	Permissi-ble limit	Measure-ments	Permissi-ble limit	Measure-ments	Permissi-ble limit
October 2006	75.9	60	75.73	55	74.61	50
Novem-ber 2006	76.27	60	75.77	55	74.63	50
Decem-ber 2006	75.98	60	75.43	55	74.45	50

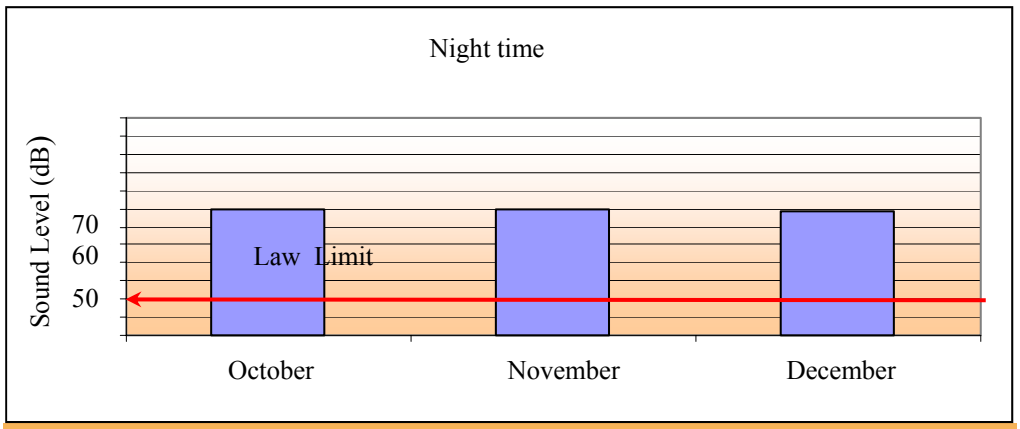


Figure (2-3) $L_{(A)}$ eq during night

the high sound of horns which are extensively used. This could be due to the absence of a pedestrian area, accordingly pedestrians pass randomly.

3. Noise levels exceeding permissible limits during night could be the result of increased heavy truck traffic and use of horns in vehicles and wedding processions at night time.

4. Comparing noise levels during days of the week, it was found that they are close although it was expected that noise levels would decrease during Fridays and Saturdays as the weekends.

This shows that traffic volume increases during weekends.

b. Environmental Noise Contour Maps in Nile Corniche (Maadi–Helwan) Road

These maps have been drawn using noise monitoring measurements and noise prediction program

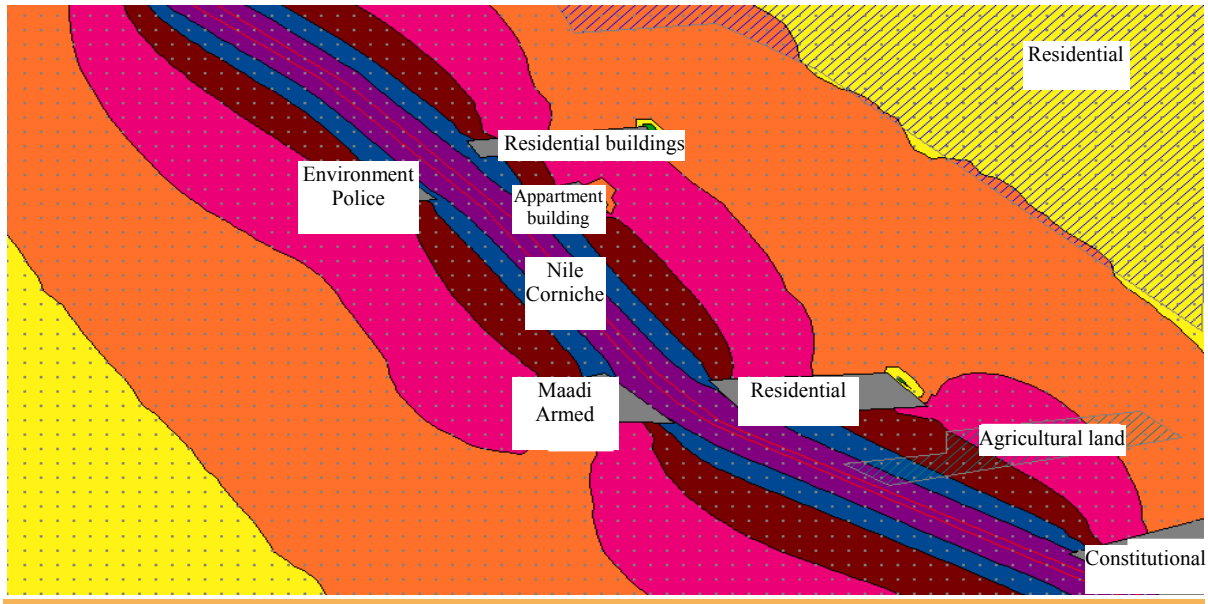


Figure (2.4) Environmental Noise Map in Nile Corniche (Maadi–Helwan) Road during Day

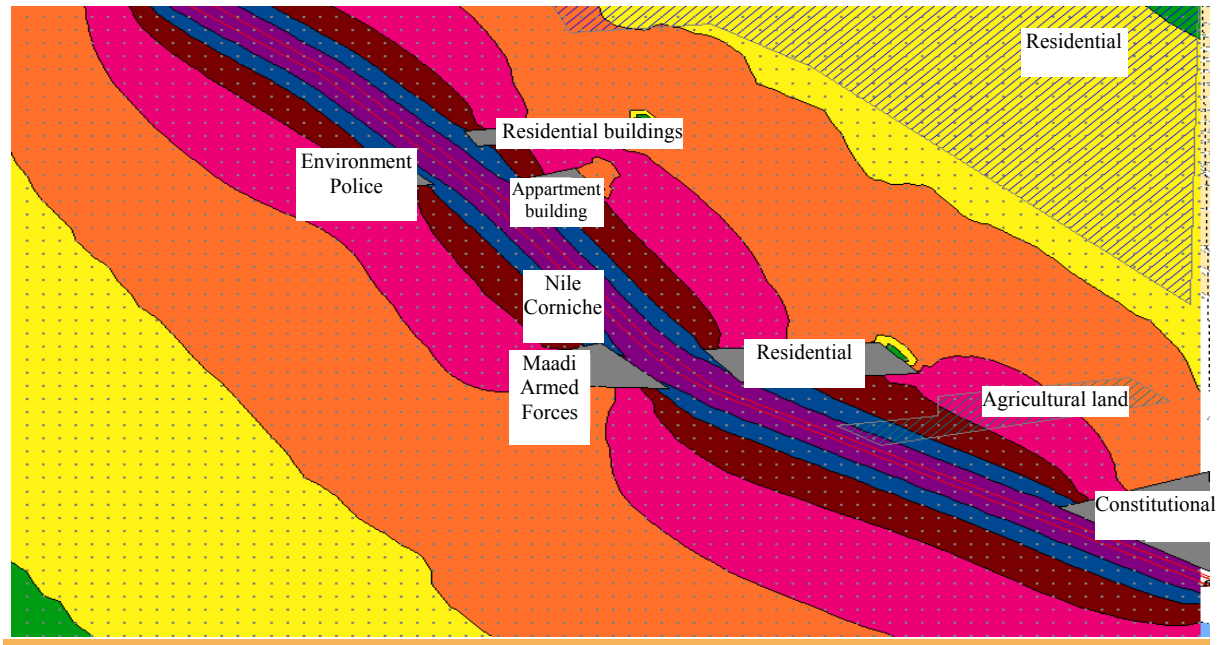


Figure (2.5) Environmental Noise Map in Nile Corniche (Maadi–Helwan) Road during Evening

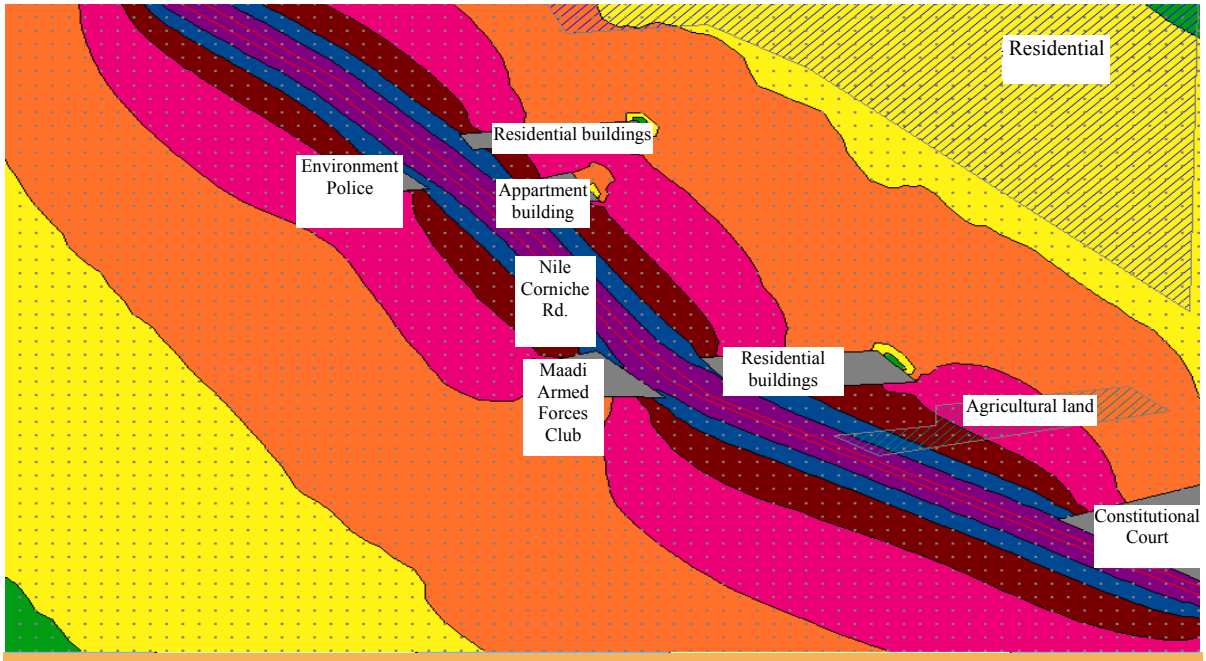


Figure (2.6) Environmental Noise Map in Nile Corniche (Maadi–Helwan) Road during Night

nr	From	To	fill style	fill color
1	45.0	55.0		
2	55.0	60.0		
3	60.0	65.0		
4	65.0	70.0		
5	70.0	75.0		
6	75.0	80.0		
7	80.0	95.0		

Contour Map Legend of Noise Levels around the Road
Colors indicate noise levels in dB

2- Noise Levels in Giza Square

Within the framework of re-planning and developing Giza Square, which suffers from high noise due to increased traffic volume and variety of overlapping activities, measurements have been carried out in the Square to determine the current noise levels, make use of results in proper planning of the square, and avoid increase of noise levels after development ends. These measurements aim at the following:

- Evaluation of noise levels to which the Egyptian citizen is currently exposed and the extent of noise level compliance with limits stipulated in Law of Environment 4/1994.
- Making use of measures in reducing noise levels during the re-planning and development of the Square to meet limits stipulated in Law of Environment 4/1994 after development.

Noise monitoring measurements were carried out for two hours per day period as stated in the Executive Regulations of the Law of Environment. Results were compared with parameters provided in Table (2), Annex (7) of the Executive Regulations, Law of Environment 4/1994. Giza Square was considered a commercial, administrative area and as downtown.

Measurement Locations in Giza Square:

1) In front of Istiqama Mosque
2) In front of Omar Effendi (Giza)
3) In front of Misr Insurance Building
4) In front of Bank Du Caire

a. Measurements Results and Noise Data Analysis

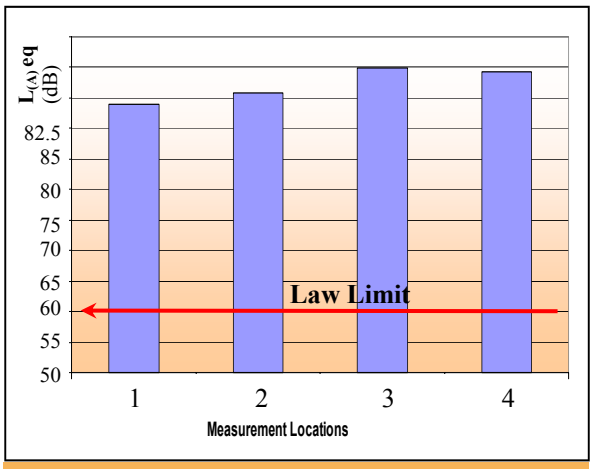


Figure (2.7) comparison between $L_{(A)}$ eq results at measurement locations during evening

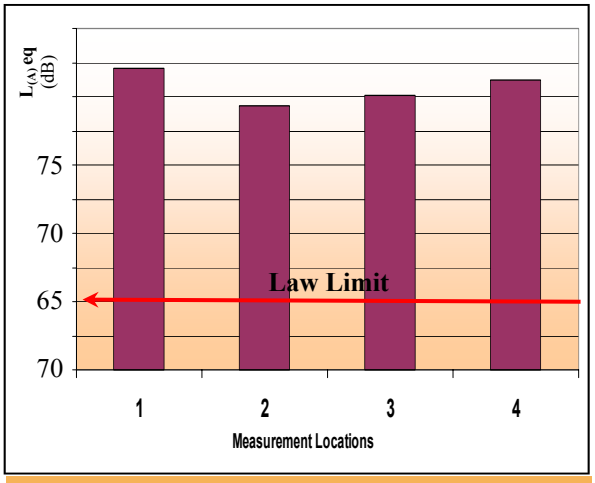


Figure (2.8) comparison between $L_{(A)}$ eq results at measurement locations during day

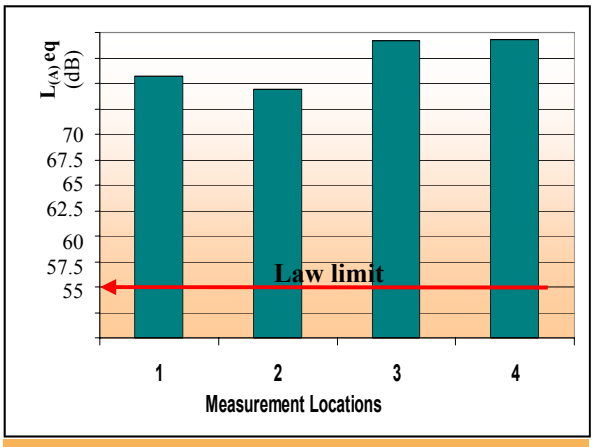


Fig. (2.9) Comparison between $L_{(A)}$ eq at measurement locations during night

Table (2.2) $L_{(A)}$ eq during Day Periods at Measurement Locations in Giza Square

Period	permissible limits of $L_{(A)}$ eq (dB)	Noise Level at Location 1 $L_{(A)}$ eq (dB)	Noise Level at Location 2 $L_{(A)}$ eq (dB)	Noise Level at Location 3 $L_{(A)}$ eq (dB)	Noise Level at Location 4 $L_{(A)}$ eq (dB)
Day	65	82.1	79.37	80.14	81.19
Evening	60	76.97	77.95	79.9	79.64
Night	55	75.73	74.4	79.2	79.29

Analysis of monitoring results:

1) Results showed a rise in $L_{(A)}eq$ than permissible limits set by the executive regulation of environmental law, during day periods for all monitoring locations. Noise levels increased during day time by a range of 15 to 17 dB, during evening by a range of 16 to 20 dB, and at night to more than 20 dB.
2) Relevance in results of noise level measurements at several locations around Al Giza square, El Gamaa and Morad streets, and El Ahram Street. They all ranged from 75 to 79 dB, this rise in noise levels at all locations is due to increase in the volume of traffic congestion, scattered microbus parking areas all around the square, and presence of street vendors causing obstruction of traffic flow and excess use of horns.
3) Although noise level measurements have been performed for location 4 (in front of Cairo Bank) on Friday (official vacation) where noise levels were expected to decrease, it was noticed that they have increased to be the same as all the week rates. This is due to excess traffic volume at the square as well as crowdedness of citizens especially during day time after El Gomaa prayer.
4) Measured sound frequencies analysis proves that the highest measured sound frequency ranges from 400 to 4000 Hz during day periods for all monitoring locations. Sources of noise for these frequencies can be identified as a group of sounds such as car horns, diesel-operated engine sounds (microbuses and buses), street vendors, and pedestrians sounds.

Note:

- $L_{(A)}eq$: The equivalent continuous A – weighted noise pressure level identified in the Environment Law 4/1994.
- Decibel is the unit of measuring sound level (**dB**)
- Hertz is the unit of measuring frequency (**Hz**)

b- Environmental noise Contour maps in Al Giza Square

These maps were drawn upon monitoring results and using noise prediction program

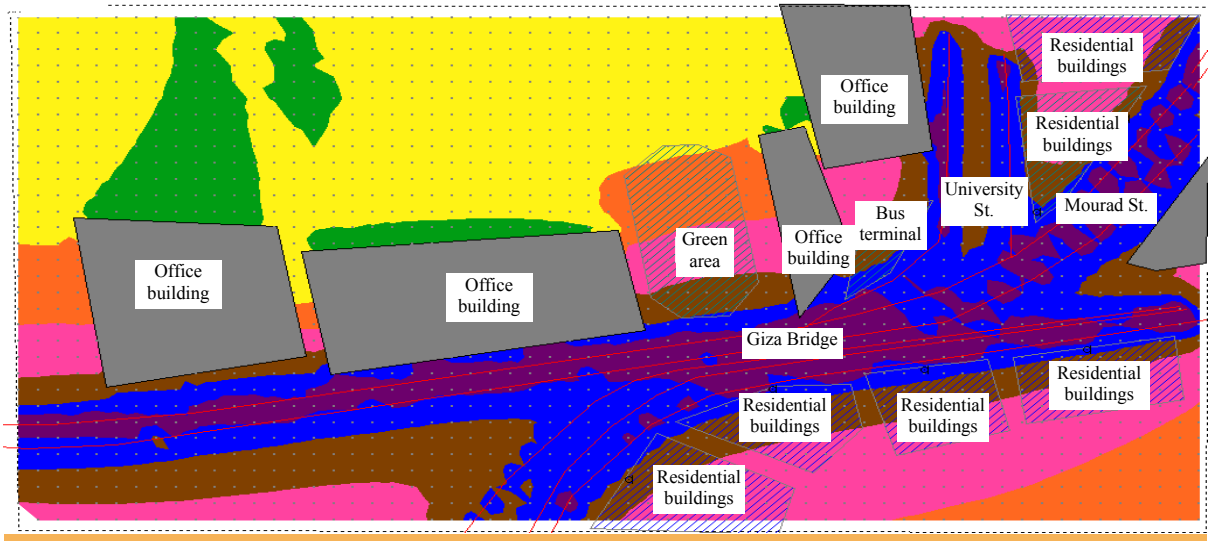


Fig (2-10) shows the environmental noise map for Al Giza Sq area at day time

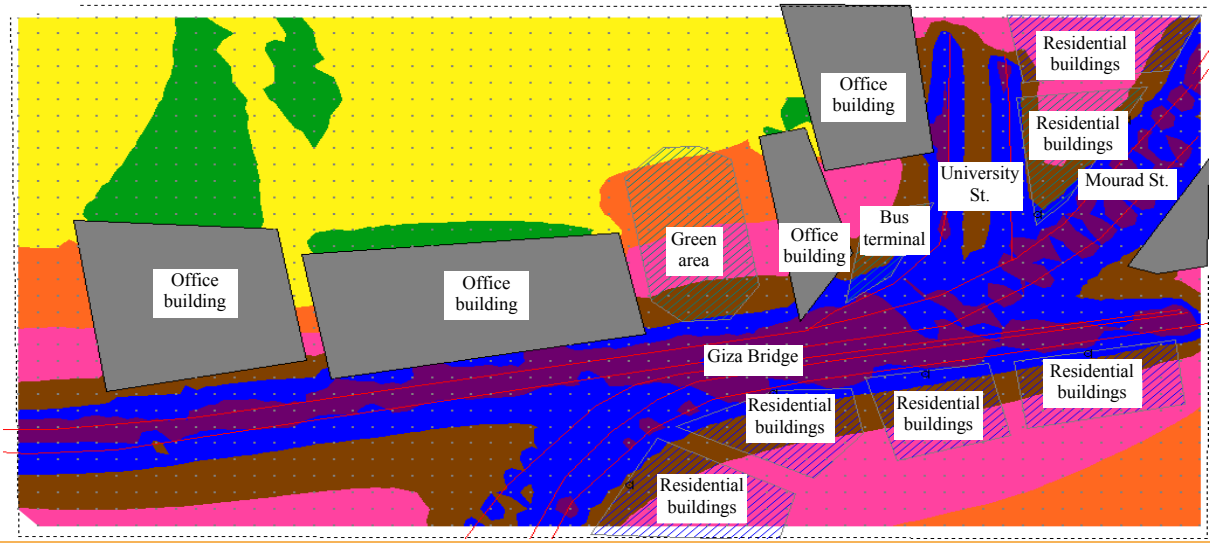


Fig (2-11) shows the environmental noise map for Al Giza Sq area in the evening

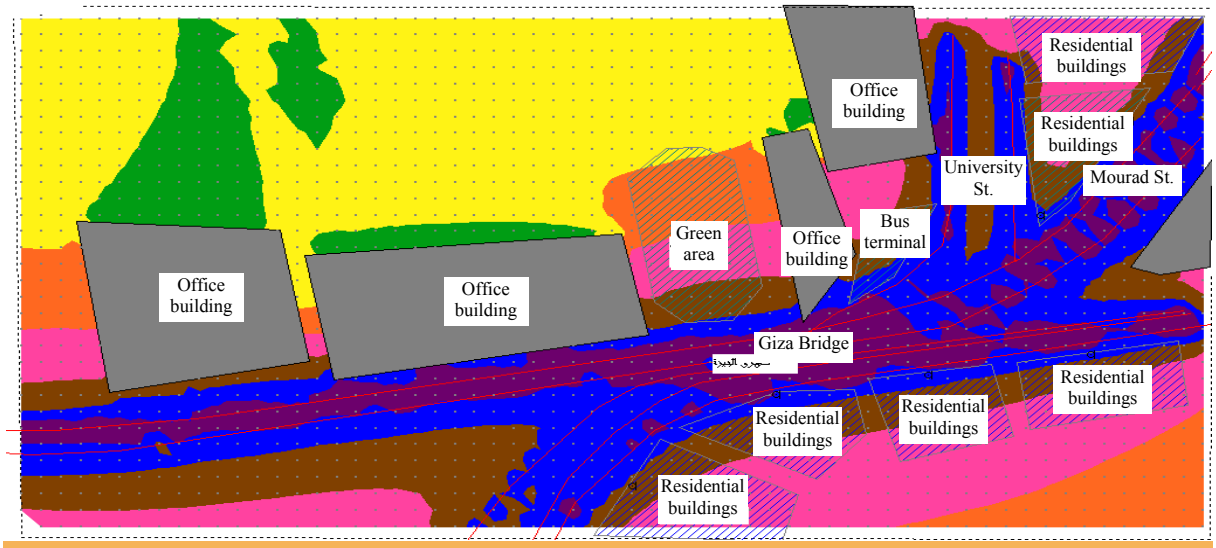


Fig (2-12) shows the environmental noise map for Al Giza Sq area at night

nr	From	To	fill style	fill color
1	30.0	50.0		
2	50.0	60.0		
3	60.0	65.0		
4	65.0	70.0		
5	70.0	75.0		
6	75.0	80.0		
7	80.0	90.0		

Contour map legend of Giza Sq;
Colors indicate the level of noise in dB

Noise levels of different activities all over the governorates of the republic during 2006

EEAA is activating the environmental law (EL) no. 4 of 1994 concerning article 44 of the executive regulation for permissible limits of noise levels through periodic inspection process over enterprises and investigation of citizens' complaints. A database was established for noise levels measured within industrial, commercial, and touristic enterprises all over the republic during inspecting these enterprises through the Environmental Inspection Department of EEAA and its RBOs. The database is published on the internet on the website of EEAA, and all the RBOs recorded their measurement results in the database.

The report denotes that the total enterprises inspected (concerning noise emission) at EEAA RBOs in different governorates during 2006 were 704. The ratios of violating enterprises were 32, 25% (recorded more than permissible limits of EL no. 4 of

1994). Necessary legal procedures have been taken towards these enterprises, while the ratio of non-violating enterprises was 66, 75%.

Table (2-3) No. of different facilities inspected concerning noise all over EEAA RBOs

(RBO)	No. of Violating Facilities	No. of non-Violating Facilities	Total
Cairo	57	66	123
Alexandria	18	149	167
Tanta	44	96	140
Al Masura	40	77	117
Al Suez	12	20	32
Asyut	52	60	112
Hurghada	11	2	13

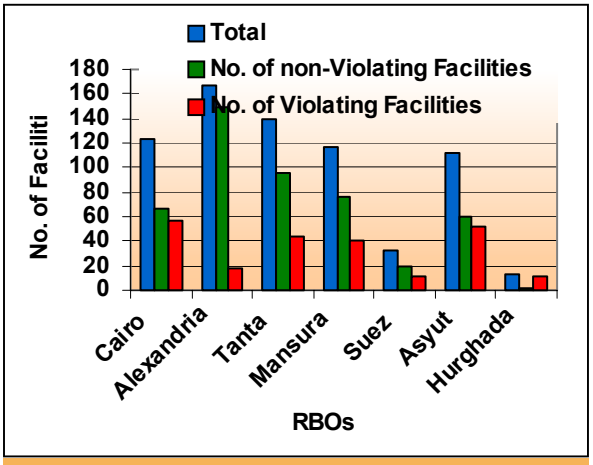
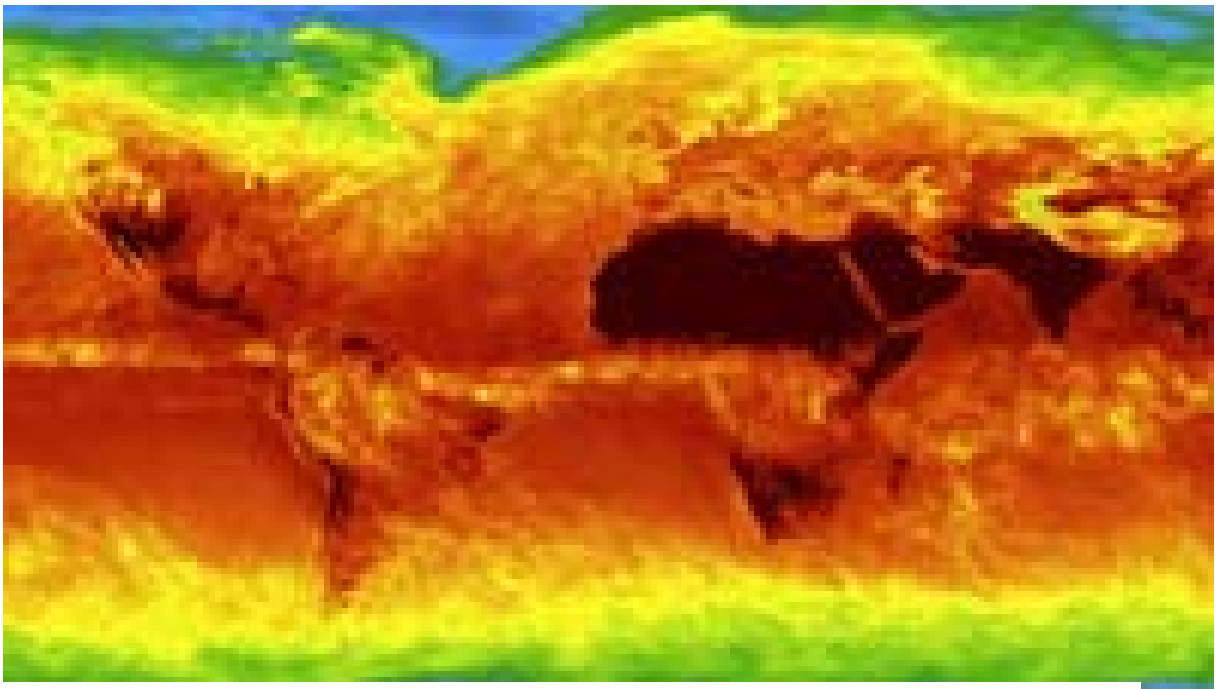


Fig (2-13) graph showing no. of different enterprises inspected during 2006 all over (RBOs) of EEAA

Efforts of the Ministry of State for Environmental Affairs (MSEA) to combat noise in 2006

In the framework of the National Plan (NP) to combat noise developed by EEAA in coordination with the concerned ministries, MSEA activated their role by preparing the necessary arrangements for establishing the National Noise Monitoring Network (NNMN) to monitor environmental noise levels. The Network will start operation on March 2007 with Cairo governorate as a first phase. NNMN consists of 20 Stationary monitoring stations and 2 Mobile trial monitoring stations. Locations where stations will be installed were chosen and identified; 5 stations location were identified to be installed permanently in five of the main squares (El Tahrir, El Ataba, Ramsis, Roxi, and El Opera), and 15 stations south of Cairo at locations of different activities according to international standards. They include various activities; (industrial, commercial, touristic, roads, railways, and residential). These stations will be transferred to north, east, and west of Cairo until noise monitoring is completed all over Cairo governorate, then they will be moved to Al Giza and Qalyubia during the second and third phases.



3- Climate Change

Introduction

Potential Climate changes resulting from increased accumulation of green house gases (such as carbon dioxide, methane, nitrous oxide, and others rare gases) are considered as a global problem that all countries of the world are cooperating to mitigate in order to protect Man and his environment from the negative impacts of these changes in future and from the current stresses impacting the environment.

Since 1990, the Intergovernmental Panel on Climate Change (IPCC) has been interested in the study of different climatic changes and their impacts through conducting different emission scenarios including mathematical models. Since then, it has also conducted several reviews of the results and emphasized in its fourth report for 2007 that if CO_2 gas rates into the atmosphere had doubled above values during the pre-industrial age, temperature would rise all over the world from about 1.8 to 4˚C by the end of the century. This would be accompanied by rise in the sea water level from around 180 to 590 mm. The IPCC shows that potential climatic changes will differ in their consequences from one continent to the other; and from one region to the other within the same continent.

Owing to the growing global concern with the issue of climate change, the United Nations Framework Convention on Climate Change was signed. Simultaneously, the United Nations Conference on Environment and Development (UNCED), "*Earth Summit*", was held in Rio de Janeiro in 1992. This was followed by the "*Kyoto Protocol*" declaration in 1997. All these efforts would force industrial countries to reduce their total green house gases at least 5% below 1990 levels by 2008 - 2012. The

protocol has also identified three mechanisms to help member parties reduce their emissions, these are: The C**lean Development Mechanism, Emissions Trading System, and Joint Implementation Mechanism.**

Although green house gases in Egypt do not exceed 0.6% of world total emissions (table 3-1), however Egypt as well as other countries will be highly affected by potential climatic changes. Potential disturbances might occur in the River Nile hydrology, affecting the amount of water available to Egypt. Wide ranges of north Delta might be affected as well especially the area between Alexandria and Damietta that extends to nearly 180 km and 50 km deep down in the Delta due to the rise in Mediterranean Sea level. Accordingly, Egypt has ratified the UNFCCC. Since then, EEAA is closely following up developments in climate change issues (participating in relevant conferences, workshops and international and regional meetings). Egypt has ratified the "*Kyoto protocol*" in 2005 and in this framework the Designated National Authority (DNA) for the Clean Development Mechanism (CDM) (one of the Kyoto protocol implementing tools) was established. The Egyptian DNA consists of the Egyptian Council for Clean Development Mechanism (EC-CDM) responsible for setting CDM policies in Egypt, and the Egyptian Bureau for CDM (EB-CDM), considered CDM executive secretariat.

CDM is one of "*Kyoto protocol"* three mechanisms; it aims at implementing projects in developing countries, with funding and technology provided by developed countries. These projects aim at reducing emissions of greenhouse gases and in return developed countries purchase CER's proving such reduction to be deducted from the permissible commitments of that respective country. As for developing countries in which such projects are implemented, they benefit from the transfer of this clean technology, and from selling these CER's to developed countries in addition to other social benefits.

Table (3-1) Quantities of green house gases emissions in Egypt

Year	Qty of emissions in Egypt Million equivalent ton of CO_2	Qty of emissions for the whole year
1990/1991	107	0.4%
2005/2006	152	0.57%
2006/2007	154	0.59%

DNA having initially approved seven CDM projects in 2005 and has approved 15 more projects during 2006. Investments required for implementing these fifteen projects are about 285 million $; these projects are:

1. Installing a cogeneration unit with 14 mw power, GT model, operating on natural gas at the Al Sindian Company Paper Factory.
2. Collection and burning of biologically-generated methane gas at waste dumpsites in Alexandria.
3. Replacing mazot with natural gas as fuel for Sinai Cement Company Factory (producing grey cement).

4. Implementing the first and second phases of the Greater Cairo Metro (network) line 3.
5. Partial replacement of fuel by Biomass fuel in Assiout Cement Factory.
6. Establishing 85 mw wind farms at Za'farana with Spanish cooperation.
7. Establishing 80 mw wind farm at Za'farana with German cooperation.
8. Tree planting of the ring road surrounding Greater Cairo.
9. Reducing greenhouse gases (Nitrous Oxide) (N_2O) in the acid production unit at Elnasser for Coke and Chemicals Company.
10. Replacing equipment and transforming fuel at the Dying and Chemical Materials Factory.
11. Reducing emissions of PFC gases at Misr Aluminum Company.
12. Fuel switching to natural gas in 311 Clay Brick factories at Arab Abu Sa'ed and El Saf areas.
13. Changing fuel type in boilers, dryers, and furnaces at the Alexandria Oil and Soap Company.
14. Changing fuel type used for power generation and industrial processes at Misr Fine Spinning and Weaving Co.
15. Changing fuel type used for power generation and industrial processes at Misr Beida Dyers Company.

The following is a list of projects granted final approval letters during 2006:

1. Establishing N_2O removal unit from exhaust gases at the Abu Qir Acid Plant.
2. Establishing a 120 mw wind farm at Al Zafarana.
3. Collection and burning of biologically generated methane gas at waste dump-sites in Alexandria.

Impacts of climate change on Egypt:

These projects are being marketed to identify donors for their implementation.
No accurate studies on negative impacts that could occur in Egypt due to global climatic changes.

However, an increased interest is dedicated to this issue at the level of different agencies, represented in the Higher Committee on Climate Change as well as different Universities and NGO's.

Recent reports (developed in 2006) published by the Governmental Committee On Climate Change, which is the official reference on this issue, emphasized that climate change is unequivocal reality, and that the worldwide rise in temperature was no longer a doubtful matter.

These studies also stress that the results of this change are; sea level rise from 20 to 60 cm during this century, change in rainfall sites and times, and the direct impact of temperature increase on Man and cultivated crops on which Man depends for food.

The following are the most vulnerable sectors and areas to climate change in Egypt:

1. Agricultural
2. Tourism
3. The Egyptian Delta

This is due to:

In Agriculture: There are two major potential threats; the first is results presented by some of the mathematical models that the River Nile might lose about 30 to 60% from its main resources due to change in the amount of rainfall at its origins. This might cause severe loss in agricultural production capacity. The second is that all international estimates show that North Africa rainfall farming productivity would decrease to 50% owing to climate change.

In Tourism: Climate change will cause a sea level rise, posing a threat to existing tourism investments. Temperature rise would also cause the whitening of coral reefs, the major tourism attraction in the Red Sea area.

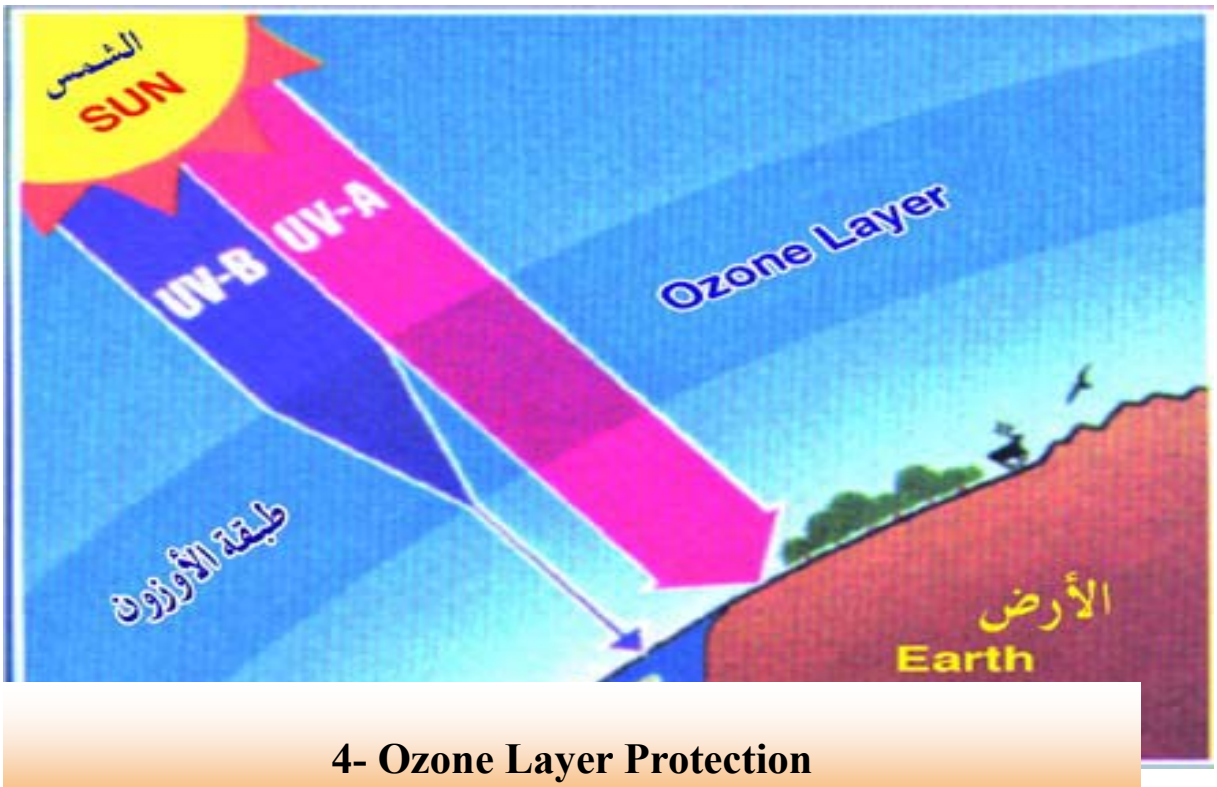
In the Egyptian Delta Area: UNEP and Alexandria University studies have proved that sea level rise would cause the submergence of a clear part of the delta, particularly areas below sea level. Moreover, potential leakages of sea water below Delta subsoil causing soil salination. This means losing the best agricultural land in Egypt and the evacuation of millions of local inhabitants.

As for Human health and life, this is associated with the spread of diseases never existed before in Egypt as a result of their transfer via disease vectors from the south to the north of the African continent.

The rise in temperature would also impact on the elderly and children. A clear example is increased death rates in Europe due to heat waves that hit Europe three years ago.

All these expected impacts require developing a comprehensive program with precise time frames and clearly identified responsibilities to address this problem seriously through:

1. Reaching the maximum certainty possible about what would happen to the river water through developing a regional mathematical model for Nile Basin countries. Based on the model's results, an integrated strategy of different alternatives should be developed to address the shortage or surplus in water resources.
2. Identifying available and possible alternatives for addressing the sea level rise issue for both the Delta and tourism investments on the Mediterranean and Red Sea coasts.
3. Identifying available alternatives for the cultivation of key field crops on which local inhabitants rely for food.



4- Ozone Layer Protection

Introduction

Ozone is formed in the upper layers of the atmosphere (the Stratosphere) by the natural reaction between oxygen molecules and atoms. At the same time, Ozone molecules are split into oxygen molecules and atoms by absorption of ultraviolet rays (UV-B). Such reactions (i.e. ozone formation and decomposition) are natural, constant and balanced governed by atmospheric factors and chemical composition of the stratosphere. However, it was found that some chemical compounds emitted by human activities (such as nitrogen oxides, chlorofluorocarbons (CFCs) and Halons) help in accelerating the process of ozone molecule decomposition, hence, disturbing the existing natural balance leading to depletion of the ozone in the stratosphere (known as the ozone layer).

It is known that the reduction of 1% in the ozone layer leads to an increase of about 2% in the UV-B amount reaching the Earth surface. Such increase causes disorder in the human body immunity system resulting in increased exposure to the different infectious diseases, eye diseases, particularly cataract, and increased skin cancer incidents. On another hand, the increase in UV rays is accompanied by harmful impacts on a large number of plants including crops such as vegetables, soybeans and cotton.

Ozone layer protection being a global issue, the international community has taken preventive action by concluding the Vienna convention in 1985 (the Vienna Convention on Ozone Layer Protection) emanating from which the Montreal Protocol (on Substances that Deplete the Ozone Layer) was signed in 1987. The Protocol (with several amendments introduced thereon after) had developed a timeframe for reducing the

production and consumption of ozone-depleting CFCs and Halons.

Halons, refrigerant gases (Freons), methyl bromide, Carbon tetrachloride and Trichloroethane (Methyl chloroform) are major ozone-depleting substances. Though Egypt is not one of the countries producing such compounds stipulated upon in the Montreal Protocol and annexes thereof, however it imports these necessary substances many industries rely upon, and used in a cluster of daily practices by all people, regardless of their groups, races or places of living, worldwide.

Eliminating ozone-depleting substances require much coordinated effort among all governmental/private institutions and civil society organizations and full cooperation among the different international community groups at all the national and regional levels.

Egyptian environmental policy strived to facilitate compliance with the provisions of the Montreal Protocol on the Protection of Ozone Layer without prejudice to developmental programs or impact on State priorities for achieving sustainable development.

Egypt is keen on regional cooperation and coordination with Arab and African countries through exchanging information and data to ensure communication and exchange of experiences with other countries. Egypt is committed to submit required reports and data to the Protocol Secretariat with utmost accuracy and in a timely fashion.

During 2006, the Ministry of State for Environmental Affairs (MSEA), in cooperation with agencies concerned, had overseen the implementation of projects for introducing alternatives to ozone-depleting substances, modern technology transfer activities and the replacement of old equipment and devices with new ones running on ozone-friendly substances in the different sectors, in addition to the implementation of awareness programs.

Full replacement of ozone-depleting substances (ODS) with ozone-friendly substances has been realized in the following sectors:

Foam Production Sector:

Full elimination of the use of ozone-depleting substances (CFCs) has been fully accomplished in 36 industrial facilities producing all types of foam. Worth noting, this sector used to consume 1302.8 tons of ozone-depleting substances.

Household Refrigerators Production Sector

Total elimination of the use of ozone-depleting substances (R-11, R-12) has been implemented in 28 industrial facilities producing household, commercial and industrial refrigerators as well as the introduction of new insulation and mechanical cooling circuit technologies. Ozone friendly products are currently widely marketed, particularly those based on R-134a in mechanical circuits and R-141B cooling gas in refrigeration insulation.

Industrial Solvents Sector

Full compliance of 9 national companies has been achieved, where annual consumption of depleting substances was reduced by 440 tons that were replaced by ozone

friendly substances. By the end of June 2007, the remaining 5 companies consuming 41 tons/year of Carbon tetrachloride and Trichloroethane as solvents for cleaning surfaces in optics industry, electronic products, metal industries and some plastic products will be phased-out.

Halons Sector

A national strategy has been developed for encouraging the use of Halons' alternatives. Hilwan Company for Engineering Industries is nominated for the management of the Halons Bank Project under UNDP and MSEA supervision. By the end of 2007, equipment needed for the Halons Bank Establishment and Management Project in Egypt will be fully installed and operational. The Bank's purpose is to provide vital sectors in Egypt with Halons used in fire fighting equipment and systems through recovery and recycling of Halons the importation of which will be banned by 2010.

Medical aerosols Sector

By the end of 2006, the Egyptian Pharmaceutical Sector Strategy had been developed aiming at transforming medical aerosols production lines using CFCs as propellants in manufacturing Meter Dose Inhalers (MDI) used in asthma and allergic respiratory diseases treatment . The Multilateral Fund (MLF) had approved funding the strategy in cooperation with the Ministry of Health and Population (MoHP) to phase-out consumption of these substances, given that this sector consumes 163 tons of CFCs. Full transformation of pharmaceutical companies' production lines is expected by 2009.

Refrigerant and Conditioning Equipment Servicing Sector

During 2006, MSEA had completed the implementation of the Egyptian Refrigeration Management Plan (RMP) Strategy for the Refrigerent and conditioning Servicing Sector. This eliminated the use of 162 tons of CFCs (R-11, R-12, R-113, R-114 and R-115) that were consumed annually during maintenance and repair operations.

The strategy included:

- Implementing a National Plan for meeting the needs of CFC Refrigerant and Conditioning Servicing Sector through adopting a standardized technology for the recovery and recycling of these ozone-depleting Freons.
- Developing a database on government and private sector maintenance and repair centers.
- Implementing a training program for maintenance workshop staff as well as for secondary industrial school Technical Higher Institutes students to prepare cadres trained on CFCs recovery and recycling systems.
- Distributing recovery and recycling equipment for free to air conditioning and refrigeration workshops and Mobile Air Conditioning (MAC) service centers.

Work at centers and workshops receiving free equipment will be monitored to ensure their compliance with the program terms and conditions aiming at eliminating the importation of CFCs by 2010.

Methyl Bromide Sector:

During 2006, MESA, in cooperation with the Ministry of Agriculture, had implemented research and field experiments for identifying suitable alternatives for the Egyptian environment to eliminate the use of methyl bromide in soil sanitization, fumigation of agricultural crops and commodities warehouses, silos and treatment in agricultural quarantine and pre-shipment of commodities (QPS) .

MSEA Strategy for in the coming phase

1. Gradual progress in the use of ozone-depleting alternatives as well as making them available at competitive prices to ensure Egyptian products and market stability.
2. Continuing the implementation of ozone-depleting substances recovery and recycling program besides providing maintenance workshops and service centers with free equipment and training technicians on their use.
3. Intensifying awareness campaigns on eco-friendly alternatives and directing them to all community categories.
4. Cooperating with all state control authorities and providing them with refrigerant gas analyzers and identifiers and providing training programs on their use for addressing illegal cooling gas trade and tightening the control over markets.

5- Fresh Water

Introduction:

Water pollution is any change in the natural, chemical or biological characteristics of water that affects its suitability, or renders it unsuitable, for the different uses. Surface waters (rivers and canals) are exposed to pollution as a result of discharging untreated liquid wastes into them. Pollution is not limited to surface water, but impacts groundwater as well, as contamination has become a problem in many areas due to increased usage of chemical fertilizers and pesticides in agriculture. Moreover, the discharge of different waste types (e.g. municipal wastewater and industrial effluents) into areas unsuitable for such purpose results into waste leaching into groundwater. Water with high concentrations of nutrients such as phosphates and nitrates leads to what is known as "eutrophication", or the increase of nutrients in water, leading to the growth of different algae and plants, such as water hyacinth, water lettuce and water cabbage, among others. Growth of such flora increases in warm weather and slow water streams. Eutrophication causes different harms to fish wealth in water bodies and bed organisms by blocking sunlight from reaching all parts of the water column thus leading to unbalanced oxygen cycle in water. Growth of different plants helps create a suitable environment for the reproduction of mosquitoes, snails and other insects that carry many diseases.

River Nile Water Quality

Surface and ground water qualities are monitored through monitoring networks, where natural, chemical and microbiological indicators are used to determine water quality. These networks include:

- Ministry of Water Resources and Irrigation (MWRI) network including 232 monitoring sites along the Nile River, canals and drains in addition to 203 monitoring points for monitoring groundwater quality;
- 69 monitoring sites along the River Nile managed by EEAA laboratories in the different governorates; and
- 154 monitoring sites on the Nile River, its two branches and some main canals such as Mahmoudia, Ismailia and Ibrahimia, as well as some large canals (Bahr Muweis, Bagoureya, Qased, Bahr Shebeen) that directly branch off the River Nile at Al-Qanater Al-Khaireya fed by Tawfiqi and Monoufi main canals. There are also some monitoring points along Bahr Youssef canal in Beni Sueif in addition to 20 monitoring points in Fayoum Governorate that are all located on Bahr Youssef canal. Monitoring is undertaken monthly by the Ministry of Health and Population (MoHP) Environmental Monitoring and Work Environment Studies Center .

Lake Nasser Water Quality

The lake is 500 km long, 350 km of which is located within the Arab Republic of Egypt, while 150 km is located in the Sudan (Lake Nubia). Bays of significant importance for fisheries in the lake are around 85 (48 to the east and 37 to the west). There are varying activities along the lake including tourist activities (6 tourist floaters), industrial activities (represented in fish processing) in addition to limited agricultural activities.

Monitoring results in 2006 have indicated no considerable change in the Lake water quality compared to 2005 due to limited development projects around it. The results also indicated no pollution from pesticides, fertilizers or heavy metals. Monitoring results showed that the average organic substances concentration was in most months less than Environment Law water quality permissible levels; a sign that water quality in the lake has not been affected by existing industrial or agricultural activities.

Water Quality in the River Nile and its Branches

According to analyses by MoHP Environmental Monitoring Center and EEAA Central Laboratory, 2006 Nile water quality monitoring results showed the following:

1. Average organic substances concentration represented by the biological oxygen demand (BOD5) was less than the applicable guideline (6 mg/l) in all governorates except Damietta where BOD average concentration exceed the limits by less than 1 mg/l. This is likely because of the agricultural drainage from el-Sarw El-A'la drain. Fig. (5-1) shows a comparison of average BOD concentrations in the different governorates.

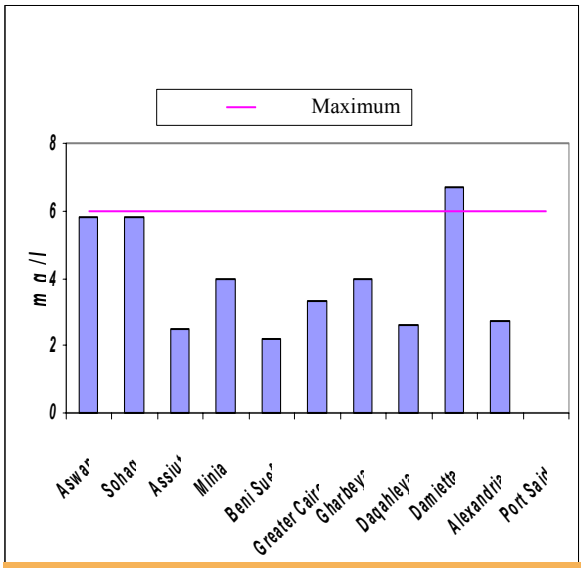


Fig (5-1) BOD averages in Egyptian

Fig. (5-2) shows a comparison of BOD average concentrations over 7 years (2000 - 2006) indicating a general decrease in 2006 compared to previous years in Assiut, Minia, Beni Soueif, Gharbeya and Alexandria.

Although BOD average concentrations were higher at Aswan, Sohag and Port Said in 2006 than in 2005, it is still less than the permissible limit (6 mg/l).

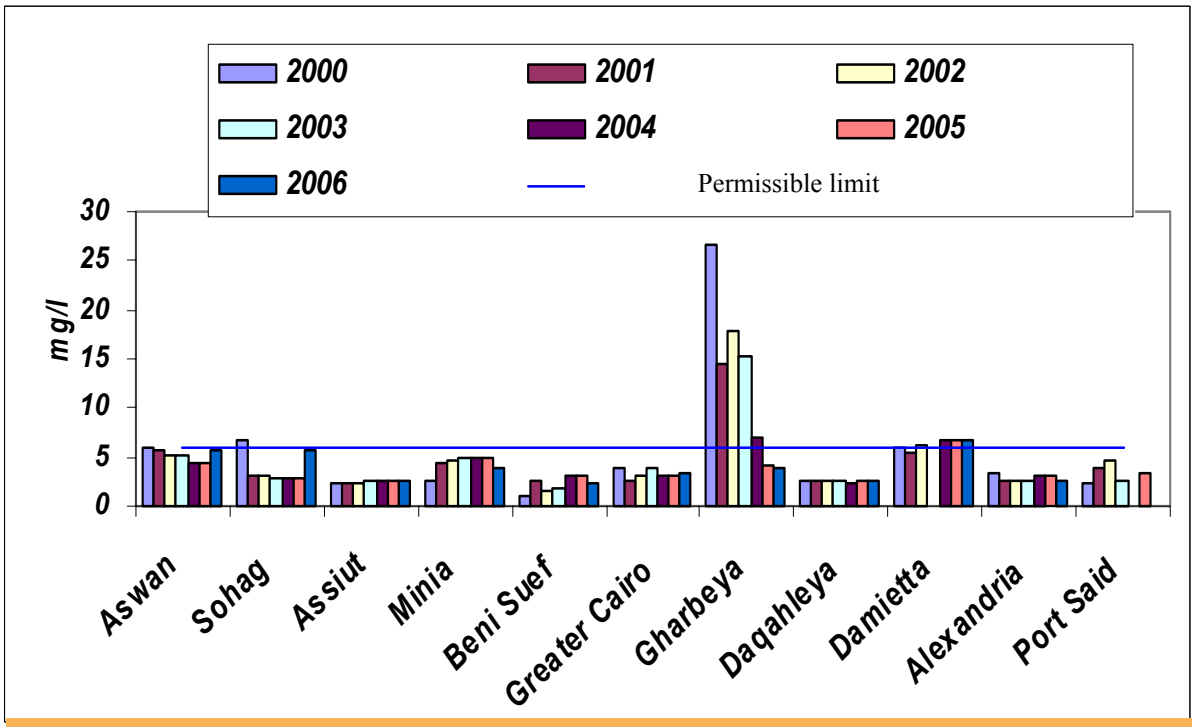


Fig (5-2) Average organic load results expressed in BOD in Egyptian governorates (2000 – 2006)

2. Results have shown that average organic substance concentration expressed by COD in Nile water in most governorates was less than the permissible limits (10 mg/l). This is due to efforts to control industrial liquid effluent drainage into the river and the compliance of most industrial facilities located along its banks. However, there was a slight increase in average COD concentration in Gharbeya governorate and a significant increase in Greater Cairo, Damietta and Alexandria. This may be due to the discharge of industrial effluents into the Nile by some non-compliant food factories, in addition to the discharge of municipal wastewater (untreated and detergent-carrying wastewater) and other wastes into the river. Fig. (5-3) compares average COD concentrations in the different governorates in 2006.

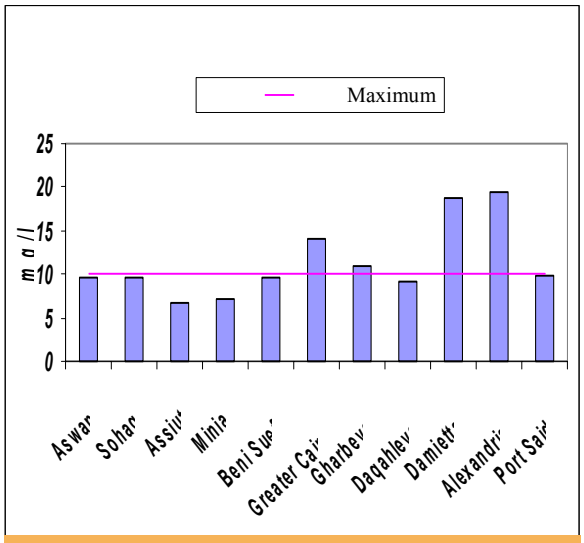


Fig (5-3) COD averages in Egyptian

Fig. (5-4) shows a comparison of COD average concentrations during the last 7 years in different governorates highlighting a significant improvement particularly in Gharbeya and Damietta governorates.

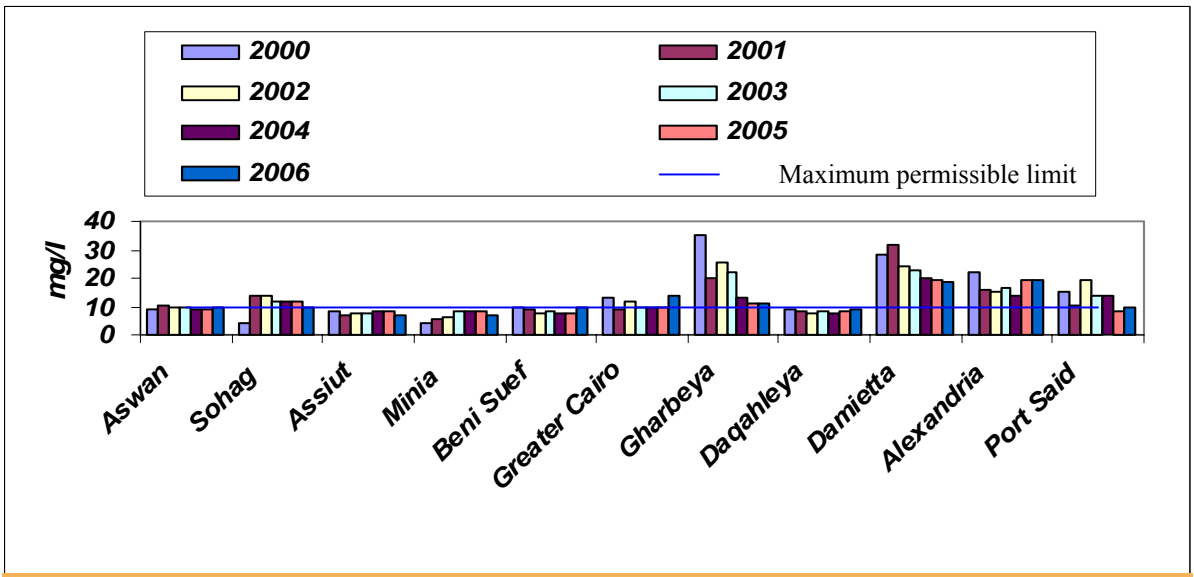


Fig (5-4) Organic load averages expressed in COD in Egyptian Governorates (2000 – 2006)

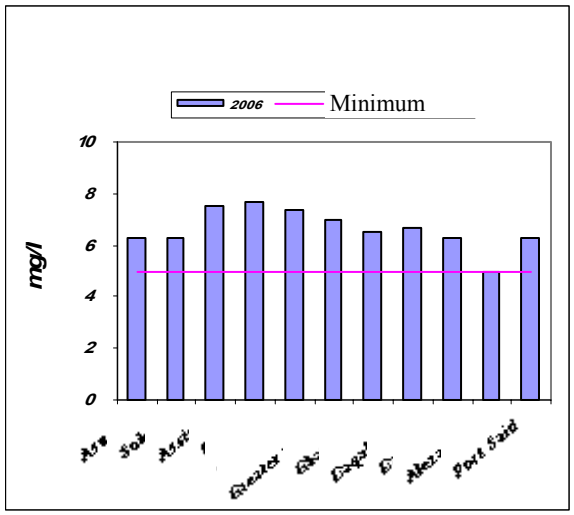


Fig. (5-5) Dissolved Oxygen Averages in Egyptian Governorates in 2006

3. Monitoring results have shown that average dissolved oxygen concentrations (DO) in all governorates are still higher than the minimum limit for water quality guidelines (5 mg/l) as shown in Fig. (5-5) which is good sign for water quality.

4. Nutrients (ammonia, nitrates and phosphates) concentrations were within permissible limits at most monitoring locations. Although Ammonia concentrations were less than the permissible limit (0.5 mg/l), however they exceeded such limit at 4 locations on Damietta Branch ranging between 1.26 – 2.25 mg/l. I has also exceeded the limits at 5 locations on Rashid Branch ranging between 0.541 – 0.908 mg/l. This may be due to agricultural drainage containing municipal wastewater discharges into Damietta and Rashid Branches. Nitrate average concentrations ranged between 0.002 and 9.4 mg/l, whereas the permissible is 45 mg/l. Results have also shown that phosphate average concentrations ranged between 0.030 – 0.50 mg/l.

5. Inorganic substance (fluorides and sulphates) concentrations were within permissible limits at all monitoring stations, where fluoride concentrations ranged between 0.20 – 0.45 mg/l and sulphate concentrations ranged between 9.9 – 66.6 mg/l, whereas their permissible limits are 0.5 and 200 mg/l respectively.

6. Total Dissolved Solids (TDS) concentrations ranged between 145 – 416 mg/l, whereas the permissible limit is 500mg/l.

7. Heavy metals (iron, manganese, lead, chromium and cadmium) concentrations were less than the permissible limits, as they were less than the lower limits the analysis device could measure. However, iron concentration amounted to 0.71 mg/l (still less than the permissible limit) in Daqahlia monitoring station. This may be due to the sanitary drainage from Nasseria village. Manganese maximum concentration was 0.30 mg/l (less than the permissible limit (0.5 mg/l)) at one monitoring location on Rashid Branch in Kafr El-Sheikh, which may be due to discharges by Edfina Company in Matobus drain.

Efforts Implemented to Protect the River Nile and Canals from Pollution

1. Discharging industrial effluents into the River Nile has been stopped in 91 facilities with a total discharge volume of 4,952bn m^3/year (99.64% of total industrial discharges into the river). This took place either by closing the drainage outlets or through environmental compliance where discharging has been com-

pletely stopped in 61 facilities that sued to discharge 81,205 million m^3/year (1.63% of total discharges into the river). Furthermore, 30 facilities with treatment systems have environmentally complied. These are regularly inspected and are currently discharging according to Law 48/1982 permissible limits with a total discharge volume 4,871 billion cubic meters per year (representing 98.1% of total discharges into the Nile).

2. Non-compliant discharges in 25 facilities are currently being stopped, with a total of 17,755 million cubic meters per year (representing 0.36% of total discharges into the river). This is being implemented as follows: 10 facilities are currently implementing a compliance plan until 2007, with a total discharge volume of 4,574 million cubic meters per year (0.09% of total industrial effluents discharged into the Nile). Providing technical and financial support of LE 67 million to the remaining 15 facilities discharging 3,181m m^3/year (0.27% of total drainage) in order to achieve environmental compliance is currently being considered.

3. Industrial effluent (direct or indirect) into Manzala Lake results from 13 industrial facilities, making 0.08% of the total drainage into the lake (industrial, agricultural and sanitary drainage). 8 industrial facilities environmentally complied, now draining as per the provisions of Law 48/1982. Coordination is being made currently for other facilities to comply.

4. Industrial effluents discharged into Lake Borollos represent 1.25% of the total discharges (agricultural, sanitary and industrial) into the lake. MSEA has investigated the environmental situation of 16 industrial facilities and the means to provide them with financial and technical assistance to help them achieve environmental compliance with Law 48/1982 permissible limits. This has resulted in environmental compliance of 5 facilities that are currently discharging within Law 48/1982 permissible limits. Coordination has been made with the Ministry of Investment where LE 200 million was allocated to achieve environmental compliance in three business sector companies. MSEA is currently coordinating with the German Construction Bank (KFW) to provide an LE 30 million soft loan for environmental compliance in 8 private sector companies.

5. Industrial effluents into Lake Mariout (0.43% of total discharges) come from 6 industrial facilities directly/indirectly discharging into the lake. Two facilities have environmentally complied and currently discharge within Law 48/1982 permissible limits. Another 2 facilities are currently implementing an environmental compliance plan until 2007. MSEA, through support from the "Industrial Pollution Prevention Project II" is currently working on funding the remaining two companies in order to achieve environmental compliance thus completely eliminating illegal discharges into the lake.

6. For controlling municipal wastewater discharges from villages, 219 priority villages deprived of sanitation services were identified in the framework of MSEA vision to direct its support to those villages directly discharging into the Nile, Rashid and Damietta branches and into the north-

ern lakes in order to mitigate pollution resulting from discharging sanitary drainage into water bodies as a result of informal village sanitation systems. A comprehensive list including 1,165 villages was compiled based on the joint views of the Ministries of Housing and Utilities, Water Resources and Irrigation, Health and Population and MSEA in order to develop a comprehensive plan for establishing wastewater treatment plants. Priority was given to villages discharging into the Nile and water courses, followed by villages with high subsurface water table.

7. With respect to wastewater discharges form river floaters, a docking station was established in A'qab area, east Aswan, at a cost of LE 5 million for collecting wastewater discharges from river floaters at a rate of 900 cubic meters per day, in addition to an associated 4.5 km discharge line ending at a treatment plant. Treated water is currently used in irrigating a 69-feddan tree forest. A new docking station has also been initiated south Luxor/Mereis Bridge with the purpose of establishing a tourist, investment, cultural and developmental activity for attracting tourism, providing job opportunities and upgrading the docking station area. This project would provide capacity for receiving wastewater discharges from floating hotels completely preventing them from reaching the Nile.

6- Coastal and Marine Areas

Introduction:

Egyptian coasts are approximately 3000 km in length of which some 1150 km extends along the Mediterranean Sea from Salloum, west, to Rafah, east, and 1850 km covering Egyptian Red Sea coasts at the main Red Sea basin (some 1200 km) and both Gulf of Suez and Gulf of Aqaba (about 650 km).

Egypt marine and coastal area environment – as the case is for all coastal countries – is a renewable source of living and non-living wealth and basic foundation for civilization and economic progress. A coastal area is an attraction center for many projects in different economic and social domains, such as entertainment and tourist, fish wealth and processing, and international trade projects. However, such areas are always and disparately subject to pollution from several land and marine sources.

It has been well known – as noted by UN reports (GESAMP, 1990) and later confirmed by many field studies and research – that almost 80% of marine environment pollution and coastal deterioration are attributed to different land activities whether industrial, agricultural, urban or physical, in particular those produced wastes and emissions that are not treated in a sound environmental manner. The remaining 20% is due to other sources ahead of which are marine sources, i.e. different offshore activities such as oil, mineral and natural gas exploration and drilling operations, besides fishing, shipping and unloading, and marine transportation. Furthermore, there are wastes and leaks from increasing launches and different marine entertainment and tourist boats.

Fig. (6-1) shows marine pollution sources.

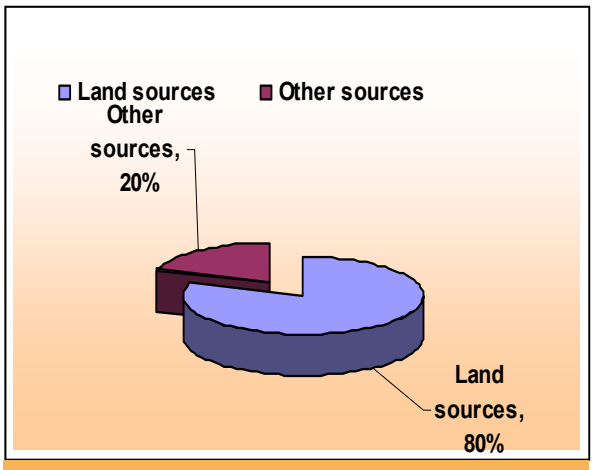


Fig. (6-1) Marine Pollution Sources

It has been well stated that such activities, if not environmentally rationalized, will have a negative impact not only on marine environment and wealth, but also on different aspects of development and investment activities in the coastal area. It also imposes several threats on human health as well.

Egyptian Coastal Water Environmental Monitoring Program

MSEA and EEAA were keen to monitor the marine environment and coastal area status in 2006 (as in the previous years) through the ongoing environmental monitoring program for Mediterranean and Red Sea coastal water quality.

In this program, marine samples from selected stations along Egyptian coasts are collected and analyzed 4 times a year: in March, May, July and September so as to represent physical, chemical and biological conditions in the 4 seasons. The program – implemented in collaboration with specialized stakeholders in Egypt – focuses on monitoring bacterial total number, nutrient salt (ammonia, nitrates, nitrites and phosphorus) and chlorophyll A concentrations. Some hydrographic measurements that may help explain natural phenomena impacting marine environmental status are also made.

Following in this report are the main results for 2006 monitoring program compared with previous year 2005 similar results. This aims at reaching some conclusions on the improvement, settlement or deterioration of marine environment status during this period, in addition to shedding some light on potential reasons for such improvement or deterioration.

Mediterranean Coastal Water Quality

Mediterranean coastal water quality was monitored in 31 stations along the coast from Salloum (Me1) to Rafah (Me 47a). Map (6-1) locates these stations relatively with the coastline.

Map (6-1) Distribution of monitoring specimen collection locations

Western area:	From Salloum (Me1) to West Nobareya Drainage (Me8)
Alexandria area:	From Hanoville (Me9) to M'addeya straits (Me25)
Delta area:	From Rashid (Me29) to Gamil Straits east (Me40)
Eastern area:	From Port Said (Me41) to Rafah (Me47a)

Bacterial Measurement(Bacteriological Count) Results In 2006

To estimate coastal water environment status at those stations, bacterial counts for three pathogenic bacteria in water samples: coliform, E. coli and faecal Streptococci bacteria were measured.

As stipulated by the Executive Regulations of the Environment Law, the maximum limit allowed is 500 units/100 ml of sea water for the first type (coliform) and 100 units/100 ml of sea water for the second and third types (E. coli and faecal Streptococci). These are the permissible limits between polluted and unpolluted water and are represented by the horizontal lines in histograms (6-2, 6-3 and 6-4).

Results showed 15 out of 27 stations monitored polluted with one or more of such bacteria. The most polluted stations included Dekhela, Max, Western Harbour and East Abu Qir.

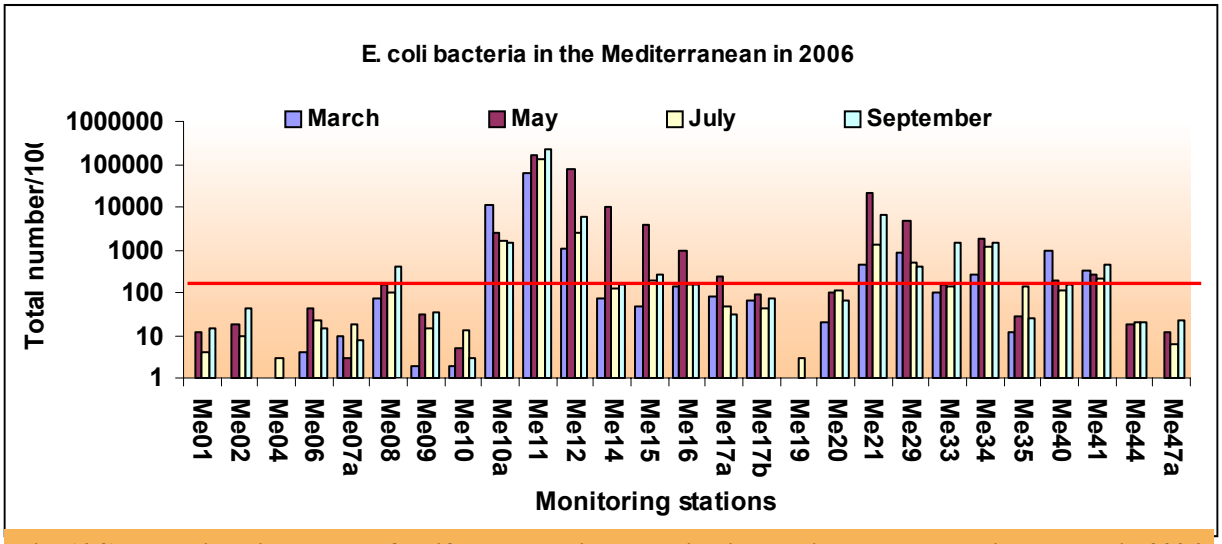


Fig. (6-2) Bacteriological count of coliform bacteria at monitoring stations on the Mediterranean in 2006

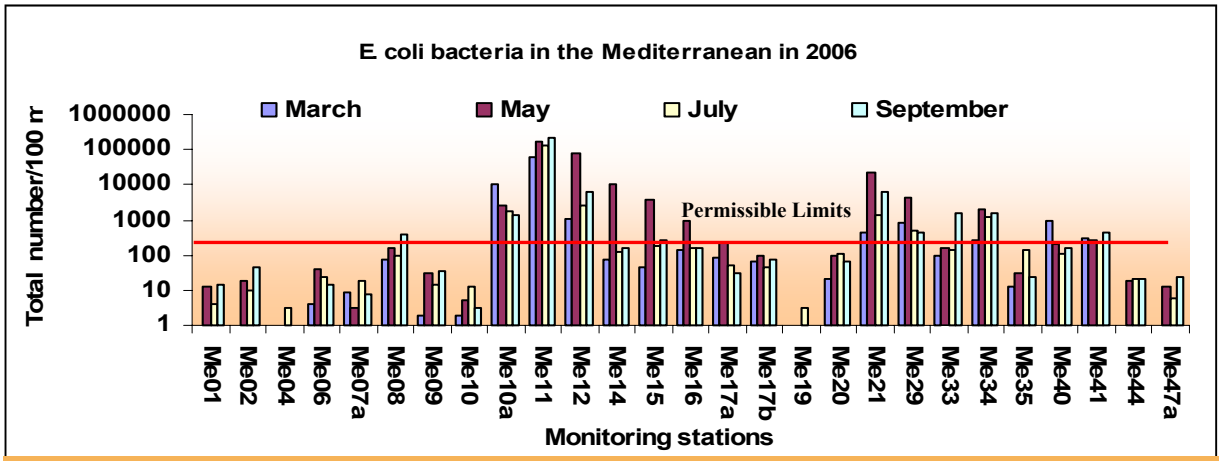


Fig. (6-3) Bacteriological count of E.coli bacteria at monitoring stations on the Mediterranean in 2006

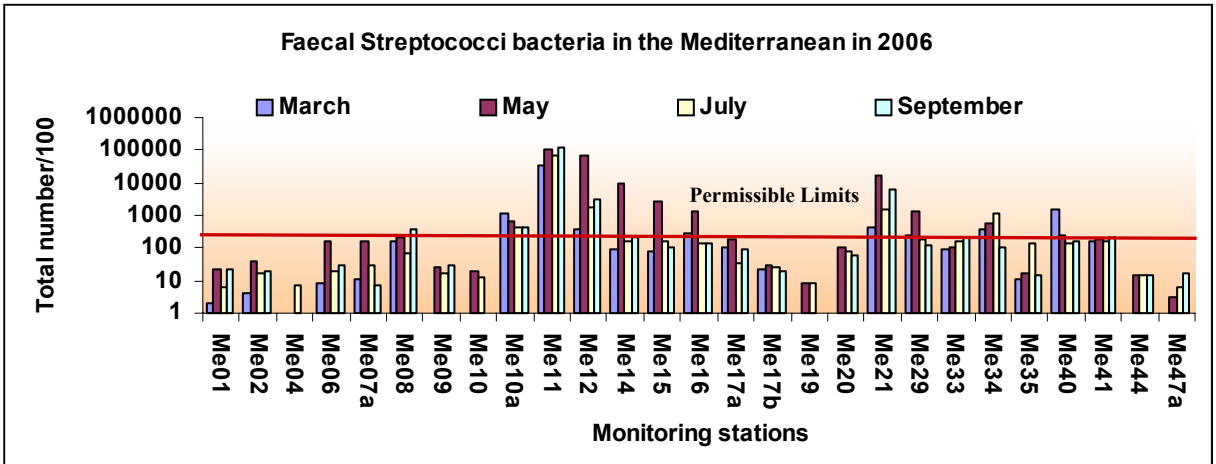


Fig. (6-4) Bacteriological Count of Faecal Streptococci bacteria at monitoring stations on the Mediterranean in 2006

Such results assert the fact that the most polluted areas along the coast are those related to untreated or partially treated sewage discharge sources (such as Dekhela (Me10a) and Max (Me11)), those with population density higher than the water capacity of such areas, those with untreated sewage discharge (Abu Qir (Me21)) or those with any other leaks (Western Port (Me12)).

Nutrient Salt And Chlorophyll-A Concentration Results In 2006

Monitoring results showed a noticeable contrast in nutrient salt and chlorophyll-A levels between different areas along the Mediterranean coast in 2006 as shown in figures (6-5, 6-6, 6-7, 6-8 and 6-9).

It is scientifically proved that nutrient salt concentrations, such as nitrates, nitrites and ammonia in a certain area is directly and indirectly related to the biomass of the phytoplanktons of such area, which are expressed by high chlorophyll-A values. Any increase in such nutrient salt concentrations results in a parallel increase in phytoplankton productivity, which often leads to abnormal growth of marine algae, or to the occurrence of the "red tide" phenomena harmfully impacting environment and public health. Usually, high levels of nutrient salt concentration are associated with and a result of different human and industrial activities which discharge their untreated, partially or insufficiently treated wastes into the coastal marine environment.

Consequently, marine monitoring results showed the following:

- The Western Area recorded moderate nutrient salt and chlorophyll-A levels except Bagoush which had low chlorophyll-A level, and Sidi Krir and Nobareya where chlorophyll-A was high.
- In Alexandria, most stations indicate a high levels of nutrient salts, which resulted in high phytoplankton content in water, which, in turn, led to high concentrations of chlorophyll-A, particularly in Dekhela, Max, Western Harbour, Eastern Harbour, Shatbi and Sidi Gaber.
- Delta had moderate to high levels of nutrient salts, and the whole area from Rashid to Gamil had high chlorophyll-A content.
- Most Eastern area stations had moderate levels of nutrient salts except Port Said which had high levels of ammonium and nitrates, which was reflected on chlorophyll-A concentrations in such stations.

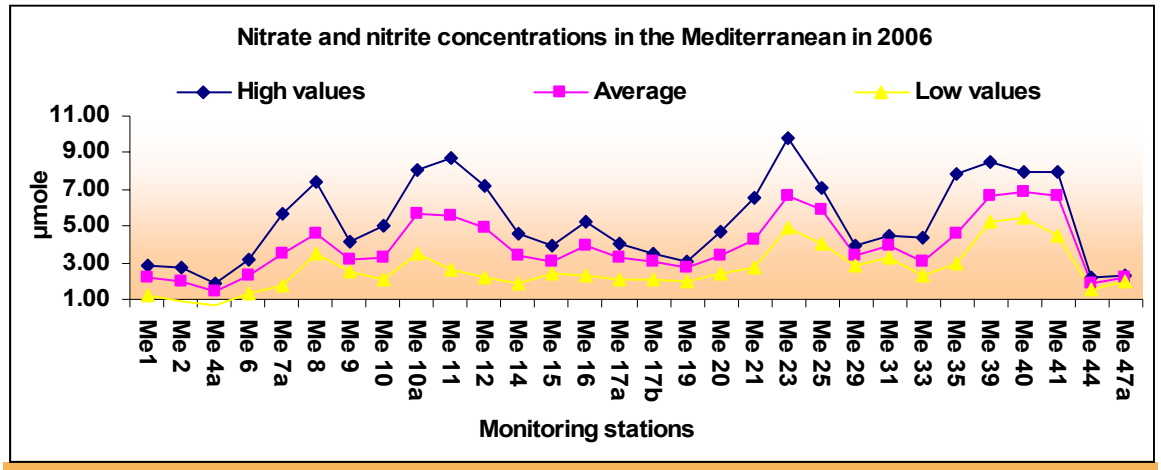


Fig. (6-5) Nitrate and nitrite salt concentrations at monitoring stations on the Medit. in 2006

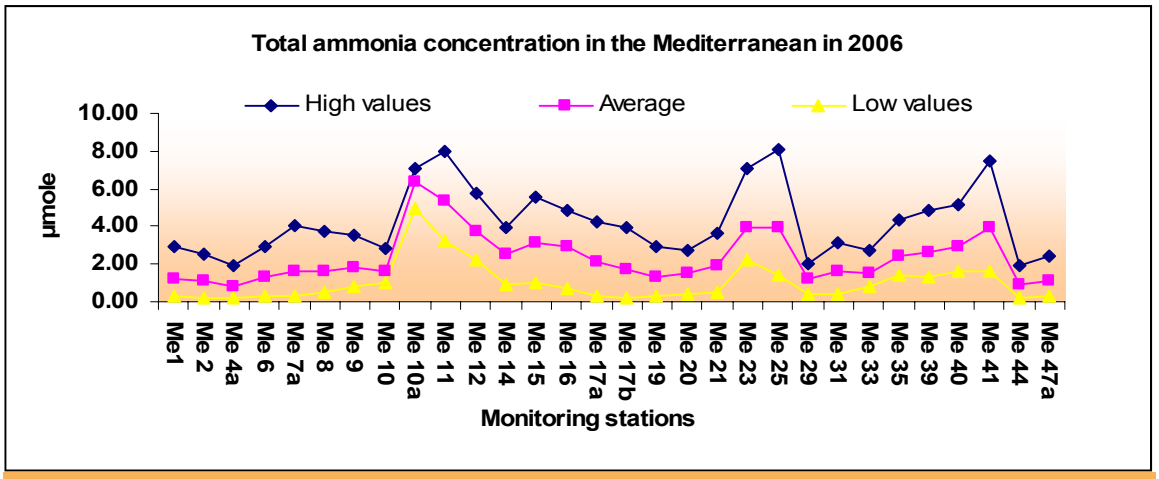


Fig. (6-6) Ammonia concentrations at monitoring stations on the Mediterranean in 2006

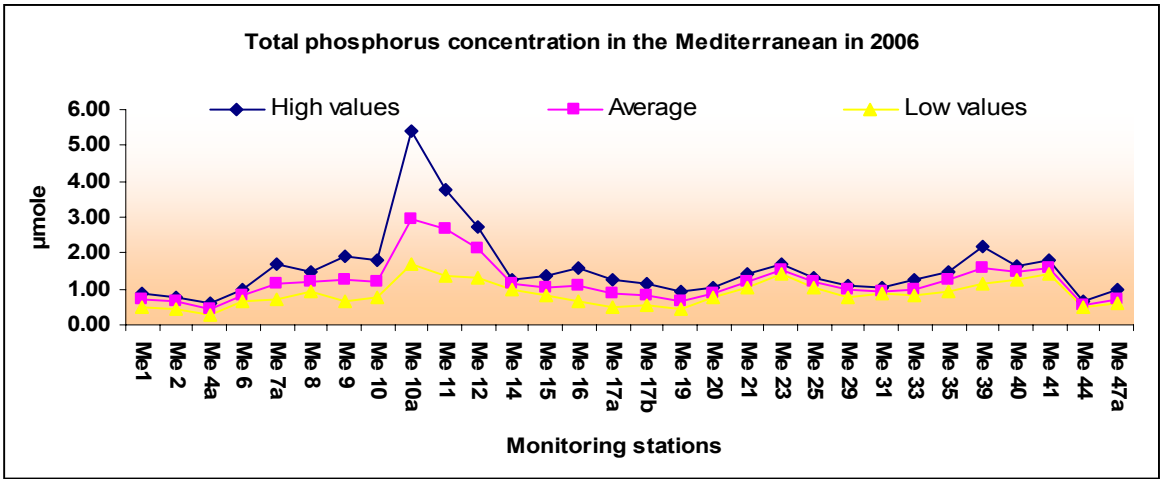


Fig. (6-7) Total phosphorus concentration at monitoring stations on the Mediterranean in 2006

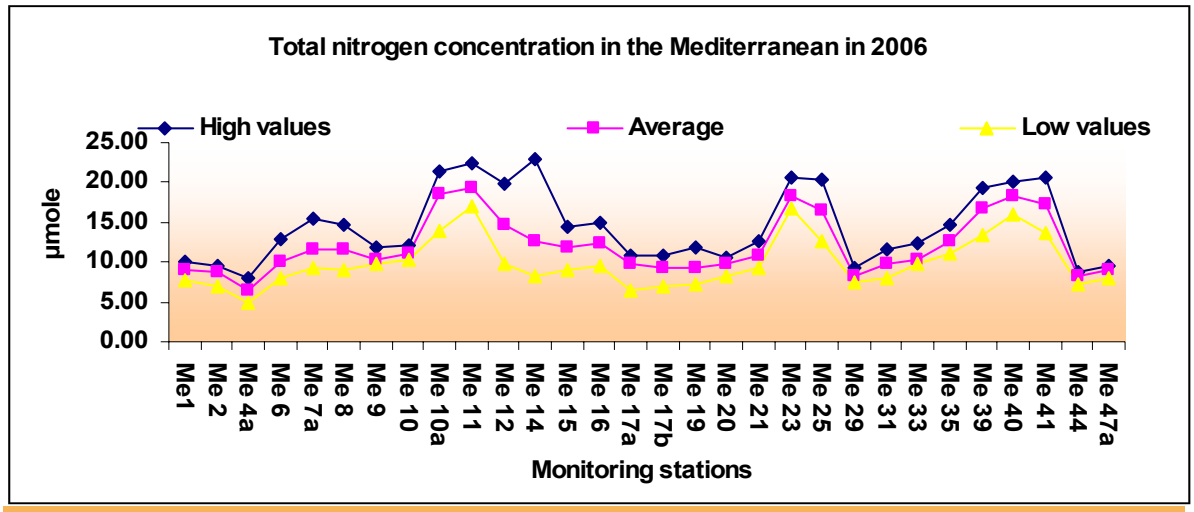


Fig. (6-8) Total nitrogen concentration at monitoring stations in the Mediterranean in 2006

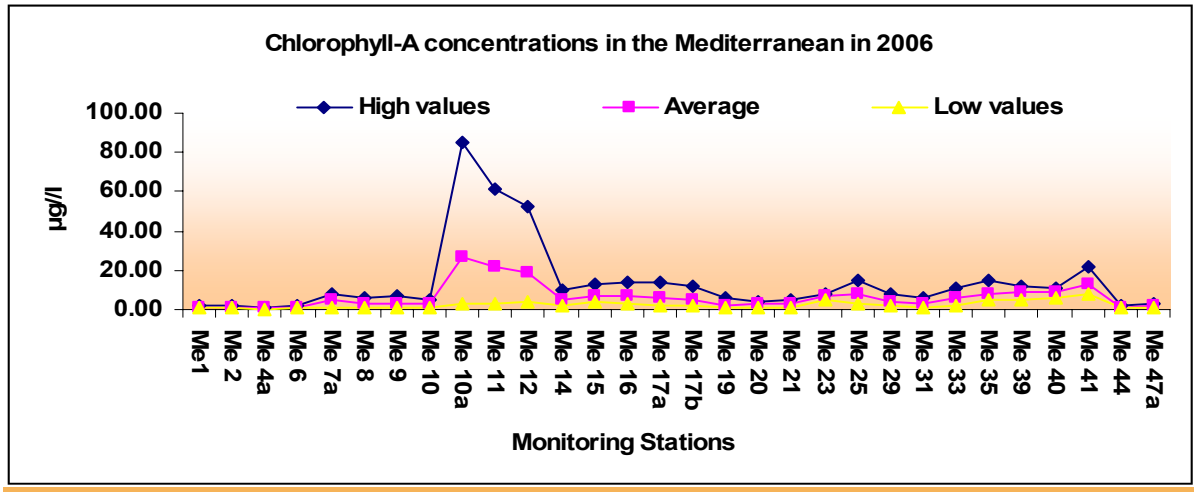


Fig. (6-9) Chlorophyll-A concentrations at monitoring stations on the Mediterranean in 2006

Note:

Under the marine monitoring program, chlorophyll-A concentration was classified as per the following scale:

- Low: concentration is less than 1 µg/l
- Average: concentration is more than 1-2 µg/l
- High: concentration is more than 2-5 µg/l
- Extremely high: concentrations is more than 5 µg/l

Nutrient salt concentration was classified as per the following scale:

- Low: nitrate and ammonia concentration is less than 0.5 µmole/l
- Average: ammonia concentration is > 0.5 and < 2 µmole/l
- Average: nitrate concentration is > 0.5 and > 4 µmole/l
- High: ammonia concentration is > 2 µmole/l
- High: nitrate concentration is > 4 µmole/l.

Comparing 2006 monitoring results with those of 2005, the following is concluded:

(1)There is improvement in coastal water quality in most Western Area stations, where bacteriological pollution decreased generally. Bagoush area (Alamein – Marina) showed more significant improvement than in 2005.

(2)Coastal water quality in Dekhela, Shatbi and Sidi Gaber improved bacteriologically, but Max, Western Harbour, East Abu Qir, Anfoushi and Eastern Harbour were worth than in 2005. It is noteworthy that Max is still receiving wastewater from Mariout Lake through Max pumping station.

(3)Coastal water quality in Rashid, Borg. Gamasa and Gamil was more bacteriologically improved than in 2005.

(4)Bacteriological pollution almost disappeared in Arish and Rafah shores in 2006.

(5)Average concentrations for ammonia, nitrates and chlorophyll decreased in most stations in 2006 except Sidi Krir and Nobareya areas where chlorophyll-A concentration was high.

(6)A slight increase in ammonia and nitrate concentration occurred in 2006 in Dekhela, Max, Eastern Port, Anfoushi and Shatbi compared with 2005 concentrations. This is related to phytoplanktons in such stations.

Red Sea Coastal Water Quality

During 2006, Red Sea coastal water quality was monitored in 24 stations distributed along the Egyptian Red Sea and Suez and Aqaba Gulf coasts.

Most monitoring stations were noticed to have a spread of several waste types and the accumulation of oils, petroleum spills and marine algae, particularly in the general Suez beach, Atkah beach, south of Suez, Fishing harbor beach, Tor, and Ras Ghareb, Safaga, Bir Shalateen on the Red Sea Coast.

Bacteriological Count Results In 2006

Count results for the 3 bacteria types in figures (6-10, 6-11 and 6-12) showed the following characteristics:

- Ras Ghareb beach is still having the highest bacteriological pollution levels due to the continuous discharge of the city untreated sewage waste into the sea.
- Suez beaches (Cabnon and Rex) and Atka Port had less bacteriological pollution this year than in 2005 (1-2 as much the permissible limit) compared with the past years where bacteriological pollution in some cases was hundreds, even thousands, of types.
- The rest of shores in the Gulf of Suez were clean from bacteriological pollution, a significant improvement in the marine and coastal environmental status in such area that suffered from severe pollution problems in the past.
- The most polluted station south of the Red Sea was Bir Shalateen due to primitive fishing practices.
- There was moderate bacteriological pollution in Sharm el Sheikh Port and Naama Bay due to increased private launches and entertainment boats especially diving boats berthing in such areas and increased number of visitors in Sharm el Sheikh resorts.

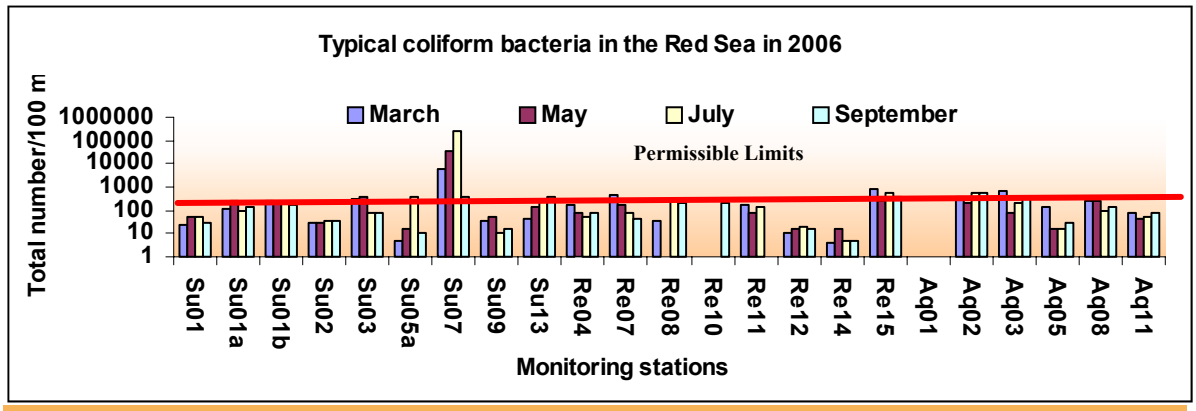


Fig. (6-10) Bacteriological count of typical coliform bacteria at monitoring stations on the Red Sea in 2006

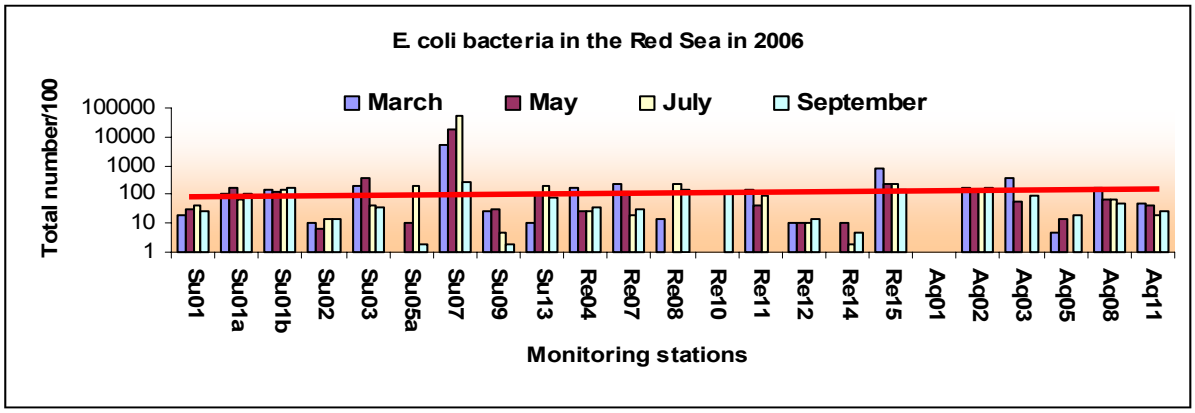


Fig. (6-11) Bacteriological count of E. coli bacteria at the monitoring stations on the Red Sea in 2006

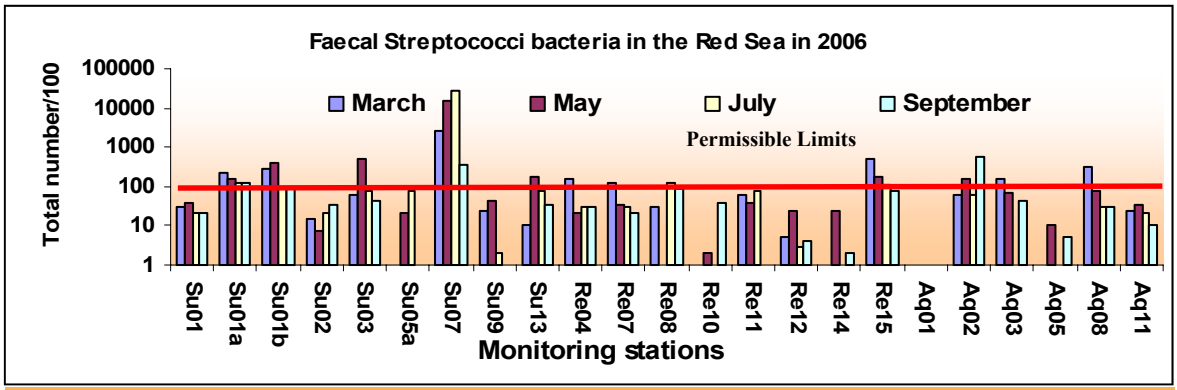


Fig. (6-12) Bacteriological count of faecal streptococci bacteria at the monitoring stations on the Red Sea in 2006

Nutrient Salt And Chlorophyll-A Concentrations In 2006

Figures (6-13, 6-14, 6-15, 6-16 and 6-17), revealing nutrient salt and chlorophyll-A concentrations in the Red Sea coastal waters, show the following:

- There was significant increase in ammonia concentration around Suez city and Ras Ghareb, where the annual average of ammonia around Suez was 20 µmole, the highest concentration in Red Sea water, followed by Ras Ghareb (14 µmole). In the rest of the stations, the ammonia concentrations were less than 0.6 µmole.
- The annual average of nitrate concentration was high before Suez city (26.6 µmole), whereas concentrations in the rest of the stations did not exceed 0.7 µmole.
- stations had low concentrations of reactive phosphate except Ras Ghareb where it reached 0.6 µmole, and Bir Shalateen (0.11 µmole) as a result of human and industrial activities in such areas.
- Monitoring results recorded high concentrations of chlorophyll-A in the northern part of the Gulf of Suez (1.44 mg/l), while in the rest of the Gulf water, coastal Red Sea water and the Gulf of Aqaba, concentrations were relatively low (0.25-0.32 mg/l).

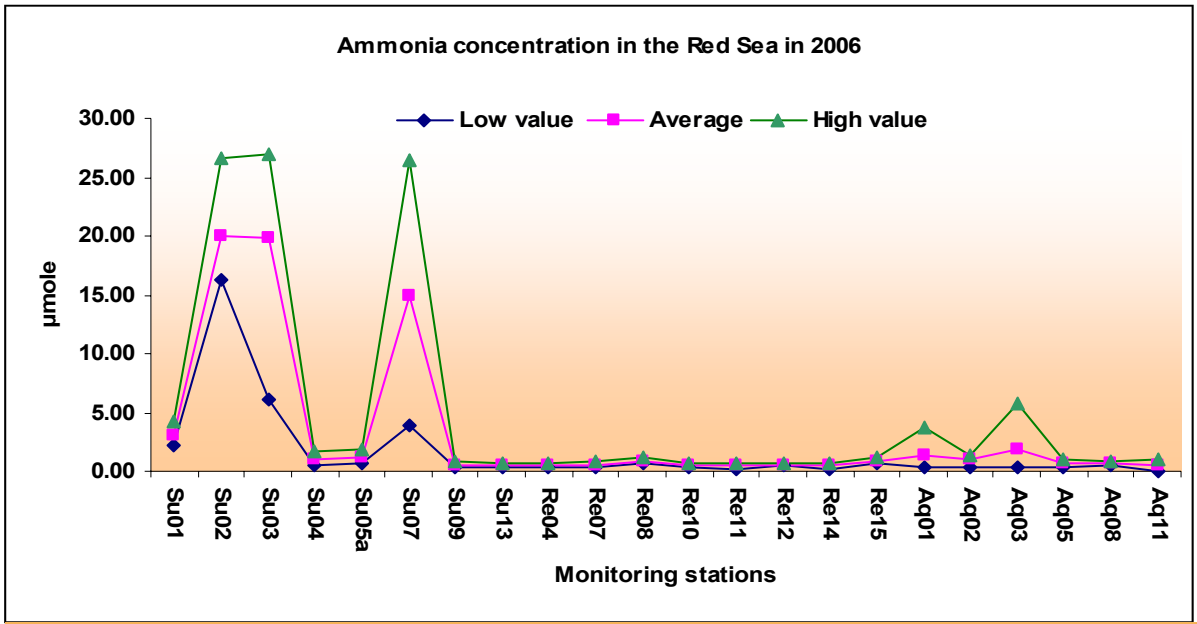


Fig. (6-13) Ammonia concentrations at monitoring stations on the Red Sea in 2006

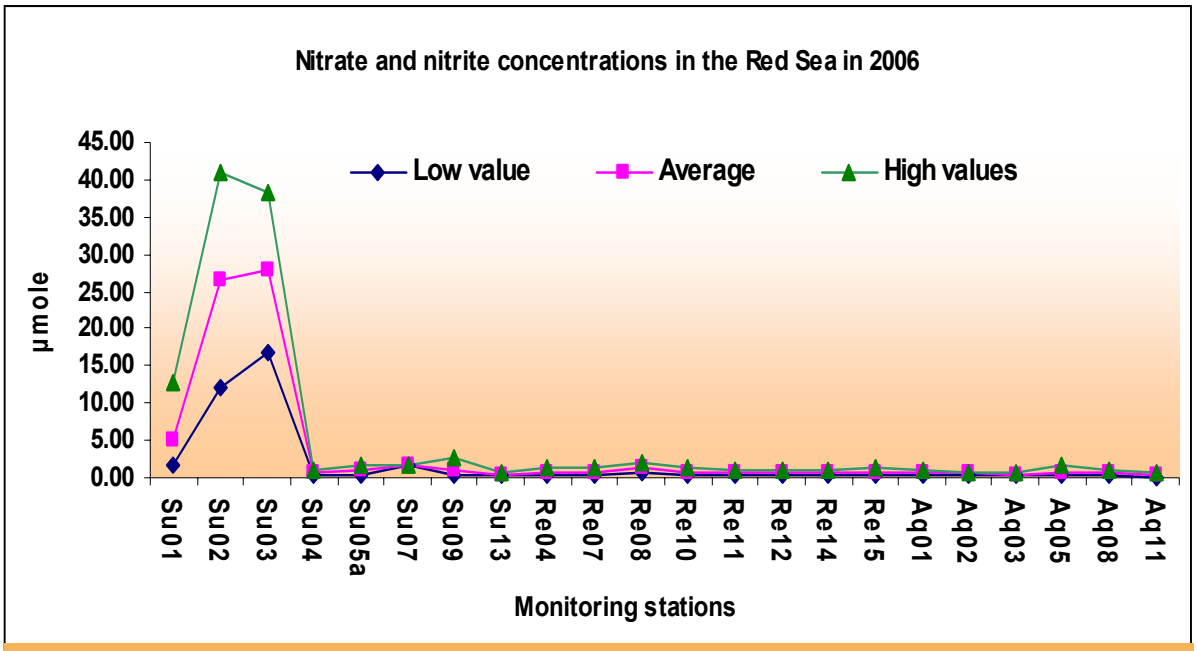


Fig. (6-14) Nitrate and nitrite salt concentrations at monitoring stations on the Red Sea in 2006

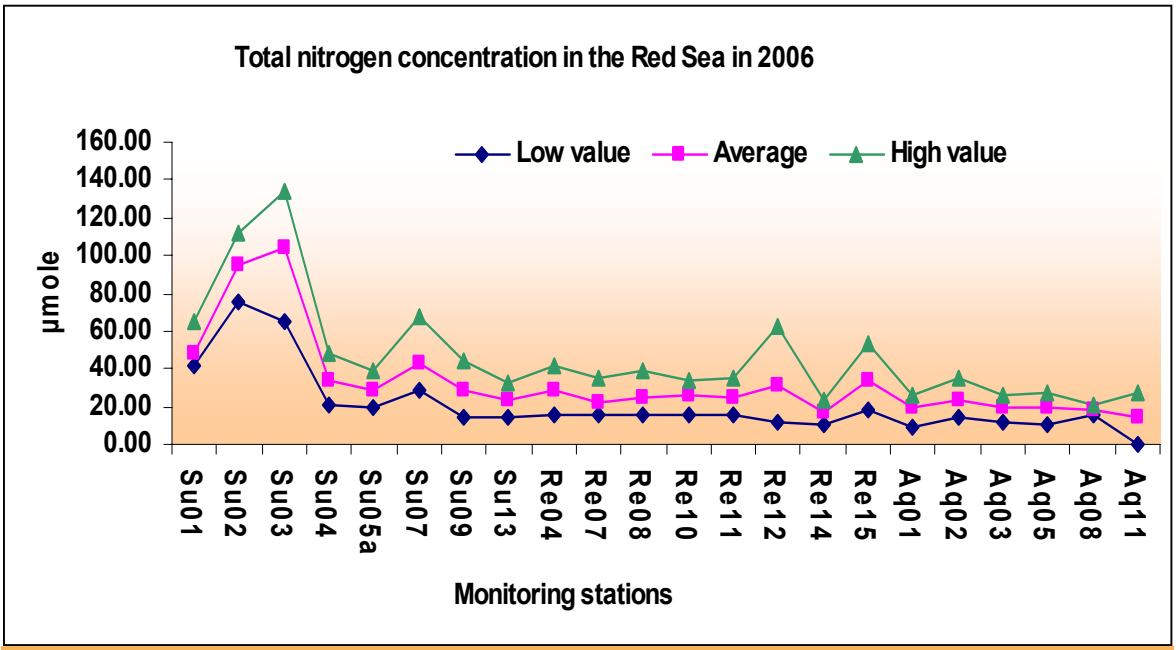


Fig. (6-15) Total nitrogen concentrations at monitoring stations on the Red Sea in 2006

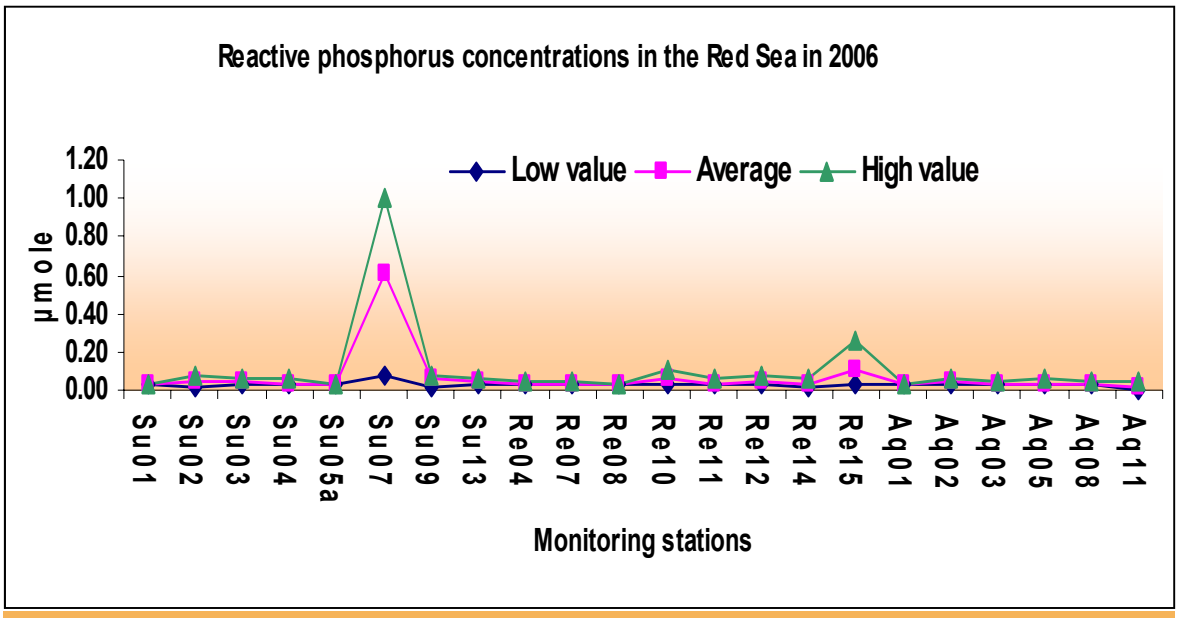


Fig. (6-16) Reactive phosphorus concentrations at monitoring stations on the Red Sea in 2006

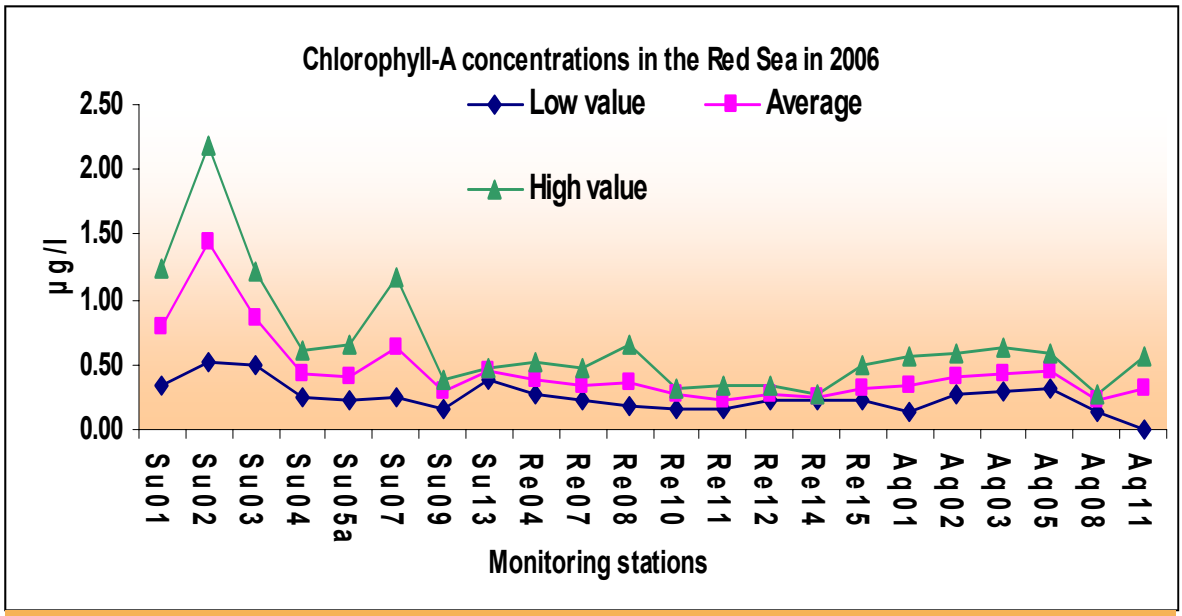


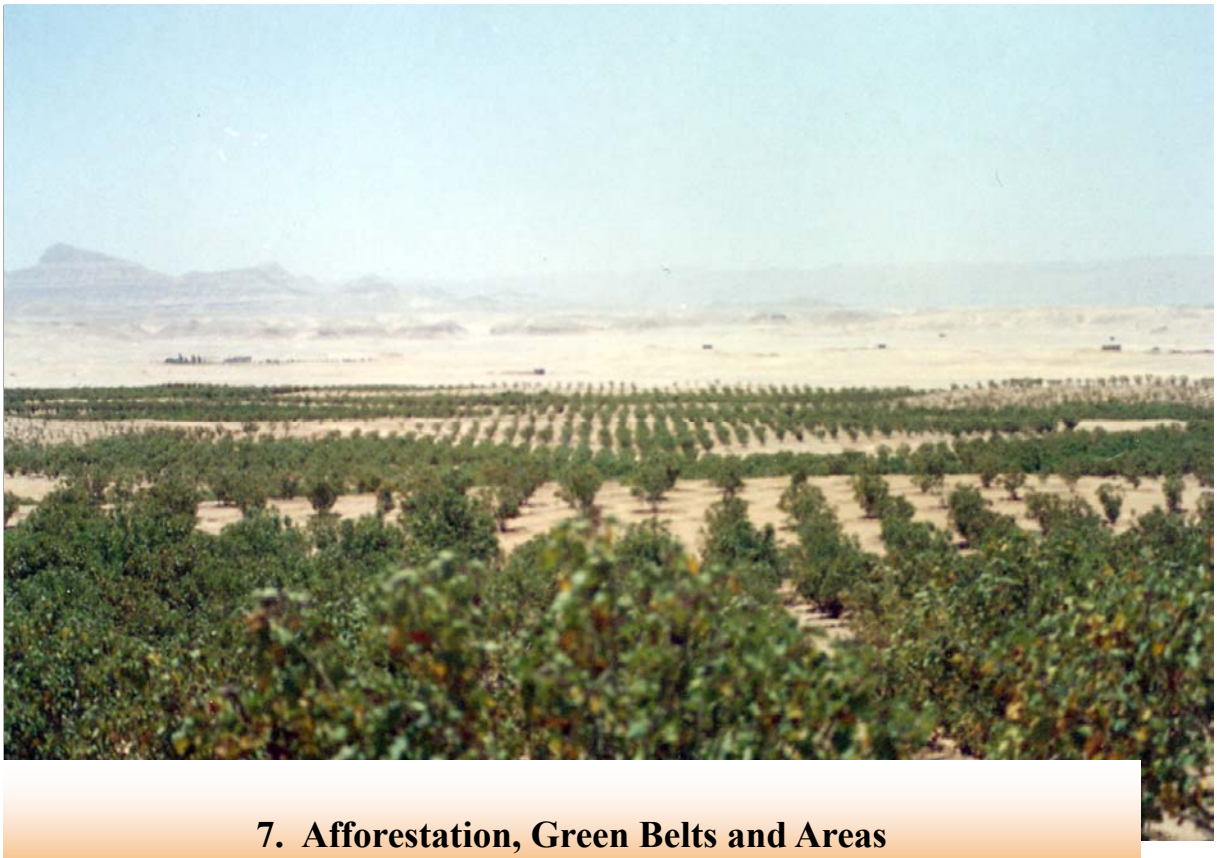
Fig. (6-17) Chlorophyll-A concentrations at monitoring stations on the Red Sea in 2006

Comparing monitoring results in 2006 with those of 2005 the following is detected:

- In north Gulf of Suez, bacteriological pollution was decreasd from 2-8 as much the limit allowed in 2005 to 1-2 as much the limit allowed in 2006, a partial improvement from what has been the case before. This is attributed to taking measures to stop the drainage from some polluting activities in this area into the Gulf of Suez water.
- Bacteriological pollution increased in Ras Ghareb from 6-28 as much the permissible limit in 2005 to 113-196 as much the limit permissible in 2006, an indication of marine environmental deterioration in this area.
- Bacteriological pollution on the shoreline from Hurghada to Bir Shalateen decreased from 4-21 as much the limit permissible in 2005 to 1-3 as much the limit permissible in 2006.
- There was no tangible change in coastal water quality in the Gulf of Aqaba from Ras Mohamed to Taba.
- No significant changes took place in nutrient salt or chlorophyll-A levels from 2005 to 2006 in general, which indicates environmental settlement in most Red Sea areas with the exception of Suez area and Ras Ghareb for ammonia concentrations often resulting from industrial activities which discharge their untreated drainage into neighboring coastal water.

References

GESAMP (Group of Experts on Scientific Aspects of Marine Pollution) (1990). The State of the Marine Environment – London, United Kingdom



7. Afforestation, Green Belts and Areas

introduction

Cairo low geographical location – surrounded by the desert from one side and Moqatam hills from the other – makes it prone to dust from the desert and Moqatam hills, particularly during sand storms, which adversely impact air quality. In an attempt to limit such adverse impacts on the one hand and preserving natural wealth sources in the form of treated wastewater on the other, Ministry of State for Environmental Affairs (MSEA) is regulating and supporting many afforestation, green belts, and green areas activities as wind barriers; at the same time these trees and green areas absorb an amount of carbon dioxide generated by different development activities.

In this respect, MSEA has implemented the following activities:

1.Greater Cairo Green Belt (Cairo, Giza, and Qalioubeya)

The project aims at planting a one hundred kilometers green belt around Greater Cairo including the planting of 500,000 trees using treated wastewater instead of wasting it in the desert, providing working opportunities for youths and achieving environmental and economic benefit. The work started in 2005, and in 2006 about 65,000 trees including Eucalyptus, Casuarinas, Cupressus and Acacia trees were planted using drip irrigation by treated wastewater.

2. Afforestation Using Treated Wastewater

The three Ministries, Ministry of State for Environmental Affairs (Egyptian Environmental Affairs Agency), Ministry of Agriculture and Land Reclamation (under secretary of state for Afforestation and Environment), and Ministry of Housing, Utilities and Urban Communities are cooperating together to implement the National Program for Safe Use of Treated Wastewater for Afforestation through a protocol signed by the three parties.

In 2004 the infrastructure was implemented and 10,350 feddans were planted with tree forests irrigated by treated wastewater. Another 845 feddans were planted in 2005. In 2006 infrastructure was completed and planting started for another 890 feddans. These forests were focused in Matrouh, Qena, Minya, Assyout, and New Valley governorates.

During 2006, the participation of the investment and private sectors continued in Afforestation in Attaqa forest (Suez governorate) over an area of 400 feddans, planted by Jatropha to produce bio-oil of high economic return.

Photo (7-1) Cupressus trees in the GC Green Belt project

3. Afforestation and Planting of Green Areas and Parks

The Ministry of State for Environmental Affairs contributed in the World Environment Day celebrations on June 5, 2006, with the slogan "Deserts and Desertification, Do Not Desert Dry Lands", distributing 150,000 trees on the five desert governorates of (North Sinai, South Sinai, Red Sea, Matrouh, and New Valley) to benefit from them in planting green areas and parks.

In cooperation with Local Governments, MSEA has contributed in establishing international and public parks with historical nature and children parks in all governorates countrywide. Total park area reached 20,000 feddans. Most significant of these parks are "All Religions Park" in Fustat and "Al Dawahi District Park" in Port Said on an area of 8.5 feddan, after being transferred from a dumpsite into a park. The Ministry has also developed the 15-feddan public park (El Salam Park) in Kharga city entrance in The New Valley governorate.

MSEA has also contributed in establishing nurseries and green houses in the different governorates in Egypt, whether for the Government or non-governmental organizations, with areas ranging between 1 to 10 feddans per nursery. In 2006, MSEA participated in establishing 21 nurseries to produce trees, shrubs, and ornamental plants.

MSEA has also tree planted many schools (72 schools) in residential areas, in front of mosques, inside monasteries, hospitals, and security units. It has also provided trees to many NGOs (2000 trees). The most distinguished of these

works was contributing in tree planting Children's Cancer hospital park in Sayyda Zainab, the One-Day Surgery Hospital in Marg, and Child Library's parks in Shubra El khema and the development of waste collectors (zabaleen) area in Manshayet Naser district.

Photo (7-2) Child Library Park in Shubra El khema

Photo (7-3) One-Day Surgery Hospital park in Marg in Greater Cairo.

The Ministry has also contributed in tree planting and beautification of some universities and colleges, including completing the development and tree planting of Fayoum University campus, Faculty of Law in Beni Suef University, Faculty of Mass Communication, Cairo University, Faculty of Applied Arts and the Leadership Training Institute in Helwan.

Photo (7-4) University of Fayoum Campus.

The Ministry has also contributed in tree planting and beautification of many desert roads, to protect them from sand encroachment such as Cairo–Fayum road (10.9 Km) and Ismailia desert road and the first phase for tree planting some roads and cities in North Sinai governorate (40 km). The planning and implementation of irrigation networks and planting 60 feddans with olive trees in Cairo International Airport runway has been completed.

Photo (7-5) Ismailia–Cairo Desert Road

In the framework of testing the kinds of plants mentioned in the Egyptian Code for using treated wastewater in farming, issued in 2005 by the Ministry of Housing, Utilities and Urban Communities, a set of tests on different kinds of those

corps has been implemented among the Integrated Water Resources Management Project (LIFE), implemented by the Ministry on an area of 10 feddans in Luxor forest. Jatropha curcas, Jojoba, Linen, Rose, Bird-of-paradise flower, Gladius, white Duranta, Sorghum fodder, Mulberry and African mahogany trees were planted. Evaluation of these crops for the economical and environmental green and fruitful growth started in the beginning of 2006, Initial results indicate the success of planting such crops.

Photo (7-6). Jatropha irrigated by treated wastewater

Photo (7-7) Jojoba watered by treated wastewater in Luxor

Photo (7-8) Linen plantation on the treated wastewater in Luxor

8- Biodiversity

Introduction:

Biodiversity encompasses natural environments and habitats as well as flora, fauna and microbial species and the genetic resources included in each. The Arab Republic of Egypt occupies a significant geographic location, distinguished ecosystems and habitats sheltering about 20,000 flora and fauna species, including some endemic species in Egypt, and other rare or endangered species.

Natural environments, flora and fauna and genetic resources included in them face a number of pressures leading to their degradation and loss (such as papyrus plant, the sacred Ibis bird… etc.). the most important of these pressures are pollution, the degradation of natural types, hunting and spread of invasive species …etc. These resources have become prone to extinction due to their current depletion as a result of intensifying agricultural and industrial activities and the development of scientific and technological capacity to transform and sometimes destroy such sources to satisfy the needs of increased population and consumption. Climate changes are expected to contribute largely to their degradation, and loss of biodiversity.

It has become essential to conserve such natural resources, resulting from complex reactions over thousand of years between man, nature and technology, and to combat the degradation of productive ecosystems, so as not to exceed their capacity limits, and ensure their use is sustainable and does not deplete species and ecosystems on which life depends. This should be undertaken in the framework of socially favourable priorities to ensure their contribution in socio-economic development and to preserve their cultural value.

UN Member States have undertaken to conserve biodiversity and utilize its components sustainably and to the fair and equitable division of the benefits arising from the use of genetic resources under the UN Convention on Biological Diversity (1992), which Egypt has ratified, and thus becoming a full fledged member in 1994.

This chapter addresses the state of biodiversity in Egypt in 2006, its challenges, preservation efforts and sustainable use in the framework of the National Strategy for Biodiversity Conservation (1997-2017) included in the State National Plan as a basis for the sustainable development of natural resources.

Maintenance of Biodiversity within the Natural Environment

1. Natural Protectorates

The promulgation of Law 102/1983 on Natural Protectorates was in tandem with the declaration of Ras Mohamed National Park in South Sinai, the first natural protectorate in Egypt. This was followed by establishment of natural protectorates to reach 24 in 2005. Three more protectorates were declared; The Red Sea Northern Islands, El-Gulf El-Kebeer and El-Dababya, thus by the end of 2006 early 2007, natural protectorates reached 27 covering an area of about 150,000 km^2 representing 15% of Egypt's area. Protectorates cover most distinguished ecosystems and habitats encompassing over 20,000 flora and fauna species. Tables (8-1) and (8-2) show fauna and flora species surveyed in the protectorates in comparison with species registered in Egypt: 5121 and 17309 flora and fauna species respectively, taking into consideration that the current number of biodiversity in Egypt is less than the actual number as many species are not finally recorded.

It is planned to finish the network of natural protectorates in the light of the National Strategy for Biodiversity Conservation and Action Plan and to reach 40 protectorates in 2017 representing about 20% of Egypt's territory.

The Status of Biodiversity in Natural Protectorates

Table (8-1) total plant species in natural protectorates

Plant	In natural protectorates	In Egypt
Flowering plants	842	2094
Non-flowering plants	-	337
Algae	-	1148
Fungi	-	1260
Bacteria	-	238
Viruses	-	44
Protista	250	NA
Total	**1092**	**5121**

Table (8-2) total Animal species in natural protectorates

Phylum	Class	Species no.	
		In natural protectorates	In Egypt
Arthropoda	Arachnida	51	376
	Crustacea	278	480
	Insecta	460	10000
	Other Invertebrates	0	3850
Chordata	Fish	294	766
	Amphibia	2	8
	Reptilia	120	120
	Aves	406	514
	Mammalia	116	132
Echinodermata	-	113	254
Mollusca	Bivalvia	25	53
	Cephalopoda	8	20
	Gastropoda	110	351
Nematoda	-	1	32
Rotifera	-	36	36
Cnidaria	Anthozoa	255	276
Elasmobranchii		15	39
Hydrozoa		0	2
Total		**2290**	**17309**

During 2006, activities focused on supporting the infrastructure of current natural protectorates (such as Zaranik, Wadi El-Rayan and Wadi El-Gemal), completing staffing and equipment, updating the national map for land uses, documenting protectorates, reviewing and following-up project EIA studies, enforcing environmental laws, handling environmental violations and assessing their environmental impacts and coordinating and cooperating with different authorities, the civil community and NGOs, and permanent appointment of employees in natural protectorates.

All this has lead to a noticeable increase in the number of large animals such as gazelles, rams and Barbary sheep that were exposed to hunting in the past years. For example, gazelles and Barbary sheep increased by more than approx. 500 and 200 respectively in Elba and Wadi El-Gemal protectorates.

Field studies showed that the number of marine turtles in the Red Sea, the islands and the Mediterranean Sea coast has increased significantly during the past years as shown in table (8-3):

Table (8-3) Read Sea Marine Turtles Monitoring Results

	Monitoring Operations	Remarks
1	Numbering: 25 green turtles	In Zabargad Island
2	Hawksbill Numbering: 2 turtle	In Hurghada city
3	The highest nesting rate registered in Zabargad Island; 1456 green turtle nests	100% increase from the last year (718 nests)
4	The highest nesting rate registered in Gaftoon Kabeer Island; 1456 hawksbill turtle nests	No. of nests last year (157 nests)
5	The highest nesting rate registered in Gaftoon Zagheer Island; 1456 hawksbill turtle nests	No. of nests last year (121 nests)

Monitoring activities indicated an increase in Red Sea mermaids and sharks. Studies proved that Wadi El-Gemal Island has the largest "Sooty Falcon" population estimated by 260 pairs of birds south the small island.

During 2006, the management plan for Red Sea protectorates was being implemented in coordination with the Red Sea Governorate. The activities of NGO, especially established for dolphins, was activated in partnership with all stakeholders in the area leading to a rise in the average number of dolphins existing in the region from 32 dolphin in 2004 to 78 dolphins per day in 2006. Environmental Monitoring Program indicated a significant improvement in coral reefs growth rate in the area and the continuous existence of dolphins estimated to be about 120 dolphins per day during summer.

Rehabilitating Endangered Species

- Rehabilitating some endangered species within natural protectorates for the purpose of protecting threatened flora and fauna at both the national and international levels as well as endemic species and the implementation of Natural Protectorate Law no. 102 of 1983 and the international agreements and conventions concluded by Egypt (CBD, CITES, Ramsar, CMS, AEWA, PERSGA, RAC/SPA). 35,000 Accacia trees were planted in South Sinai natural protectorates, which faced stresses as a result of human activities (tourism and overgrazing).
- Rehabilitating of the Egyptian Tortoise in Zaraniq and El Omayed protectorates by releasing 70 turtles into their natural habitats in the protectorates.
- Regenerating the Egyptian dabb-lizard (Spiny-tailed lizards) in Wadi El Assuti Protectorate.

Photo (8-1) Protectorate Gazelles in Elba

Photo (8-2) Rehabilitating the Egyptian Tortoise in Zaraniq

Biodiversity Conservation outside the Natural Environment

To date, no integrated system for wildlife outside natural protectorates exists to cope with international, regional and national requirements and latest developments (international agreements such as the Convention on Biological Diversity, the Convention on International Trade in Endangered Species (CITES), The Convention on the Red Sea and Gulf of Eden Environment Protection (PERSGA) and The Mediterranean Action Plan (MAP)).

Conservation activities of threatened land species as well as agricultural related-genetic resources are concentrated at the Ministry of Agriculture National Gene Bank (NGB), Nature Conservation Sector and Botanic Gardens on terrestrial species captive breeding program outside their natural environment.

1. National Gene Bank (NGB)

The NGB (Agricultural Research Center, Ministry of Agriculture) undertakes the process of collecting, conserving, describing, evaluating, regenerating and documenting flora and fauna genetic resources and origins and beneficial and disease-causing micro living organisms in the agricultural field. The NGB also reproduces plant genetic origins with vitality less than the limits identified by competent international organizations, as well as repatriating Egyptian genetic origins stored in foreign Genetic Origins Programs. The NGB also regulates Egyptian genetic origins aiming at generating new derived items and reserving the right of the Sate therein. NGB capacity encompasses 200,000 genetic origin samples.

Plant genetic origins of field and horticulture crops existing in NGB conservation chamber is estimated at more than 35,000 genetic origins, 500 of which are vegetables collected from breeding programs and international gene banks. Classes and species follow the genetic origins shown in table (8-4).

Table (8-4) Classes and Species Genetic Origins

Crop	Class no.	Species no.
Field crops	48	111
Vegetables	45	56
Medical and aromatic plants	133	173
Wild plants	141	227
Trees and bushes	45	63
Total	412	630

2. Regenerating Threatened Species Ex-Situ

Rehabilitation and protection of threatened species ex-situ is currently implemented depending on ex-situ reproduction programs for the following purposes:

- Protecting biodiversity elements and components ex-situ;
- Protecting biodiversity elements and components threatened with extinction;
- Creating reserve components and elements for in-situ biodiversity components and elements for protection in case of natural disasters or the spread of epidemic disasters leading to the death and extinction of hundreds of these elements.
- Repatriating and introducing recently extinct elements and components to their natural habitats

Photo (8-3) ex-situ captive breeding programs

Ex-situ captive breeding programs in cooperation with the private sector had lead to the achievement of tangible results by the end of 2006 as shown in table (8-5).

Table (8-5) Ex-situ Reproduction Program Results					
Sr.	**Animal**	**original no. in-situ (2002/03)**	**No. after reproduction in 2005**	**Current no. by the end of 2006**	**Reproduction source**
1	Egyptian gazelle	6	36	48	- Sinai Peninsula Eastern Desert
2	Nubian Ibex	4	17	29	Sinai Peninsula
3	Barbary sheep	4	20	28	Western Desert
4	Barbary Hyena	4	5	5	Sinai Peninsula
5	Caracal	1	1	3	Sinai Peninsula
6	Swamp cat	2	6	6	Egypt - Delta
7	Fennec fox	13	13	13	Sinai Peninsula
8	Rock hyrax	4	15	26	Sinai Peninsula
9	Golden spiny mouse	8	10	10	Sinai Peninsula
10	Large gray mongoose	11	11	13	Egypt - Delta
11	Egyptian Geese	7	70	95	Nile Valley
12	Egyptian vulture	2	2	2	Nile Valley
13	Cinereous Vulture	2	2	3	South Eastern Desert
14	Turkey Vulture “gray-headed”	1	1	2	Eastern Desert
15	Bold hawk	2	2	2	South Eastern Desert
16	Black Geese (Branta)	9	9	9	Manzala Lake
17	White Geese (chen)	5	9	15	Manzala Lake
18	Greater Flamingo	16	16	16	Manzala Lake
19	White Stork	13	13	13	Sinai Peninsula
20	Egyptian Tortoise	24	25	31	Northwest coast
21	Egyptian Tortoise (North Sinai)	9	9	11	North coast, Sinai
22	Sulcate Tortoise	5	212	320	Egypt border triangle (Libya, Shad, Sudan)
23	Nile Turtle	7	7	7	Nasser Lake
24	Water Turtle	5	5	5	Red Sea
25	Nile Monitor	7	17	17	North Sinai Desert
	Total	**171**	**533**	**729**	

The Egyptian Tortoise (Successful Model)

The Egyptian Tortoise is the most crucial and smallest (7-9 cm) threatened species all over the world. It was an inhabitant in semi-arid areas in Egypt and East Libya. It is near extinction in its habitats because of urbanization and the destruction of its environment and its large population for trade by selling in pet shops.

It was by chance when one of North Sinai Bedouins mentioned that there is a few number of Egyptian Tortoise near Zaraniq Protectorate, thereupon, a scientific team was formed to study the last numbers of this species before they become extinct. The study included the surrounding environment, the biological characteristics of the Tortoise such as growth rates, age and mating seasons as well as implementing a captive breeding program in participation with local residents and returning them to their natural habitats, Zaraniq and El Omyed protectorates, and monitoring them during the few past years.

The experiment began with 35 tortoises increased during the past years to 315 tortoises in 2004, 530 in 2005, and around 700 during 2006. Local residents had participated in the continuous monitoring processes that included the study of its movement, natural environment, available food, the measurement of growth rates and protection. Female Bedouins were successful in implementing handicrafts activities alongside the Egyptian Tortoise Development Program, which leads to tourism development in the Egyptian Tortoise habitat, consequently, financial resources of local residents nourished.

Lessons learned from the successful story of the Egyptian Tortoise is the concerted and comprehensive efforts required for some years to conserve a very small living being such as the Egyptian Tortoise to overcome its extinction.

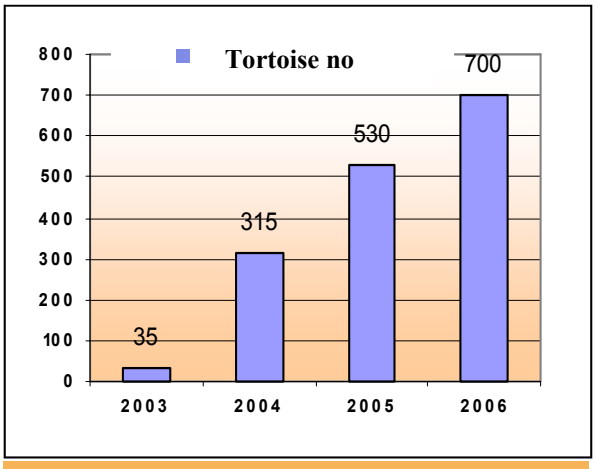


Fig. (8-1) number of Egyptian Tortoise resulted from captive breeding programs

Photo (8-4) Handicrafts parallel with Egyptian Tortoise Development Program

- Medicinal Plants Conservation

In cooperation with the Global Environment Facility (GEF) and United Nations Development Programme (UNDP), MSEA implemented the Medicinal Plants Conservation and Sustainable Use Project in arid and semi- arid environments in Egypt.

The project aims at conserving and using Medicinal Plants in St.Kathrerine and developing a strategy for the protection and development of threatened plants in addition to providing employment opportunities and investment in Medicinal Plants.

Major Achievements

- Finalizing Medicinal Plant countrywide survey, identification and documentation.
- Establishing the first electronic herbarium of Medicinal Plants in Egypt including 365 samples.
- Finalizing the reproduction of 91% of target medical species.
- Preserving the seeds of 84 target and major plant species in NGB and Desert Research Center (DRC) genetic origins bank.
- Establishing 11 pilot Medicinal Plants' farms.
- Providing over 35 employment opportunities for Bedouins.
- Reproducing 43 species to be used in the International Salam Park in Sharm Sheikh, these species generated 32,000 seedlings representing 34 species from total species reproduced. 32 Sinai-specific species were planted on 6.5 feddans of the park.
- Repatriating two of the most important species in the protectorate; Acacia and Mangrove trees, and Reproducing 3000 transplants of each.
- Establishing geographic database including the distribution of Medicinal Plants, target species and linking them with a medicinal database including all available data about each species.
- Issuing volumes I and II of the first scientific encyclopedia on wild Medicinal Plants in Egypt.
- Initiating the proceedings of the Intellectual Property Rights Committee for developing a national legislation for protecting biodiversity-related Intellectual Property Rights in Egypt.
- Collecting traditional information on 35 medicinal plant species from St. Catherine area and inputting them into the Medicinal Plants database.
- Launching a web site on the internet to show Egypt's ownership of Medicinal Plant species and Intellectual Property Rights to well known species. www.mpcpegypt.com

Confronting Invasive Specie Threats to Biodiversity

Invasive species represent the second cause for extinction of species and biodiversity loss which lead to significant economic and social loss adversely impacting public health and flora and fauna wealth. Biological Diversity Convention called on member states and regional and international organizations to take this issue into consideration and to develop and implement national programs to confront invasive

species; In response the following was implemented in 2006:

- Conducting a study on the invasive alien species (IAS) in the Egyptian environment including definitions for such species and the current status in Egypt. As a result, six more species were added to Egypt IAS list, still under review, thus, IAS number increased to 55 invasive species.
- Combating the spread of mesquite trees in Elba Protectorate considering them as IAS spreading and affecting the plant cover of inhabitant species through the cooperation with the local community in:

1. Identifying and mapping the location of such trees in the southern area of Elba protectorate.
2. Disposal of trees through cooperation with local residents.

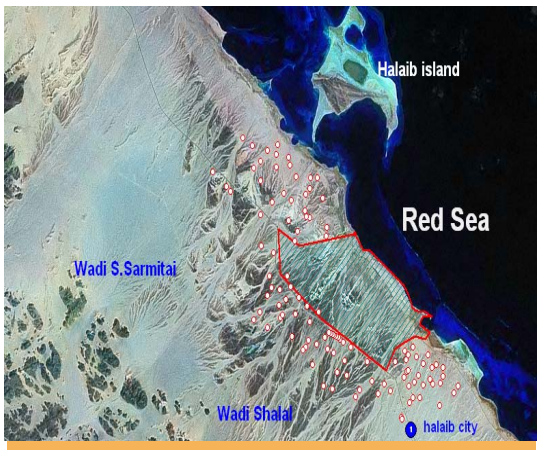


Photo (8-6) Using satellite images to show the density of mesquite spread in Halaib

Photo (8-5) Efforts for combating mesquite in Elba in cooperation with local residents

Combating invasive mesquite trees (another successful model)

Invasive mesquite trees are considered as one of the invasive trees in the southeast of Egypt. They were introduced by one of local residents in Halaib in the eighties for the purpose of forestation and coal production. The tree was rapidly became endemic at the expense of local trees, particularly after the heavy rain falls over Elba Protectorate during 1996. Camels and sheep grazing related activities moving from Egypt to North Sudan assisted in the widespread of such species.

Field surveys proved that seeds density has reached about 1000/km^2 and was concentrated in 3 main areas in the protectorate; however, most of them are located in Halaib.

Map (8-2) Major area for the endemism of Mesquite trees

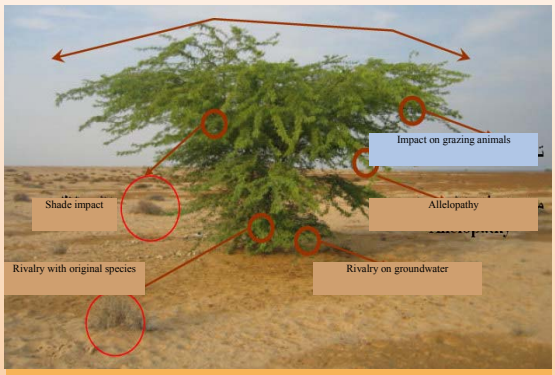


Photo (8-6) Invasive mesquite trees

Invasive mesquite trees pose a great threat to biodiversity in Elba Protectorate, besides negatively impacting the whole ecosystem functions and water balance in the area. Moreover, they have side effects in the form of a condensed plant cover at the cost of local plant species, thus the increased grazing in many of the protected areas including salt marshes along the Red Sea Coast and the protectorate desert plains and valleys

An environmental monitoring program for mesquite trees has been implemented since 2004 and a combat program was developed in participation with local residents. Combating measures included mechanical and manual methods where trees were felled and trunks and roots were burnt. In 2006, mesquite spread in main grazing areas was controlled. Currently, every tree is followed up and monitored via GIS, besides developing a database on mesquite biology and environment. Combat measures are one of the temporary solutions in assisting conservation processes in Elba Protectorate. The best methods to exploit mesquites are currently recognized.

Pic. (8-7) Combating mesquite trees with local resident's assistance

National Legislation to Conserve and Activate Biodiversity

Several nature conservation national legislation activities took place in 2006:

1. Updating conserved species list as per international standards developed by agreements and international organizations by virtue of which licenses are issued and wildlife use is organized as per Law 4/1994 as shown in Table (8-6).

Table (8-6) List of protected species as per international standards

Groups	Number of species protected
Mammals	59
Birds	409
Reptiles	48
Fish	24
Bivalves	2
Amphibians	2
Insects	9
Butterflies	60
Plants	455

2. Implementing several awareness campaigns, organizing obtaining living organisms for education and scientific research purposes, and collaboration with border guards and the police in seizure campaigns on markets selling threatened species (such as the Egyptian Tortoise, Foxes and Egyptian Gazelle), arresting law violators (who hunt Gazelles and Vultures), confiscating species they hunt to be collected by tourists, and imposing fines on them according to the conditions of each incident.

Pic. (8-8) Hunting small migrant birds via "snares" along the North Coast. They are sold in Delta markets during autumn. The number of hunted birds (mostly protected) is estimated at 1 million birds.

Pic. (8-9) Extension of quail hunting nets for hundreds of kilometers

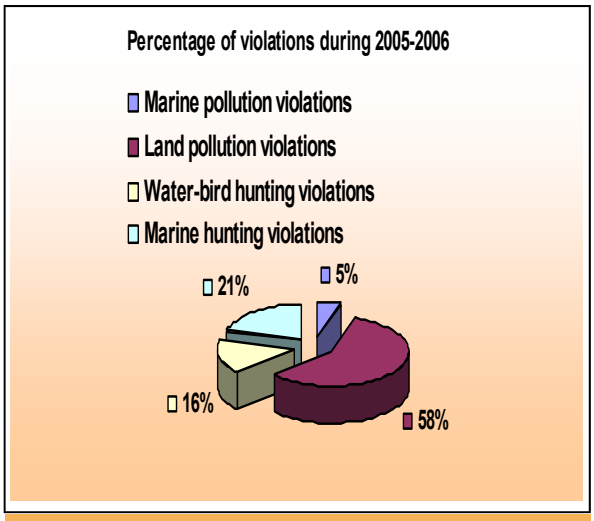


Fig. (8-2) Percentage of violations in 2005-2006

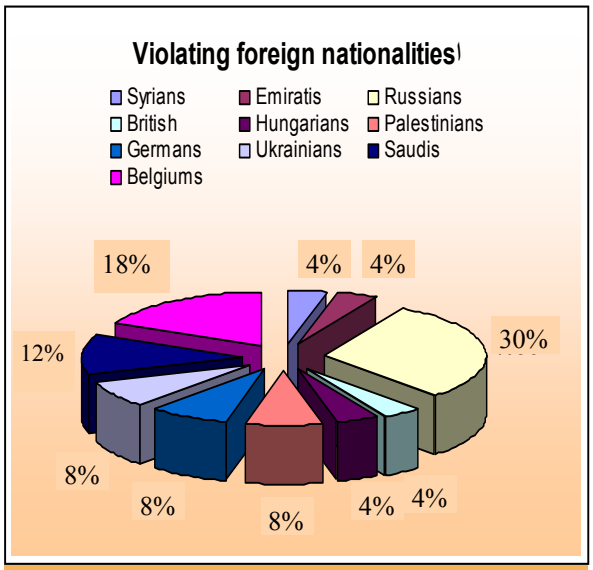


Fig. (8-3) Violating foreign nationalities

3. Continuous coordination with Red Sea, South Sinai and Marsa Matrouh to issue decrees prohibiting collecting and hunting threatened living organisms (such as sea cucumber and ornamental fish).

Despite efforts made during 2006, gazelle hunting is still ongoing where recent studies proved that Egyptian Gazelle loss rate during the past decades is still continuous, and that Gazelle and Barbary sheep exist only in Natural Protectorates.

Pic. (8-10) Egyptian Gazelle in natural protectorates (Elba and Wadi El Gamal)

Table (8-7) Protectorates with Egyptian and White Gazelle			
Sr.	**Protectorate**	**Egyptian Gazelle**	**White Gazelle**
1	Camel Valley, Hamata	+	-
2	Siwa	+	+
3	White Desert	+	+
4	Elba	+	-
5	Rayyan Valley	+	-
6	Assiuti Valley	+	-
7	Alaqi Valley	+	-
8	Taba	+	-
9	St. Catherine	+	-
10	Degla	+	-
11	Nabq	+	-

Furthermore, public awareness of wildlife conservation is still poor and its related local decrees are not properly examined, as shown by killing animals in remote areas. For example the rare Striped Hayena in Siwa and near Marsa Matrouh was killed.

Pic. (8-11) Rare Striped Hayena killed in Siwa

Combating the Lethal Bird Flu (H_5N_1)

In 2005, the world was worry following up the spread of the avian influenza virus H_5N_1 across different countries and its destructive impacts on national economies and social and health aspects in several countries. Egypt's Ministries of Agricultural, Health and Environment cooperate to combat bird flu. MSEA played an effective role in this respect through measures taken starting from observing the virus in land and migrant birds crossing Egyptian territories. Preparedness level was raised and more concern was paid to monitor migratory birds and their habitats along the borders and at rivers. Moreover, 5000 samples were obtained and analyzed in the Naval American Medical Research Unit (NAMRU3). All results were negative. Immediate action, monitoring, and different-area sampling units were increased according to migration different routes and seasons, and intensive training programs were held for immediate action groups and they were handed clothes, equipment and eco-friendly disinfectants.

On 17th February 2006, the first chicken H_5N_1 infection was reported officially. Before one month had passed and recording any human cases, virus hubs in Egyptian governorates were 840 in farms mainly and in households subsequently, which indicated huge failure in applying biological security and health safety requirements. Such failure was not restricted to random farms only (with 80% of total farms in Egypt), but large farms were also blighted.

On 15th March 2006, the first human infection was reported and led to the first mortality this year. Consequently, bird and human observation programs were greatly activated, and hub cleansing campaigns were conducted. Random farm raising of birds were stopped for 2 successive cycles to prevent virus spread, and all infected birds raised were killed. Observation and combat teams were formed.

In MSEA, participants in wild fowl observation and follow-up program increased that they were divided into 4 main field teams with 15 members each assisted by sub-teams with 60 members, those who are well trained on observation, follow-up, and raising public awareness. This team is assisted by extra 400 persons working in natural protectorates and EEAA/RBOs who record data in the database, which are then analyzed by the main team and used

During the year and a half since the beginning of the national action, the disease has been observed in 25 natural sites of migrant and endemic birds in wetlands, Delta, Nile basin, small water communities, hunting ponds, oxidization stations and city greenbelts. A proper database was built to monitor bird movements, behaviors and health conditions in all the said locations on a daily basis and up to date. More than 5000 samples of all wild migrant birds were analyzed in 2006 in collaboration with the Naval American Medical Research Unit (NAMRU3) and all proved negative. Furthermore, the public awareness team covered 20 governorates and distributed more than 50,000 fliers and handbooks on different stakeholders and local communities. Additionally, protection means were provided for action in more than 50 wildlife locations sufficient to equip 500 combat persons at a cost of some EGP 2m. MSEA issued decrees prohibiting hunting birds in 2005 and 2006.

in developing an observation and the best combat measures program. Another central 20- member team works on preparation and public awareness in MSEA central operation room. Thus, working groups were formed of almost 500 persons with sufficient scientific background and necessary experience to monitor and combat the virus. Most of these resources were not available before 2006.

MSEA currently has efficient observation teams and better combat facilities compared with 2005. It needs more capacity building to control the disease before it turns into an epidemic, besides supporting public awareness means.

This matter is highly regarded by the National Higher Committee for Bird Flu Combat.

Table (8-8) Numbers and types of samples collected from migrant wild fowl in 2006

Collection location	Number of samples	Type of birds	Analysis results	
			- ve	+ ve
Manzala Lake (Damietta, Port Fuad salt ponds, Manzala, Matareya, Daqahleya)	1268	Migrant and endemic water fowl: migrant ducks, water hen, sea gull	1268	-
Arish (Bardawil)	44	quail, coot	44	-
Rashid (Edku Lake, Borollos, Nile course)	682	Quail, pintail, teal, water sparrow	682	-
Sharqeya (Akiad Lakes, Nasr, Abbassiya, Baaloh, Inan)	1940	Teal, shoveller duck, wigeon, pintail, mallard, coot	1940	-
Port Said	534	Migrant and endemic fowl birds: migrant duck, water hen, sea gull	534	-
Fayoum	42	Water hen, cattle egret, sea gull, plover	42	
South Sinai	18	White stork, various migrant birds	18	-
Suez & Ismailia	24	White stork, migrant birds	24	-
Cairo	564	Cattle egret	564	-
Dahshour	18	Teal, coot	18	-
Aswan	38	Egyptian geese, great cormorant, white heron	38	-
Total	**5172**		**5172**	

9- Urban Expansion and Informal Settlements Phenomenon

1- Increased Urban Expansion

A- High Population Growth Rates

Censuses indicate that Egypt's population has doubled in fifty years (from 1897 – 1947) from 9.7 million to more than 18 million. The second doubling took almost thirty years (from 1947 – 1976) reaching around 36 million according to 1976 census. In 1986, population reached 48.3 million, and by 1996 it was 59.3 million. 2006 Census results indicate that population has increased to more than 75 million.

Despite decreased population growth rates in Egypt from 2.8 % (from 1976 – 1986) to 1.99% currently, they are still considered amongst the highest internationally. Egypt's population is expected to reach at least 96 million in 2020, with a 20 million increase on current population, which will in turn leads to the aggravation of the increased Urban Expansion issue and the spreading of informal settlements phenomenon, hence, to the problem of agricultural land erosion and environmental degradation.

Population growth and distribution Egypt until 2020 warns of more depletion of agricultural lands in addition to the aggravation of environmental problems resulting from infrastructure weakness to face such increase. Figure (9-1) shows the expected population growth until 2020.

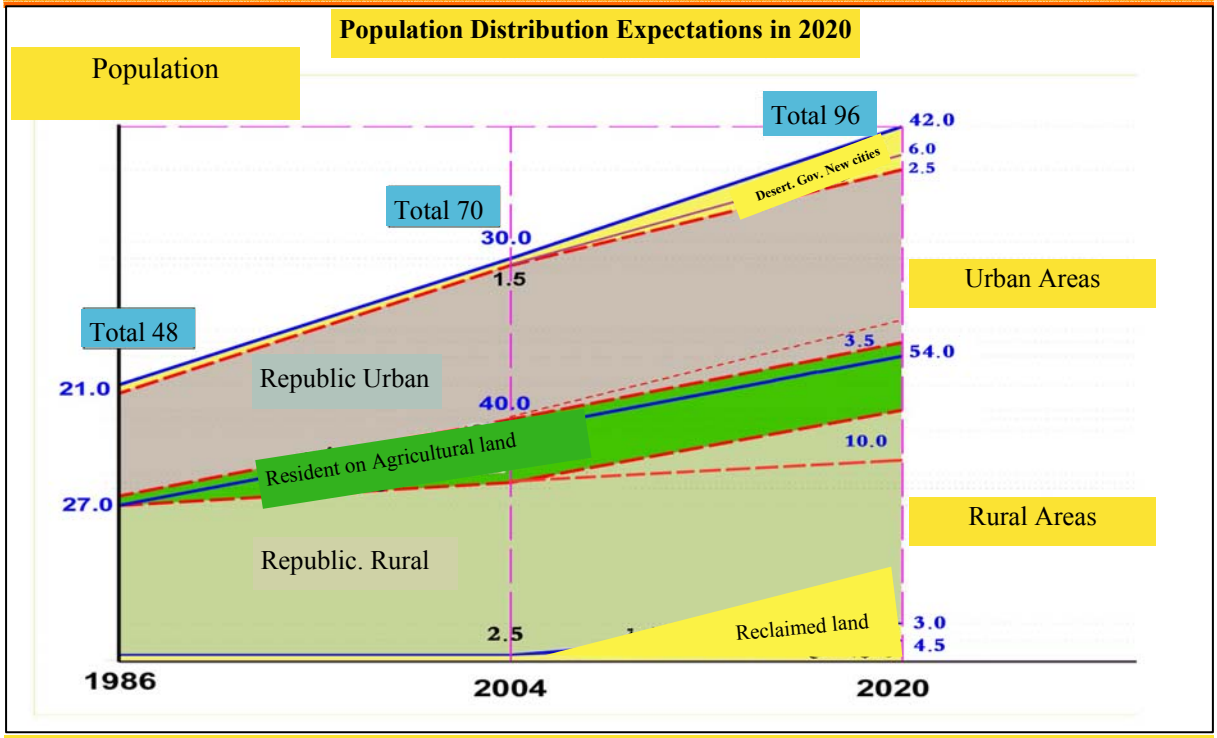


Figure (9-1) Expected Population Growth until 2020

B – Agricultural Land Erosion Rates and Future Risks

Sprawl of buildings, projects, services and the non-agricultural utilization of agricultural lands led to the loss of huge areas of agricultural land in Egypt reaching around a million feddans. Available numbers clearly show significant disparity in agricultural land depletion rates resulting from urban growth. However, they almost agree that 53% of such depletion is owed to residential buildings, 26% to services, and 21% to other projects and infrastructure projects.

It is however noticed that the expansion of villages, hamlets and satellites is horizontal using low buildings, thus with much less utilization of land than in informal urban growth, which is vertical with high utilization of land due to difference in living circumstances and lifestyles between urban and rural areas. Thus, informal growth in rural areas is much graver than in cities. This issue has not yet received due concern.

This led specialized national councils to develop two scenarios of the agricultural lands future in the Valley and Delta. One is pessimistic, based on slow movement towards the desert to the new cities and mega projects, with the inability of directing urban growth away from the Delta and Valley. While the second is optimistic, based on the speed and rise of settlement rates in new cities and mega projects and finding new policy alternatives, thus, preserving agricultural lands.

Figures (9-2) and (9-3) show the two alternatives for the continuous urban growth at the expense of agricultural lands; both showing significant agricultural land depletion. Both figures show complete loss of old agricultural lands, either within fifty years, if current policies sustain, or by the end of this century if development efforts and expansion outside Egypt's populated areas succeed. This requires serious study of the issue and taking measures to ensure that such expectations do not come true.

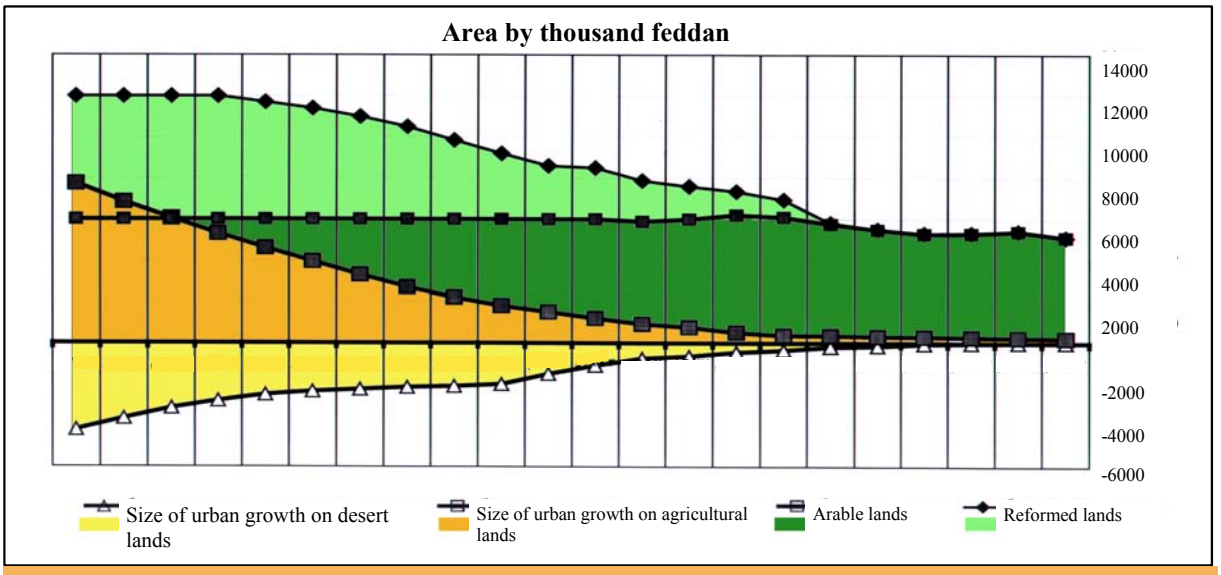


Figure (9-2) continuous urban growth at the expense of the agricultural lands (pessimistic alternative)

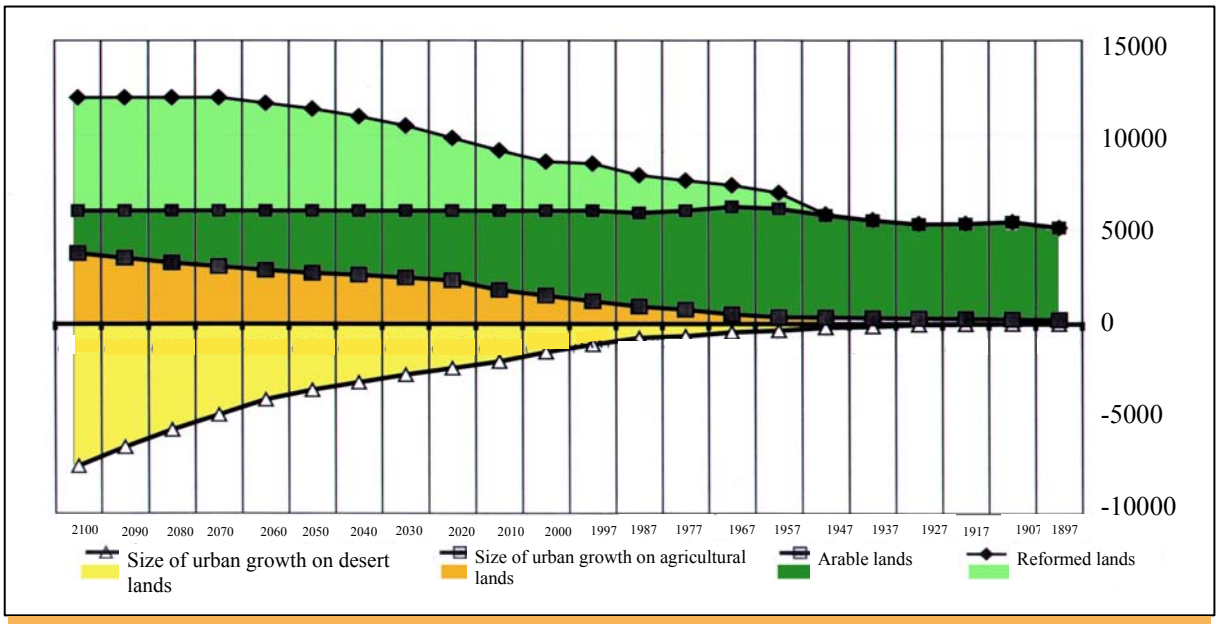


Figure (9-3) continuous urban growth at the expense of the agricultural lands (optimistic alternative)

Negative results of this unplanned urban growth are numerous:

1. Decreased agricultural production.
2. Environmental degradation resulting from many development activities implemented in urban growth areas, particularly unplanned industrial activities and its impacts on the Egyptian citizen.
3. Contribution in the spread of the informal pattern in all aspects of life along with the hard living circumstances, decreased society productivity and values, and disturbance in the Egyptian urban system and its adverse impacts.

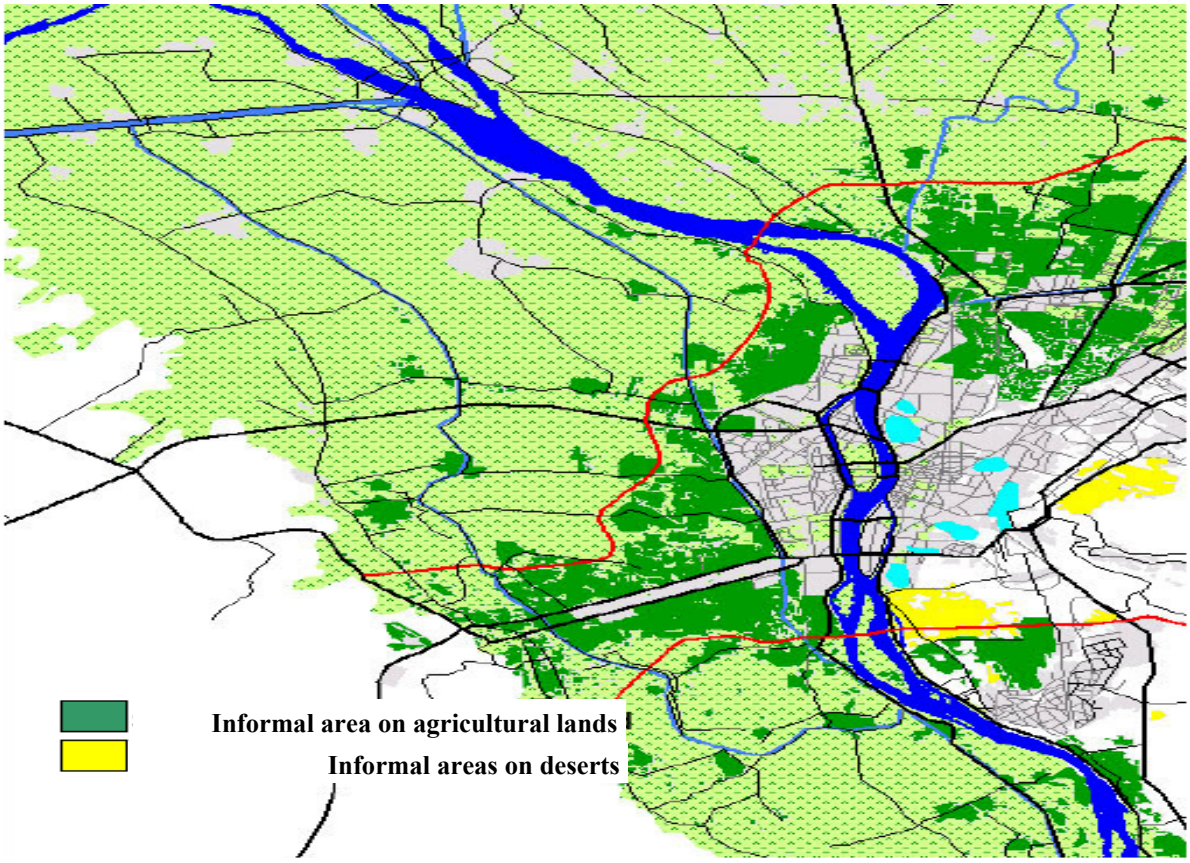
This aggravated situation requires quick actions for developing an integrated urban policy that puts all State efforts in building new cities and desert hinterland villages, and developing informal settlements in the framework of a clear general plan that implements priorities.

2- Spread of Informal Settlements Phenomenon

Urban growth of Egyptian cities takes place primarily on informal areas, i.e. unsystematic growth, where informal settlements grow at high rates that they have really become to represent connected cities where poor and middle classes adjoin. Informal settlements are a disgrace on the forehead of urban communities in Egypt, as their environments and communities lack many basic elements of accepted human life. The seriousness of the situation in informal settlements is exacerbated by the unnatural population density, which leads to the deterioration of all their urban environmental components.

The informal settlements issue has gained increasing concern since almost fifteen years ago, receiving more political and security attention, media intensification and cultural activity. Concern with this issue has become the official drift announced by the State. The political/security obsession was what exploded this issue in Egypt. However, informal settlements, according to all definitions, have existed, settled and exacerbated as a phenomenon forming the urban/social weave long before that. Informal settlements have several, diverse, and extremely disparate types.

Cairo alone includes 81 informal settlements with eight million people living amongst 16 million inhabiting the capital. These informal settlements occupy 62% of Greater Cairo area. Map (9-1) shows informal settlements distribution in Greater Cairo region on desert and agricultural lands.



Map (9-1) Informal areas distribution in Greater Cairo on desert and agricultural lands.

Although features of the informal settlements problem are very clear in Cairo, this does not mean that it is limited to Cairo. Cities' Informal expansion is a phenomenon in all Egypt's cities. Available statistics show that the number of informal settlements in Egypt had reached 434 in 1993. However, in 2006 they reached 1,221 in 24 governorates. Around 15.7 million people are living in these informal settlements, representing 24% of total population in Egypt and 40% of total urban population, in addition to 8 million people living in rural areas.

Informal settlements in some cities reached 77% of city's urban growth (Bani Mazar – El Minya). They have even reached 87% of Giza city urban expansions. Informal settlement population in cities to total city population is around 25% in Assyout and 62% in Giza. In Alexandria governorate there are 54 informal settlements with around 1.36 million inhabitants representing 35% of total Alexandria city population. Pictures 9-1, 9-2 and 9-3 show examples of informal settlements in Greater Cairo region and Alexandria city.

Pic. (9-1) Informal areas on agricultural lands

Pic. (9-2) Informal areas in Greater Cairo region

Pic. (9-3) informal area in Alexandria

The State adopts a long-term plan aiming at reducing informal settlements phenomenon and developing such areas. Total investments allocated for developing and improving informal settlements in 2005/2006 plan reached 157 million pounds that contributed in developing 349 informal areas.

The 2005/2006 plan aims at developing 120 informal settlements in different governorates. LE 300 million was initially allocated for implementing the plan. 50% of these appropriations (LE 150 million) shall be provided by the general budget, whereas donor agencies and civil societies and stakeholders' contributions shall be 15%, and 35% respectively. Informal Settlements Development Program includes the legalization of land ownership and real estate market activation through registering those buildings and linking the legalization process to utility and infrastructure connection. Credit facilities are also being provided to land owners for construction works and small projects

MSEA Efforts in Informal Settlements Environmental Development

Developing informal settlements is considered one of the major priority programs sponsored by Her Excellency the First Lady, Mrs. Suzan Mubarak. MSEA participates in achieving expected upgrading in these areas through implementing a series of environmental activities including: tree planting; removal of accumulations; beautification of houses facades; establishing parks; using cement bypass in paving side streets; establishing and operating Environmental Awareness centers including Green Corner activities for educating, training

and environmental awareness raising of children; an awareness raising unit for raising women's environmental, hygienic, and cultural awareness, and developing skills through handicraft activities using environmental materials; NGO units for exhibiting products and developing skills; and training halls for developing capacities of different levels of informal settlements inhabitants.

MSEA contribution in developing informal settlements in cooperation with Integrated Care Society (ICS) in Ezab and Arab El Waldah, and El Ma'asara is an example of environmental upgrading in other informal settlements where MSEA has implemented the following:

(1) Paving 20 side streets in participation of local youths after receiving training acquiring skills in this field.

(2) Beautifying and painting 948 building facades benefiting 30 thousand citizens.

(3) Planting more than 1000 tree in main roads.

(4) Establishing two parks; the first on 4 feddans including an environmental awareness center at Al Ma'asara, while the second on 7 feddans next to and environmental awareness center in Ezab and Arab El Waldah.

(5) Providing the parks with children playgrounds, theatres, pergolas in the environmental awareness centers, and cafeterias.

(6) Implementing awareness, capacity building and environmental skills development activities, in addition to health awareness activities and computer training.

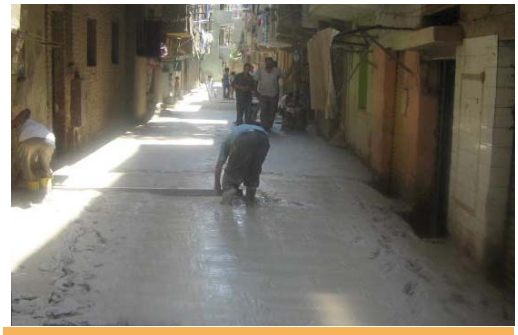
Pic. (9-4) A 7 fedans Park in Ezbet Al Waldah

Pic. (9-5) Solid wastes removal and treeplanting in Ezbet Al Walda

Pic. (9-6) Establishing and operating EA center in Ezbet Al Waldah

Pic. (9-7) beautifying of houses facades

Pic. (9-8) Solid wastes removal and tree planting in Ezbet Al Waldah



Pic. (9-9) paving roads with cement bypass

Owing to the success of this model and the positive impacts on the local inhabitants, and in order to ensure ongoing implementation of these programs, an Informal Settlements Environmental Upgrading Unit has been established within MSEA, directly reporting to the Minister, with the mandates of continuing work through developing plans and programs, acquiring experiences, capacity building, identifying funding sources and encouraging community contributions with effort and money, in addition to developing mechanisms to ensure sustainability of activities and maximize their returns.

To ensure the implementation of desired objectives, a group of informal settlement development experts were selected to manage the unit and implement its activities.

3- Environmental Degradation as a Result of Urban Expansion and Informal Settlements Proliferation

MSEA's concern with this issue is due to extreme environmental degradation resulting from such increased urban expansion, particularly on agricultural land, and the proliferation of informal settlements phenomenon. Environmental degradation is seen in the following:

A- Solid Wastes and Unplanned Waste Disposal:

- Waste accumulations adjacent to residential areas.
- Open burning or self burning of accumulations.
- Spread of informal settlements around

dumpsites to benefit from waste unsafe scavenging and sorting by children and different age groups.

- Unsafe disposal of medical wastes in informal dumpsites exposing children and scavengers to hazardous diseases.
- Wastes accumulations in some areas in governorates near water ways directly impact water and vegetation quality when using such wastewaters in irrigation.

B- Sanitation

- Some city areas and most informal settlements lack integrated sanitation services.
- In such areas, wastewater is disposed of in unlined septic tanks or deep discharges to underground aquifers.
- Formation of wastewater pools and swamps in informal settlements.
- Adverse environmental impacts on water quality in waterways due to final disposal using emptying trucks which discharge in waterways, as well as environmental impacts on soil quality in case of disposed in open land.

C- Drinking Water

- Several informal and marginal areas lack water supply services.
- Some informal settlement inhabitants lacking drinking water use unhealthy pumps for pumping underground water, resulting in poisoning, diarrhea or any other health problems, in addition to potential groundwater contamination.

D- Industrial activities

- Industrial activities such as potteries, smelters, brick factories, handicrafts workshops, medium size factories, quarries products storage areas and poultry and animal farms spread in some cities particularly informal settlements.
- Unplanned disposal of industrial solid and liquid wastes in adjacent lands and water ways, directly and adversely affecting soil and water quality.
- Existence of handicraft workshops amidst residential areas results in hazardously high noise levels.

E- Awareness and Environmental Education

- Extreme lack of awareness in these informal settlements with hazardous impacts of environmental degradation leads to more degradation.

MSEA efforts in this framework focus on significant participation in developing controls governing urban expansion, preventing informal settlements and participating in developing existing ones.

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10- Energy

Introduction

Improving energy efficiency in fields of industry, transport, electricity, buildings, and petroleum is still one of the main challenges at the national level. There is a great amount of mutual benefits from implementing energy efficiency policies in production and consumption sectors. This includes reducing demand on energy, reducing its cost, improving air quality, and reducing emissions of green house gases.

Making energy efficiency technologies available for these fields would undoubtedly support all efforts aiming to achieve sustainable production and consumption patterns.

Environmental State of Power Stations

Power stations in Egypt are the main driver of Egyptian industry. It is the main pivot of Egyptian economy growth. Mammoth development has taken place in electrical power stations through past decades, where the rate of generated electricity country-wide had increased 7.3% annually. Mazot fuel and gasoline fuel consumption rates decreased by 6.2% and 23% respectively, while natural gas usage rate increased 12.8%. This shows that natural gas consumption rate to total fuel used for 2005/2006 is around 79.6%; i.e. with about 4.2% increase compared to 2004/2005 as shown in table (10-1).

Table (10-1) Natural Gas to Total Fuel used in 2005/2006				
Item		**05/06**	**04/05**	**Development rate%**
Mazot	Thousand ton	3691	3936	(6.2)
Natural gas	Million m^3	17298	15334	12.8
Ordinary gaso-line	Ton	6722	28778	(76.6)
Special gasoline	Ton	63350	61324	3.3
	Total	**18448**	**17028**	**8.3**

Reviewing the situation of fuel used at electric power stations, it is found that current use of mazot, considered the worst environmentally polluting fuel, is limited to only four power stations in Egypt (Arish, Syouf, Walidiah, and Assiout).

With increased Egyptian stock of natural gases, the Ministry of Electricity in cooperation with MSEA has pursued a policy to replace liquid fuels such as mazot and gasoline with natural gas. Table (10-2) shows development in activating the use of natural gas.

The environmental return resulting from the use of eco-friendly fuel is very high, particularly in power generation stations. The use of liquid fuel such as mazot and solar causes an increase in SO_2 and CO and lead ratios in the ambient air, thus causing significant environmental degradation of air quality.

Table (10-2) Development in Activating the Use of Natural Gas					
Company	**Natural gas million m^3**	**Special gasoline ton**	**Ordinary gasoline ton**	**Mazot x1000 tons**	**Total x1000 ton/oe**
Cairo	5194	1738	515	831	5211
East Delta	5327	55538	2114	758	5395
West Delta	5485	6074	2375	689	5319
Upper Egypt	1292	-	1718	1413	2523

In this framework, MSEA in coordination with the Ministry of Petroleum supplied power stations with natural gas as an alternative fuel, where air quality to lead and SO_2 improvement ratio reached 6% and about 20% respectively according to a study on pollutants' sources

New and Renewable Energy

Upon a commissioning by the Supreme Council for Energy, a strategy is developed currently to increase electrical energy generation capacity from renewable energy sources to 20% of total generated energies till 2020; i.e. around 13,500 MW. This strategy includes the following:

- Executive plan divided over the years until 2020
- Plan for local manufactured components of wind turbines
- Surveying required lands and their availability for wind energy projects
- Developing the necessary legislation for regulating and encouraging investments in this field

In the field of solar energy, procedures for implementing the first thermal solar power plant are currently underway with a capacity of 150 MW where 20 MW of which would be the capacity of the solar component at Al Korymat area. The project is implemented in cooperation with GEF, MSEA and the World Bank. The project is planned to be completed mid 2009. Annual energy generated from this power plant would reach 985 GWhr/year.

Energy Efficiency in Egypt

Energy Efficiency is measured in all countries through Energy Intensity Coefficient; i.e. total energy consumed to total GDP. In other words, energy intensity is defined as total primary energy consumption (Kg oil equivalent/year) for every $1000 of GDP.

Energy Intensity indicator in Egypt equals 0.53; which is a high rate compared to North Africa countries such as Tunisia and Morocco, where it equals 0.25 and 0.26 respectively. While it ranges from 0.15 to 0.17 in EU countries.

This means that Energy Intensity Coefficient in Egypt is five times more than that in Spain, Germany, and Austria (0.15), and two times more than Tunisia and Morocco, i.e. increased wasted consumed energy (fuel + Electricity) in Egypt, which is due to several reasons including continuous local fuel subsidy, bringing its price as the lowest among countries and low awareness level with the importance of energy efficiency in all production and consumption sectors.

To face this problem, the Supreme Council for Energy in its first meeting in September 2006 commissioned MSEA to present a study on proposed policies for rationalizing energy use in production and consumption sectors. The following is a brief presentation of proposed policies to improve energy efficiency in Industry, Power, Transport, and Housing sectors.

1- Electrical Industry Sector

a. It is proposed to improve energy efficiency in industrial facilities through investing in the following components:

- Lighting (interior and exterior)
- Air-conditioning and ventilation
- Insulation and lining of steam and hot water piping, boilers
- Using capacitors to improve power factor in factories
- Improving burning efficiency in boilers and steam systems, through waste heat recovery.

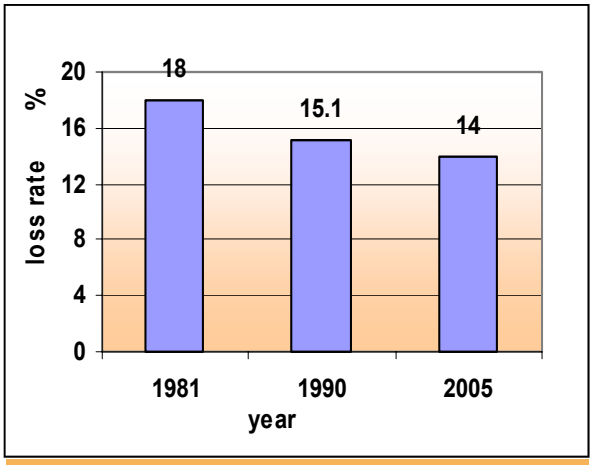

Fig (10-1) losses rate in transferring and distributing electric energy produced from 1981 to 2005

Source: Electric Utility Agency (EUA), 2005

b. Applying energy audits system in the industrial sector would reduce energy consumption by 19.5% of total industrial facilities consumption of primary energy.

2-Electrical Power Sector

Electrical Power sector was interested in rationalizing energy for years. This resulted in the reduction of fuel consumption rate in thermal stations from (250g/KWhr to 226g/KWH). The proposed fuel consumption reduction system in the electrical power sector includes:

a. Reducing the losses in electric energy transferred through the National Grid to consumers via load centers through installing capacitors to improve power factors on both high and intermediate tensions. Fig (10-1) shows losses rate in transferring and distributing electric energy produced since 1981 till 2005:

b. Using cogeneration combined heat and power systems, waste heat recovery systems and steam turbines.

3- Transport Sector

Transport sector is described as one of the most important of all sectors consuming fuel; it comes in second place after industry sector. It consumes 28% of final total energy consumption, and comes first in consumption of petroleum products; around 10.8 million toe, and represents 40.4% of total petroleum substances consumption; (27.6 million toe).

The proposed system for rationalizing energy use in the transport sector includes:

a. Improving economics of land transport, railways, vessels, and planes.

b. Identifying a maximum rate for vehicles and trailers fuel consumption, so as not to permit licensing of those vehicles exceeding this rate.

c. Reducing maintenance and operation costs.

d. Ensuring highest levels of sound and thermal insulation.

4- Buildings Sector

Residential, commercial, and governmental buildings sector comes first in electric energy consumption; around 38 billion KWhr equivalent to 45% of total electric energy consumed 85.8 (billion KWhr). It comes third in final total energy consumption; around 20% of final total energy consumption in Egypt.

Buildings sector in Egypt consumes 45% of total electric energy used; the highest compared to neighboring countries.

Fig (10-2) shows rates of buildings sector consumption of electric energy in Egypt and some neighboring countries:

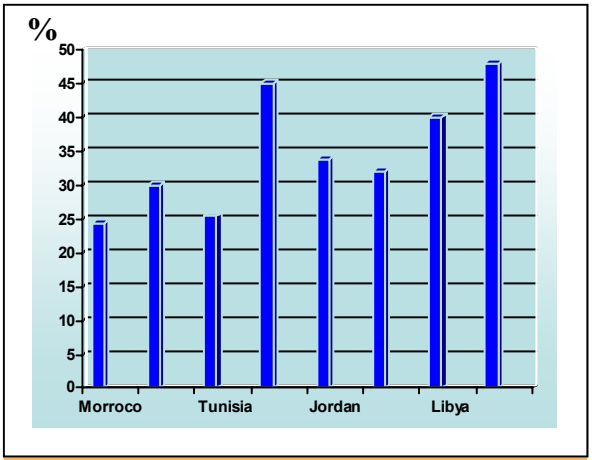

Fig (10-2) rates of buildings sector consumptions of energy in Egypt and

Source: MED_ENEC, 2006

Proposed Energy Efficiency Measures in Buildings

a. Installing high energy efficient lighting

b. Using thermal insulation materials in new buildings facades (walls roofs, ceilings, and windows)

c. Preventing air leakage to the outside and entry of hot air to the inside.

d. Reducing number and areas of exterior openings

e. Managing energy use in facilities all day round (optimal control in connection and breakage through smart and occupancy sensors and controlling cooling and heating units based on maximum demand).

f. Developing incentives for constructing new buildings that comply with buildings codes for reducing energy consumption.

11- Management of Solid Wastes

Introduction

Sound Solid wastes management needs to be dealt with in an integrated manner as one multi-faceted, multi-component and closely-linked system.

Solid wastes management systems established in Egypt did not meet the needs of society strata in achieving an acceptable level of cleanness, mitigating health risks and adverse environmental impacts or providing the general civilized appearance. This deficiency led to solid wastes accumulation in residential blocs, empty lots, and on the borders of residential blocs (closed canals and drains).

This deficiency in providing the required services is due to:

1. Lack of human skills and experiences.
2. Deficiency of institutional and administrative systems, and lack of integration and coordination between different stakeholders.
3. Unavailability of sanitary landfills for the disposal of these wastes.
4. Low level of environmental awareness and bad practices in municipal solid wastes handling.
5. Extreme shortage in enforcement and implementation of laws and legislations.

Table (11-1) shows daily wastes quantities generated in different Egyptian governorates according to latest data available.

Table (11-1) illustration of daily generated wastes quantity

Governorate	Daily generation (ton/day)	Compiling efficiency
Cairo	10000	68%
Giza	3800	45%
Qaliubya	3600	55%
Alexandria	2500	80%
Behera	2200	55%
El-Wadi El -Gedid	90	65%
Qena	1200	75%
Red Sea	305	70%
Marsa Matrouh	520	75%
Mnofya	1370	60%
Gharbya	2050	65%
Kafr El-Shiekh	2200	50%
Damitta	1300	70%
Souhag	1000	65%
Aswan	670	80%
Assuit	850	55%
Daqahlya	3600	50%
North Sinai	325	65%
South Sinai	450	80%
Port Said	800	75%
Ismailia	650	70%
Luxor	300	80%
Suez	500	70%
Sharqya	1800	55%
Beni Suef	750	55%
Mienya	1200	65%
Fayoum	600	60%
Total	**44630**	**65%**

The Ministry of environment in cooperation with the governorates has identified and selected 53 sanitary landfill sites, with only 4 operational in Cairo, Alexandria, Suez and Port Said.

The Ministry of State for Environmental Affairs has paid special attention for removing accumulations and developing sanitary landfills.
To minimize this problem, the ministry has also implemented the following measures in 2006:

1 – Removal of Historical Accumulations

MSEA, in cooperation with the Ministry of Local Development, continued municipal solid waste historical accumulation removal program in Greater Cairo, where 4.5 million m^3 of historical accumulations were removed in 2006 to controlled landfill sites within Greater Cairo borders. By the end of 2006, a total of around 15 million m^3 of historical accumulations have been removed.

Table (11-2) shows stages of historical accumulation removal in 2006.

Table (11-2) Illustration of accumulation removal stages in 2006

Gover-norate	Site	Quantity of accumulations disposed of by leveling and covering (m^3)	Quantity of accumulations transferred to controlled landfills (m^3)	Con-trolled landfill
Cairo	Mohamed Nageeb drainage, Marg	4,000,000	100,000	El-Wafaa wal-Amal
	Salah Salem St. and the Middle Island, Helwan			
	Hefni Abu Gabal, Helwan			
	Atlas St. next to tombs, Helwan			
	Faydi St. next to Azhar Institute and Faculty of Engineering, Helwan			
	Maasara, Helwan			
	Magra el-Oyoun Wall, Old Cairo			
Giza	Teret Zenin St, Boulaq el-Dakrour	300,000	100,000	Shabra-mant
	Teret Abdel Al St. (Shorbagy), Boulaq el-Dakrour			
	Teret el-Zomor St, Bulaq el-Dakrour			
	Mashtal St, Boulaq el-Dakrour			
	Kafr Tohormos Residences Rd, Boulaq el-Dakrour			
	Saft el-Laban, in Kerdasa Town & Markaz			
	Kom Bakkar, Haram			
	Salmaneya, Warraq			
	Khalayfa, Warraq			
	Gas site, Warraq			
	Kaabeesh Rd, Haram			
	Ezbet el-Mofti and the Tunnel, Warraq			
Qaliubeya	Abu Bakr el-Seddiq St, West Shubra El-Kheima	200,000	185,000	Abu Zaabal
	Rashah Mostorod St, West Shubra El-Kheima			
	Delta Residences behind Bahteem Transformers, East Shubra El-Kheima			
	Behind Zosar Schools, West Shubra el-Khaima			
	Masraf Laz St, West Shubra El-Kheima			
	Toukh city and Markaz, Qaliubya			
Total		**4,500,000**	**385,000**	

2– Upgrading Collection and Transfer Operation Efficiency

MSEA provided technical and financial support to governorates for equipping and transforming public dumpsites into controlled dumpsites. 5 dumpsites in Cairo, 5 in Giza, and 8 in Qaliubya were developed. Hence, controlling such dumpsites and preventing **waste self-burning**.

MSEA also contributed to improving and upgrading the **collection and transfer** system in governorates through providing them with equipment, vehicles and tractors. See table (11-3).

- Moreover, in 2006**,** MSEA provided governorates with a financial support of around LE 2.3 million to contribute to the removal of historical accumulations and equipment purchase; and
- In collaboration with the Danish ESP Project, MSEA conducted projects to dispose of municipal solid wastes in Beni Suef (13 projects with LE 11.1m until now) and in Aswan (16 projects with LE 14.2m).

Table (11-3) Support for upgrading collection and transfer operations for governorates

Sr.	Governorate	Tipper truck 20 tons	Compactor truck 20 tons	Loader 3.5 tons	Tractor	Trailer
1	Cairo	-	2	1	-	-
2	Giza	7	3	1	5	5
3	Qaliubeya	4	-	-	1	1
4	Beni Soueif	2	-	-	10	10
5	Fayoum	-	-	-	8	8
6	New Valley	-	-	-	5	5
7	North Sinai	-	-	-	3	3
8	South Sinai	2	-	-	1	1
9	Gharbeya	1	-	-	2	2
10	Marsa Matrouh	1	-	-	-	-
11	Sharqeya	3	-	-	28	6
12	Daqahleya	1	-	-	2	2
	Total	**21**	**5**	**2**	**65**	**43**

MSEA efforts in agricultural waste management:

1. In collaboration with the Arab Organization for Industrialization (AOI), 2 factories were established to transform rice straw into compost in Qareen and Khatara, Sharqeya, with a capacity of 150,000 tons/factory/year.

2. A contract was concluded with the Armed Forces' National Service Agency to work in Sharqeya to press and transfer rice straw to the two recycling plants in Qareen and Khatara, in Sharqeya. The Armed Forces supported the system through the following:

   - The Ministry of Defense (MoD) provided 90 agricultural tractors and 90 trailers. In addition, the the Armed Forces Transport Department undertook the transfer of the pressed rice straw.
   - A permanent camp was established to host people and equipment in el-Tal el-Kabeer on an 8-feddan plot of land leased from the Armed Forces.
   - The Armed Forces provided 1000 laborers to work in the system, who were highly trained on all straw pressing and collection specialized operations, in addition to equipment and tractors repair and maintenance.
   - A total of 70 tons of rice straw was pressed and transferred to AOI factories in Sharqeya.
   - MSEA provided 185 compactors, in addition to 70 tractors to serve this system.

3. Addition of agricultural waste recycling lines was incepted in 19 recycling plants nationwide.

4. Two plants are being built in Kalabsha with a capacity of 100,000 rice straw tons/year/plant.

5. In collaboration with the Chinese, two pilot units to produce gas from rice straw were operated, and 50 initial priority households in Abu Hammad, Sharqeya, and Tomay El-Amdid village in Daqahlia, were connected, given that each plant had capacity to serve 300 households.

6. 200 tractors and 300 automatic compactors were provided to support the rice straw pressing system at governorate level where rice is grown.

7. A plan for creating 3000 job opportunities in 6 years through mushroom production from rice straw project in Delta governorates:

   - governorates (Daqahleya and Gharbeya) where the project is required to be implemented were identified. Some 40 sites in these governorates were selected and are currently being established and developed, with 25% prepared by December 2006.
   - 10 sites were established in youth centers, Daqahleya, during September – December 2006.
   - Commercial marketing and production size amounted to 800 kg from September – December 2006.

NGO Roles in Waste Recycling

Through MSEA's efforts to support and build NGO capacities in municipal and agricultural SWM in cooperation with NGOs through implementing major projects in this field, 36 projects have been implemented, 24 of which are in Minya (16 municipal and 8 agricultural waste management), in addition to 12 projects in Ismailia (7 municipal and 5 for agricultural waste management).

12- Hazardous Substances and Waste Management

Introduction

Hazardous materials and waste management is a priority issue for Ministry of State for Environmental Affairs (MSEA) due to the high risks they pose to public health and the environment.

1. Hazardous Wastes

During 2006, MSEA gave special attention to some hazardous wastes types: namely electronic and medical wastes.

a. Electronic Wastes

Wastes from local electronic and electrical industries are hazardous wastes due to their hazardous content such as:

- Phosphorous used for painting computer screens;
- Barium used in the front board of the screen for protection against radiation;
- PVC plastics and flameproof material limiting fire spread in plastic materials;
- Lead used in screens ranging from 2 to 4 kg, according to screen size, as well as that used in circuits of printed circuits which are covered by lead;
- Cadmium used in electronic integrated circuits (ICs), resistors, and condensers in electrical appliances
- Mercury used in flat screens, electric and electronic equipment, and cell phones.

Handling e-wastes faces some problems, at the top of which are the following:

Ministerial Decree 770/2005 of the Import Regulations of the Customs Law allows importing used computer sets and assistant hardware provided that their production date is not later than ten years, which results in importing computer sets with lifetime almost at end. This burdens the envi-

ronment on the short term in the absence of high-tech industrial entities to recycle main elements as an alternative to safe burial in landfills; a highly costly option. Unsafe disposal of these wastes, either by burial or burning, causes many diseases such as osteoporosis, neural diseases, memory weakness, and progeria.

The only measure taken during 2006 to handle these wastes is:

- A mobile operator collected consumed cell phone batteries from the Egyptian market to be recycled in the United Kingdom in cooperation with Phone Back Company.
- The operator also collected used parts of copiers and printers (Xerox) and re-sent them to the headquarters abroad.

b. Medical Waste Safe Management

Safe management of medical wastes from healthcare facilities is one of the most important issues in which MSEA is specifically interested, due to their hazards to Egyptians' health and environment. Accordingly, MSEA took the initiative to develop a strategy to address this problem for coordination with all stakeholders, taking into consideration legislative systems, technical standards, and the comprehensive development process requirements.

The problem is currently handled in Egypt through (MSEA) coordination with Ministry of Health and Population (MoHP) and Ministry of Local Administration (MoLA) to control the comprehensive system (segregation at source, collection, transfer, and final disposal processes) dealing with approximately 50,000 tons/year of medical wastes (according to MoHP estimates).

Incineration systems (common) and sterilization are used in Egypt for the disposal of medical wastes. Table (12.1) shows the distribution of incineration, mincing, and sterilization units in health care facilities till the end of 2006. MSEA contributed purchasing 28 incineration units provided in cooperation with the military production sector.

Table (12.1): Number and locations of treatment units (incinerators, sterilizers) in governorates till the end of 2006

Governorate	Incinerators			Mincing and Sterilization Equipment
	Governmental Hospitals	University Hospitals	Private	
Cairo	6	3	1	9
Qaliubeya	6	1	*0*	1
Giza	8	0	0	2
Sharqeya	5	0	1	0
Gharbeya	3	0	1	0
Monofeya	3	0	1	0
Daqahleya	6	0	0	0
Behera	3	0	0	1
Kafr el-Sheikh	3	0	0	0
Damietta	5	0	0	0
Marsa Matrouh	3	0	0	0
Ismailia	1	0	0	0
Port Said	1	0	1	0
Suez	0	0	1	0
New Valley	1	0	0	0
Beni Soueif	3	0	0	0
Minya	4	0	0	0
Qena	1	0	0	0
Aswan	1	0	0	0
North Sinai	1	0	0	1
South Sinai	2	0	0	0
Red Sea	2	0	0	0
Luxor	0	0	0	0
Fayoum	2	0	0	0
Alexandria	1	0	0	0
Sohag	1	0	0	0
Assiut	2	0	0	0

Source: MoHP 2007 Report

As a result of the expansion in incineration systems, MSEA validated and set maximum limits for emissions from medical waste incineration units and published them in the amended copy of the Executive Regulations of Law 4/1994 to avoid air pollution.

MSEA makes efforts to encourage and facilitate national and foreign private sector contribution to the medical waste safe management system. Ambitious proposals have been presented by some experienced and pre-qualified Arab investors to carry out a comprehensive project of medical waste management using state-of-the-art mincing and sterilization technologies.

Within this framework, the number of private companies working in the integrated medical waste management system is currently 4 in Greater Cairo, the largest source of medical waste amounts in Egypt (about 55 tons/day). Table (12.2) shows the amounts generated daily in Greater Cairo.

Table (12.2): Amounts of medical wastes generated in Greater Cairo

Governorate	Hospital #	Bed #	Healthcare wastes (kg/day)
Cairo	423	31844	35028
Giza	239	10155	11170
Qaliubeya	98	8536	9090
Total	**760**	**50535**	**55288**

These amounts are handled by a group of private companies which submitted their project EIA studies on using mincing and sterilization systems to MSEA which, in turn, reviewed the systems used and their compliance with applicable technical requirements and standards of mincing and sterilization units. These companies are operating through contracting with local administration within Greater Cairo:

Northern Zone – Ama Arab Environment Company:

- Treatment unit location (El-Wafaa wal-Amal)
- Treatment system: vapor sterilization

Southern Zone – EcoConserve Company

- Treatment unit location (15th of May City)
- Treatment system: outsourced vapor sterilization and incineration (Cairo University hospital incinerator)

Eastern Zone – Spanish Company

- Treatment unit location (El-Wafaa wal-Amal)
- Treatment system: vapor sterilization

Western Zone - Ama Arab Environment Company:

- Treatment unit location (El-Wafaa wal-Amal)
- Treatment system: vapor sterilization

EEAA follows up custom releases of imported hazardous wastes to ensure banned hazardous wastes do not enter the country. 208 custom releases were studied during 2006.

Project for Establishing Central Units for Treatment and Final Disposal of Hazardous Wastes in Free Zones and Accumulated Port Wastes

This project is planned to be executed through investors by promoting it to local investors and at the regional and international levels. A proposal was received from a Saudi company partnering with an American joint company specialized in safe management of hazardous wastes for implementing a port-accumulated hazardous waste disposal project and establishing an integrated system of hazardous industrial waste management in Egyptian industrial cities and utilizing such wastes in energy production in 10th of Ramadan city as a start. An MoU has been signed by MSEA and the mentioned company, by virtue of which MSEA shall coordinate with stakeholders to facilitate the procedures of issuing licenses and approvals required to start project execution.

Integrated Hazardous Industrial Waste Management Project in Alexandria in Cooperation with the Finnish Government

The second phase of this project was completed as an example to be followed in developing hazardous industrial waste management in Egypt. Until now, the project has surveyed industrial facilities producing hazardous wastes in Alexandria. A landfill for these (solid inorganic) wastes has been located. A (chemical-physical) treatment unit of liquid inorganic industrial wastes has been established.

2. Hazardous Material

In 2006, MSEA adopted the following procedures:

a. Preparation and distribution of hazardous material record guidelines among various industrial sectors in Shubra El-Khayma to make an inventory of used chemicals and their amounts.

b. Ministry of Industry (Trade and Industry) hazardous material list was modified by adding 35 new chemical substances to the list issued in 1999.

c. Inventory of polychlorinated biphenyl (PCB) in 8 transformer stations, Shubra el-Khayma Power Station, 4 major factories, and 3 petroleum companies under “Environmental Management Improvement Project", of the Integrated Hazardous Waste Management Component funded by JICA.

d. Preparation of a plan for raising environmental awareness of pollutants and their health impacts to be executed in cooperation with factories and NGOs.

Table (12.3): Hazardous material lists issued by line ministries

Ministry	List (A)	List (B)	Remarks
Health	7	52	In addition to list (B) All kinds of detergents and disinfectants of high concentration Insecticides used in public health. Pharmaceuticals
Electricity & Energy	-	184	A paragraph on natural materials is attached to the list
Industry	-	145	
Petroleum	-	48	
Interior	-	75	
Agriculture	172	-	

3. The Problem of Mines in Egypt

Egypt suffers from land anti-personnel (AP) and anti-tank (AT) mines spread over vast areas in the North Coast and Sinai. World War II has left in Alamain, south of the Northern Coast through Western Egyptian borders, around 17.5 million mines over more than quarter a million of arable feddans. Egyptian-Israeli wars have left about 5.5 million mines in Sinai and the Eastern Desert. According to official statistics, Egypt currently contains around 21,800 million mines out of 23 million, thanks to Armed Forces' success in sweeping some 1,200 million mines since 1995.

a. Negative Impacts of Mines in Egypt

Undoubtedly, the existence of such huge number of mines hinders development as follows:

The Eastern Desert:

- Obstruction of many tourist development projects at Red Sea and Sinai Beaches and high cost of projects established in this area due to increased cost of mine sweeping.
- Obstruction of industrial development processes and establishing new urban communities, besides enormous costs of clearing areas planned to be developed.

- Obstruction of agricultural development processes in Sahl el-Tineya, Balooza, and North Sinai areas.
- Disruption of petroleum exploration processes.

The Western Desert:

- Disruption of cultivating vast arable areas despite water availability in areas such as Hammam and Alamain.
- Disruption of development projects in the North Coast and some areas in Marsa Matrouh.
- Disruption of Qattara Depression project as a large one for electricity generation due to mines interception of the channel road.
- Petroleum exploration.

b. Problems and Obstacles of Mine Sweeping in Egypt

(1) Variation of AP and AT mines planted by the Allied and the Axis Powers in the Western Desert during World War II.

(2) Mine movement from their original locations because of sand dunes and climatic changes over half a century.

(3) Mine sensitivity to explosion as a result of because of oldness and meteorological factors.

(4) Disappearance or absence of mine maps.

(5) Absence of paved ways to mine areas.

(6) Unavailability of modern technologically advanced equipment to be used in mine sweeping.

(7) The financial cost of removing about 23 million mines.

(8) Huge human burdens related to mine sweeping, and absence of sufficient experts.

(9) Egypt is not listed on the international mine action map.

Efforts made to sweep mines in Egypt

(1) During Geneva 1996 Conference on Disarmament, Egypt demanded from the countries which planted mines in its lands to bear the responsibility of mine sweeping.

(2) In March 1998, the Egyptian Minister of Defense met his German counterpart where Germany expressed its willingness to provide technological and financial aid to sweep mines. In October, 1998, Germany presented 110 mine detection sets to Egypt.

(3) During UN General Assembly Meetings in 1993, Egypt demanded, through UN Ambassador, that countries which planted mines in its lands bear responsibility and submit maps and registers of mine fields and locations.

(4) Ministry of Defense published a book "*Iron Killers*" as a means of international awareness of the problem of mines in Egypt.

(5) Introducing Egypt mine issues during the People's Assembly's Education and Scientific Research discussions.

(6) The Egyptian Ministry of Foreign Affairs contacted countries concerned, Britain and Germany, and demanded the provision of aids, equipment and training on mine sweeping.

Egypt Attitude to Ottawa Treaty

Although Egypt, in December 1997, did not sign Ottawa Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction, she supported the treaty in principle. Egypt participated in all preliminary phases preceding signing the treaty.

During expert meetings to discuss the treaty draft in Oslo, September 1997, Egypt demanded more international pressure to urge the countries which participated in WWII battles on Egyptian territories to submit mine maps and provide more support to sweep them.

Human catastrophes resulting from mines have become more expounded. With information flow, now available for all and expressive of the volume of human losses due to these mines, international movement has become decisive and active in facing this issue. This information has generated wide international concern about mines and combating methods worldwide, as until recently, the world has been completely ignorant about this issue or not interested in it. The international campaign to ban mines began in 1991, followed by UN involvement with its magnitude and capacities since 1994 to discuss radical solutions to this problem. International concern about this issue brought forth the ratification of 135 states on an international convention banning the use of land mines. All these have become a justification to meet the international community's dire need of international, regional, and local effort collaboration to achieve this ban and put an end to the problem.

Reviewing worldwide land mine problems, mine sweeping should be done through the following:

- Cooperation among all war parties responsible for mine plating, notwithstanding land ownership;
- Activation of international cooperation according to rules of international law and conventions;
- Establishment of an effective mechanism coordinating and following up mine sweeping and planting monitoring operations during conflicts and wartime;
- Activation of international, regional, local, and specialized non-governmental organizations' roles and providing them with proper support to carry out their role perfectly.

References

(1) Law 4/1994 and the amended Executive Regulations thereof
(2) Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal; Basel Convention
(3) MoHP Report on the Number of Hazardous Waste Incinerators in Health Facilities for 2007.
(4) State Information Service Report on Mines in Egypt.

The International Co-operation Projects in the Field of the Environment Improvement

International Cooperation Projects for Environment Improvement

S	Project	Stakeholders	Project objective	Project schedule	
				Start Date	End Date
1	PMU and EEAA Support	ESP and DANIDA	1. Applying environmental management tools locally. 2. Supporting decentralization strategy of EEAA in spreading its services and functions regionally and locally. 3. Providing institutional support for Aswan and Beni Suef. 4. Assisting Egyptian industry in complying with environmental regulations through CP applications. 5. Presenting technical support to Shore Protection Authority and Ministry of Water Resources and Irrigation	2002	2008
2	ACI				
3	SDEM				
4	LIFE A Treating Lead Foundries Emissions	USAID	Treating lead foundries' emissions to mitigate lead pollution at six locations at Al Qalyobia, Shubra Al Kheima Area		
	B Red Sea Economic Sustainability		1. Supporting environmental activities paving the way for creating job opportunities, coexistence, providing main services, and improving living conditions for Red Sea governorate residents especially locals and Bedouins. 2. Increasing touristic promotion for both environmental and traditional tourism, increasing demand on local products, supporting available experiences in this field to increase locals' job opportunities, and diversifying and broadening the Red Sea touristic market. 3. Ensuring protection, management and sustainable use of natural and cultural sources, which the tourism industry in Red Sea and natives' means of living and income are based upon.	2004	2008

International Cooperation Projects for Environment Improvement

S	Project	Stakeholders	Project objective	Project schedule	
				Start Date	End Date
5	Assessment and management of mangrove forests in Egypt for sustainable utilization and development	International Tropical Timber Organization (ITTO)	Evaluating and managing Mangrove forests along the Red Sea coast for conservation and to achieve optimum and sustainable use, and the forestation of 50 hectares with Mangrove.	2002	2008
6	Lake Manzala Engineered Wetlands	GEF/UNDP	1. Assessing constructed wetlands as a low-cost method to treat large volumes of drainage water. 2. Capacity building to ensure sustainable development of Lake Manzala.	1999	2006
7	Wetlands conservation in the Mediterranean Region	GEF/UNDP	Conserving wetlands in the Mediterranean region to conserve the natural environment and ecosystem in coastal areas and the wetlands at Al Borollous, Al Zaraneeq and Al Ameed protectorates.	2002	2007
8	**Conservation and sustainable use of medicinal plants in dry and semi-dry ecosystems in Egypt**	GEF/UNDP	Preservation and use of medicinal plants in the area of Saint Catherine and preparation of a strategy for its protection as well as growing endangered plant species and creation of job and investment opportunities in the field of medicinal plants.	2002	2007
9	**Capacity Building for Conservation of Biological Diversity**	GEF/UNDP	1. Conservation and sustainable use of biodiversity. 2. Setting international biodiversity principles for animal and plant species (biodiversity). 3. Setting plans to deal with invasive species and for hunting management. 4. Setting plans to protect endangered plant and animal species.	6/2004	6/2006

International Cooperation Projects for Environment Improvement

S	Project	Stakeholders	Project objective	Project schedule	
				Start Date	End Date
10	Bioenergy for Sustainable Rural Development	GEF/UNDP	Preparation of a detailed feasibility study on possible use of biomass as a renewable energy source in Egypt to develop rural areas, to contribute to the reduction of greenhouse gases from conventional power sources. Should use of biomass prove feasible, the project will prepare a fiche for a main project to apply and disseminate selected technologies through public, private and national sectors in Egypt's governorates.	2005	2006
11	National Capacity Self Assessment	GEF/UNDP	Supporting the capacities of the Ministry of State for Environmental Affairs to meet its international obligations	2005	2007
12	Sustainable Transport	GEF/UNDP	Supporting the sustainability of public transport in urban areas	2005	2006
13	Institutional Support for the Implementation of Montreal Protocol	Multilateral Fund for the implementation of Montreal Protocol	1. Implementing Egyptian Obligations towards the protection of the Ozone Layer and disseminating periodic and annual reports according to the provisions of Montreal Protocol. 2. Implementing ministerial decrees related to environment protection in collaboration with different ministries and agencies. 3. Investigating and reviewing applications submitted by companies' representatives to obtain customs permitting forms at an average of 25 forms daily. 4. Shipment checking in Egypt's ports for ozone depleting substances to limit trade fraud of refrigerant gases, refrigerant units used and production lines that contain refrigerant units and insulation material. 5. Inventory and registration of the ozone depleting substances, imported in accordance with Montréal Protocol provisions, and their entry into a database (gases, compressors and methyl bromide). 6. following up on project implementation and co-reviewing technical reports with financer and implementer agencies (UNIDO, GTZ, UNDP) 7. Coordinating and collaborating with the Egyptian Environmental Affairs Agency and providing the agency with all information on the Ozone Unit activities.	2002	2007

International Cooperation Projects for Environment Improvement

S	Project	Stakeholders	Project objective	Project schedule	
				Start Date	End Date
14	Refrigerant Management Plan	Multilateral ozone fund – Vienna	1. Establishing a complete database for the refrigeration and air conditioning sector. 2. Rehabilitation of formal and informal employment in the refrigeration and air conditioning sector. 3. Building a network for collecting and recycling CFC's materials.	2004	2006
15	Halon Management Bank	UNDP	1. Supplying a governmental institution or NGO (not seeking profit) with equipment to build a Halon Bank for each Country. 2. Training and awareness of the Halon Bank staff and providing technical and financial project assistance for management. 3. Assisting in collecting, treating and reusing Halons according to needs of the armed forces during the gradual lowering and after the phase of cessation of Halon production by 2020.	2005	2008
16	Solvents	UNIDO	1. Supplying 5 companies with machinery and equipment. 2. Training and establishing workshops on using artificial solvents alternatives. 3. Disposing of 41 tons of ozone-deleting solvents by 2007.	2005	2007
17	Sustainable Transport	GEF/UNDP	Supporting the sustainability of public transport in urban areas	2005	2006

International Cooperation Projects for Environment Improvement

S	Project	Stakeholders	Project objective	Project schedule	
				Start Date	End Date
18	National phase-out of methyl bromide in horticulture and commodities fumigation	UNIDO	1. Determining the machinery and equipment required for the agricultural sector (machines, tools, materials) 2. Transferring modern technology that uses methyl bromide alternatives. 3. Conducting training programs in collaboration with the agricultural research institute on using alternatives to methyl bromide and the equipment used. 4. Identifying proposed chemical and biological alternatives to methyl bromide under the supervision of the Ministry of Agricultural. 5. Reducing approximately (133.3) tons of methyl bromide usages in agriculture and storage.	2005	2013
19	African Environmental Information Network (AEIN)	UNEP	Publishing Egypt state of the environment reports	2003	2009
20	Environmental Facility/ Public Sector Industries	KFW	1. Reviewing and granting technical approvals in cooperation with KFW 2. Cooperating with consultant coordinating in marketing competent funding packages and demonstrating their advantages 3. Supervising implementation of projects and funding packages exchange	1996	2008
	Technical Component	KFW			
21	Development of the Solvent Sector Strategy for Ozone Depleting Substance	UNIDO	1. Analyzing the refrigeration and air conditioning sector and its consumption. 2. Purchasing machinery and equipment the collection and recycling and developing training programs. 3. Conducting a feasibility study for the commercial refrigeration sector and the necessary modifications.	8/2005	6/2010

International Cooperation Projects for Environment Improvement

S	Project	Stakeholders	Project objective	Project schedule	
				Start Date	End Date
22	Capacity Building and Institutional Support to Nature Conservation Sector of MSEA (EEAA)	Italian Government	Efficiency raise of Environmental Protection Sector in EEAA to perform its duties in a sustainable way	4/2005	4/2008
23	Biological Diversity Monitoring and Assessment (Bio Map Project)	Italian Government	Protection and management of Biodiversity and sustainable use through developing international classification principles for flora and fauna species. Developing plans to confront flora and fauna invasive species phenomenon through hunting management and conservation of endangered species.	11/2004	11/2007
24	Wadi Al Ryan Protected Area Support Project	Italian Government	1. Contributing to the conservation of natural and cultural resources of Egypt 2. Managing Al Ryan protected area in a sustainable manner in participation with local stakeholders to contribute in preserving local resources and economic development of Al Fayoum area.	10/2004	10/2007
25	Siwa Environmenta melioration Project	Italian Government	Contributing to conservation and sustainable use of natural and cultural resources at Siwa area	10/2004	10/2007

International Cooperation Projects for Environment Improvement

S	Project	Stakeholders	Project objective	Project schedule	
				Start Date	End Date
26	Gabal Elba Protected Area Support Project	Italian Government	Managing Gabal Elba in a sustainable manner in participation with locals with interests; contributing to the conservation of local resources and in economical development of the area and the development of a funding plan.	10/2004	10/2007
27	Projects Coordination Unit	Italian Government	Implementing 8 of experimental environmental projects; including areas of nature protection, developing protected areas, environmental management of historic sites. As well as, managing solid wastes, planning water resources, supporting legislative and institutional framework, and building capacities of Environment Protection Sector.	10/2004	10/2007
28	Sustainable Development of Environmental Sound Management in South Sinai (Ras Mohamed National Park Project)	Italian Government	1. Establishing an under water marine panorama at Ras Gezlani 2. Developing protected area visitors center 3. Developing camping sites at the protected area	2005	2007
29	General Training, Capacity Building and Environmental Data Yearbook	Italian Government	Building staff capacities and developing annual environmental statistics	2005	2007

International Cooperation Projects for Environment Improvement

S	Project	Stakeholders	Project objective	Project schedule	
				Start Date	End Date
30	Innovative Means of Increasing Water Resources (North Sinai)	Italian Government	Providing a fresh water source to one of the villages lacking water supply; Al Gefgafah village in north Sinai.	2005	2007
31	"Utilization of Solar Thermal Energy in Resorts and Villages in New Reclaimed Areas" Project.	Italian Government	1. Spread notion of using renewable energy sources, such as solar energy for generating Clean Energy (CE) for tourist resorts and newly-reclaimed areas lacking power networks. MSEA implements it through the national plan 2. Spread notion of using (CE) to reduce pollution due to using traditional energy 3. Contribute to promoting Egyptian tourism products by using (CE) sources. 4. Generalizing new technology transfer and encouraging access to CE generation investments. Building capacities in the field of solar energy. 5. Promoting small projects in the field of CE mechanism.	2005	2007
32	Supporting Legal and Institutional Framework	Italian Government	Developing and integrating environmental laws and regulations on solid wastes management, natural protectorates, and marine environment. Improving the effects of legislations concerning environmental dimension in natural protectorates and marine environment.	10/2004	10/2007

International Cooperation Projects for Environment Improvement

S	Project	Stakeholders	Project objective	Project schedule	
				Start Date	End Date
33	Community Environmental Action Plan (CENACT)	CIDA	1. Supporting environmental work in the community 2. Building NGOs capacities 3. Establishing sustainable institutions with high technical and institutional capacities regionally to support NGOs 4. Supporting NGOs unit capacities at EEAA 5. Supporting women	2004	2008
34	Climate Change Initiative Project	CIDA	Transforming 50 clay brick factories at Arab Abu Saed area from using mazot to natural gas	2002	2006
35	Information and Management System for Hazardous Substances in Egypt (Chlorine)	Swiss Agency for Development and Cooperation (SADC)	Raising safety standards at water purification stations using chlorine Developing study for 10th of Ramadan plants a risk-assessment. Investigating waste treatment options for 10th of Ramadan plants.	3/2005	9/2007

List of Environmental Abbreviations

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AHED	Association for Health and Environmental Development
ALECSO	Arab League Educational, Cultural and Scientific Organizations
AMCEN	African Ministerial Conference On The Environment
ANC	Authority of New Communities
AOYE	Arab Office for Youth and Environment
APE	Association for the Protection of the Environment
ARFI	Arab Regional Financial Institution
ATM	Air Traffic Management
AU	African Union
BASEL	Convention of BASEL (control of transboundary movements of hazardous wastes and their disposal)
BCM	Billion Cubic Meter
BOD	Biochemical Oxygen Demand
BOT	Build, Operate, and Transfer
C&D	Construction and Demolition
CAIP	Cairo Air Improvement Project
CAMP	Coastal Areas Management Program
CAPMAS	Central Agency for Public Mobilization and Statistics
CBD	Central Business District
CBO	Central Business Organization
CDA	Community Development Association
CDM	Clean Development Mechanism
CEDARE	Center for Environment and Development for Arab Region and Europe
CEO	Chief Executive Officer
CEOSS	Coptic Evangelist Organization for Social Services
CFCs	Chlorofluorocarbons
CIDA	Canadian International Development Agency
CITES	Convention for International Trade in Endangered Spaces
CMS	Convention on Migratory Species
CNG	Compressed Natural Gas
CNS	Communication & Navigation Systems
CO2	Carbon Dioxide
COD	Chemical Oxygen Demand

CPM	Critical Path Method
DANIDA	Danish International Development Agency
DEM	Digital elevation Models
DFID	Department for International Development
DO	Dissolved Oxygen
DRC	Desert Research Center
DRI	Drainage Research Institute
ECEP	Energy Conservation and Environment Project
ECES	Egyptian Center for Economic Studies
EEAA	Egyptian Environmental Affairs Agency
EEC	Energy Efficiency Council
EEHC	Egyptian Electricity Holding Company
EEI	Emerging Environmental Issues
EEIF	Egyptian Environmental Initiatives Fund
EEPP	Earth Education Partnership Program
EESA	Egyptian Energy Service Association
EHMIMS	Egyptian Hazardous Materials Information and Management System
EIA	Environmental Impact Assessment
EIMP	Environmental Information and Monitoring Project
EMU	Environmental Management Unit
EMG	Environmental Management in the Governorates
EPAP	Environment Pollution Abatement Project
EPF	Environmental Protection Fund
EPM	Environmental Planning and Management
EQI	Environmental Quality International
ERF	Environmental Revolving Funds
ERSAP	Economic Reform and Structural Adjustment Program
ESP	Environmental Sector Program
EU	European Union
Eutrophication	Eutrophication is a condition in an aquatic ecosystem where high nutrient concentrations stimulate blooms of algae
FAO	Food and Agriculture Organization
FDI	Foreign Direct Investments
FEA	Friends of the Environment in Alexandria
FEDA	Friends of the Environment and Development Association
FEI	Federation of Egyptian Industry

Faecal Streptococci	Kind of harmful bacteria
GCR	Greater Cairo Region
GDP	Gross Domestic Products
GEF	Global Environment Facilities
GHG	Green House Gases
GHGRP	Green House Gases Reduction Project
GIS	Geographic Information System
GMA	Global Mercury Assessment
GMO	Genetically Modified Organisms
GOE	Government of Egypt
GOFI	General Organization for Industry
GOPP	General Organization for Physical Planning
GPA/LBA& MEDPOL	Global Program of Action for the Protection of the Marine Environmental from Land Bared Activities
GTZ	German Technical Cooperation Agency
GWS	Ground Water Sector
HACCAP	Hazardous Analysis & Critical Control Points System
HCRW	Health Care Risk Wastes
HCW	Health Care Wastes
ICA	Institute of Cultural Affairs
ICARDA	International Center for Agricultural Research in Dry Areas
ICCON	International Consortium for Cooperation on the Nile
ICED	International Center for Environment and Development
ICZM	Integrated Coastal Zone Management
IDB	Islamic Development Bank
IDSC	Information and Decision Support Center
IFCS	International Forum on Chemical Safety
IPCS	The International Program on Chemical Safety
ISI	Import Substitution Industry
ISO	International Standard Organization
IT	Information Technology
JICA	Japanese International Cooperation Agency
LDC	Least Developed Countries
LIFE	LIFE program USAID/Egypt for Lead Pollution Clean-Up in Qalyoubia
LMO	Living Modified Organisms

LPG	Liquefied Petroleum Gases
M&E	Monitoring and evaluation
MALR	Ministry of Agriculture and Land Reclamation
MAP	Mediterranean Action Plan
MENA	Middle East and North Africa
MEAs	Multilateral Environmental Agreements
METAP	Mediterranean Environmental Technical Assistance Program
MHUUC	Ministry of Housing, Utilities, and Urban Communities
MLD	Ministry of Local Development
MLF	Multilateral Fund Ozone
MOEE	Ministry of Electricity and Energy
MOFA	Ministry of Foreign Affairs
MOHP	Ministry of Health and Population
MSEA	Ministry of State for Environmental Affairs
MSDS	Material Safety Data Sheet
MSWs	Municipal Solid Wastes
MSY	Maximum Sustainable Yield
MTBE	Methyl Terially Butyl Either
MWRI	Ministry of Water Resources and Irrigation
NAFTA	North America Free Trade Agreement
NAP	National Action Plan
NAPOE	National Association for Protection of Environment
NARSSS	National Authority for Remote Sensing and Space Sciences
NAWQAM	National Water Quality and Availability Management Project
NBI	Nile Basin Initiative
NC	National Communication
NEAP	National Environmental Action Plan
NEES	National Energy Efficiency Strategy
NEPAD	New Partnership for Africa's Development
NGO	Non-Governmental Organization
NIOF	National Institute of Oceanography and Fisheries
NOPWASD	National Organization for Potable Water Sanitation and Drainage
NOU	National Ozone Unit
NRI	Nile Research Institute
NSS	National Spatial Strategy

NWC	National Women Council
NWRC	National Water Research Center
NWRP	National Water Resources Plan
OAU	Organization of African Unity
ODS	Ozone Depleting Substances
OEP	Organization for Energy Planning
OPEC	Oil Producing and Exporting Countries
ORDEV	Organization for Reconstruction and Development of Egyptian Villages
PAH	Poly Aromatic Hydrocarbons
PAP	Priority Action Program
PCB	Polychlorinated Biphenyl
PERSGA	Program for the Environment of the Red Sea and Gulf of Aden
PFTC	Department of Planning, Follow-up and Technical Cooperation
PIC	Prior Informed Consent
P&I	Protection and Indemnity
PM10	Particulate Matter
POPs	Persistent Organic Pollutants
PPC	Policy Planning Committee
PPM	Part Per Million
PPP	Pollution Prevention Pays
R&D	Research and Development
RAC	Regional Activity Centers
RBO	Regional Branch Offices
RFP	Request for Proposals
RIGW	Research Institute for Groundwater
RMP	Refrigeration Management Plan
SAICM	Strategic Approach to International Chemicals Management
SAP	Strategic Action Program
SCA	Supreme Council for Antiquities
SDU	Sustainable Development Unit
SEDO	Small Enterprise Development Organization
SEAM	Support for Environmental Assessment and Management
SFD	Social Fund for Development
SGP	Small Grants Program
SHW	Solar Hot Water

SMART	Scientific, Measurable, Attainable, Relevant and Trackable
SME	Small and Micro-Enterprises
SPAMI	Specially Protected Areas of Mediterranean Importance
TDA	Tourism Development Authority
TDS	Total Dissolved Solids
TLV	Threshold Limit Values
TOE	Ton Oil Equivalent
TSM	Total Suspended Matter
TSP	Total Suspended Particles
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNCHS	United Nations Center for Human Settlements
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention for Climate Change
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
VET	Vehicle Emissions Testing
VOC	Volatile Organic Compound
WHO	World Health Organization
WB	World Bank
WRI	World Resources Institute
WTO	World Trade Organization

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