

MiNTS – MISR NATIONAL TRANSPORT STUDY

**THE COMPREHENSIVE STUDY
ON THE MASTER PLAN
FOR NATIONWIDE TRANSPORT SYSTEM
IN
THE ARAB REPUBLIC OF EGYPT**

FINAL REPORT

**TECHNICAL REPORT 9
ENVIRONMENTAL CONSIDERATION**

March 2012

JAPAN INTERNATIONAL COOPERATION AGENCY

**ORIENTAL CONSULTANTS CO., LTD.
ALMEC CORPORATION
KATAHIRA & ENGINEERS INTERNATIONAL**

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**TRANSPORT PLANNING AUTHORITY
MINISTRY OF TRANSPORT
THE ARAB REPUBLIC OF EGYPT**

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CHAPTER 1: INTRODUCTION

1.1. BACKGROUND

The Japan International Cooperation Agency (JICA) and the Transport Planning Authority of the Ministry of Transport are cooperating in the conduct of the *Comprehensive Study on The Master Plan for Nationwide Transport System in the Arab Republic of Egypt (MiNTS – Misr National Transport Study)*, based upon agreements finalized during July, 2009¹. Oriental Consultants Company Limited, headquartered in Tokyo, Japan, is the designated lead consultant for the study. Associated firms are Almec Corporation, Japan and Katahira & Engineers International, Japan. Technical efforts in Egypt were initiated during December, 2009.

1.2. THE MiNTS FRAMEWORK

1.2.1. Study Scope and Objectives

MiNTS is comprehensive in nature, that is, approaches have been designed to mitigate transport problems and contribute to the sustainable development of the nation. Investigative efforts extend over the entirety of the Republic (Figure 1.2.1), with a particular focus being major corridors of movement for both persons and cargo. All major modes of transport are addressed including road, rail, maritime, inland waterway, civil aviation and pipeline. However, the practical master planning focus falls upon those modes falling under the jurisdiction of the Ministry of Transport; that is, the road, rail, maritime and inland waterway sectors.

Five key milestones form the foundation upon which planning efforts are based:

- Establish a nationwide, multi-modal database whose validity rests on a series of focused transport survey and data collection exercises;
- Formulate overall strategies and policies for development of the nationwide transport fabric;
- Develop an integrated, multi-modal transport master plan with years 2017, 2022 and 2027 being short, medium and ultimate planning horizons, respectively;
- Identification, within the master plan framework, of high-priority projects; and,
- Implementation of an effective and productive technology transfer program with Egyptian counterparts.

¹ *Scope of Work - Comprehensive Study on The Master Plan for Nationwide Transport System in the Arab Republic of Egypt*, as mutually agreed upon between the Japan International Cooperation Agency and the Ministry of Transport, Government of Egypt, July 16, 2009.



Source: JICA Study Team

Figure 1.2.1 MiNTS Study Area

The transport strategy embedded within MiNTS must concurrently contribute to an efficient economic structure, strengthen linkages within Egypt as well as with neighboring countries, and provide a base for market-oriented transport activity. Economic expansion and social transformations within Egypt are well underway; continuing improvements in productivity and well-being are expected. As economic growth continues, changes in transport activities and behavior will follow suit. **Thus, the foci of transport planning must gradually shift from alleviation of present deficiencies to realization of a transport system founded upon sustainable evolution and integrated, mutually supportive transport solutions.** This strategy is particularly valid given the almost 20-year planning horizon adopted by MiNTS.

1.2.2. A Consultative Planning Process

The final structure of MiNTS, and the successful reception thereof, can only be achieved as a direct result of cooperative efforts and close liaison between the Study Team and local experts. Considerable efforts have been expended in gathering information, reviewing previous studies and holding numerous discussions to enhance knowledge of, and sensitivity to, local transport conditions, norms and practices.

The Study Team, housed in the offices of the Transport Planning Authority, Ministry of Transport, is being strongly assisted by its designated counterpart Special Working Group, Coordination Committee and Steering Committee. Thus, continuous and productive technical liaison is being maintained with a number of organizations including the Ministry of Transport and various entities thereof (Office of the Minister, Transport Planning Authority, Egypt National Railways, General Authority for Roads, Bridges and Land Transport, General Authority for River Transport, Maritime Transport Sector); the Ministry of Housing, Utilities and Urban Communities; Ministry of Civil Aviation; Ministry of Agriculture and Land Reclamation;

Ministry of Trade and Industry; Ministry of Industrial Development; Ministry of Interior; Ministry of Local Development; Ministry of Finance; State Ministry of Foreign Affairs, Sector of International Cooperation; Ministry of the Environment; CAPMAS (Central Agency for Public Mobilization and Statistics); as well as various Governorates and entities thereof. Close coordination has also been effected with Universities and various departments within those learned institutions.

Likewise, effective consultations are programmed with various international agencies, funding institutions, donors, and consultant groups in order to obtain an overview of previous, current, and likely future activities and/or involvement in Egypt.

1.2.3. Sustainability and Human Resources Development

The components of the Master Plan diversify beyond the traditional “hardware” concepts associated with infrastructure provision. Additional key elements of the process consist of “software” aspects, that is, available technology, international standards, and modal integration needs (cargo/passenger terminals, logistics chains, transfer points) as well as “humanware” needs. In the latter case, this represents the cultivation of human resources via the designation of training and education programs as well as other requirements for developing expertise. In other words, “sustainability”, or the notion that the planning process must allow Egyptian stakeholders to participate in visualizing and shaping their own future. **This is of substantial importance in terms of ownership building if MiNTS is to be adopted and used by the people and their elected officials both during, and following, the conduct of MiNTS.**

1.3. REPORTING STRUCTURE

The *Final Report* consists of three elements: *The Master Plan* report, *Technical Reports* and *Appendix Reports*.

- *The Master Plan* report is seen as the main document whose intent is to present, in a synoptic sense, main findings of the MiNTS investigations;
- *Technical Reports* represent a series of sector-specific reports which document the technical underpinning of *The Master Plan* document (Table 1.3.1), and,
- *Appendix Reports* represent task-specific or activity-specific documents and other data summaries, some of which have been developed in response to client group requests.

Table 1.3.1 Technical Reporting Structure

Report Number	Subject
1	Road Sector
2	Rail Sector
3	Inland Waterway Transport Sector
4	Maritime Sector
5	Civil Aviation and Pipeline Sectors
6	Demand Simulation and Scenario Testing
7	Organizational and Functional Aspects of the Transport Sector
8	Private Sector Participation
9	Environmental Considerations
10	The MiNTS Vision, Policies and Strategies
11	Transport Survey Findings
12	Project Prioritization
13	Counterpart Training Program

Source: JICA Study Team

CHAPTER 2: POLICY, LEGISLATIVE AND INSTITUTIONAL FRAMEWORK

2.1. ENVIRONMENTAL POLICY

2.1.1. National Environmental Action Plan (1992)

National Environmental Action Plan (NEAP) of 1992 is the first public document to provide the tools for ensuring that "Egypt's economic growth becomes a sustainable one". It firmly asserts that "Protecting the environment, among other aspects, is one of the key imperatives imbedded in the concept of sustainable development".

2.1.2. Policy Directive of MSEA (2002)

The Policy directives of the Ministry of State for Environmental Affairs (MSEA) were issued in 1998 and updated in 2002 and represent a good start towards establishing an environment management system based on specific programs and outputs that would enable MSEA and the Egyptian Environmental Affairs Agency (EEAA) to set specific targets and report on the achievement of those targets.

At present the seven directive of the policy statement of the MSEA the policy are as follows:

- Strengthening partnerships at the national level;
- Supporting bilateral and international partnerships in the environmental fields;
- Enforcing Law 4/1994 for the protection of the environment, and the Law 102/1983 for Natural Protectorates and all other environmental legislation;
- Supporting institutional strengthening and capacity building for EEAA) and Environmental Management Units (EMUs) of the governorates;
- Supporting integrated environmental management systems;
- Integrate the use of market-based instruments in the field of environmental protection; and
- Transfer and adaptation of environmentally friendly technologies.

2.1.3. Updated National Environmental Action Plan (NEAP) (2002)

The Updated National Environmental Action Plan (NEAP) of 2002 covers the period from 2002 to 2017. This document is designed to represent Egypt's agenda for environmental actions over the next 15 years. It is also designed to complement and integrate with existing sectoral plans for economic growth and social development. The updating of the NEAP utilized a participatory and consultative approach, whereby several workshops and meetings with stakeholders were conducted to explore their interests, assess and resources and formulate issue-specific working groups to reach a consensus on the issues and priorities as well as directions for future actions.

The NEAP 2002 presents a brief account of the State of the Environment by providing information on the issues such as water resources, air pollution, land uses (agriculture and human settlements), marine environment, waste, biodiversity, and bio-safety and biotechnology.

The NEAP includes programs and projects that address the aforementioned environmental issues. It also discusses the necessary measures for institutional development. It is viewed as a diagnostic document with qualitative analysis of the environmental issues but with little quantitative analysis for setting priorities, including a plan of strategic actions. However, in contrast to the NEAP of 1992, this document doesn't provide any cost estimate of the strategic actions proposed, which could make its implementation difficult.

2.1.4. EEAA Five-Year Action Plan

EEAA Five-Year Action Plan is based on the NEAP 2002 and the policy directives. EEAA developed its five year action plan, which includes the following:

- Integrated solid waste management program to achieve sound management of solid waste and healthcare waste in all governorates of Egypt;
- Pollution Abatement Program to protect River Nile and water resources and air quality
- of Greater Cairo;
- Environmental education, training and awareness program to increase public awareness of environmental program and develop human resources within the field of environment;
- Environmentally friendly technology transfer and support Egyptian exports program to promote the use of environmentally technology in all economic activities;
- Environmental information and monitoring system program to enhance the use of information technology specially in the field of environmental management;
- Nature conservation and protecting biodiversity program to conserve national biodiversity;
- Capacity development of EEAA and RBOs program to support the institutional structure of environmental management at the national level;
- Afforestation and Green area expansion program to support governorates and NGOs in establishing nurseries and carrying out greening projects;
- Regional Branches Offices (RBOs) of EEAA Program to support renovation and establishing new RBOs at the governorates level; and
- Environmental Protection Fund Program.

2.1.5. Decentralization Policy of Environmental Management

There is also a strong policy direction away from centralized environmental management activities towards decentralization at the regional and governorate levels. EEAA has set up RBOs covering Greater Cairo, West Delta, East Delta, Central Delta, the Suez Canal and Sinai, etc. Several initiatives have taken place to

develop the capacities of these RBOs as well as the Environmental Management Units (EMUs) in each of the Governorates. Administratively, EMUs are a part of each governorate's structure, yet, but operationally they follow EEAA. Support has been given to some governorates in the participatory process of preparing the Governorate Environmental Action Plan (GEAP).

Further support in the future will be needed to ensure sustainability of the progress achieved and to aid in the implementation of the GEAP. Developments in this area include the creation of a GEAP unit and an EMU Unit in EEAA. The EMU Unit has been specifically set up to support the protocol of cooperation signed between the MSEA and the Ministry of Local Development.

2.2. LAWS AND REGULATIONS RELEVANT TO ENVIRONMENTAL PROTECTION

2.2.1. Laws and regulations

Major laws and regulations relevant to environmental protection in Egypt are shown in Table 2.2.1.

Table 2.2.1 Major Laws and Regulations relevant to Environmental Protection

	Items	Title etc.	Law No./Year	Description
1	Protection of Environment (in general)	Protection of Environment	4/1994 (amended 9/2009)	Establishment of EEAA and Environmental Trust Fund, requirement of EIA, regulation of air pollution, hazardous waste management, and marine pollution
		Executive Regulations	Decree 338/1995 (amended 1741/2005)	Environmental standard, EIA classification and procedure, etc.
2	Nature Conservation	Natural Protectorates	102/1983	Designation and management of natural protectorates
3	Protection of air quality	Protection of Environment	4/1994 (amended 9/2009)	Control of air pollutant emissions and protection of ambient air quality
		Transport air pollution	66/1973	Control of air pollution from transportation sources
4	Protection of freshwater (rivers, lakes, waterways)	Protection of Nile and its waterways from pollution	48/1982	Control of effluent discharge and surface water pollution
		Wastewater and Drainage	93/1962	Control of wastewater discharges and drainage to public sewers
5	Protection of coastal and marine environment	Protection of environment	4/1994	Control of wastewater discharges to marine water and coastal and marine pollution
		Marine disasters and wreckage	79/1961	Prevention of marine disasters and wreckage
6	Noise	Protection of environment	4/1994	Control of noise
7	Protection of cultural property and heritage	Cultural Heritage	117/1983	Preservation and management of cultural heritage
8	Protection of water resources	Public Water Resources	27/1978	Protection of public water sources for drinking and domestic purposes
9	Solid waste management	Public Cleanliness	31/1976(amended Law 38/1967)	Control of solid waste management
10	Protection of Agriculture	Irrigation and Drainage	12/1998	Control and management of irrigation water
		Prohibiting the destruction of agricultural lands and preserving their fertility	116/1983	Preserve agricultural land
11	Protection of Fishery	Fisheries	124/1983	Management and protection of fisheries and marine animals
12	Land Acquisition and Resettlement	Property Expropriation for Public Benefit	10/1990	Regulation and procedure for expropriation of real estate in the public interest
		Other relevant laws	27/1956, 252/1960, 13/1962, and others	Expropriation and compensation procedures

	Items	Title etc.	Law No./Year	Description
13	Pollution control of Industrial activities	Use of fuel, coal and petrol materials	66/1953	Management of handling and control pollutants emissions
		Mines and stone quarries	86/1956	Management of handling and control pollutants emissions
14	Occupational health	Labor	137/1981	Control of workplace safety and environment
15	Control fo urban and housing development	Housing	106/1976	Management of housing development
		Physical planning	3/1982	Management of urban development

Source: JICA Study Team

(1) Law 4/1994 on Protection of Environment

Until 1994 Egyptian government has issued several legislations reflecting the concern of preserving the environment and its resources. However, these laws are targeted to specific sector or activity and not comprehensive.

In 1994 the government issued the first law for preserving the environment (Law No. 4/1994). This law was drafted with a view not to replace previous environment-related legislations but to complement these legislations and to address any legal gaps or needs that are adequately addressed by these previous laws. The law is also considered the first Egyptian legislation aiming at environmental preservation setting an integrated legal framework for such preservation and has a greater role with respect to all governmental sectors as a whole.

The Law No.4 (amended by Law 9/2209) and its executive regulations 338/1995 (amended by Decree 1741/ 2005) define use of environmental management mechanisms, which include command and control measures such as the setting of appropriate standards, the application of the polluter pays principle (through the implementation of penalties and fines) and use of environmental impact assessment (EIA).

The law and the executive regulations also provide establishment of the Egyptian Environmental Affairs Agency (EEAA) affiliated to the competent Minister for Environmental Affairs, and the roles and responsibilities of EEAA, which include protection and management of environment as a whole, regulation of air pollution, control of hazardous substances, management of hazardous waste and control of discharges to marine environment as well as EIA certification.

Contents of the Law 4/1994 are shown in Table 2.2.2.

Table 2.2.2 Contents of Environment Law 4/1994

Part/Chapter/Section	Article
Preliminary Part	
Chapter 1 General Provisions	Article 1
Chapter 2 Environmental Affairs Agency	Article 2 to13
Chapter 3 Environmental Protection Fund	Article 14 to 16
Chapter 4 Incentives	Article 17 to 18
Part I Protection of Land environment from Pollution	
Chapter 1 Development and Environment	Article 19 to 28
Chapter 2 Hazardous Material and Waste	Article 29 to 33
Part II Protection of Air Environment from Pollution	Article 34 to 47
Part III Protection of Water Environment from Pollution	
Chapter 1 Pollution from Ships	Article 48 to 68

Part/Chapter/Section	Article
Section 1 Oil Pollution	Article 48 to 59
Section 2 Pollution from Harmful Substances	Article 60 to 65
Section 3 Pollution from Sewage and Garbage	Article 66 to 68
Chapter 2 Pollution from Land based Sources	Article 69 to 75
Chapter 3 International Certificates	Article 76 to 77
Chapter 4 Administrative and Judicial Procedures	Article 78 to 83
Part IV Penalties	Article 84 to 101
Final Provisions	Article 102 to 104

Source: Law 4/1994

(2) Law 93/1962 for Discharge of Wastewaters

The law regulates the disposal of wastewater, and liquids at large, to the sewerage networks. The law has specified the procedures to be followed for establishing sewerage networks, house connections, licensing procedures for connecting different establishments to the sewers and the sampling/analysis responsibilities.

(3) Law 48/1982 for Protection of River Nile and Watercourses

Law 48/1982 and its Executive Regulation regulate the discharge to watercourses and groundwater. Said discharge shall comply with the standards of the law for relevant receiving media.

The Executive Regulation have specified certain standards for ambient water quality in freshwater canals and in drains. The Ministry of Irrigation and Water Resources is responsible for meeting such water quality objectives through controlling discharge permits and mixing drains with freshwater bodies.

It prohibited discharging all types of waste (solid, liquid or gaseous) from all sources to any water stream. It prohibited the construction of any facilities, which waste is discharged in the water streams, except upon license of Ministry of Irrigation. The said law laid the bases for protection of water streams. The relevant standards of liquid industrial discharging to fresh water surfaces like the River Nile, its branches, tributaries and canals are more stringent than those of the raw water (drains, lakes, ponds and marshes)

(4) Law 38/1967 for General Cleanliness:

The law regulates cleanliness of cities with respect to garbage collection and disposal, in addition to sewage cesspit evacuation and disposal. Articles 1 and 2 of the law stipulate that households, institutional entities and owners of businesses are not allowed to dispose of garbage or cesspit sewage, except in locations identified by the local authority and according to their guidelines.

The law also includes articles that regulate construction waste.

(5) Law 102/1983 of Protected Areas

Law empowered the Prime Minister to designate certain areas to be declared as protectorates. The protected areas are defined as any area on the ground, the territorial water or the inland water containing the creatures, plants, living animals, fish or the natural phenomena of cultural, scientific and tourist value, as determined by a Prime Minister Decree upon a proposal of EEAA. The Decree also defines the limits of each protected area and sets the basic principles for its management and for the preservation of its resources.

Till now 29 protectorates are declared, 15% of the total area of Egypt (See Chapter 2).

Law prohibits the construction of buildings, facilities, roads or driving any cars or exercise of any agricultural, industrial, or commercial activities in the protected area except by approval and license of the competent administrative authorities, subject to the conditions, provisions and measures, determined by Prime Minister. Law prohibited the exercise of any activities, transactions, actions, or experiments in the surrounding area of the protected areas except on the permission of the competent administrative authorities.

Law 17/1983 for Protection of Antiquities

There are numerous sites of historical, religious, archaeological, and unique cultural and natural value spread all over Egypt.

The Law covers issues such as the definition of private property, system of ownership, and extension of protection – including registration, archeological excavations, and authorities responsible for protection.

- In the law the antiquities are defined as "Each movable or immovable produced by different civilizations". The definition of antiquities includes arts, science, literature and religions from ancient ages up to 100 years ago. -The definition also includes human corpses which have remained from the ancient ages (Article 1).
- Antiquities shall be registered by virtue of a Ministerial Decree issued from the Minister of Culture, in which said registration implies certain standards and precautions for the protection of antiquities (Article 12).
- During its construction work it is not allowed to demolish all or parts of antiquity structures, renovate or change the structures' features (Article 13).
- The Minister of Culture identifies beatification zones surrounding antiquity sites.
- These beatification zones are considered part of the site, and it is not allowed to construct or excavate or plant trees inside these zones (Articles 19 and 20).
- Each person who finds a movable antiquity, or parts of an antiquity structure, should notify the nearest administrative authority within 24 hours and should keep the antiquity in its discovered status. The antiquity becomes the State's property (Article 24).

Labor Law 12/2003

The law and its regulations included some work environment related requirements, which can be summarized as follows:

- Securing the work environment against physical, mechanical and chemical hazards.
- Taking relevant precautions and conditions for fire protection, as specified by the competent authorities.

2.3. ENVIRONMENTAL STANDARDS

Standards of air quality, effluent discharges to various water bodies and environmental noise are established as well as working conditions as shown in Table 2.3.1 to Table 2.3.8.

2.3.1. Environmental Standards

As shown in Table 2.3.1 to Table 2.3.3 environmental standards are established for ambient air quality, water quality (effluent/discharged water) and ambient noise

Table 2.3.1 Ambient Air Quality Standards

Pollutant	Time of exposure	Maximum Limit Value ($\mu\text{g}/\text{m}^3$)	
	time	Egypt	reference (WHO)
Sulfur Dioxide (SO ₂)	1 hour	350	500 (10 min)
	24 hours	150	125
	Year	60	50
Nitrogen Dioxide (NO ₂)	1 hour	400	200
	24 hours	150	-
	Year		40-50
Ozone (O ₃)	1 hour	200	150-200
	8 hours	120	120
Carbon Monoxide (CO)	1 hour	30 000	30 000
	8 hours	10 000	10 000
Total Suspended Particles (TSP)	24 hours	230	-
	Year	90	-
Particles <10 μm (PM ₁₀)	24 hours	70	70 **
	24 hours*	150	
	1 year*	70	
Suspended particulate matter/Black Smoke (BS)	24 hours	150	50 *
	1 year	60	-
Lead (Pb)	1 year	1	0.5-1,0

Note: * amended value.

Source: (1) Executive Regulations of the Environmental Law No. 4 of Egypt (1994),

(2) The Strategic Urban Development Master Plan for a Sustainable Development of the Greater Cairo Region in the Arab Republic of Egypt (2008)

Table 2.3.2 Effluent /Discharged Water Standards

Effluent/Discharged Water Bodies	Discharge to Coastal Environment	Discharge to sewer system		Underground reservoir and Nile branches/canals	Nile River (Main stream)	Non potable surface water		
		modified by Decree No.9/1989	modified by Decree No.44/2000			Municipal	Industrial	
Relevant Laws/Decree	Law No.4/1994	Law No.93/1962		Law No.48/1982				
1	BOD(5days, 20°C)	60	<400	600	20	30	60	60
2	COD (Mn)	n/a	350		10	15	40	50
3	COD (Dr)	100	<700	1100	30	40	80	100
4	pH	6~9	6~10	6~9.5	6~9	6~9	6~9	6~9
5	Oils & Grease	15	<100	100	5	5	10	10
6	Temperature (°C)	>10°C	<40	43	35	35	35	35
7	TSS (Total Suspended Solids)	60	<500	800	35	30	50	60
8	SS (Settable solids, ml/L)	n/a	n/a	8 (10min.), 15 (30min.)	n/a	n/a	n/a	n/a
9	TDS (Total Dissolved Solids)	2,000	2,000	2,000	800	1,200	2,000	2,000
10	PO4	5	30	25 (T-P)	1	1	n/a	10
11	NH3-N	3	<100	<100	n/a	n/a	n/a	n/a
12	NO3-N	40	<30	100 (T-N)	30	30	50	40
13	Total Recoverable Phenol	1	<0.005	0.05	0.001	0.002	n/a	0.005
14	Fluoride	1	<1	<1	0.05	0.05	n/a	0.5
15	Sulfide	1	<10	<10	1	1	1	1
16	Chlorine	n/a	<10	<10	1	1	n/a	n/a
17	Surfactants	n/a	n/a	n/a	0.05	0.05	n/a	n/a
18	Probable Counting for colony group/100ml	5,000	n/a	n/a	2,500	2,500	5,000	5,000
19	Al	3	n/a	n/a	n/a	n/a	n/a	n/a
20	As	0.05	n/a	2	0.05	0.05	n/a	n/a
21	Ba	2	n/a	n/a	n/a	n/a	n/a	n/a
22	Be	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23	Cd	0.05	<10	<10	0.01	0.01	n/a	n/a
24	Cr	1	<10	<10	n/a	n/a	Total metals <1	Total metals <1
25	Cr(VI)	n/a	Total metals; <5, <10, <50 m3/day		0.05	0.05		
26	Cu	1.5		0.5	1	1		
27	Fe	1.5		1.5	1	1		
28	Pb	0.5			0.05	0.05		
29	Mn	1		1	0.5	0.5		
30	Hg	0.005		<10	0.2	0.001	0.001	n/a
31	Ni	0.1	<10	1	0.1	0.1	n/a	n/a
32	Ag	0.1	<10	0.5	0.05	0.05	n/a	n/a
33	Zn	5	<10		1	1	n/a	n/a
34	CN	0.1	<0.1	0.2	n/a	n/a	n/a	0.1
35	Total metals	n/a	Total metals; <5, <10, <50 m3/day	5	1	1	1	1
36	Organic Compounds	0	0	0	0	0	0	0
37	Pesticides	0.2	0	0	0	0	0	0
38	Color	None	None	None	None	None	None	None

Note: Units are mg/L or ppm, unless otherwise noted)

Source: Law No.4/1994 and other laws

Table 2.3.3 Ambient Noise Standards

Target areas	Noise level equivalent (Leq), in dB (A)		
	Day time	Evening time	Night time
	7am - 6pm	6pm - 10pm	10pm - 7am
Rural residential areas, hospitals and gardens	45	40	35
Residential suburbs with low traffic	50	45	40
Residential areas in cities	55	50	45
Residential areas with workshop or commercial establishments, or in front of main roads	60	55	50
Commercial, administrative, and downtown areas	65	60	55
Industrial areas	70	65	60

Source: Executive Regulations for Law 4/1994

2.3.2. Standards for Working Conditions and Places

Standards for working conditions and places are indicated in Table 2.3.4 to Table 2.3.8.

Table 2.3.4 Quantities of External Air Necessary for Ventilating Public and Closed Places

Quantity Of External Air (*) m ³ /minute/person	Type of Place and Activity
0.14 – 0.28	Place with high ceiling, bank, lecture hall, worship place, large public place, theatre, room without smoking.
0.28 – 0.42	Apartment, hairdresser's, beauty shop, hotel room, room with light smoking
0.42 – 0.56	Cafeteria, place with small restaurant, general place of work, hospital room, restaurant, or room with medium smoking.
0.56 – 0.85	Private place of work, office, clinic, or room with heavy smoking.
0.85 – 1.7	Conference hall, nightclub, crowded room with heavy smoking.

Note 1: The space appropriated for each person shall not be less than 4.25 m².

Note 2: The floor area appropriated for each person shall not be less than 1.4 m².

Note3: * Without using air-conditioners

Source: Law No. 4/1994

Table 2.3.5 Limit of Exposure to Temperature Permissible in Work Environment in accordance with Type of Work and Air Speed

Type Of Work	Low Air Speed	High Air Speed
Light Work	30.0	32.2
Moderate Work	27.8	30.5
Heavy Work	26.1	28.9

Source: Law no.4/1994

Table 2.3.6 Limits of Heat Exposure Permissible in Work Environment according to Work System

System of Work and Rest per hour	Light Work	Moderate Work	Heavy Work
Continuous Work	30.0	26.7	25.0
75% Work, 25% Rest	30.6	28.0	25.9
50% Work, 50% Rest	31.4	29.4	27.9
25% Work, 75% Rest	32.2	31.1	30.0

Source: Law no.4/1994

Table 2.3.7 Maximum Period Permissible for Exposure to Noise in Places of Work

(Factories and Workshops)

Equivalent noise intensity LAeq in decibel (A)	95	100	105	110	105
Period of Exposure (1 hour)	4	2	1	0.5	0.25

Source: Law no.4/1994

Table 2.3.8 Maximum Limit Permissible for Exposure to Intermittent Noise Resulting from Heavy Hammers

Sound Intensity (decibel)	Number of knocks permissible during the period of daily work
135	300
130	1,000
125	3,000
120	10,000
115	30,000

Source: Law no.4/1994

2.4. LAWS AND REGULATIONS FOR ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

2.4.1. Environmental Impact Assessment (EIA)

The purpose of EIA is to ensure the protection and conservation of the environment and natural resources including human health aspects against uncontrolled development. The long-term objective is to ensure a sustainable economic development that meets present needs without compromising future generations ability to meet their own needs. EIA is an important tool in the integrated environmental approach.

EIA must be performed for new establishments or projects and for expansive or renovations of existing establishments according to the Law for the Environment (Law 4/1994, most recently amended as Law 9/2009).

EIA process is the systematic examination of consequences of a proposed project, aiming to prevent, reduce or mitigate negative impacts on the physical environment, natural resources, health and social elements* as well as capitalize on positive impacts of the project.

This examination yields an EIA form/study that:

- Documents the results of the process.
- Analyzes potential environmental and social impacts of the project
- Analyze the project alternatives
- Incorporates the results of the public consultation process
- Describes the needed environmental management plan (EMP)

2.4.2. Legislative Framework

According to the law 4/1994, an EIA should be undertaken for new establishments/projects and for expansions/renovations of existing establishments before construction. The law considers the EIA as a main condition for licensing and thus the project that does not prepare an EIA or does not abide by the EIA conditions could be subjected to its license revoke.

The articles of the law stipulate measures and procedures related to the EIA. These are further clarified by the provisions of articles of the executive regulations.

Regarding EIA, procedure, categorization of projects, roles of EEAA and the Competent Administrative Authority (CAA) are expressed in the Guidelines of Principles and Procedures for Environmental Impact Assessment (2009).

2.4.3. Main EIA Stipulation

The main EIA stipulations in law 4/1994 and its Executive Regulations are shown in the following.

1) Principles and System of EIA

- EEAA shall, in agreement with the Competent Administrative Authorities (CAAs), issue a decision identifying the elements, designs, specifications and principles in light of which the project proponents will prepare the EIA. These include EIA lists, assessment requirements and documentation requirements (forms and table of contents of EIA report). The project proponent shall be committed to follow these requirements and prepare the needed documents.
- CAAs are responsible for issuing construction and operation licenses, to guide them through the EIA process and its requirements. A list of some CAAs is shown in Table 2.4.1.

Table 2.4.1 List of some CAAs

CAA	Projects
1) Ministry	
Ministry of Health and Population	Hospitals and medical centers
Ministry of Agriculture	Agricultural and land reclamation projects
Ministry of Water Resources and Irrigation	Projects including irrigation, agricultural drainage, barrages and dams
Ministry of Transport	Large transport projects such as roads, airports, railways and large transportation systems as well as marine transportation including ports and marine platforms
Ministry of Housing and New Urban Communities	Urban development projects, residential complexes, water treatment plants, domestic wastewater treatment plants on the city level as well as tourism cities affiliated to the Ministry
Ministry of Electricity and Energy	Power generation projects and electricity grids
Ministry of Petroleum and affiliated petroleum/gas entities	Projects related to petroleum, gas and petrochemicals

CAA	Projects
2) Governorates	Projects that are within the governorates boundaries and in land affiliated to the governorate
3) Entities, Authorities and Sectors	
Industrial City Councils	Projects within industrial cities
Tourism Development Agency (TDA)	Tourism projects in lands affiliated to the TDA
General Authority for Investment and Free Zones	Projects that are within the free or investment zones or projects established according to the Law of Investment, 8/1997
General Authority of Industrial Development, affiliated to the Ministry of Industry	Development of industrial estates
Nature Protection Sector in EEAA	Projects within the boundaries of the natural protectorates

- EEAA Board of Directors must, approve the elements, procedures and requirements of the EIA system.

2) Procedure for EIA Review

- The CAAs should assess the EIA documents submitted by the project proponent and then forward them to EEAA. EEAA must review the EIA and notify the CAA of its opinion and required conditions to be taken in order to ensure environmental protection. This notification should be undertaken within a maximum of 30 days from receipt of the EIA at EEAA, otherwise, the EIA is considered approved.
- EEAA Board of Directors shall develop the selection criteria for consultants to be assigned by EEAA to review the EIAs and prepare a list of these consultants. EEAA may, when necessary, seek the assistance of any of the experts included in the list in order to review the EIAs, provided that the period of 30 days mentioned in the Law is complied with.

3) Appeal System

- The CAA shall notify the project proponent with the results of the assessment, via a registered letter with an acknowledgment of receipt. The project proponent has the right to appeal in writing the result of the assessment within 30 days from the date of his notification.
- Permanent Review Committee
- The Minister for the Environment shall issue a decree for the formation of the Permanent Review Committee to be headed by a counselor from the State Council and the membership is (a) a representative of EEAA, (b) the project proponent, or his/her representative, with an official power of attorney, (c) a representative of the CAA, (d) three experts nominated by EEAA CEO.
- EEAA CEO shall nominate one of the Agency's personnel to prepare the minutes of the meetings of the Permanent Review Committee and act as reporter for the committee.

4) Registers of EIAs Documents

- EEAA shall keep a register including copies of the EIAs studies/forms, the final results of the review, and the other measures to be taken by the project proponent as required by EEAA.

2.4.4. Classification of Projects

1) Three Category of Projects

The EIA system classifies the projects into three categories based on different levels of EIA requirements according to severity of possible environmental impacts and location of the establishment and its proximity to residential settlements:

- (1) Category (A): projects with minimum environmental impacts.
- (2) Category (B): projects with potential adverse environmental impacts yet less adverse than category C..
- (3) Category (C): projects which have highly adverse impacts.

As a reference, categorization by JICA Guidelines for Environmental and Social Considerations, projects are basically classified into three categories* according to the extent of environmental and social impacts, taking into account an outline of project, scale, site condition.

Category A: Proposed projects are classified as Category A if they are likely to have significant

Category B: Proposed projects are classified as Category B if their potential adverse impacts on the environment and society are less adverse than those of Category A projects.

Category C: Proposed projects are classified as Category C if they are likely to have minimal or little adverse impact on the environment and society.

Thus naming is in reverse order to that of above mentioned Egyptian EIA system.

*Except Category FI

2) Classification Method and Procedure

(1) Criteria for Classification of Projects

The classification of projects depends on a number of criteria that take into consideration the elements of location, resources consumption, nature of project and energy as per law 4/1994, for the protection of the environment.

Assuming locations that are not sensitive, these criteria have been elaborated as follows:

- a) Consumption of resources
- b) Nature of the project and the change it may cause on the environment and resources
- c) Nature of inputs and nature and severity of aspects and pollution generated.
- d) Geographical extent of the project and its effects.

Three Levels of Criteria

For each of these criteria, the classification approach depends on indicating three levels of severity (highest, medium and lowest). These levels have been indicated to guide the application of the criteria and render it more transparent so as to ensure uniform, equal and fair application of the criteria, guide the final decision and judgment of EEAA as well as support the project proponent in identification of the category of the project.

(2) **The three levels are:**

a) Highest Level

- Consumption and use of large quantities of resources.
- Causing a permanent and radical change in predominant land use and development trends.
- Use or production or handling of hazardous substances or handling or generation of hazardous waste in any of its forms (solid, liquid and gaseous) as an integral aspect of the activity.
- Generation of high loads of non-hazardous liquid, gaseous or solid wastes/pollutants, implied by the nature of the activities.
- Extended geographical extent and effect.
- Numerous environmental, health and social aspects in the construction and operational phases with high magnitudes.

b) Medium Level

- Consumption and use of medium quantities of resources.
- Causing a permanent yet confined change in predominant land use and development trends.
- Use or production or handling of hazardous substances or handling or generation of hazardous waste in any of its forms (solid, liquid and gaseous) as a secondary aspect of the activity.
- Generation of medium load of non-hazardous liquid, gaseous or solid wastes/pollutants, implied by the nature of the activities.

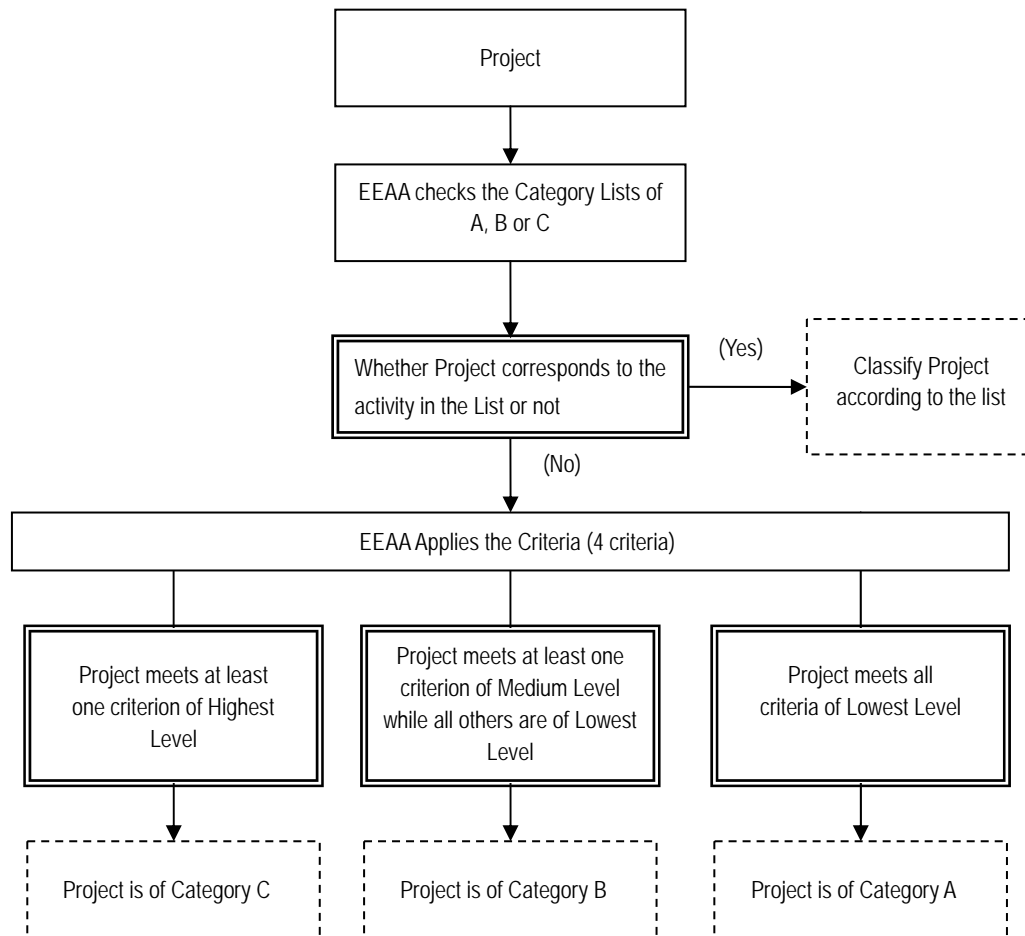
c) Lowest Level

- Consumption and use of limited quantities of resources.
- Not causing permanent change in predominant land use and development trends.
- No production or handling hazardous substances or handling or generation of hazardous waste in any form, within the main activities of the project.
- Generation of a small load of non-hazardous pollutants.

Using the above criteria classification of the project is determined as follows:

- a) Category A project: The project which meets all criteria of lowest level
- b) Category B project: The project which meets at least one criterion of the medium level and the rest is of the lowest level
- c) Category C project: The project which meets at least one criterion of the highest level

Procedure of the classification summarizing the above process is shown in Figure 2.4.1.



Source: Prepared from Guidelines of Principles and Procedures for Environmental Impact Assessment (EEAA, 2009)

Figure 2.4.1 Procedure of Project Classification

(3) Special cases

There are a number of special cases for which projects are not classified according to the criteria

a) Projects in Areas that are Environmentally Sensitive

In this case, the project is located on, or in the vicinity of, or overlooks a location that should be preserved because of its environmental or heritage value or when any change in its characteristics causes large changes in its nature or its use.

These include protectorates, Nile banks and its branches, coastlines of the sea, lakes, wetlands, archeological areas and highly dense areas, as specified by law 4/1994 (Table 2.4.2). In this case, the project is considered of a more strict category than in the normal case, i.e. if the project is originally classified as category A or B, it is considered in this case a category B or C respectively.

Table 2.4.2 Sensitivity Criteria used for the Determination for EIA requirements

Item	Criteria	
1	Depletion of Environment	1) Denudation of agricultural land
		2) Desertification
		3) Destruction of trees, especially palm trees
		4) Pollution of water resources (River Nile, groundwater)
2	Location	5) Banks of the River Nile
		6) Branches of the River Nile or main canals
		7) Tourist areas
		8) Antiquities and Heritage sites
		9) Nature Reserves (National protectorates)
		10) Densely populated areas

b) Projects Included in a Development for Which an Integrated EIA has been Prepared

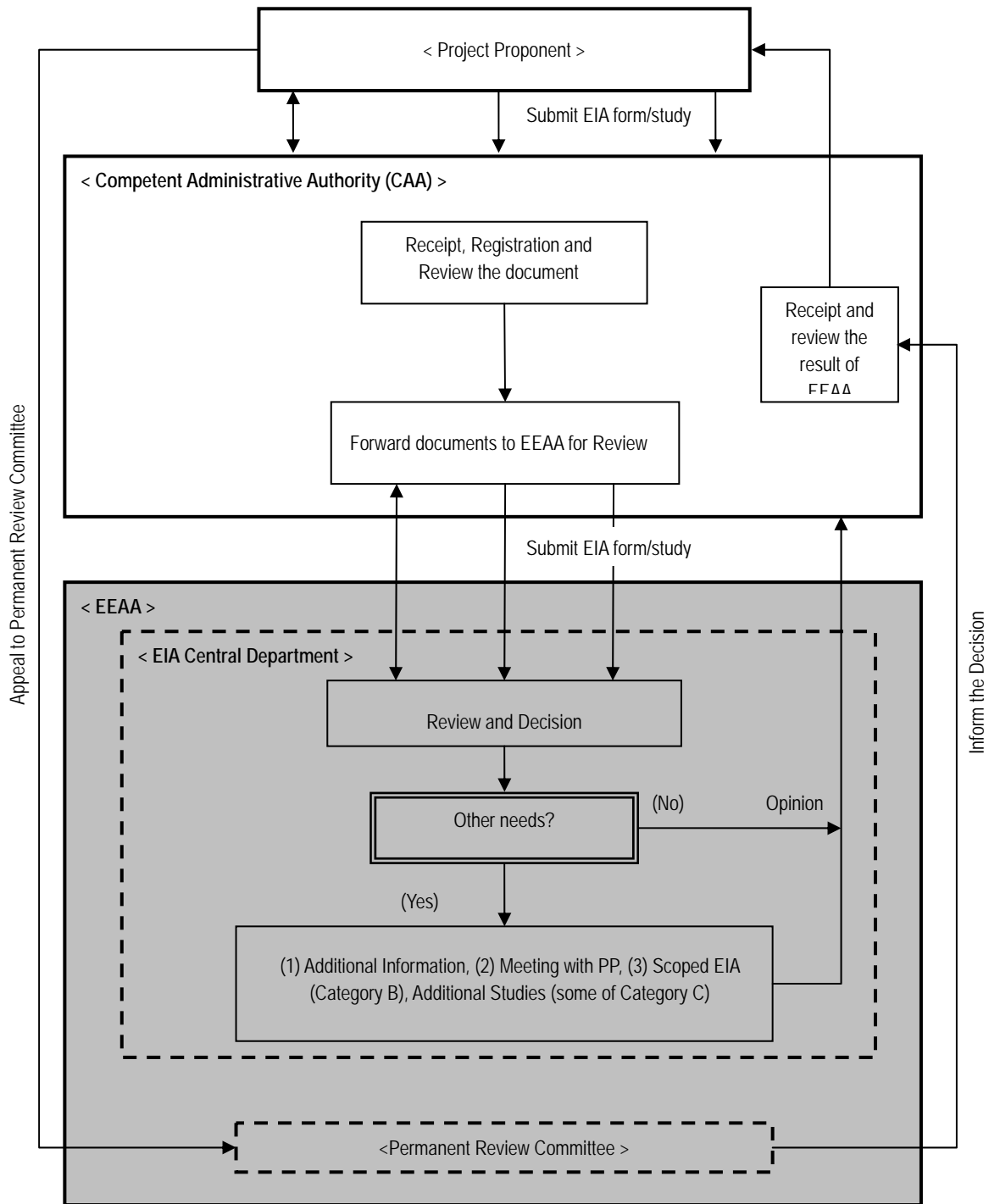
In this case, the project will be required to abide by the requirements of the category that is less strict than its original category if the projects are similar. In case the projects of the development are not similar, projects of category C type will prepare Scoped EIA according to requirements set by EEAA.

c) Expansions of Existing Facilities/Project

The level of EIA assessment of these expansions is a function of the nature of the expansion, existing establishment and the environmental status of the project area as well as whether it has prepared an EIA

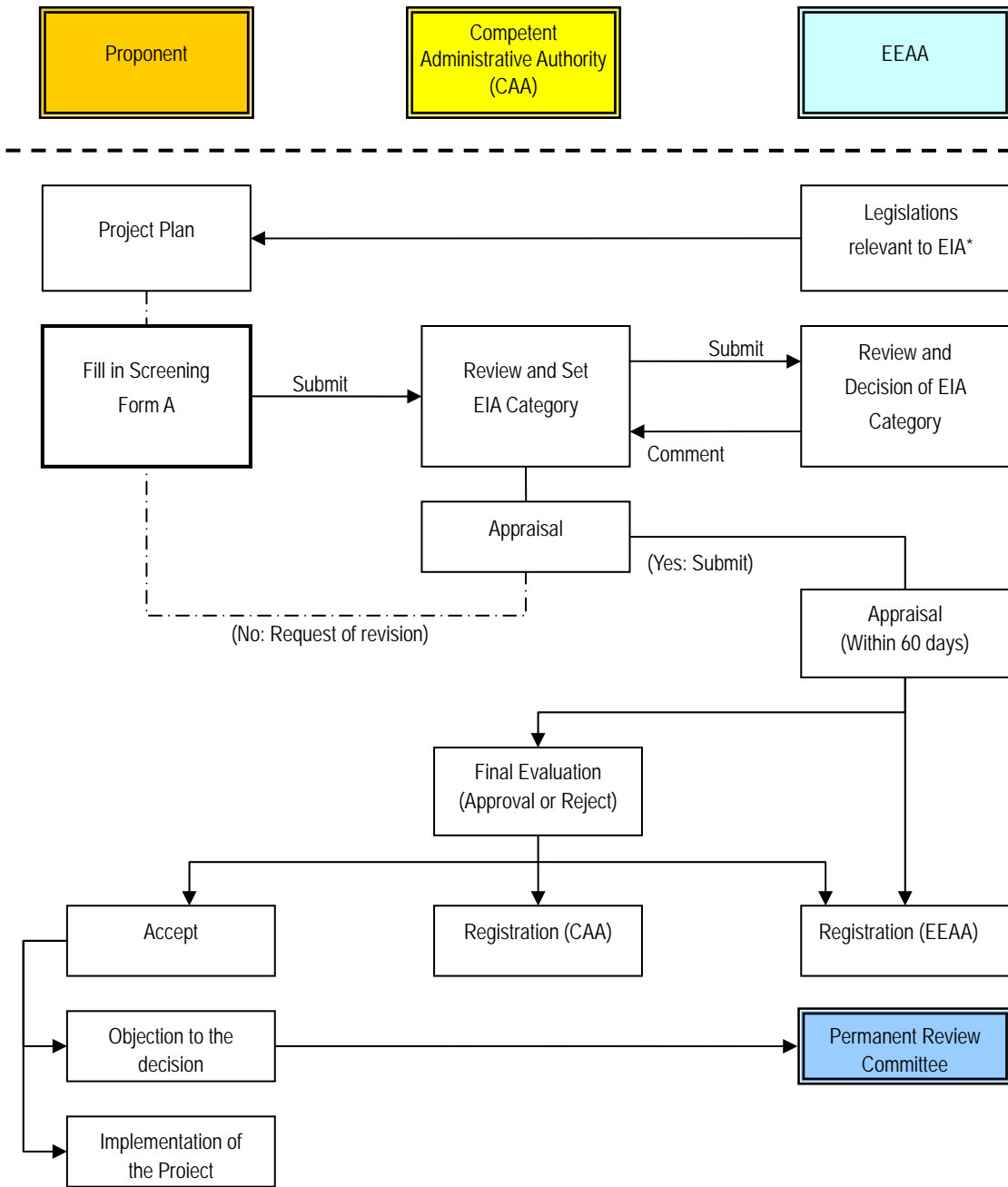
2.4.5. EIA Procedures

Each of the three categories has specific requirements for impact assessment yet have similar processing procedures as shown in Figure 2.4.2 to Figure 2.4.5.



Source: Prepared from Guidelines of Principles and Procedures for Environmental Impact Assessment (EEAA, 2009)

Figure 2.4.2 EIA System Procedures



Note 1: * Legislations - (1) Law 4/1994 and 9/2009, (2) The Executive Regulations of Law 4/1994, modified by the Decree 174/2005, (3) Guidelines of principles and procedures for Environmental Impact Assessment (2nd Edition, 2009) etc.
 Source: JICA Study Team

Figure 2.4.3 EIA Approval Procedure (Category A)

The Competent Administrative Authorities (CAAs) are the entities responsible for issuing licenses for project construction and operation.

- The CAA directs the project proponent to the correct project category using the illustrative lists and inform the proponent of the related requirements. In case the project is not included in the EIA indicative lists, consultation with EEAA is undertaken using the criteria to identify the category of the project. EEAA will have the final decision regarding the classification and should provide the proponent with its opinion in writing via the CAA.
- The project proponent or whom he delegates applies to the CAA, before any construction works are initiated, with a letter of intent and attaches 4 copies of the required documents (forms/study) in Arabic, the official language for the review.. A CD of the study is also attached for category C projects. It is preferred to submit one English copy of the EIA if it exists.
- The CAA evaluates the EIA documents through checking the study/form to ensure that the selected category is correct and that the project is compatible with the general plans for the CAA and to check that compliance of the information submitted with that required and check its completeness. If the project was not correctly categorized, the CAA directs the proponent to the right category and requests the resubmittal of the required documentation.
- The CAA formally forwards 3 copies of the documents to EEAA for review and evaluation. Such forwarding of the EIA documents is considered as a non-objection on the project according to criteria other than environmental ones.
- EEAA reviews and evaluates the documents and provides its remarks and conditions needed for mitigation and minimizing negative impacts. EEAA notified the CAA of its decision (approval, objection or information requests, etc.) within 30 days of EEAA's receipt of completed documents else it is considered an implicit approval. For projects deemed of high impacts by EEAA, an independent advisory entity will be considered by EEAA for additional advice. The review could require site inspection or meetings with the proponent or his delegate to discuss specific points of the study.
- EEAA registers the documents, its opinion and recommendations in the EIA register at EEAA and notifies the CAA of its decision. The CAA officially notifies the project proponent of the results via a registered letter with an acknowledgment of receipt and communicates the final result of the review. The result can be as follows:
 - a) An approval of the EIA form/study, while indicating the environmental requirements (specified in the approval), with which the project proponent should comply.
 - b) An objection of the EIA and a recommendation to refuse the project. Reasons for objection are included and are usually environmental reasons related to the project and the maximum carrying capacity for pollution in the project area.
 - c) Further requests from the proponent:
 - Additional information or clarifications could be requested from the project proponent.
 - For some of category B projects, EEAA might request scoped EIA study for certain components, impacts or processes of the project in accordance with the Terms of Reference prepared by EEAA.
 - In case of some of category C projects, EEAA could request additional studies such as risk

assessment or cumulative pollution load to ensure compliance with allowable limits.

2.4.6. Requirements of EIA for each category

The three categories A, B and C differ in the requirements of analysis and assessment.

1) Category A Projects

Category A has the basic requirements essential for environmental impact assessment

The project proponent has to fill in the Environmental Impact Assessment Form A as shown in Table 2.4.3.

Table 2.4.3 Contents of Environmental Impact Assessment Form A and B

Environmental Impact Assessment Form (A)	Environmental Impact Assessment Form (B)
1. General Information	1. General Information
2. Project Information	2. Project Information
3. Description of Project Phases	3. Description of Project Phases
3.1 Construction Stage	3.1 Construction Stage
3.2 Operation Stage	3.2 Operation Stage
	Add: alternatives taken into consideration for inputs or technologies or design or layout, etc.
4. Legal Framework	4. Legal Framework
5. Analysis of Environmental Impacts	5. Analysis of Environmental Impacts
6. Environmental Management Plan	6. Environmental Management Plan
7. Attachments	7. Attachments

Source: EEAA (2009.1) Guidelines of Principles and Procedures for Environmental Impact Assessment 2nd Edition

2) Category B Projects

Requirements of category B are more stringent than those of category A. The proponent has to fill in the Environmental Impact Assessment Form B. Comparing the two forms for categories A and B, they appear to be similar in the type of questions included. However, the level of details and analysis required for category B is much more than that of category A projects.

Based on the review of form B, and upon specific criteria developed by EEAA, EEAA may request the proponent to submit a scoped EIA for specific identified components and impacts.

3) Category C Projects

This category includes projects with substantial environmental impacts and thus needs a full EIA study.

(1) Document of a full EIA study

The project proponent or his delegate has to prepare a full EIA document following the table of contents as shown in Table 2.4.4.

Table 2.4.4 Table of Contents for full EIA Study

	Description
1	Executive summary.
2	Policy, legal and administrative framework.
3	Description of the project.
4	Description of the environment.
5	Identification and analysis of Impacts.
6	Analysis of alternatives.
7	Public consultation.
8	Environmental management plan
9	List of References
10	Annexes include
	List of consultants participating in the study and their role
	Lists of attendees in public consultation meetings
	Agenda of public consultation meetings
	Others

(2) Public Participation

For Category C projects the involvement of the public and concerned entities in the EIA planning and implementation phases is mandatory through the public consultation process with concerned parties.

Consultation is undertaken twice during the EIA process, the first in the phase of identifying the scope of the project EIA, and the second is after the preparation of the draft EIA report.

2.4.7. Cases of Projects submitted to EEAA

According to EEAA in 2010 the number of EIA forms and studies received by to EEAA was 6,033 as shown in Table 2.4.5. Among them Category C projects were about 5% as shown in Table 2.4.6.

Table 2.4.5 Number of projects submitted to EEAA for reviewing and obtaining approval (2010)

Kind of Projects		Total	(%)
1	Agriculture	217	3.60
2	Industry (including agrochemical)	4,551	75.44
3	Tourism	299	4.96
4	Energy/Electricity/Production	5	0.08
5	Energy/Electricity/Distribution	2	0.03
	Energy/Petroleum/Production	1	0.02
6	Energy/Petroleum/Processing	313	5.19
7	Energy/Petroleum/Services	1	0.02
8	Infrastructure/Road	8	0.13
9	Infrastructure/Portable Water	21	0.35
10	Infrastructure/Domestic Wastewater	29	0.48
11	Ports	10	0.17
12	Airports	1	0.02
13	Health (Hospital)	17	0.28
14	Transportation/Tunnel	1	0.02
15	Communication	260	4.31
16	Housing & Reconstruction	1	0.02
17	Social Services	296	4.91
Total (2010)		6,033	100.00

Source: EEAA Central EIA Department

Table 2.4.6 Number of projects submitted to EEAA for reviewing and obtaining approval

EIA category		Total (2010)	(%)
1	Category A	398	6.6
2	Category B	5,338	88.5
3	Category B + Detailed scoping	22	0.4
4	Category C	275	4.6
Total (2010)		6033	100.0

Source: EEAA Central EIA Department

2.5. LAND ACQUISITION AND RESETTLEMENT

2.5.1. Definition of Land Acquisition and Resettlement

One of major social issues generated by development is land acquisition and resettlement. Land may be acquired to secure necessary space for various development activities for the public purpose by the government and related organizations. Generally land acquisition contains not only land itself but also assets. On the other hand, international donors such as World Bank, African Development Bank and JICA have different definition and there are some gaps of land acquisition and resettlement issues between Egyptian Government and donors as mentioned later.

1) Land tenure and related land laws and legislation in Egypt

The Egyptian Constitution recognizes three main forms of land ownership in Egypt.

a) Public or State land

- Public land or State land is divided into State's public domain that cannot be alienated and State's private domain, which can be alienated generally through sale, lease, or through usufruct.
- The large majority of land in Egypt is public or State-owned desert land that is for the most part undeveloped (estimated to be 90-95% of the national territory).

b) Private land

- Private land may be alienated/transferred freely; and Waqf land (land held as a trust/endowment for religious or charitable purposes), which is often subject in covenants on transfer or use, and which is typically transferred through leasehold or usufruct.

c) Customary land

- In addition, there are some areas in Sinai and in the northern coast, in Alexandria and Matruh Governorates, with implicitly recognized customary rights to land to the benefit of Bedouins. In these areas, someone wishing to acquire land often has to make two payments, first to the Bedouin claimant(s) for the right of use and then to the State to regularize and register their land tenure/ownership and be able to obtain services.

2) Legislative framework for land acquisition (expropriation) and resettlement

The Constitution prohibits the expropriation of private property except for public interest against compensation determined pursuant to the law. It is the Government's policy to pay compensation or offer assistance to people whose lands and properties are affected by projects undertaken by the Government.

There are the various laws and legislation governing the issue of land acquisition (expropriation) for public interest whether for land or structures in Egypt. However, the fundamental regulation related to land acquisition and resettlement is Law No. 10/1990 concerning the Expropriation of Real Estates for Public Interest, which reflects this constitutional mandate.

Several governmental bodies are involved in land or property expropriation or resettlement. According to law 10/1990, the Egyptian Authority for Land Surveying (ESA) is mandated to do

this task at the central level together with other ministries or local governmental bodies (Governorates).

In addition, expropriation of property is also regulated by Law 59/1979 concerning establishment of New Urban Communities and Law 3/1982 concerning Urban Planning.

The projects for public benefit/interest in the context of expropriation of private land/property or ownership has been defined in Article 2 of Law 10/1990 are as follows:

- Construction, widening, improving, or extending roads, streets, or squares, or the construction of new districts,
- Water supply and sewerage projects,
- Irrigation and drainage projects,
- Energy projects,
- Construction or improvement of bridges, cross roads for railway and tunnels,
- Transportation and telecommunication projects,
- Urban planning purposes and improvements to public utilities,
- Other acts considered as acts for public interests mentioned in other laws.

Land/property expropriation and compensation in Egypt is initiated and executed at central, local, stakeholders levels. On the central level, the government agency in charge of the implementation of the expropriation acts issued for public interest is the Egyptian General Authority for Land Survey (ESA).

Usually the executing body could be other Ministries or Governorate. Accordingly, this executive agency would be responsible for paying the compensation to affected groups through ESA or under its supervision.

Referring to the Law 10/1990 and other laws procedure of land/property expropriation and compensation can be described below and shown in Figure 2.5.1.

(1) Entitlement of Executing Expropriation of Physical Property

The expropriating entity submits project plans to secure physical property (land, asset etc.) for public benefit/interest to Presidential Office. Then Presidential Office reviews the plan and promulgates the Decree determining the public interest accompanied with a memorandum on the required project and a complete plan for the project in official newspaper and in relevant local administrative units as well as mayor's or police premises and in the First instance Court in the jurisdiction area. By the Decree the expropriating entity is entitled to execute acquisition of the concerned land/property and has right of access into the lands and technical and surveying operations.

On the central level, the governmental agency in charge of the implementation of the expropriation acts issued for public interest is the Egyptian General Authority for Land Survey (ESA), except for projects handled by other entities pursuant to a law to be issued in this respect. ESA is charged with the formation of the expropriation and compensation committees.

(2) Assessment of Physical Property

A presidential decree will be issued to establish a committee for the assessment of the physical properties that will be affected by a project. The committee consists of a delegate from the entity in charge of the expropriation, an officer and a cashier from the governorate.

Announcement of physical property assessment will be done at the central office of the governorate and in the premises of the mayor. The owners of the properties and holders of rights will be informed through an official letter about the result of the assessment. The owners of the affected properties are required to attend the assessment.

(3) Assessment for Compensation

After the committee examines the affected physical properties, assessment for compensation will be conducted at each governorate by a committee, based on a decree from the Minister of Public Works and Water Resources. A committee consists of a delegate from the survey department, a delegate from the department of housing and utilities in the governorate, and a delegate from the department of real estate taxes in the governorate.

The committee prepares an assessment report, which includes the owner's name, address, and the size of the property. The result of the assessment will be announced to the property owner(s) and holders of rights through an official letter.

The amount of compensation will be communicated through official letter to the concerned owners and the holders. In addition, an announcement will also be made in the Egyptian Official Gazette, Official Journal, and two daily newspapers for a period of one week. Owners and the holders are informed through official letters to deliver their properties within a period of five months.

(4) Transferring Ownership

Owners and the holders must sign the form to transfer ownership of the properties to the public sector. In case the owners and the holders do not sign this form, a ministerial decree is issued to expropriate the said properties. The signed form and ministerial decree are kept at the Real Estate Notarization Office. Ownerships of properties are transferred when owners and tenants receive the compensation amount.

(5) Grievances of Redressing

Owners and the holders are given 30 days after the expiry of the public announcement to notify grievances to the central office of the expropriating entity or governorate.

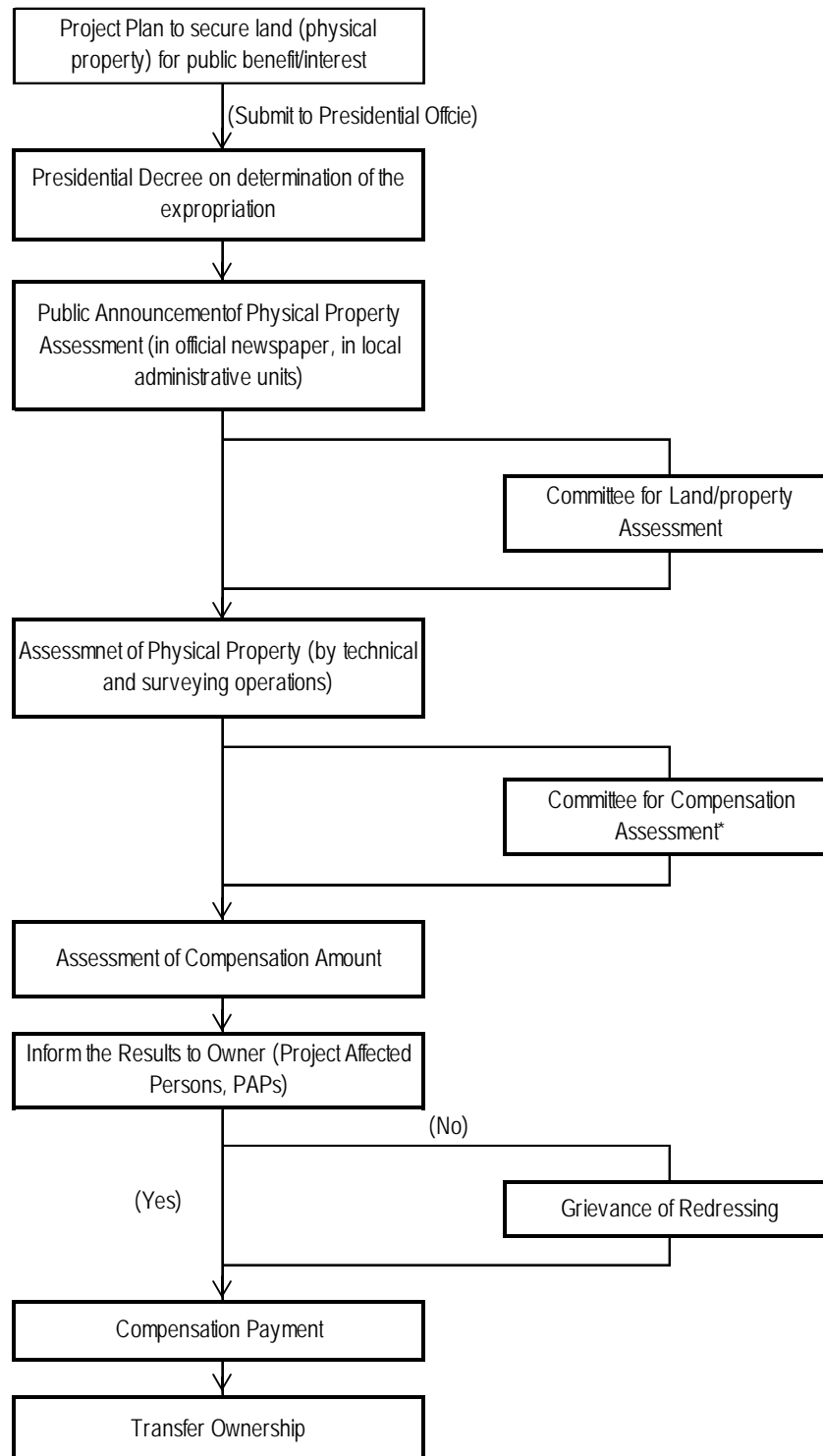
Both the expropriating entity and, owners and the holders have the right within 4 months to object to the determination of compensation by ESA.

(6) Period for Validity of Compensation

In case compensation is not paid within two years from the date of publication of the assessment of compensation, a resolution to declare the compensation invalid will be issued.

(7) Institutional Arrangement

On the central level, the governmental agency in charge of the implementation of the expropriation acts issued for public interest is the Egyptian General Authority for Land Survey (ESA), except for projects handled by other entities pursuant to a law to be issued in this respect. ESA is charged with the formation of the expropriation and compensation committees.



Source: JICA Study Team prepared referring to Law 10/1990

Figure 2.5.1 Procedure of Land Acquisition and Resettlement

3) Gap of policies for land acquisition and resettlement between Egyptian Government and Donor

(1) Donor's policies for land acquisition and resettlement (involuntary resettlement)

According to World Bank Safeguard Policies (Operational Policy 4.12, 2001: Involuntary Resettlement), involuntary resettlement is defined as follows:

- the involuntary taking of land resulting in (i) relocation or loss of shelter; (ii) loss of assets or access to assets; or (iii) loss of income sources or means of livelihood, whether or not the affected persons must move to another location; or
- the involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons.

The above definition covers not only loss of land and properties but also loss of access to properties, loss of income sources, means of livelihood etc. Thus it implies that features are somewhat different from those of Egyptian Government regarding land acquisition and resettlement issues.

In addition, policies for involuntary resettlement are basically the following:

- To avoid or minimize (whenever possible) involuntary resettlement and land acquisition through design efforts.
- If involuntary resettlement and land acquisition is unavoidable, to execute resettlement and compensation activities as sustainable development programs, whereby sufficient investment resources are provided to give the displaced persons an opportunity to share in project benefits. Displaced and compensated persons shall be meaningfully consulted and given opportunities to participate in planning and implementing resettlement plans.
- To assist displaced persons in their efforts to improve their livelihoods and standards of living or at least to restore them to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

(2) JICA Guidelines for Environmental and Social Considerations (2010)

In JICA Guidelines for Environmental and Social Considerations (2004, Amended 2010) regarding involuntary resettlement, required environmental and social considerations are mentioned as follows:

- Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives. When, after such an examination, avoidance is proved unfeasible, effective measures to minimize impact and to compensate for losses must be agreed upon with the affected people.
- People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported by project proponents etc. in a timely manner. Prior compensation, at full replacement cost, must be provided as much as possible. Host countries must make efforts to enable people affected by projects and to improve their standard of living, income opportunities, and production levels, or at least to restore these to pre-project levels. Measures to achieve this may include: providing land and monetary compensation for losses (to cover for land and property), supporting means for an alternative sustainable livelihood, and

providing the expenses necessary for the relocation and re-establishment of communities at resettlement sites.

- Appropriate participation by affected people and their communities must be promoted in the planning, implementation, and monitoring of resettlement action plans and measures to prevent the loss of their means of livelihood. In addition, appropriate and accessible grievance mechanisms must be established for the affected people and their communities.
- For projects that will result in large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people. It is desirable that the resettlement action plan include elements laid out in the World Bank Safeguard Policy, OP 4.12, Annex A.

(3) Gaps of Land Acquisition and Resettlement Policy between Egypt and donors

Comparing compensation and resettlement requirements by Government of Egypt with those of donors such as World Bank and JICA, there are several differences in eligibility, valuation and compensation payment methods as shown in Table 2.5.1. For example, resettlement assistance to illegal occupants for eligibility and non-depreciated value of structures and assets for valuation are included in the World Bank policy, while there are no such considerations for compensation measures in Egyptian laws and regulations.

Subsequently, adverse impacts expected by involuntary resettlement such as generation of PAPs are not formally taken into consideration for categorization of project. Therefore, if number of PAPs are expected more than 200 due to the project (According to World Bank safeguard policy, it is classified as Category A project). It is not clear whether EIA is truly required or not.

Table 2.5.1 Comparison of Egyptian Laws and Regulations with World Bank Policies

	Topic	Egyptian legislative requirements	WB policy requirement
1	timing of compensation payment	Prior to displacement	Prior to displacement
2	Calculation of compensation	According to prevailing prices in the affected area and assessed by a specialized committee for that purpose	Full replacement cost
3	Squatters	Not included in the legislation (Applied cases for resettlements revealed that squatters have been compensated as a result of political sensitivity)	Are to be provided resettlement assistance (but no compensation for land)
4	Resettlement	Affected occupants who are physically displaced are to be provided with another residential housing. They do not have the rights to object the location of the resettlement but only the housing suitability in terms of area, design or relevant issues. Their objection is submitted within 15 days after receiving the notification of the new housing, to a dedicated committee for the purpose, which should respond in one month.	Affected people who are physically displaced are to be provided with residential housing, or housing sites, or, as required, agricultural sites at least equivalent to the old site. Preference to be given to land-based resettlement for displaced persons whose livelihoods are land-based. The resettlement would be based on RAP in case there the affected people is 200 or more while for less than 200, an RAP would be conducted.
5	Resettlement assistance	Not included.	Affected people are to be offered support after displacement, for a transition period.
6	Vulnerable groups	Not included.	Particular attention to be paid to vulnerable groups, especially those below the poverty line, the landless, the elderly, women and children, indigenous peoples,

	Topic	Egyptian legislative requirements	WB policy requirement
			ethnic minorities.
7	Information and consultation	Displaced persons are provided timely and relevant information. Not consulted on resettlement options. Not able to participate in planning, implementing and monitoring resettlement.	Displaced persons and their communities are provided timely and relevant information, consulted on resettlement options, and offered opportunities to participate in planning, implementing, and monitoring resettlement.
8	Grievances	(1) Specialized committee for that purpose and time. (2) One month to object the decision of resettlement. (3) Four months to object the compensation value.	Appropriate and accessible grievance mechanisms to be established.

Note 1: * Involuntary resettlement policy of JICA is the same as that of World Bank

Source: Governorate of Alexandria (2007.6) Alexandria Development Project, Integrated Environmental and Social Impact Assessment (IESIA) - Resettlement Policy Framework (by North South Consultants Exchange and Royal Haskoning) (WB-RP 457)

In addition gaps of the policy are also found in entitlements of Project Affected Persons (PAPs).

The Egyptian laws and regulation state that formal affected owners or formal occupiers are only

entitled for compensation. The laws showed that they are entitled to physical compensation

whether through offering alternative shelter or equivalent remuneration to their original properties.

While, the Egyptian laws do not state any formal right for squatters, the World Bank OP 4.12 gives those squatted households entitlements for shelter and compensation for involuntary resettlement as shown in Table 2.5.2.

Table 2.5.2 Gaps between Egyptian Laws and Regulations and World Bank Policy related to Entitlement

Entitlement Cases		Entitlement in Egyptian Regulation	Entitlement according to World bank Policy*
1	Permanent acquisition of land (residential, or commercial)	Full payment according to prevailing prices in the date of the decree	Full value of the land based on price of similar land in adjacent areas
2	Acquisition of easement rights	Compensation through equivalent value (usually value is determined below real market value)	Full value of the land based on price of similar land in adjacent areas
3	Temporary occupation of land	No Compensation	Full value of economic return (assuming that the land has been rented on market basis) within the occupation period.
4	Destruction of permanent immoveable structures	Determination of price per room or area (usually the compensation below actual market value) Tenants get the options for acquiring alternative shelter but paying the difference in price.	Full cost of the structure (without applying any depreciation) including internal finishing. Both owner and tenants get full compensation
5	Temporary displacement of moveable structures	No entitlement for compensation	Estimated value of using this moveable structure within the displacement period
6	Businesses	Entitlement for compensation determined by committee (usually below market value)	Compensation is based on area, location, license, practice of activity, internal or external finishing together with compensation for establishing new business.

Source: Governorate of Alexandria (2007.6) Alexandria Development Project, Integrated Environmental and Social Impact Assessment (IESIA) - Resettlement Policy Framework (by North South Consultants Exchange and Royal Haskoning) (WB-RP 457)

2.6. INTERNATIONAL AND REGIONAL ENVIRONMENTAL LEGISLATION

The Egyptian Government has ratified multilateral environmental agreements on biodiversity and natural resources, oceans and seas, hazardous materials and chemicals, atmosphere and air pollution, and health and workers safety. The following list provides the multilateral agreements relevant to the project activities:

- The convention for the protection of the Mediterranean Sea against pollution(Barcelona) and its amendments and protocol regarding pollution from land-based sources which lists the substances of which discharge is prohibited, and the factors which should be taken into account in order to eliminate pollution from these substances.
- Convention on Wetlands of International Importance Especially as Water Fowl Habitat (RAMSAR 1971)
- Convention Relative to the Preservation of Fauna and Flora in their Natural State
- International Plant Protection Convention
- African Convention on the Conservation of Nature and Natural Resources
- Protocol to Amend the Convention on Wetlands of International Importance Especially as Water Fowl Habitat
- Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES)
- Convention on the Conservation of Migratory Species of Wild Animals (Bonn 1983)
- Convention on Biological Diversity (1992)
- Convention Concerning the Protection of the World Cultural and Natural Heritage
- Protocol Concerning Mediterranean Specially Protected Areas
- Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean
- United Nations Convention on the Law of the Sea
- Agreement Relating to the Implementation of Part XI of the United Nations Conventions on the Law of the Sea of 10 December 1982
- Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks
- Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters (Paris, 1974)
- Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972
- Convention Concerning Prevention and Control of Occupational Hazards Caused by Carcinogenic Substances and Agents
- Protocol on the Prevention of Pollution of the Mediterranean Sea by Trans boundary movements of Hazardous Wastes and their Disposal
- Basel Convention on the Control of Trans boundary movements of Hazardous Wastes and Their Disposal
- Amendment to the Basel Convention on the Control of Trans boundary movements of Hazardous Wastes and Their Disposal
- Bamako Convention on the Ban of the Import into Africa and the Control of Trans boundary Movement and Management of Hazardous Wastes within Africa
- Stockholm Convention on Persistent Organic Pollutants (POPs)

2.7. INSTITUTIONAL FRAMEWORK

2.7.1. Environmental Institutions in Egypt

In Egypt there are many environment-related institutions. They could be classified in the following three categories:

- (a) The national environmental organization represented by the MESA, EEAA and its Regional Branch Offices, which are charged with overall monitoring and regulatory coordination;
- (b) Institutions with specific operational functions on environment which are performed by environment units in line ministries, and by environment management units (EMUS) in the governorates; and
- (c) Institutions with environment support role. These are the universities and research institutes.

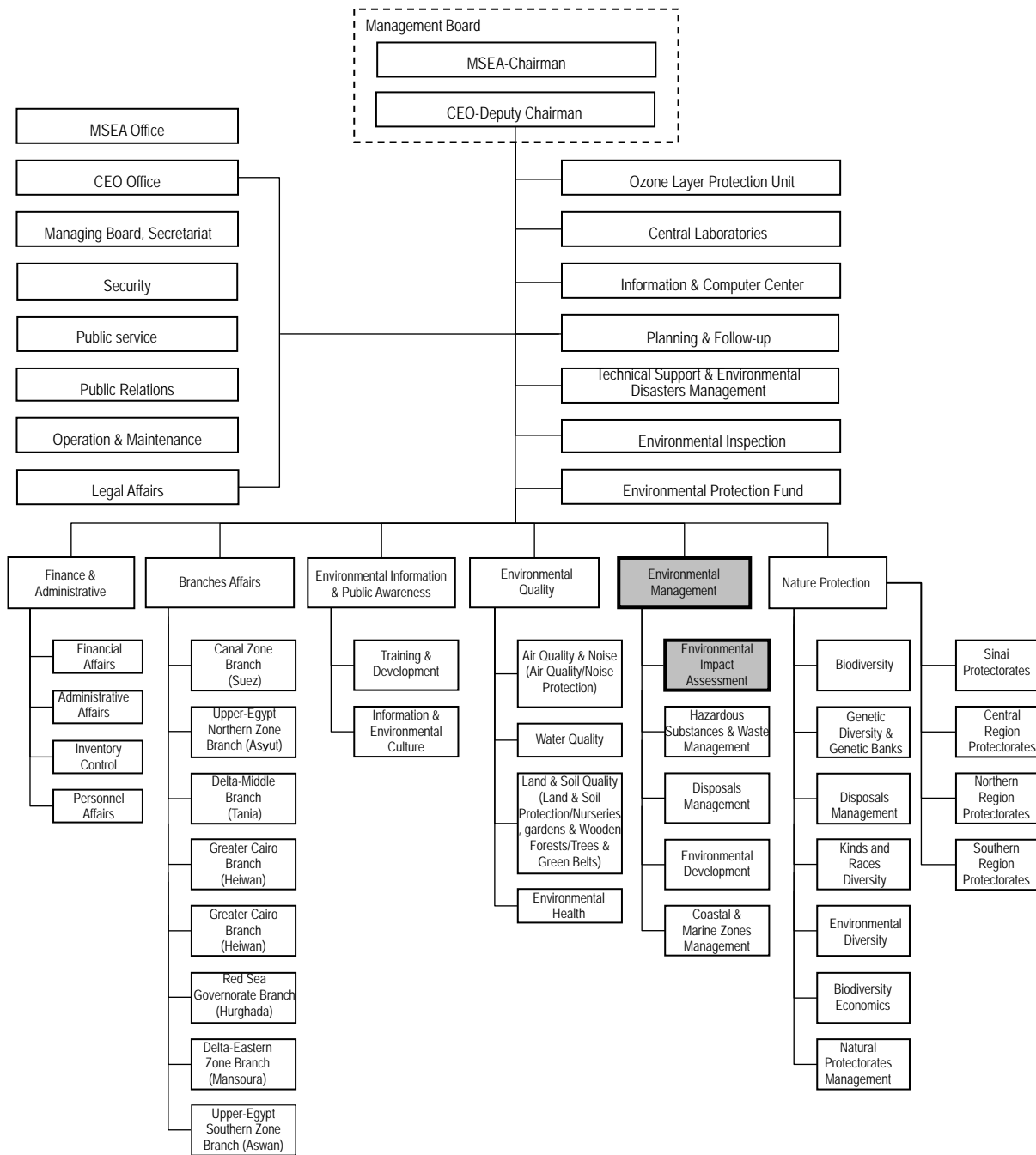
2.7.2. MESA and EEAA

According to the Law 4/1994 for the Protection of the Environment, the Egyptian Environmental Affairs Agency (EEAA) was restructured with the new mandate to substitute the institution initially established by Presidential Decree 631/1982. EEAA represents the executive arm of the Ministry.

MSEA and EEAA are the highest authority in Egypt responsible for promoting and protecting the environment, and coordinating adequate responses to these issues.

The law 4/1994 provided new mandates for the EEAA. Given its coordinating and horizontal role among all ministries, EEAA was put under the responsibility of the Council of Ministers, and a Minister was assigned to oversee the work of the agency and chair EAAA Board of directors. The Chief Executive Officer (CEO) of the Agency is nominated by the Council of Ministers and has a First Undersecretary rank. The CEO oversees the day-to-day management of the agency and ensures that the policies and guidelines provided by the Board are implemented. The main responsibilities of EEAA were merely of a coordinating role and development of legislation, standards, studies, and projects. EEAA was not responsible for developing environmental policies in accordance with the terms of the law.

Organization structures of EEAA are shown in Figure 2.7.1 and Figure 2.7.2.



Source: Website of EEA (September 2006)

Figure 2.7.1 Organization Structure of EEA

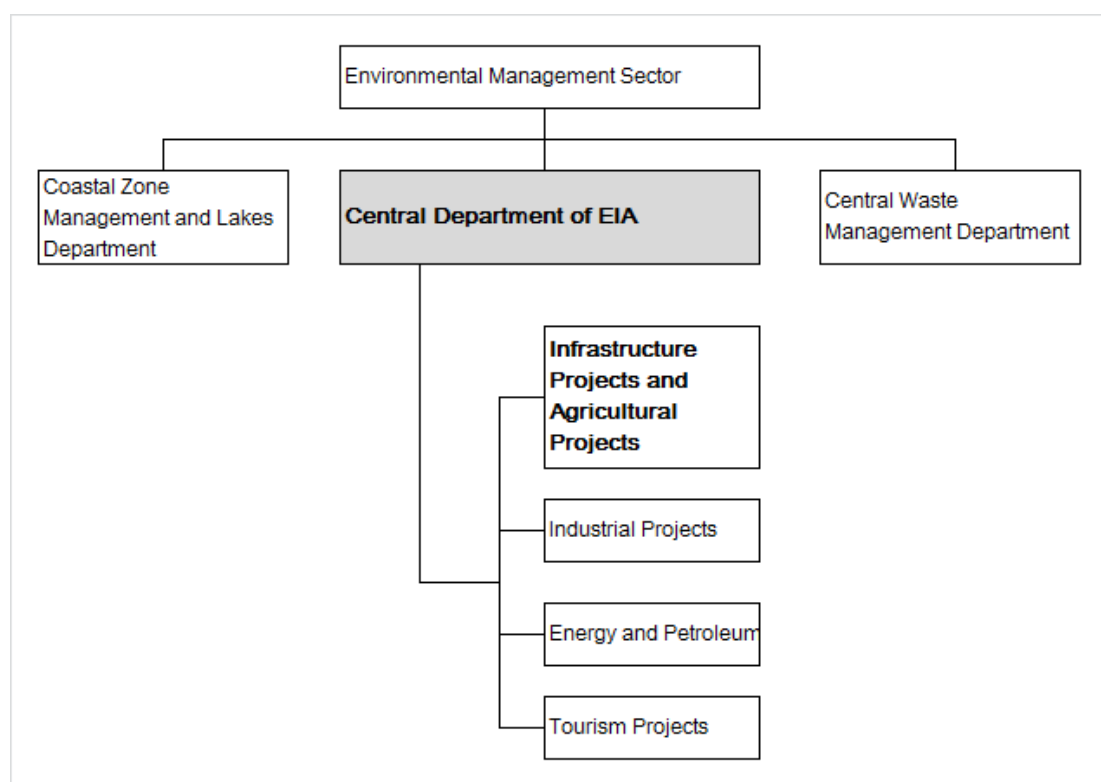


Figure 2.7.2 Organization Structure of Central Department of EIA

2.7.3. Line Ministries mandated with Environmental Issues

Although MSEA and EEAA are the highest authority in Egypt responsible for promoting and protecting the environment, responsibilities for concerned environmental issues in Egypt are dispersed among a number of Ministries and Governorates other than MESA and EEAA, and can be classified in the following three categories Table 2.7.1 provides a brief overview on the responsibilities of major line ministries in the field of the environment, the environmental institutions and or divisions within these ministries, and their affiliated concerned departments.

Table 2.7.1 Line Ministries mandated environmental issues

Ministry	Responsibility
Ministry of Health	Setting environmental health policy and regulation
	Prevention and control of environment-related health problems and diseases through environmental health officers
	Operation of the National Air Pollution and the River Nile Water Quality Networks
	Monitoring water quality for drinking water and domestic purposes.
	Monitoring municipal and industrial effluents
Ministry of Water Resources and Irrigation	Protection of public water resources
	Regulating and controlling sources of water pollution
	Operation of the national surface and groundwater monitoring networks
	Issue regulations setting water quality standards and discharge limits.
	Facility inspection and reporting violations to the police
	Protection of coastal line againstst erosion and seawater intrusion

Ministry	Responsibility
	Policy development, decision support system and monitoring
Ministry of Local Development	Overview the privatization process of solid waste management services in the Governorates
Ministry of Industry	Occupational health and safety
Ministry of Housing, Utilities, and Urban Community	Provision of water supply, sewage collection and treatment and solid waste management
	Planning and construction of new industrial cities
	Preparation of land use and physical plans
Ministry of Interior	Special police enforcement of law 48/1982 and law 4/1994
	Implementation of the vehicles emissions inspection according to law 4/1994
Ministry of Manpower	Occupational health and safety
Ministry of Agriculture and Land Reclamation	Management and conservation of agricultural land, wildlife, and biological resources
	Preventing soil stripping and protecting land from degradation
	Regulating the purchase, importation and handling of pesticides

Source: modified from World Bank (2005) Country Environmental Analysis (Egypt)

At the local level, each of the Governorates has an Environmental Management Unit (EMU).

The organization and operations of the EMUs vary across these Governorates. Under the existing institutional framework, the EMUS represent the primary local authority on environmental issues and, in many cases, operate as the executing agencies for EEAA's environmental policies and programs.

In addition to the environmental infrastructure at the sector and local levels, Egypt has a core of

well-trained academics and researchers that are involved in the field of the environment. All major universities have undergraduate and graduate programs in environmental engineering and/or public health.

CHAPTER 3: SOCIAL ENVIRONMENT

3.1. ADMINISTRATIVE DIVISION

Egypt is divided into 29 Governorates as shown in Table 3.1.1. The Governorates are further divided into regions (markaz), which are then subdivided into towns and villages.

In 2008, Cairo and Giza Governorates were subdivided into 4 Governorates, namely the governorates of Cairo, Giza, 6 October and Helwan. In 2009, the city of Luxor was declared an independent Governorate.

Table 3.1.1 List of Governorates and their capitals and locations

	Governorate	Capital	Location
1	Alexandria	Alexandria	Northern
2	Aswan	Aswan	Upper
3	Asyut	Asyut	Upper
4	Beheira	Damanhur	Upper
5	Beni Suef	Beni Suef	Upper
6	Cairo	Cairo	Middle
7	Dakahlia	Mansura	Lower
8	Damietta	Damietta	Lower
9	Faiyum	Faiyum	Upper
10	Gharbia	Tanta	Lower
11	Giza	Giza	Upper
12	Helwan	Helwan	Middle
13	Ismailia	Ismailia	Canal
14	Kafr el-Sheikh	Kafr el-Sheikh	Lower
15	Luxor	Luxor	Upper
16	Matruh	Mersa matruh	Western
17	Minya	Minya	Upper
18	Monufia	Shibin el-Kom	Lower
19	New Valley	Kharga	Western
20	North Sinai	Arish	Sinia
21	Port Said	Port Said	Canal
22	Qalyubia	Banha	Lower
23	Qena	Qena	Upper
24	Red Sea	Red Sea	Eastern
25	Sharqia	Zagazig	Upper
26	Sohag	Sohag	Upper
27	South Sinai	el-Tor	Sinnai
28	Suez	Suez	Canal
29	6th of October	7th of October	Middle

Note: Listed according to Alphabetical order

3.2. POPULATION

Egypt is the most populated country in the Middle east and the third most populous on the African continent, with about 78 million (2009).

Almost all the population is concentrated along the banks of the Nile River, in the Delta and near the Suez Canal.

3.3. RELIGION AND ETHNICITY

1) Religion

Egypt is a predominantly Muslim country with Islam as its state religion designated by the Constitution of Egypt. Around 90% are identified as Muslim and most of the rest to Christianity, primarily the Coptic Orthodox denomination. Among Muslim Sunni are predominant and others are native Sufi orders and Shi'a.

2) Ethnicity

As for ethnicity, Egyptians are by far the largest ethnic group in Egypt at more than 90% of the total population. Ethnic minorities include the Abazas, turks, Greeks, Bedouin Arab tribes living in the eastern deserts and the Sinai peninsula, the Berber-speaking Siwis (Amazigh) of the Siwa oasis, and the Nubian communities clustered along the Nile. There are also tribal communities of Beja concentrated in the south-eastern-most corner of the country, and a number of Dom clans mostly in the Nile Delta and Faiyum who are progressively becoming assimilated as urbanization increases.

3.4. SOCIAL STRUCTURE

Social structure with respect to the quality of life, and social environment of the household were considerably improved during past 25 years (1982/81 to 2006/05) due to the achievements at the social level as a result of the increasing concern with human development and focusing on the social dimensions of the economic development process.

This improvement is found in change of numerical values for human and social development indicators concerning vital statistics and the educational, health and housing services as shown in Table 3.4.1.

Table 3.4.1 Human and Social Development Indicators (1982/81-2006/05)

Indicator		Unit	1982/1981	2006/2005
1	Infant mortality rate (newborn children)	per 1000	71	17
2	Birth rate	per 1000	38.2	26.8
3	Mortality rate	per 1000	10.4	6.4
4	Life expectancy at birth (male)	years	56.6	71.5
5	Life expectancy at birth (female)	years	60.6	75
6	Enrollment rate in primary education	%	85.2	100
7	Enrollment rate in university education	%	18.6	27
8	Illiteracy rate	%	less than 42%	29.3
9	Average class density	%	43.2	40.3
10	Education leakage rate	%	1.7	0.38
11	Annual average per capita share of electric power	kwh	413	1,359
12	Annual average per capita share of electric power for household consumption	kwh	112	498
13	Rate of beneficiary households rate from electrical services	%	95.1*	99.3
14	Rate of beneficiary households rate from portable water	%	82.6*	95.6

Indicator		Unit	1982/1981	2006/2005
15	Rate of beneficiary households rate from portable water	liter/day	111.2	305
16	Rate of beneficiary households rate from sanitation	%	45.1*	50.5

Note: * data in 1996

Source: Ministry of Economic Development (2009): Sixth Five-Year Plan 2012-2007 (Chapter One The Vision)

3.5. CULTURAL PROPERTIES AND HERITAGES

Egypt is famous for its ancient culture and some of the world's most famous monuments, including the Giza Pyramid complex and its Great Sphinx. Its ancient ruins, such as those of Memphis, Thebes, Karnak and the Valley of the Kings, are a significant focus of archaeological study, and artifacts from these sites are now displayed in major museums around the world.

In Egypt there are found many sites of cultural properties and heritages, derived from the stock of the ancient Egyptian civilizations and natural environment throughout the country. Among them 7 sites are registered as UNESCO World Heritage sites of outstanding cultural or physical significance to the common heritage of humanity (See Table 3.5.1). In addition, 31 sites such as Siwa archaeological area are listed as tentative sites.

Table 3.5.1 World Heritage Sites in Egypt

	Name of the site
1	Abu Mena
2	Ancient Thebes, including its Necropolis
3	Islamic Cairo
4	Memphis and its Necropolis - the Pyramid fields from Giza to Dahshur
5	Nubian Monuments from Abu Simbel to Philae
6	Saint Catherine Area
7	Wadi Al-Hitan (Whale Valley)

Source: UNESCO <http://whc.unesco.org/en/list>

CHAPTER 4: EXISTING CONDITIONS -1 NATURAL ENVIRONMENT

4.1. INTRODUCTION

Egypt lies in the northern corner of Africa. It is bounded by the international frontiers of the Mediterranean Sea in the North, the Red Sea in the East, Libya in the west and Sudan in the south as shown in Figure 4.1.1. Total area of Egypt is approximately 1,001,450 km² including land 995,450 km² and water 6,000 km².



Figure 4.1.1 Map of Egypt

Source: EEAA (2010) Egypt Second National Communication - Under the United Nations Framework Convention on Climate Change

4.2. TOPOGRAPHICAL FEATURES

Egypt is geographically divided into four main divisions :

1) The Nile Valley and Delta (approximately 33,000km²)

It extends from the North valley to the Mediterranean Sea and is divided into Upper Egypt and Lower Egypt, extending Wadi Halfa to the south of Cairo and from North Cairo to the Mediterranean Sea. The River Nile in the north is divided into two branches, Damietta and Rachid embracing the highly fertile agricultural lands of the Delta.

2) The Western Desert (approx. 680,000 km²)

It extends from the Nile Valley in the east to the Libyan borders in the west, and from the Mediterranean Sea in the north to the Egyptian Southern borders.

It is divided into two sections. The northern section includes the coastal plain, the northern plateau and the Great Depression, the Natron Valley and Baharia Oasis. The southern section includes Farafra, Kharga, Dakhla, and El-Owainat in the far south.

3) The Eastern Desert (approx. 325,000 km²)

It extends from Nile Valley in the west to the Red Sea, Gulf of Suez, and Suez Canal in the east, and from Lake Manzala on the Mediterranean Sea in the North to Egypt's southern borders with Sudan in the south. The eastern Desert is marked with the Eastern Mountains that range along the Red Sea with peaks that rise to about 3,000 feet above the sea level. This desert is a store of Egyptian natural resources including various ores such as gold, coal, and oil.

4) Sinai Peninsula (approx. 61,000 km²)

Sinai has a triangular shape having its base at the Mediterranean in the north and its apex in the south at Ras Mohammed, the Gulf of Aqaba to the east and the Gulf of Suez and Suez Canal to the west. It is topographically divided into three main sections.

- The southern section: Mt. Catherine rises about 2,640m above sea level, thus making it the highest mountaintop in Egypt.
- The Central section: it comprises the area bounded by the Mediterranean to the north.
- At-Teeh plateau to the south: it is a plain area having abundant water resources derived from rainwater flowing from southern heights to the central plateau.

4.3. LAND USE

Egypt is situated in the arid and semi arid zones belt characterized by limited arable land resources, whether irrigated land, pluvial agricultural land, natural grazing meadows or wetlands. The arid desert covers 92% of the land, the remaining 8% of arable land being restricted to the Nile Valley, the Nile Delta and a few oases scattered in the Western Desert.

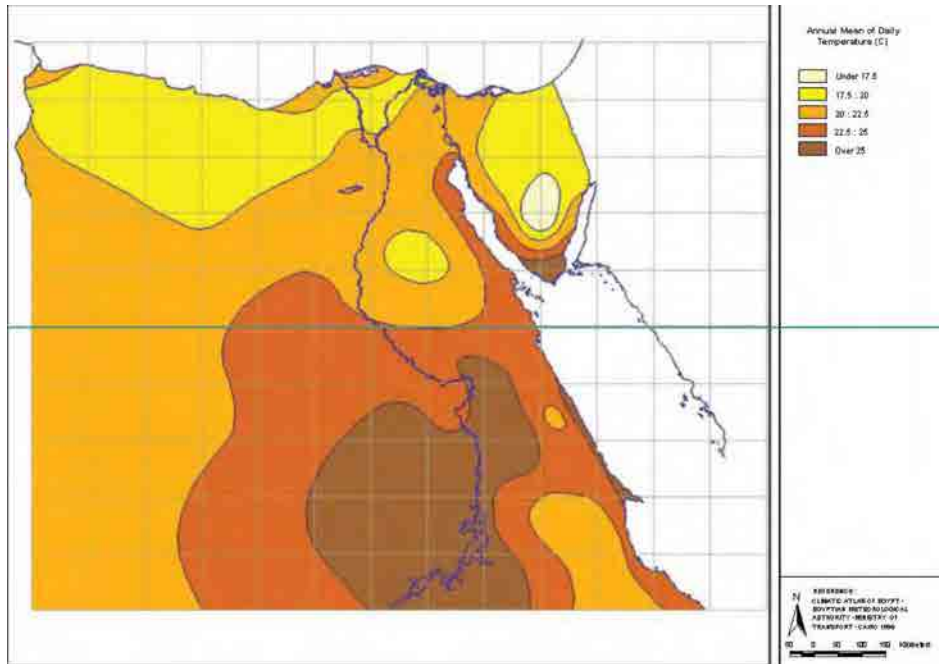
The total area of Egypt amounts to one million km² or the equivalent of 238 million feddans. (1 feddan = 4,200 m²). According to Egypt State of the Environment Report (2005), the populated area is estimated to be around 14 million feddans, i. e., less than 6% of the state total area. The agricultural lands area is estimated to be about 8.2 million feddans, i.e., 3.45% of the state total area. Out of them 5.7 million feddans of old irrigated, fertile sedimentary lands in the Nile Valley and the Delta, 2.2 million feddans reclaimed and irrigated lands and about 0.3 million feddans of rain-fed cultivations in both western and eastern coasts.

4.4. CLIMATE

The Egyptian climate is influenced by the factors of location, topography, and general system for pressure and water surfaces (See Figure 4.4.1, Figure 4.4.2, and Figure 4.4.3). These aspects affect Egypt's climate dividing into several regions. Egypt lies in the dry equatorial region except its northern areas located within moderate warm region with a climate similar to that of the Mediterranean region. It is warm and dry in the summer and moderate with limited rainfall increasing at the coast in winter. The annual average day and nighttime temperatures in Lower and Upper Egypt is 20°C and 25°C, and 7 °C and 17°C respectively.

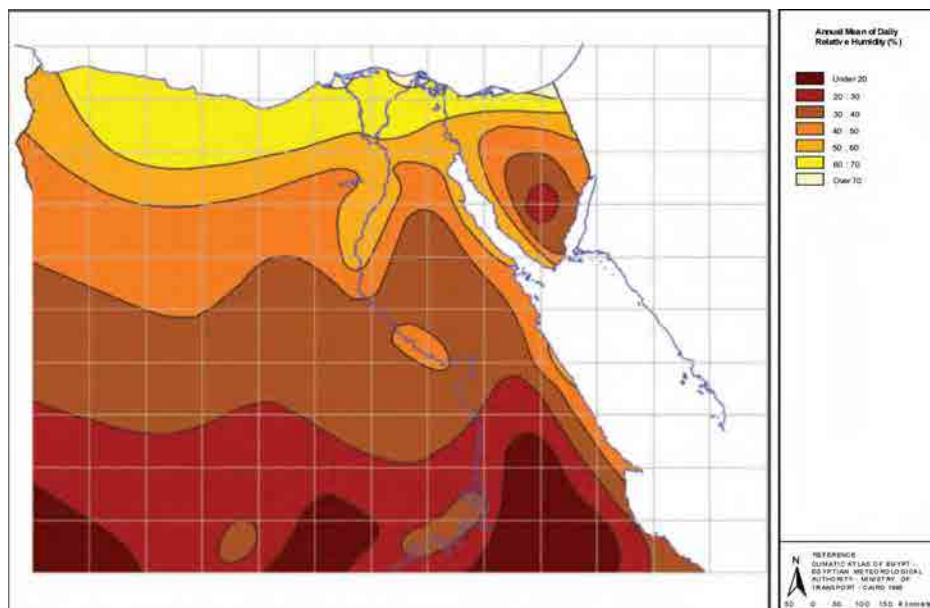
The Egypt's climate fluctuates between severe arid, semi-arid and scarcity of rainfall with average 158 mm/year. Quantities of rains are very small on most areas with exception of the north-west coast where the average rainfall is about 200 mm/year in the east of Alexandria, 75 mm/year in Port Said city.

The Red Sea and South Sinai region exposed to heavy rainy spells resulting in severe flooding in some cases. Many efforts have been exerted to beneficial use or recharge underground aquifers with them. Flood water (which can be used) is estimated with about one billion m³ annually.



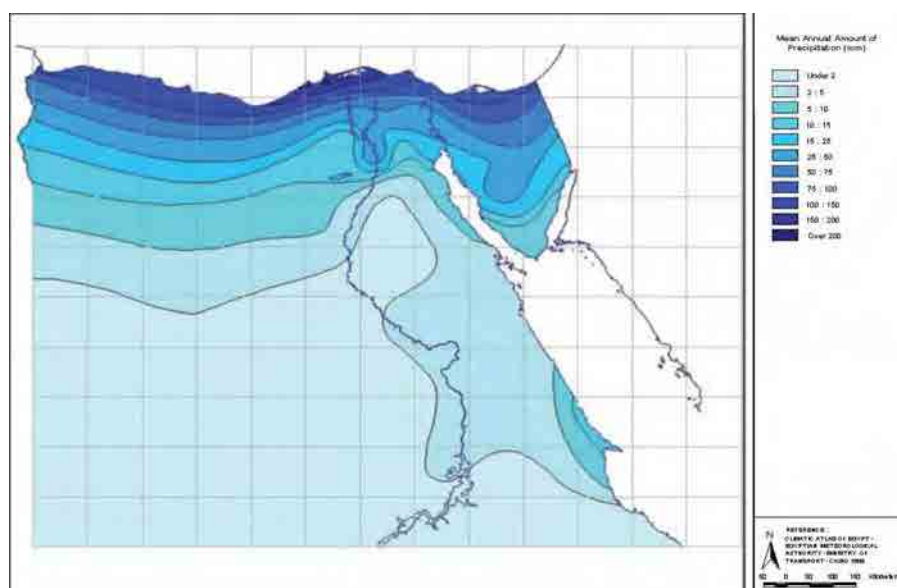
Source: EEAA (2010) Egypt Second national Communication - Under the United Nations Framework Convention on Climate Change

Figure 4.4.1 Average annual mean of daily temperature (°C)



Source: EEAA (2010) Egypt Second national Communication - Under the United Nations Framework Convention on Climate Change

Figure 4.4.2 Annual mean of daily relative humidity (%)



Source: EEA (2010) Egypt Second national Communication - Under the United Nations Framework Convention on Climate Change

Figure 4.4.3 Mean annual precipitation (mm)

4.5. WATER RESOURCES AND FRESHWATER BODIES

4.5.1. Distribution of water resources and water usage

Water resources constitute one of the development pivots in Egypt. The main water resource is the River Nile as and other sources are groundwater in Valleys and Delta, re-use of agricultural wastewater, re-use of sewerage water, rains and floods, desalination of sea water as shown in Table 4.5.1.

Regarding water usage, agriculture is main user and others are drinking and sanitary usage, industry, river navigation in addition to evaporation from Nile River and canals as shown in Table 4.5.2.

Table 4.5.1 Distribution of water resources in Egypt

Year		2002/2003		2006/2007	
Water resources		Billion (m ³)	%	Billion (m ³)	%
1	River Nile Water	55.5	81.31	55.5	79.33
2	Groundwater in Valley and Delta	6.1	8.94	6.1	8.72
3	Re-use of agricultural wastewater	4.4	6.45	5.7	8.15
4	Re-use of sewerage water	0.9	1.32	1.3	1.86
5	Rains & floods	1.3	1.90	1.3	1.86
6	Desalination of sea water	0.06	0.09	0.06	0.09
	Total	68.26	100	69.96	100

Source: EEA (2009): Egypt State of the Environmental Report 2008, Chapter 5 Fresh Water

Table 4.5.2 Distribution of water usage in Egypt

Year		2002/2003		2006/2007	
Water resources		Billion (m ³)	%	Billion (m ³)	%
1	Agriculture	57.8	86.79	59.3	85.63
2	Evaporation from Nile and Canals	2.1	3.15	2.1	3.03
3	Drinking and Sanitary Usage	5.4	8.11	6.5	9.39
4	Industry	1.1	1.65	1.15	1.66
5	River Navigation	0.2	0.30	0.2	0.29
	Total	66.6	100	69.25	100

Source: EAAA (2009): Egypt State of the Environmental Report 2008, Chapter 5 Fresh Water

4.5.2. Fresh water bodies

1) Nile River

Nile River is the second largest river in the world with about 6,825 km, its basin with about 3.1 million m², extends by 1,530 km length inside Egyptian lands. It is the main source of fresh water in Egypt and more than 95% of Egyptian people depend on it. According to 1959 Convention "Convention of the full Exploitation of Nile Water" between Egypt and Sudan, Egypt fixed share of Nile's water represents 55.5 billion m³/year, while Sudan's share represents 18.5 billion m³ annually. Ten countries participate in the Nile basin: Egypt, Sudan, Ethiopia, Kenya, Uganda, Tanzania, Eritrea, Rwanda, Burundi and Democratic Republic of Congo (Figure 4.5.1).



Source: EAAA (2009): Egypt State of the Environmental Report 2008, Chapter 5 Fresh Water

Figure 4.5.1 Nile River basin

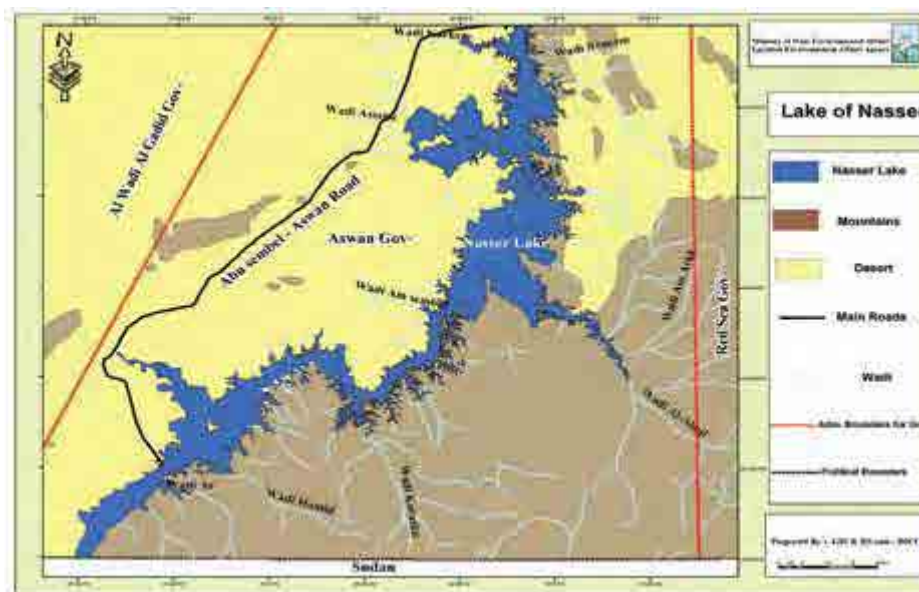
2) High Dam (Lake Nasser)

The High dam is considered the second largest artificial lake in the world with a total area of 5,237 km² and extends to a distance of 350 km inside Egyptian territories and 150 km in Sudan territories. Lake Nasser is the strategic reservoir of water in Egypt, which regulates water in front of the High dam with a storage capacity of 162 billion m³. Its water level is ranging between 183 m to 182 m. The lake and its optimum management is the fundamental and essential element to ensure the security, safety and efficiency of this vital facility especially preserving environmental balance of its water and stability of banks, insure the availability of requirements and standards for its management according to its rules of operation, storage and drainage in order to protect water quality from pollution.

3) Lakes

Lakes represent a vital economic resource for Egypt as they are an important source for fishing resources. Egyptian Government exerted consecutively greater efforts to secure provision of food for the steady increase of population through fisheries' development because fish is considered an important source of protein.

According to their location lakes can be into (i) 3 internal lakes (Qarun, Al Rayan, Nasser),(ii) 6 coastal lakes located along Mediterranean sea among which 4 are locating Delta region (Manzala, Burullus, Edco, Mairout) and 2 are in the east of Suez canal (Malahet Port Fouad, Bardawil).



Source: EEA (2009): Egypt State of the Environmental Report 2008, Chapter 5 Fresh Water

Figure 4.5.2 Lake Nasser

4.6. COASTAL AND MARINE ENVIRONMENT

4.6.1. Features of coastal and marine environment

Egyptian coasts are some 3,000 km, of which some 1,150 km are on Mediterranean Sea extending from Salloum in the west to Rafan in the east, and some 1,850 km cover the Egyptian Red Sea coasts at the main Red Sea basin (almost 1,200 km), and Suez and Aqaba Gulfs (almost 650 km).

Egyptian marine environment and coastal areas, as the cases is with all coastal states, is a permanent source of living and non-living wealth, and a foundation for cultural and economic development. A coastal area is also a pivotal point of attraction for several projects in different economic and social fields such as entertainment and tourist projects, fish wealth projects, manufacturing and international trade. However, such areas are usually exposed to discrepant pollution rates from land ad marine environments.

Egyptian marine and coastal areas contain a lot of natural resources with high economical and environmental value such as coral reefs, mangroves and sand dunes (act as natural barriers for storm, floods and erosion processes) and coastal system such as wetlands which absorb (excess nitrogen element, pollutants from land based sources and decrease effects of pollution resulting from land to marine environment). Therefore, coastal fragile eco-system must be sustainably managed and conserved for present and future generations.

Coastal zones in Egypt ad been the most heavily exploited areas because of their rich natural resources. The conflict between the need for consumption or usage of coastal resources and the need to ensure their sustainability on long term, lead to critical status represented in coastal line erosion, deterioration of fishing resources, destruction of coastal habitats, increasing demand of growing population and deterioration of water quality.

These are the essential factors that raised the need for application of Integrated Coastal Zone Management (ICZM).

4.6.2. Problems and challenges threatening coastal and marine environment

Coastal areas and marine environment in Egypt are known by the presence of many natural habitats and vulnerable environmental eco-system. With respect to this unique nature and availability of economic and environmental resources, coastal areas and marine environment are facing a lot of environmental pressure such as (a) coastal erosion, (b) deterioration of coastal water quality, (c) irrational land use, (d) deterioration of natural resources and destruction of living organisms' habitats, and (e) climate change and sea level rising, due to different development activities.

4.7. MINERAL AND OIL RESOURCES

Mineral and energy resources in Egypt are petroleum, natural gas, phosphates, gold and iron ore.

Crude oil is found primarily the Gulf of Suez and in the Western Desert. Natural gas is found mainly in the Nile Delta, off the Mediterranean shore and in the Western Desert.

According to EEA report (2020)² currently and in recent decades, fossil fuels of petroleum products and natural gas have represented the main sources of primary energy in Egypt. Since 1990 the petroleum oil reserves are almost constant at 3.7 million barrels. Since the early 1990's, large amounts of natural gas reserves have been discovered. These reserves increased from 12.3 trillion ft³ in 1990/91 to 66.3 ft³ in 2004/05.

4.8. FLORA AND FAUNA, ECOSYSTEM AND BIODIVERSITY

4.8.1. Flora and fauna

Most of Egypt is either arid or hyper arid due to its varied eco-zones. The country is home to a diversity of terrestrial habitats and a fauna and flora, which although small in numbers of species and with few endemic species, is extremely varied in composition.

Table 4.8.1 shows flora and fauna species in Egypt.

Table 4.8.1 Numbers of Flora and Fauna Species in Egypt

Taxa		No. of species	Notes
1) Flora			
Bryophyta		337	Liverworts and mosses
Pteridophytat		16	Non-flowering vascular plants
Spermatophyta	Gymnospermae	6	Plants with no protective casing on the seeds
	Angiospermae	2072	Flowering plants; 62 endemic species
2) Terrestrial Fauna			
(1) Invertebrata	Insecta	10,000	New study estimates + 15,000 species
	Arachnida	1517	Mostly spiders, mites and ticks including 24 scorpion species
	Amphibia	9	Including 1 endemic species
	Reptilia	97	Including 6 endemic and 1 endangered species
	Aves	470	Resident breeders 150; Migratory and wintering 320
	Mammalia	95	Including 6 endemic and 20 endangered species
3) Marine Fauna			
(1) Invertebrata		1740	This is an extremely low estimates
(2) Vertebrata	Fish (Chondrichthyes & Osteichthyes)	669	This is an extremely low estimates
	Reptila (turtles)	5	All five species of turtles are endangered
	Mammalia	14	Additionally, the Monk Seal and the Killer Whale may be found
4) Freshwater Fauna			
(1) Invertebrata		124	A low estimate
(2) Vertebrata	Fish (Chondrichthyes & Osteichthyes)	70	15 species have become extinct in the last centurt

Source: Gabriel Mikhail (2003) Egypt's Wilderness and the Quest for Conservation (Image House)

² EEA (2010) Egypt Second National Communication – Under the United Nations Framework Convention in Climate Change

4.8.2. Biodiversity

Egypt lies at the northeast corner of Africa at the junction of four bio-geographical regions, Irano-Turanian, Mediterranean, Saharo-Sindian and Afro-tropical. At the same time it is at the center of the great Saharo-Sindian desert belt that runs from Morocco on the northwest corner of Africa to the high, cold deserts of central Asia. This unique position is enhanced by the circumstance that it is divided by the Nile, the longest river in the world. Most of Egypt is either arid or hyper arid, however, due to its very varied eco-zones, the country is home to a diversity of terrestrial habitats and a fauna and flora, which although low in species numbers and with few endemic species, is extremely varied in composition. Egypt is bounded on its north and east by two largely enclosed seas, the Mediterranean Sea and Red Sea. The Red Sea is species rich and nurtures reef systems that are among the richest in the world as well as stands of mangroves that play vital role in the health of the sea. The reefs and the mangroves of the red sea are arguably among the most important vehicles of biodiversity in the world. However, the fauna and flora of the Red Sea is essentially a modified version of threat of the Indo-Pacific and it also has relatively few endemic species. Ecosystems and habitats must be maintained to safeguard species. Species must be protected in order to conserve ecosystems and habitats. In Egypt, the lack of species abundance and the relatively large number of eco-zones and habitats makes the preservation of both especially important.

4.8.3. Natural Protectorates

1) Natural Protectorates

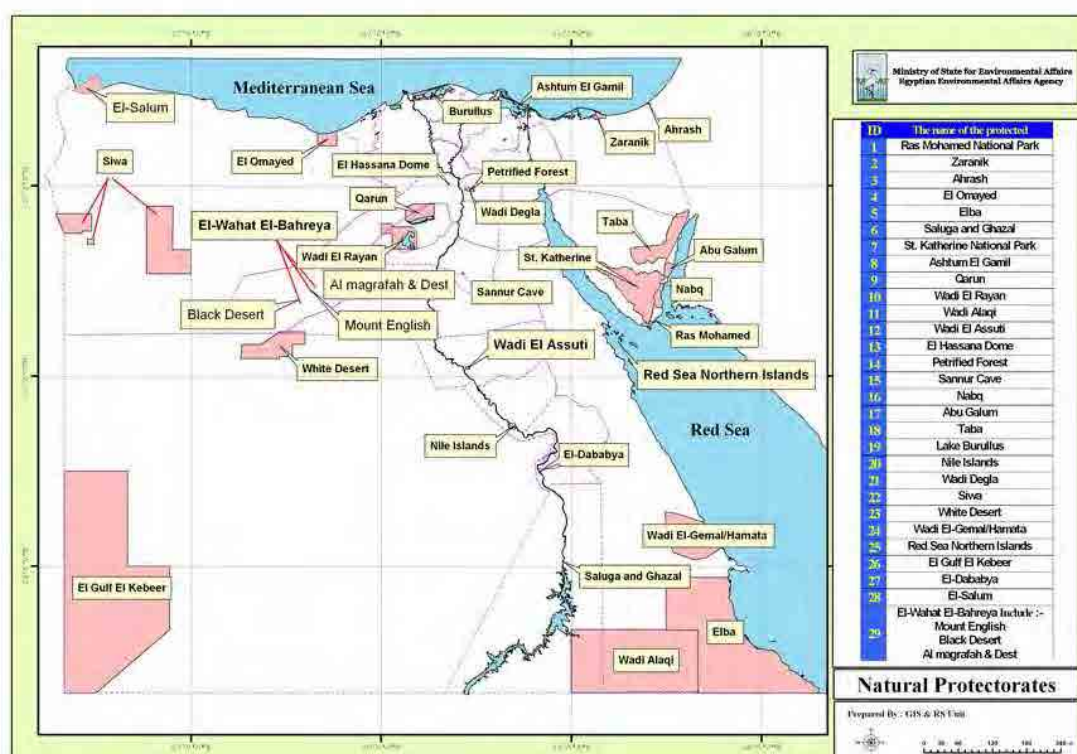
There are 29 natural Protectorates, which are defined as any area of land, or coastal or inland water characterized by flora, fauna, and natural features having cultural, scientific, touristic or esthetic value as shown in Table 4.8.2 and Figure 4.8.1. At present more than 10 sites are listed as candidates of the future Natural Protectorates by Nature Conservation Center.

Table 4.8.2 Natural Protectorates

No.	Protectorates Names	Declaration Date	Type	Area (km ²)	Governorate
1	Ras Mohamed National Park	1983	World Heritage Protected Area	850	South Sinai
2	Zaranik Protectorate	1985	Westland protected area and a natural restricted area for birds	230	North Sinai
3	Ahrash Protectorate	1985	Developing resources protected area	8	North Sinai
4	El Omayed Protectorate	1986	Desert area and vital peripheral	700	Matrouh
5	Elba National Park	1986	National Park protected area	35,600	Red Sea
6	Saluga and Ghazal Protectorate	1986	Wetlands and landscape	1	Aswan
7	St. Katherine National Park	1988	World cultural and natural heritage protected area	4,250	South Sinai
8	Ashtum El Gamil Protectorate	1988	Wetlands and natural restricted area for birds	180	Port Said
9	Lake Qarun Protectorate	1989	Wetlands protected area	250	El Fayoum
10	Wadi El Rayan Protectorate	1989	Developing management resources protected area and a natural national heritage	1,225	El Fayoum
11	Wadi Alaqi Protectorate	1989	Desert protected area and biosphere reserve	30,000	Aswan
12	Wadi El Assuti Protectorate	1989	Captive and multipurpose protected area	35	Assuit
13	El Hassana Dome Protectorate	1989	Geological protected area	1	Giza
14	Petrified Forest Protectorate	1989	Geological protected area and a national heritage	7	Cairo
15	Sannur Cave Protectorate	1992	Geological protected area and a national heritage	12	Beni Suef
16	Nabaq Protectorate	1992	Multipurpose protected area	600	South Sinai
17	Abu Galum Protectorate	1992	Landscape protected area	500	South Sinai
18	Taba Protectorate	1998	Desert and natural heritage protected area	3,595	South Sinai
19	Lake Burullus Protectorate	1998	Wetlands protected area	460	Kafr El Sheikh
20	Nile Islands Protectorates	1998	Wetlands protected area	160	All

					Governorates on the Nile
21	Wadi Digla Protectorate	1999	Desert lands protected area	60	Cairo
22	Swia	2002	Desert and cultural protected area	7,800	Matrouh
23	White Desert	2002	Desert and landscape protected area	3,010	Matrouh
24	Wadi El-Gemal/Hamata	2003	Desert protected area	7,450	Red Sea
25	Red Sea Northern Islands	2006	Developing resources protected area	1,991	Red Sea
26	El Gulf El Kebeer	2007	Natural and cultural National Park protected area	48,523	New Valley
27	El-Dababya	2007	Geological protected area	1	Oena
28	El Salum	2010	Marine protected area	383	Matrouh
29	El-Wahat El-Bahreya	2010	Natural heritage protected area	109	Giza

Source: EEAA Website: <http://www.eeaa.govt.eg/English/main/Protectorates.asp>



Source: EEAA Website: <http://www.eeaa.govt.eg/English/main/Protectorates.asp>

Figure 4.8.1 Distribution of Natural Protectorates

4.8.4. Important Birds Areas (IBAs)

Nature Conservation Sector in EEAA concerned with the conservation of birds and their habitats, is working to identify and document sites of global importance for birds around the world. These sites are called Important Bird Areas or IBAs and are selected according to internationally defined criteria.

To qualify as IBAs sites must have (a) globally threatened species, (b) species with very small world ranges, (c) Concentrations of numbers, and (d) groups of species confined to particular habitat types.

Birds have proven to be excellent indicators of biodiversity and effective flagships for conservation, because they are relatively well known and can carry popular support.

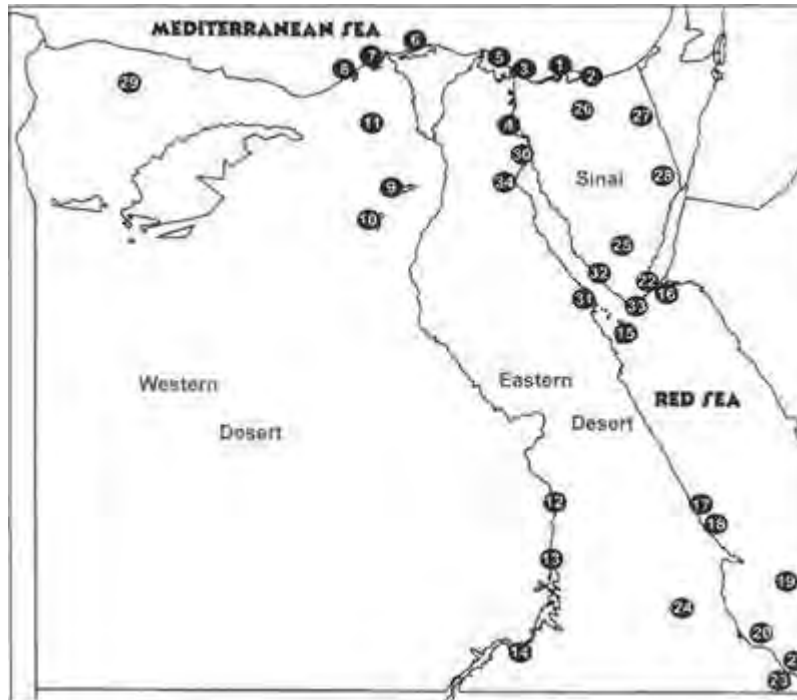
The directory of IBAs in Egypt identifies 34 sites as IBAs in the country. Egypt's IBAs comprise wide range of habitats critical to birds, including wetlands, high altitude mountains, desert wadis, coastal plains and

marine islands as shown in Table 4.8.3 and Figure 4.8.2. At present, 15 IBAs are in existing Natural Protectorates. 5 further IBAs have been proposed for protection. However, not all IBAs can become Protected Areas. Bird conservation needs at sites such as Suez and Ain Sukhna can only be addressed through conscientious planning and management.

Table 4.8.3 Important Bird Areas

	Name of the site	Location
1	Lake Bardawil	Mediterranean Coastal Area
2	Zaranik	Mediterranean Coastal Area
3	El Malaha	Mediterranean Coastal Area
4	Bitter Lakes	Suez Canal
5	Lake Manzalla	Mediterranean Coastal Area
6	Lake Burullus	Mediterranean Coastal Area
7	Lake Idku	Mediterranean Coastal Area
8	Lake Maryut	Mediterranean Coastal Area
9	Lake Qarun	Inland Desert Area
10	Wadi El Rayan	Inland Desert Area
11	Wadi El Natum	Inland Desert Area
12	Upper Nile	Nile River
13	Aswan Reservoir	Nile River
14	Lake Nasser	Nile River
15	Hurghada Archipelago	Red Sea Coastal Area
16	Tiran Island	Red Sea Coastal Area
17	Wadi Gimal Island	Red Sea Coastal Area
18	Qulan Island	Red Sea Coastal Area
19	Zabargad Island	Red Sea Coastal Area
20	Siyal Islands	Red Sea Coastal Area
21	Rawabel Islands	Red Sea Coastal Area
22	Nabaq	Red Sea Coastal Area
23	Gabal Elba	Red Sea Coastal Area
24	The Abraq Area	Inland Desert Area
25	St. Katherine	Sinai
26	Gabel Maghara	Sinai
27	Quseima	Sinai
28	Wadi Gerafi	Sinai
29	El Qasr Desert	Inland Desert Area
30	Suez	Suez Canal
31	Gabel El Zeit	Red Sea Coastal Area
32	El Qa Plain	Red Sea Coastal Area
33	Ras Mohammed	Red Sea Coastal Area
34	Ain Sukhna	Red Sea Coastal Area

Source: EEAA Website (http://www.eeaa.gov.eg/English/main/protect_bird.asp) and UNESCO



Source: EEAA Website, http://www.eeaa.gov.eg/English/main/protect_bird.asp

Note: Site number in map corresponds to that of Table 4.8.3.

Figure 4.8.2 Distribution of Important Bird Areas (IBAs)

CHAPTER 5: EXISTING CONDITIONS – 3 ENVIRONMENTAL POLLUTION

5.1. GENERAL

In this chapter deterioration and depletion of physical environment such as ambient air quality, water quality, ambient noise, global warming due to greenhouse gases emissions, solid waste generation is defined as "environmental pollution" and is expressed about present features.

Existing environmental impacts due to transport activities are separately described in Chapter 5.

5.2. AIR POLLUTION

Air pollution in Egypt is considered one of the greatest challenges because of its multiple sources resulting from the remarkable industrial development. Air pollution has various sources such as different kinds of industrial waste, burning of agricultural residues, vehicle emissions and pollutants resulting from open burning of municipal solid waste which exhaust toxic gases that cause many diseases and negative impacts to human body, such as poisoning, infertility, decrease of mental ability and human body's length, hearing impairment, anemia, neurological disorders and other diseases related to ambient environment.

Especially, the present transport infrastructure is inadequate to meet the rapidly increasing traffic demand in the Greater Cairo and Alexandria Metropolitan Area. An inadequate supply of the road capacity, road structure, insufficient traffic management and lack of exhaust emission control measures have been causing heavy traffic congestion, serious air pollution and many traffic accidents.

4.2.1 Main pollutants of ambient air

Ambient air pollutants in Egypt are divided into two types; the suspended inhaled particles and gases. The following will describe these pollutants, sources and health impacts resulting from exceeding their permissible limits stipulated in Law No. 4/1994 amended by Law No. 9/2009.

1) Particulate matters (PM, PM₁₀ and PM_{2.5})

Particulate Matters are the most common pollutants in dry, semi arid zones, industrial and heavy traffic areas. These suspended particles consist of a mixture of primary particles resulting from incomplete combustion of fuels and secondary particles resulting from incomplete combustion of fuels and secondary particles resulting from particles which are mostly produced from chemicals reactions of some pollutants in the atmosphere. These are produced from fossil fuels combustion, especially diesel fuel. Their emission increased in diesel powered transport than gasoline powered transport with 40%- 50%. These particles are also emitted from industrial facilities such as cement plants and electrical power stations...etc.

It is worth mentioning that these particles have negative impacts on human health as they cause dangerous diseases to respiratory system. Their impact depends on the size of these particles, if they are less than 10 micron (PM₁₀) they will be more harmful because they can be inhaled easily, in addition, particles less than

(PM_{2.5}) are considered the most dangerous because breathing defense organs cannot prevent them from reaching to deep lungs and interact with blood stream reaching different organs of the body.

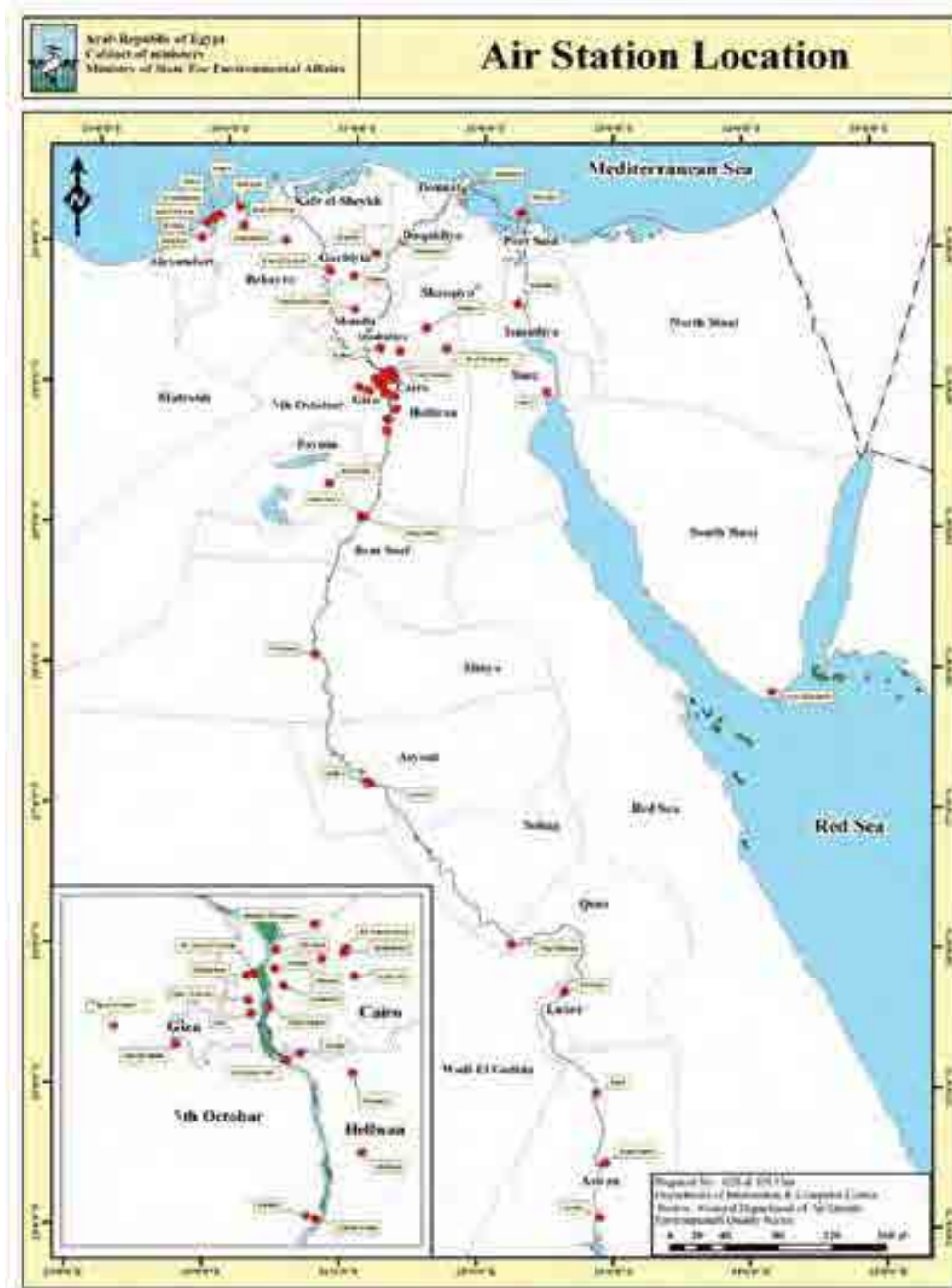
2) Gaseous pollutants

Combustion of fossil fuel is the main source of gaseous pollutants, such as nitrogen oxides, sulfur oxides and carbon monoxide (NO_x, SO₂, CO). These gases have an important role in deteriorating air quality and smog formation. Furthermore, when these gases interact with oxygen in the presence of hydrocarbons under the effect of ultraviolet rays they form very dangerous secondary pollutants such as Ozone (O₃), which causes inflammation of the mucous membranes of respiratory system as well as eye irritation, coughing, inflammation of lungs, provoking asthma and bronchitis

3) Air quality monitoring

In view of the essential role of the MESA and EEAA in monitoring air pollutants, identifying their negative impacts and reducing them; the Ministry has established an integrated National Network for monitoring air pollutants composed of 87 stations for monitoring and controlling main air pollutants periodically and continuously since 1998 until now (Figure 5.2.1). Additionally, the network monitors other pollutants such as volatile organic compounds (VOC) and non-methane hydrocarbons compounds (NMHC).

Furthermore, the Ministry compiles data from metrological stations, such as wind speed, direction, temperature, and relative humidity etc.



Source: MSEA and EEAA (2008) Egypt State of the Environment Report 2008

Figure 5.2.1 Air Quality Monitoring Stations

4) Present air quality

Situation of present air quality is described for SO_2 , NO_2 , PM_{10} , ozone and Pb as follows.

(1) Sulfur dioxide (SO_2)

Sulfur dioxide is primarily generated as an emission from sulfur residues oxidation in liquid oil fuel during the combustion process; whether from fixed sources, such as energy generation stations and different factories or mobile sources, such as vehicles particularly those operated with diesel fuel. The permitted annual limit in Law No. 4/1994 amended by Law No. 9/2009 is $60\mu\text{g}/\text{m}^3$.

Figure 5.2.2 shows the overall average concentrations of sulfur dioxide over the past six years (2004-2009) in Egypt, which clarifies significant improvement in measured concentrations since 2004 till 2009, as average monitored concentrations during 2009 were approximately 31 $\mu\text{g}/\text{m}^3$, which is similar to concentrations of 2008; while 2006 and 2007 were about 37 and 38 $\mu\text{g}/\text{m}^3$ respectively. It clarifies the remarkable improvement in the annual average concentrations along previous six years by 20-30%. This is due to tightening control over emissions from industrial facilities, efficiency of control devices, increasing traffic campaigns and emphasis on arresting vehicles violating environmental law.

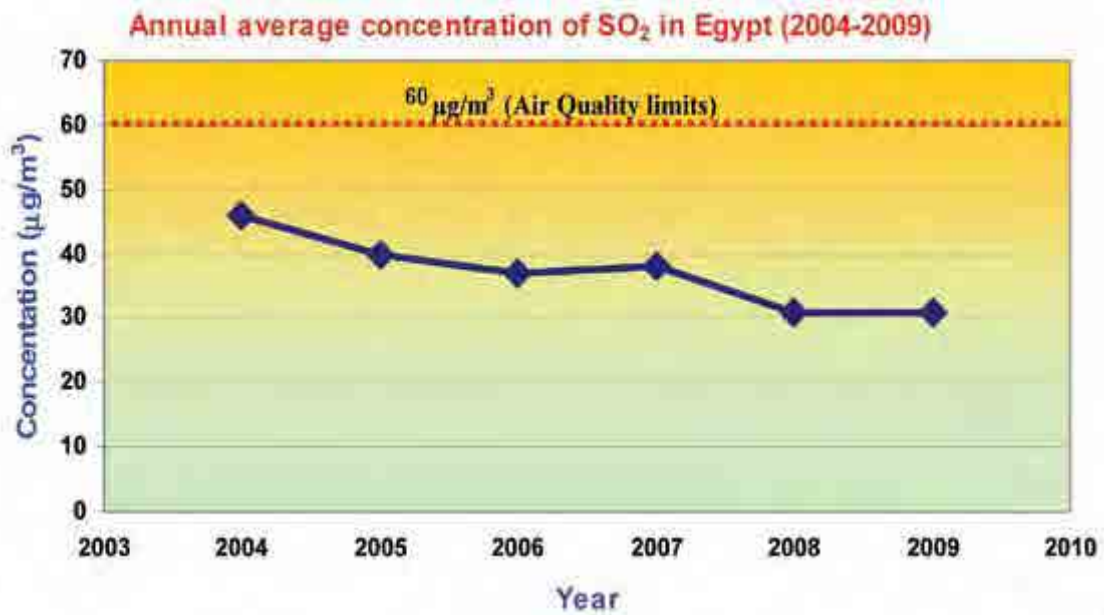
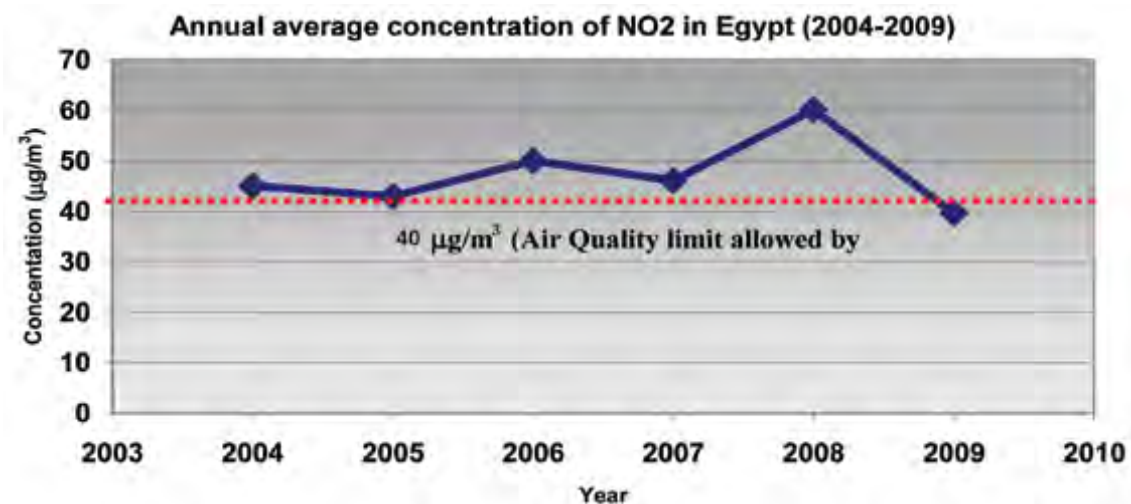


Figure 5.2.2 Annual average concentration of SO_2 during 2004-2009

(2) Nitrogen dioxide (NO_2)

Nitrogen dioxide is emitted as a result of fuel combustion processes that happen at high temperatures, and Executive Regulations of Environmental Law No. 4/1994 did not define annual average limit for its concentration. However, World Health Organization (WHO) specified 40 $\mu\text{g}/\text{m}^3$ as the annual average for NO_2 concentrations; modified Executive Regulations for Environment Law No. 9/2009 has suggested annual average concentration for nitrogen dioxide in ambient air.

Comparing 2009 annual average with previous years (Figure 5.2.3) clarified significant improvement if compared with 2008 which recorded 60 $\mu\text{g}/\text{m}^3$, while 2009 was 40 $\mu\text{g}/\text{m}^3$. NO_2 annual average concentrations from 2006- 2009 compared to baseline year 1999 in major areas of the country indicates significant improvement in most locations in average concentrations recorded in 2009 as compared to 2008.



Source: EEA SOE-2009

Figure 5.2.3 Annual average concentration of NO₂ during 2004-2009

However, average concentrations of 2009 clarified that some locations have exceeded 40µg/m³ limit. These locations are characterized with high traffic density, such as El-Kolaly, Kaha, Beni-Suief, Shebin El-kom, Fum El-Khalig and El-Gomhoriya; where their concentrations were 75, 66, 62, 57, 53 and 50µg/m³ respectively.

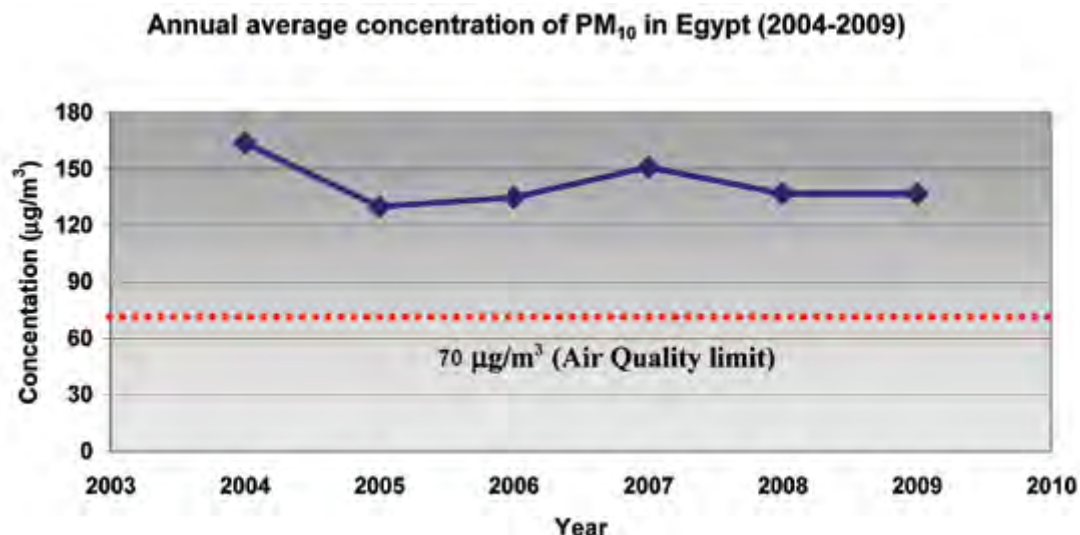
This is due to high traffic density particularly in Greater Cairo, in addition to the poor technical conditions of old cars used in some governorates, which require intensifying inspection campaigns on roads and emphasis on the full maintenance for those types of cars.

(3) SPM (Inhaled particles, PM₁₀)

Inhaled particles are considered one of the main problems causing the increase in pollution levels in Egypt, especially in Greater Cairo and neighboring areas. This is due to Egypt's topography and its multiple sources of pollution. In recent years MSEA has concentrated on monitoring all types of dust, especially inhaled particles less than 10 micron in diameter (PM₁₀), which have negative impact on human health.

The Environment law 4/1994 has stipulated that annual average permissible limit of inhaled particles less than 10 micron in diameter (PM₁₀) is (70 µg/m³).

Figure 5.2.4 shows annual average concentrations of PM₁₀ from 2004-2009; it clarifies relative stability in the annual average along the past six years, with exception of 2007. This is considered a relatively good indicator particularly within the steady increase of human activities during these past six years. In this regard, it should be mentioned that the surrounding natural resources represented in desert areas and their released winds carried with dust, significantly affect air quality in Greater Cairo and Delta. This effect was clearly appeared during 2009 autumn where dust storms had contributed to increasing annual average of particles (less than 10 microns) compared to other years. This is also confirmed by the conducted study "Attributing all Pollutants to their Sources". It proved that natural sources are responsible for 30-50% of PM₁₀.



Source: EEA SOE-2009

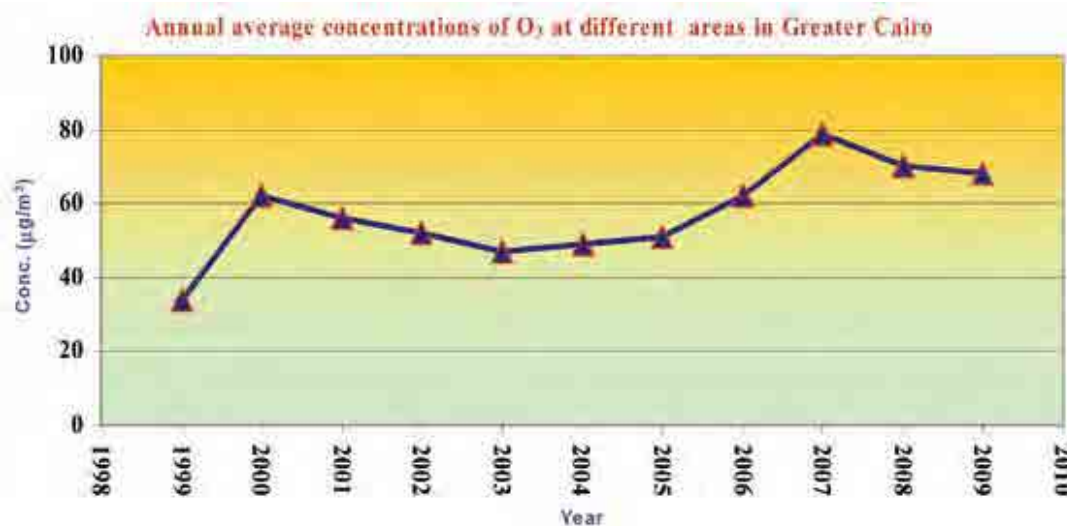
Figure 5.2.4 Annual average concentration of PM₁₀ during 2004-2009

Furthermore, the noticeable negative impacts of traffic density in some areas, open burning of solid waste and industrial expansion in some areas, such as in Upper Egypt are greatly contributing in exaggerating this effect .

(4) Ozone (O₃)

Ozone is considered a secondary pollutant; it exists at lower layers of the atmosphere as a result of interaction between volatile organic pollutants emitted from vehicles with nitrogen oxides in the presence of sunlight. Therefore, ground ozone concentrations increase during summer months than winter as a result of the increase in sunshine hours. Ozone constitutes a serious threat to human health and leads to the occurrence of smog phenomenon when its concentrations increase greatly. Therefore, Executive Regulation of Law No. 4/1994 determines that the highest environmental concentration of ozone must not exceed 200µg/m³ in one hour, while its limit during 8 hours must not exceed 120µg/m³.

Figure 5.2.5 shows annual average concentrations of ozone from 1999-2009 in Greater Cairo. It shows a reduction in ozone average concentrations near ground layers during 2009 in comparison to 2007 and 2008. The annual average during 2009 was about 68 µg/m³ and 79, 70 µg/m³ in 2007 and 2008 respectively.



Source: EEA SOE-2009

Figure 5.2.5 Annual average concentration of ozone in Greater Cairo (1999-2009)

(5) Lead (Pb)

Lead pollutant impacts on human health are different; either through inhalation, or eating food contaminated with lead or its derivatives. Its most serious impacts are represented in inhaling its particles stuck to air or dust, which accumulate this toxic element in human blood through the respiratory system. Lead has negative impact on human embryos, mental abilities, blood causing anemia and may lead to reduce intelligence rate particularly among children.

Figure 5.2.6 shows the annual average of lead concentrations from 2000-2009 in Greater Cairo. It shows the significant improvement in lead levels, which is clear indication of the success of exerted national efforts to reduce lead levels in Greater Cairo. Despite this success, it is noticed that 2009 annual average concentrations were slightly higher than the permissible annual average limit stipulated in Environment Law by recording (0.73 mg / m³), which is close by large to 2008 annual average concentrations (0.74 mg / m³), this can be traced to the significant increase of consuming gasoline 80 during this period as a result of high prices of other kinds of gasoline.

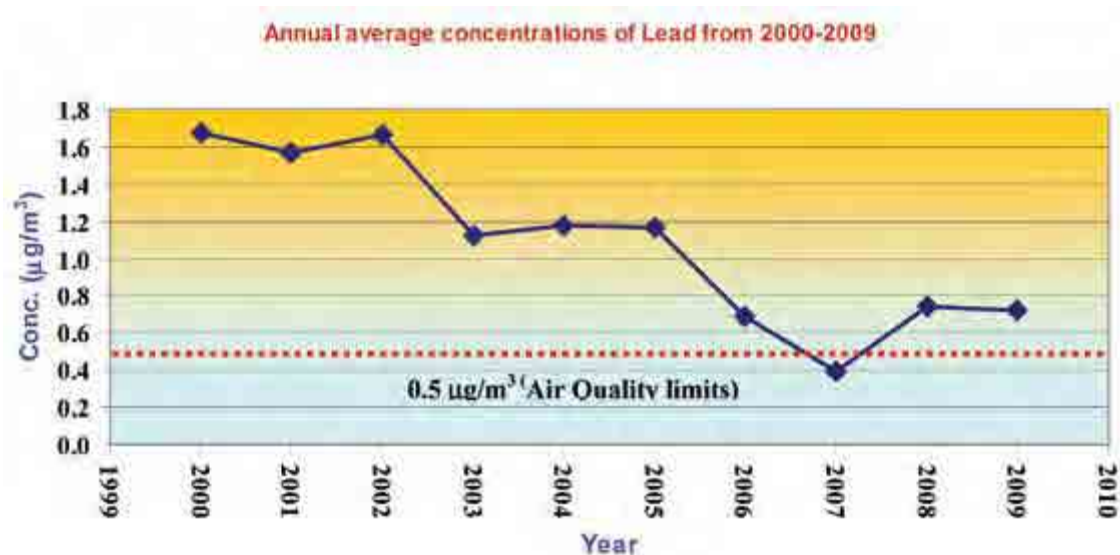


Figure 5.2.6 Annual average concentration of lead in Greater Cairo during 2000-2009

5.3. FRESHWATER POLLUTION

5.3.1. Introduction

Surface freshwater pollution results from different activities such as industrial, agricultural and tourism as well as domestic water use.

The River Nile and its two branches, canals, main canals and watercourses have been, and are, generally, suffering from the pollution of direct and indirect drainage by industrial plants as well as sanitary drainage from villages and cities situated on these watercourses. Lack of sanitary drainage services along previous years and watercourse passage through residential areas in different villages and cities have led to draining sewage into the Nile. Agricultural drainage faces the same problem, as it can be reused in irrigation after mixing with irrigation water. Water Pollution in Egypt is a very complicated issue due to the variety and accumulation of pollution causes and the need for huge investments to eliminate them. Additionally, the variety of official entities as well as regulating laws sharing water resource management may be one factor of impeding the speedy solution of such problems. Coordination is currently made for ministerial and authority cooperation to solve this problem.

5.3.2. Surface and groundwater monitoring

Monitoring of surface and ground water is carried out through monitoring networks systems all over Egypt affiliated to the following ministries:

- Network of Ministry of Water Resources and Irrigation, consisting of 232 monitoring sites for surface water located on (Nile, main canals and drainages) in addition to 203 sites for monitoring quality of groundwater.
- Network of Ministry of Health (Environmental Monitoring and Occupational Health Studies Center), consisting of 169 sites for periodical monthly monitoring of water quality along the Nile, its two branches, and some of its major canals with special interest in drinking water intakes.

- Network of Egyptian Environmental Affairs Agency, consisting of 69 monitoring sites on the Nile carried by laboratories affiliated to EEA's Regional Branches located at different governorates as shown in Figure 5.3.1.



Source: MSEA and EEAA (2008) Egypt State of the Environment Report 2007

Figure 5.3.1 Water Quality Monitoring Stations (Freshwater and Groundwater)

5.3.3. Freshwater Quality of Major Water Bodies

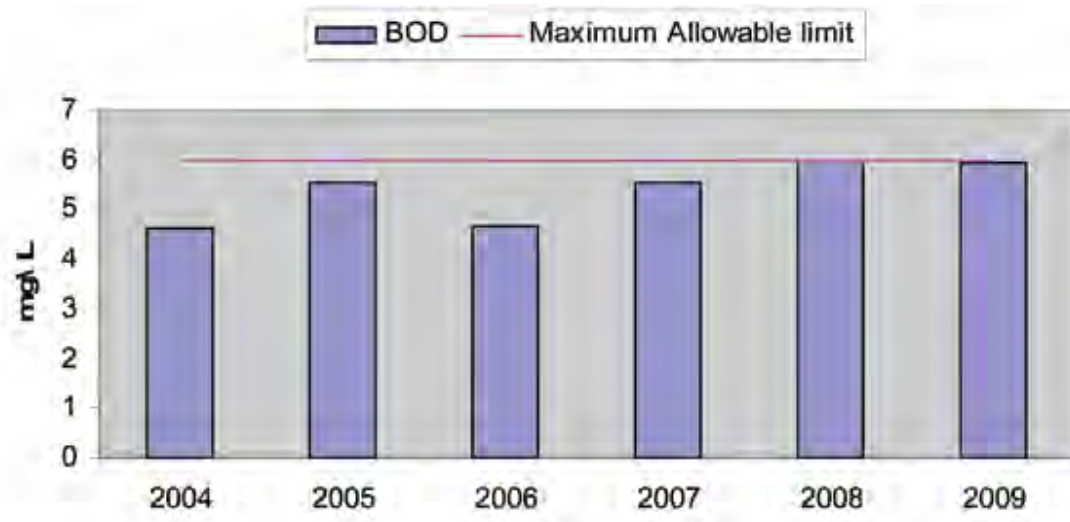
1) Lake Nasser

Water Quality of Lake Nasser is considered the reference point for water quality in River Nile, as it is the first recipient of water flowing from Sudan, before being affected by any development activities surrounding the River Nile.

Monitoring results during 2009 indicate that water quality of Lake Nasser is of good quality ,as indicated below:-

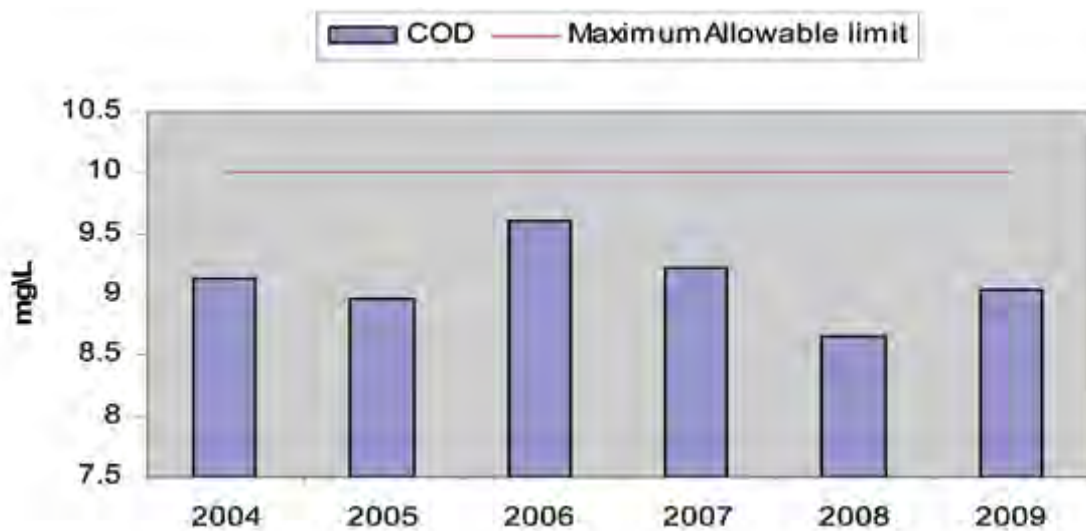
- a) pH values ranging between 5.7 - 8.7.

b) The average concentration of organic materials for biological oxygen demand (BOD₅) and chemical oxygen dissolved (COD) did not exceed the permissible limits for Nile water quality standards (6 mg / L, 10 mg / L , respectively). Additionally, it did not exceed the permissible limits during the period from 2004 to 2009 as shown in Figure 5.3.2 and Figure 5.3.3.



Source: SOE 2009

Figure 5.3.2 Average values of BOD in Lake Nasser (2004 -2009)



Source: SOE 2009

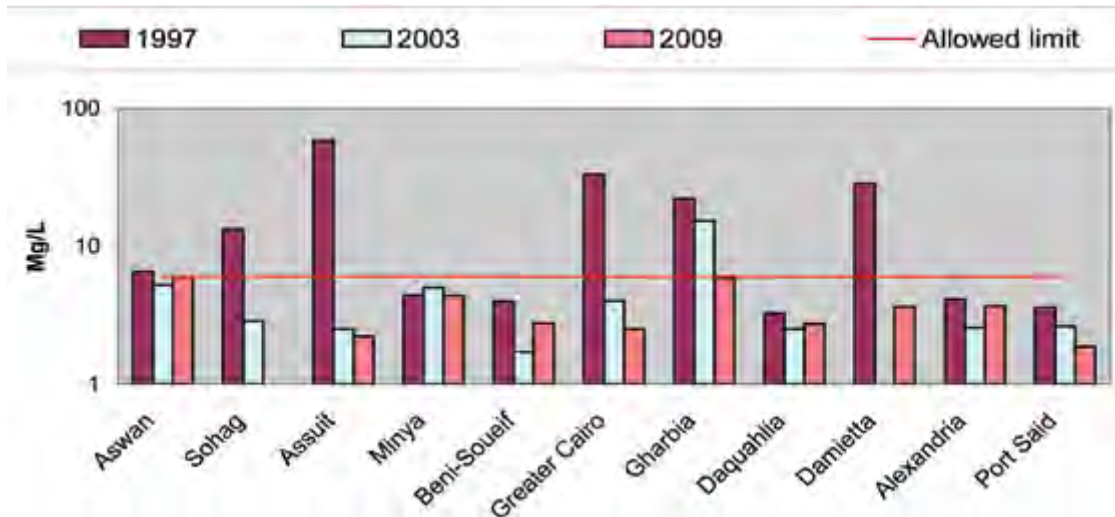
Figure 5.3.3 Average values of COD in Lake Nasser (2004 -2009)

2) River Nile

Monitoring results, clearly indicate the improvement in water quality of River Nile and its branches, as concentration of BOD, nutrients, TDS, heavy metal, chlorides and fluorides, were within the permissible limits prescribed in the Law for areas along the River Nile; it's also indicated that dissolved oxygen concentrations were higher than the minimum permissible limit prescribed by Law, which indicates water cleanliness, and clear improvement in water quality.

- a) Results during 2009 are as follows:
- b) pH ranged from 7.45 to 8.7 along the River Nile, which indicates water tendency to be alkaline.

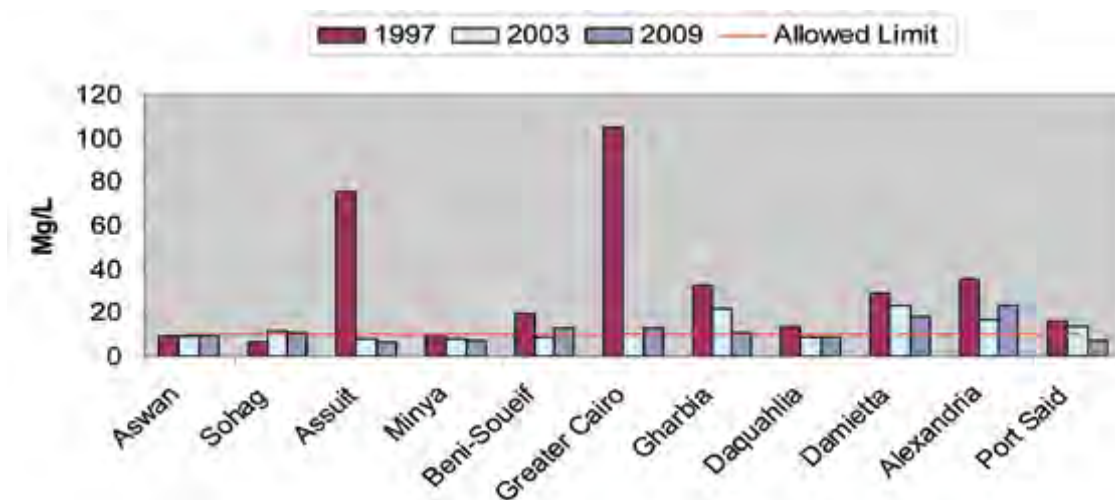
Average concentrations of organic matters, represented by the biological oxygen demand (BOD₅) were lower than the permissible limit (6 mg / L) in all governorates as indicated in (Figure 5.3.4). This is attributed to improved efforts to reduce discharge of municipal wastewater into the River Nile.



Source: SOE 2009

Figure 5.3.4 Average Values of BOD among Governorates (1997, 2003, 2009)

- c) Average concentrations of chemical oxygen demand (COD) is less than the allowable limit in most governorates. It indicates clear increase in its concentration during 1997 in most governorates with the highest increase of (78 - 110 mg / L) in both Assuit and Greater Cairo respectively during the same year; nevertheless, the concentrations did not exceed permissible limits in most governorates during the following years. (Figure 5.3.5)

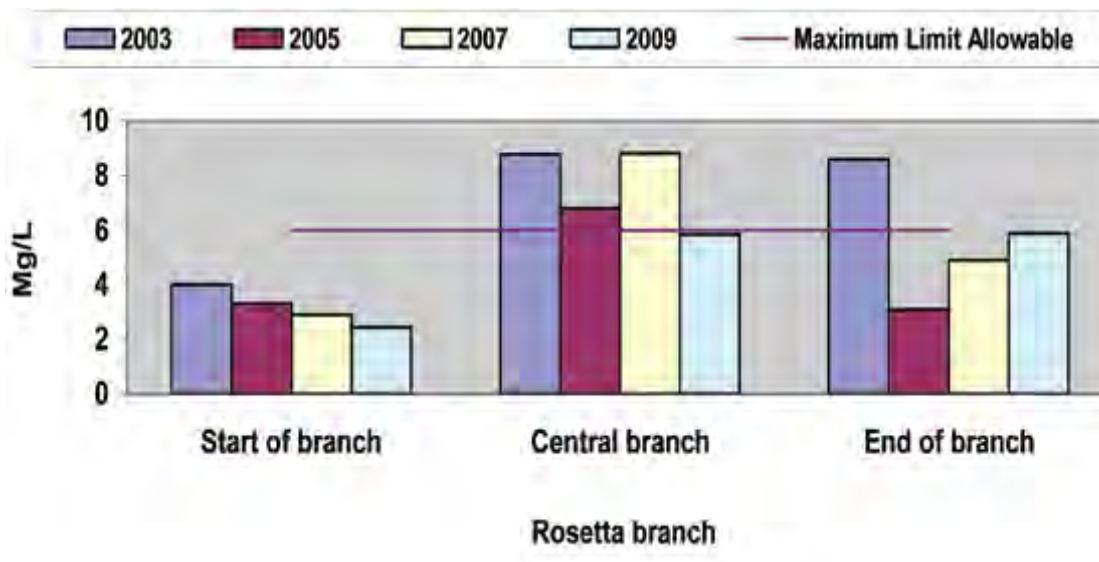


Source: SOE 2009

Figure 5.3.5 Average Values of COD over Governorates (1997,2003 and 2009)

3) Rosetta Branch

BOD was less than the permissible limit (6 mg / L) at the beginning, middle and end of the branch. Although, there was a slight increase in concentration at the end of the branch compared to the previous year; however, it remains less than the permissible limit, as shown in Figure 5.3.6.

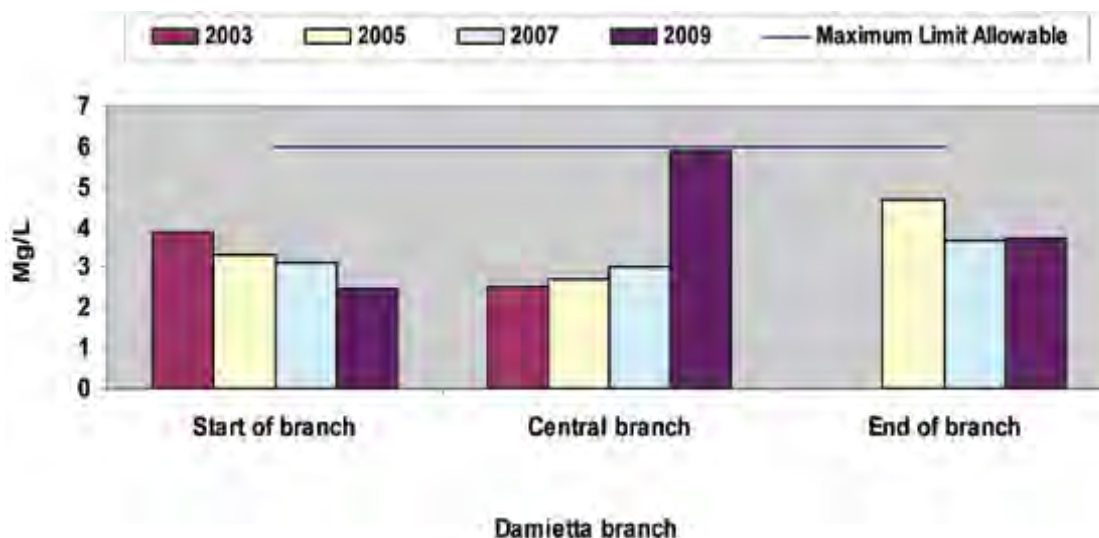


Source: SOE 2009

Figure 5.3.6 BOD in Rosetta Branch (2003-2009)

4) Damietta Branch

Average concentrations of organic matter represented by biological oxygen demand (BOD₅) during 2003-2009 were less than the permissible limit for Nile water quality (6 mg / L) along Damietta branch, as shown in Figure 5.3.7.



Source: SOE 2009

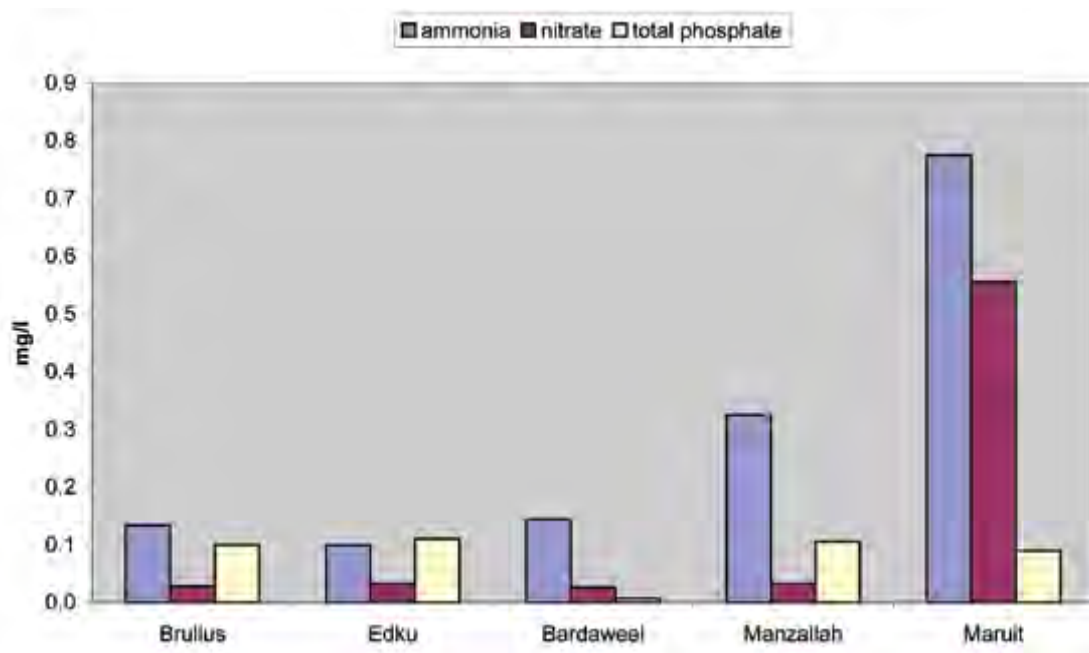
Figure 5.3.7 BOD in Damietta Branch (2003-2009)

5) Northern Lakes

Northern Lakes (Bardawil - Manzala - Burullus - Edku - Mariut) are economically important, due to their fish production which is estimated at more than 77% of total Egyptian lakes production. All are connected to the Mediterranean with the exception of Mariut Lake. Because of the shallow depths of the Northern Lakes, slow water movement and high fertility; they are considered natural hatcheries for various species of economic fish species. Northern Lakes also constitute an important refuge for hundred thousands of migratory birds during migration season.

Monitoring results of the first campaign (August 2009) for northern lakes have shown that Bardawil Lake has good water quality, and sediments since it has not been exposed in the past to pollution sources. Additionally, there were no significant differences between the lakes in other measurements, because of the geological nature of various regions surrounding the lakes and sources of drainage into each lake.

Result of nutrients show average concentrations (ammonia – nitrate - phosphate) were at less than 1 mg / L; while ammonia average concentration recorded at its highest value at Mariut Lake which ranged between (0.099 and 0.776 mg / L), as shown in Figure 5.3.8.



Source: SOE 2009

Figure 5.3.8 Average concentration of Nutrients in northern lakes.

5.4. COASTAL AND MARINE WATER POLLUTION

5.4.1. Introduction

Egyptian coasts are some 3,000 km, of which some 1,150 km are on Mediterranean Sea extending from Salloum in the west to Rafah in the east, and some 1,850 km cover the Egyptian Red Sea coasts at the main Red Sea basin (almost 1,200 km), and Suez and Aqaba Gulfs (almost 650 km).

Egyptian marine environment and coastal areas, as the case is with all coastal states, is a permanent source of living and non-living wealth, and a foundation for cultural and economic development. A coastal

area is also a pivotal point of attraction for several projects in different economic and social fields such as entertainment and tourist projects, fish wealth projects, manufacturing and international trade. However, such areas are usually exposed to discrepant pollution rates from land and marine environments.

Impact of human activities due to unsustainable fishing practices, abusive use of natural habitats and development pressures resulted in jeopardizing coastal ecosystems. Fresh water resources in coastal zones are expected to constitute critical constrains to development. Fresh water percentages have increased via desalination in coastal zones, especially in tourism projects. The quality of marine and coastal environments and their environmental resources in Egypt threatened by a number of hazards related to the following activities:

- Internal development inside the country whose impacts are carried out to coastal zones via the Nile River, agricultural drainage system and air.
- Coastal development activities leading to changes in coastal dynamics and consequently, to environmental resources and coastal water quality.
- Activities related to sea transport and seabed resource utilization (marine sources).

5.4.2. Water quality monitoring

To preserve coastal and marine environment, baseline coastal and marine water quality monitoring survey has been carried out at the stations on Mediterranean Sea, Red Sea, Gulf of Suez and Gulf of Aqaba by the Coastal Monitoring Program of EEAA (see Figure 5.4.1).

Monitoring was conducted seasonally on a regular basis every year, through four monitoring schedules (March,

May, July, and September); during which the physical, chemical and microbiological indicators are measured, as follows:

- a) Physical measurements (temperature - pH - dissolved oxygen - electrical conductivity - salinity - transparency).
- b) Chemical measurements (nitrate - nitrite - ammonia - total nitrogen - phosphate - total phosphorus - chlorophyll-a - silicate).
- c) Bacteriological measurements (coliform bacteria - streptococcus bacteria - *Escherichia coli*).



Source: MSEA and EEAA (2008) Egypt State of the Environment Report 2007

Figure 5.4.1 Coastal water quality monitoring stations

5.4.3. Water Quality in the Mediterranean Sea

Thirty fixed monitoring stations have been selected along the Mediterranean coast from Sallum in the west to Rafah in the east to cover all activities affecting residential areas, ports, industrial companies and touristic villages, in addition to some reference stations (Figure 5.4.2).

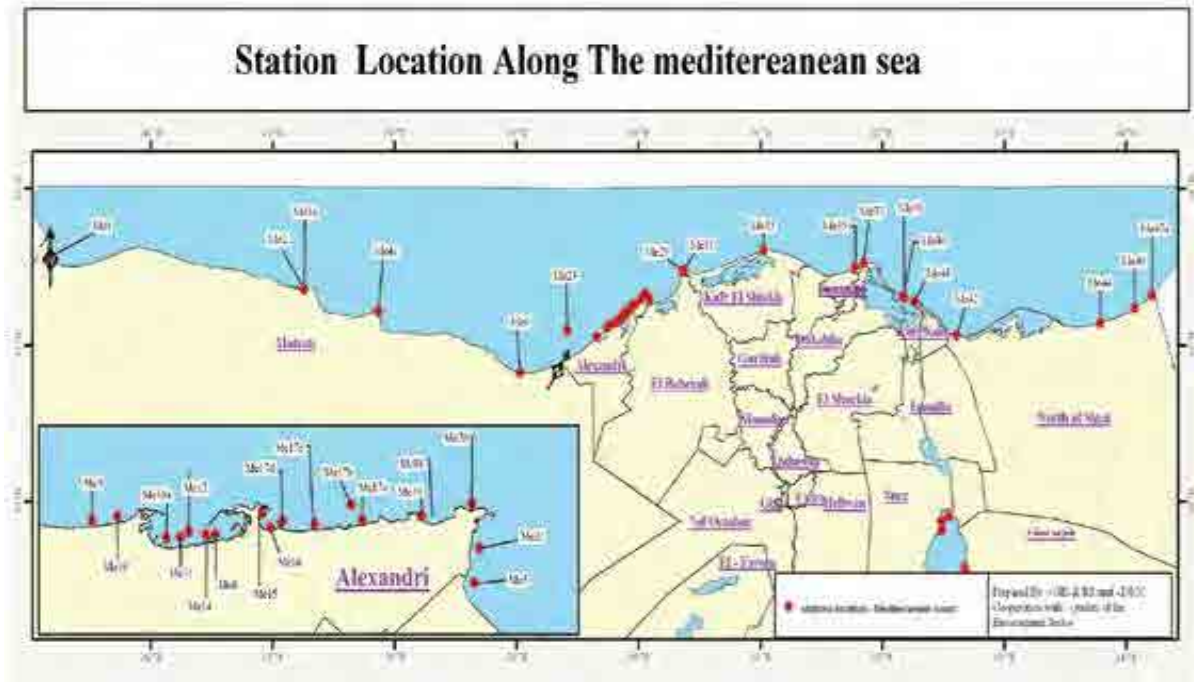
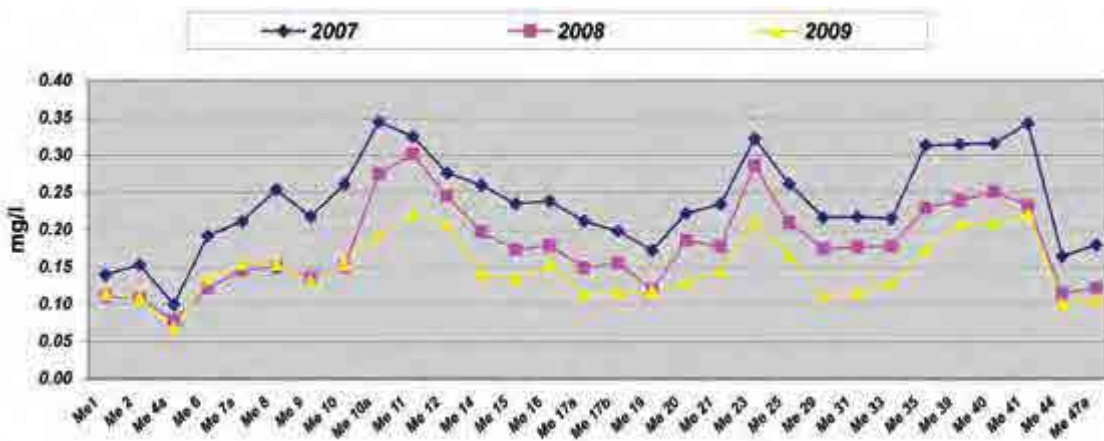


Figure 5.4.2 Monitoring sites in the Mediterranean Coast

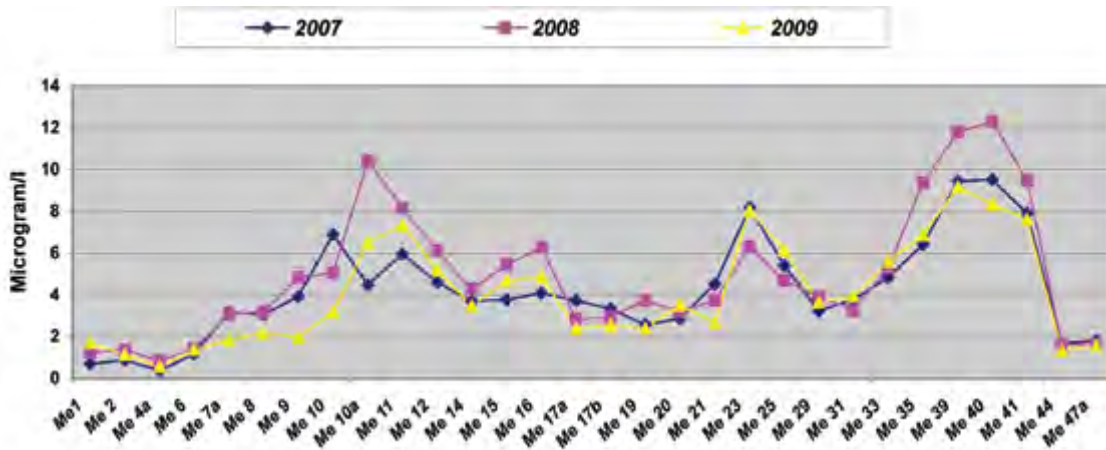
According to monitoring the effects of nutrients on water quality of the Mediterranean during the four annual trips in 2009, they were low in most observations. By comparing the average concentration of total nitrogen in 2009 with the average concentration during the last two years, it was noticed that there was a significant decrease in all sites if compared to 2007 values (Figure 5.4.3).



Source: SOE 2009

Figure 5.4.3 Average Concentration of Total Nitrogen along the Mediterranean Coast (2007-2009)

By comparing the average concentration of chlorophyll-a, which is an indicator of eutrophication, in the four trips in 2009 with those in the last two years, there was a decline in most of the sites compared to previous years except for Maadia station and the ELborg as a result of Edku water Lake effect (Figure 5.4.4).

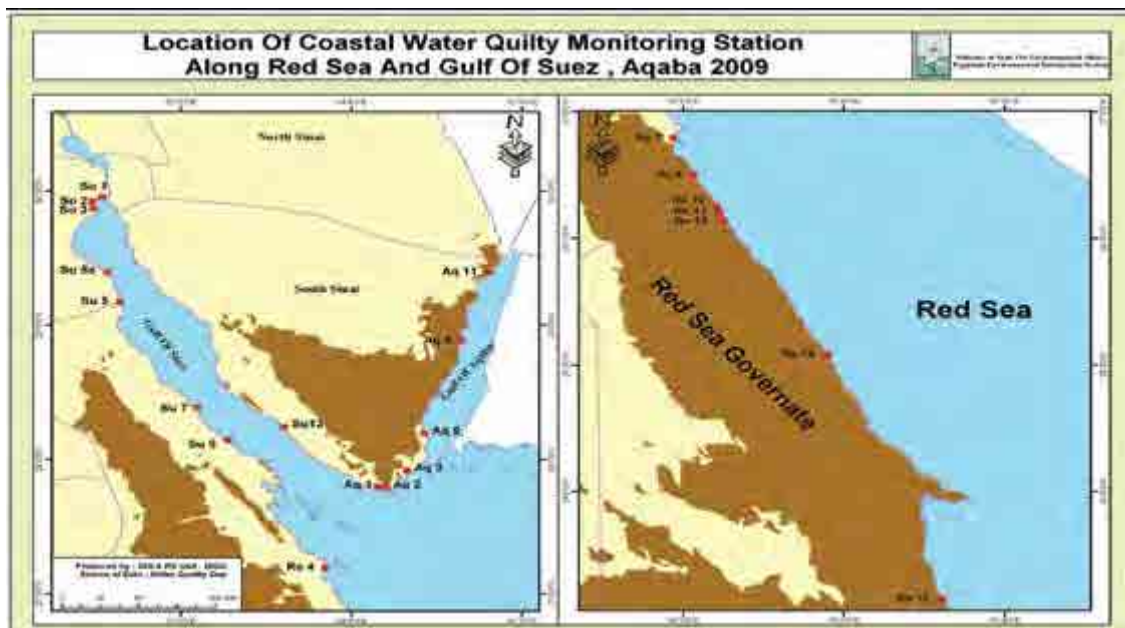


Source: SOE 2009

Figure 5.4.4 Average Concentration of Chlorophyll -a (2007-2009)

5.4.4. Monitoring water quality in the Red Sea, Gulf of Suez and Aqaba

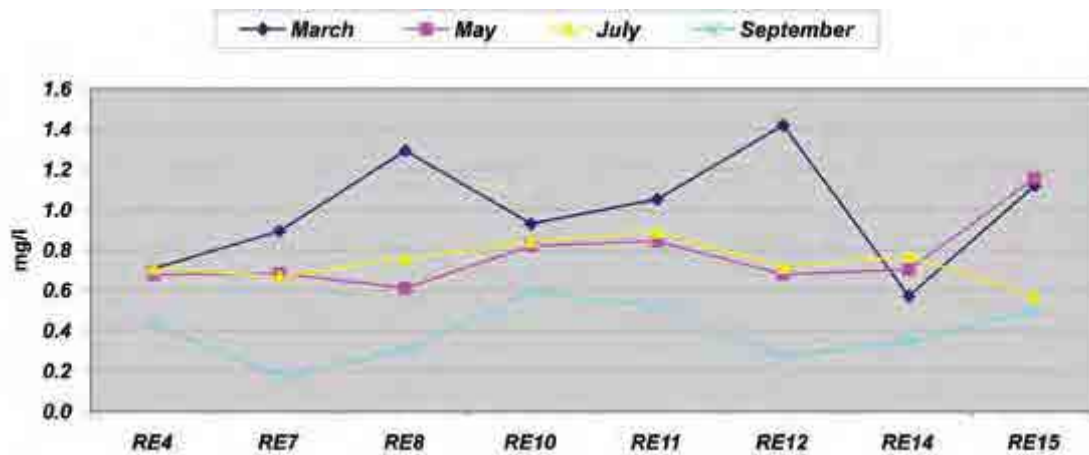
22 monitoring stations have been tested along the coast of the Red Sea, Gulf of Aqaba and Suez as shown in Figure 5.4.5.



Source: SOE 2009

Figure 5.4.5 Water Quality Monitoring Stations in the Red Sea, Gulf of Suez and Aqaba

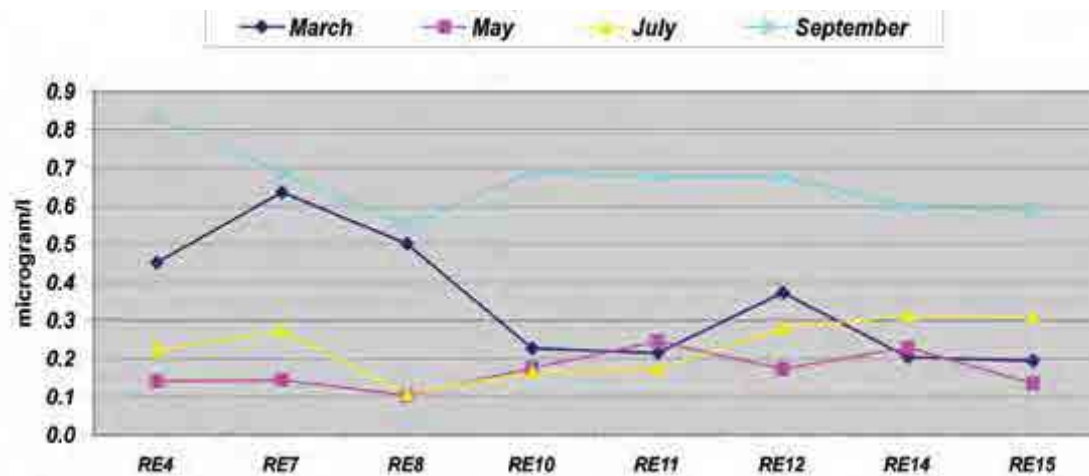
General average of total nitrogen was (0.73 mg / L), where the concentration was generally low. Figure 5.4.6 shows a significant decrease in total nitrogen concentration between the beginning and end of the year as a result of decreasing ports' activities along the coast during summer months.



Source: SOE 2009

Figure 5.4.6 Concentration of Total Nitrogen along the Red Sea Coast (2009)

Chlorophyll-a concentrations are low in all monitoring points of the Red Sea, where its values ranged between (0.1 - 0.83 mg / L) as shown in Figure 5.4.7.



Source: SOE 2009

Figure 5.4.7 Concentration of Chlorophyll-a along the Red Sea Coast (2009)

5.4.5. Marine Pollution

Many pollution sources affect the marine environment, as it receives many pollutants from land-based activities such as industrial and sewage water through estuaries and banks. Seaports are considered as one of the most important sources of marine pollution in addition to pollutants from ships such as sewage water, garbage, oily residues and contaminated ballast water, as well as pollutants resulting from accidents of oil tankers, leakage of fuel from ships and emissions resulting from their operation.

Marine pollution due to marine transport activities such as seaports and navigation shipping is described in Chapter 5.

5.5. NOISE POLLUTION

Egypt has witnessed an increasing development of new projects in addition to the increase of commercial activities and industrial establishments within residential areas especially in major cities without prior proper planning. Moreover, the high traffic density and the increase in vehicles number in recent years intensify the problem and led to the increase of environmental noise levels.

Major noise sources are:

- Transportation means and roads inside cities, including vehicles, railways and aircrafts.
- Commercial and human activities.
- Loudspeakers, celebrations and wedding processions.
- Service workshops and industrial establishments

Among them transportation is considered to be the main cause of environmental noise in Egypt. Areas lying on main roads are affected by traffic noise due to the annual increase of vehicles; car owners' neglect of regular maintenance which, if done, would reduce pollution—including noise—produced by such cars; and poor road pavement. Furthermore, train noise affect those residing beside railways up till 150 m away, and so does airport noise over urban areas that have sprawled around them.

Noise pollution due to transport activities such as road transport is described in Chapter 5.

5.6. SOLID WASTES

With the increase in Egypt's population by more than a double and a half over the last forty years, the increase in population density in urban areas, especially in metropolitan cities, and the change in the consumption patterns in urban and rural areas alike, many pressures on the environment and public health have exacerbated, including the solid waste problem, whose harmful symptoms became clearly evident throughout the country.

Existing conventional waste management methods have become incapable of meeting society needs with its different groups, in terms of maintaining a reasonable level of cleanliness, controlling health hazards and adverse environmental impact and providing a generally civilized appearance for the country.

The total quantity of solid wastes generated in Egypt is estimated at 66 million tons/year, based on 2007 estimation. They include household municipal, industrial, agricultural, healthcare and construction wastes, sludge resulting from sanitary drainage treatment, and canal and drain purification wastes (See Table 5.6.1).

Total quantity of generated municipal solid wastes (household only) in Egypt is estimated with 20 million tons annually (2008), that is daily generation estimated with 55,000 tons. As collection and transport efficiency do not exceed 65%, this leads to daily accumulations of these wastes within residential areas and vacant lands. Furthermore recycling is not undertaken safely and soundly which exposes citizens and workers to several health risks. It is noteworthy that most landfills, where final disposal of such wastes takes place are exposed to intentionally or self burn, which exposes ambient environment to risks and worsen their conditions, in addition that necessary equipment are not available in these sites for wastes' coverage to prevent such burning.

The most important reasons leading to municipal solid waste problems are low environmental awareness, bad behaviors while dealing with municipal solid wastes, severe deficiency in enforcing legislations related to solid wastes, and absence of integrated sustainable system for municipal solid wastes management.

Table 5.6.1 Distribution of solid wastes in Egypt (2007)

	Solid waste	Distribution ratio
1	Canal & drain purification wastes	49%
2	Municipal wastes	25%
3	Construction wastes	7%
4	Industrial wastes	8%
5	Agricultural wastes (rice straw)	8%
6	Sludge	3%
	Total	100%

Source: MSEA and EEAA (2008) Egypt State of the Environment Report 2007

5.7. CLIMATE CHANGE

5.7.1. Introduction

There is no doubt that threats and risks of climate change is an unequivocal fact, as human activities of industrial and technological revolution led to the increasing rate of greenhouse gas (GHGs) emissions and increasing their concentrations in the atmosphere. Main Greenhouse Gases (GHG) are CO₂, methane (CH₄), Nitrous oxide (N₂O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs) and sulfur hexafluoride (SF₆).

These gases are not considered sources of air pollution but it has been influential on the global warming phenomenon.

Table 5.7.1 indicates that CO₂ is one of the main gases which contribute to the increase of this phenomenon; it is produced during the burning of coal, oil and natural gas in power stations, cars and others, as well as it is not absorbed due to large scale of deforestation. Methane is the second important gas emitted from rice fields, cattle breeding, landfills, and mining and gas pipelines. Nitrous Oxide is emitted from fertilizers and other chemical industries and it contributes to heat trapping.

Table 5.7.1 GHG Emissions by Gas type (2000)

GHG	Emissions (Mt CO ₂ Eq)	Emissions (%)
CO ₂	128.2	66.3
CH ₄	39.4	20.4
N ₂ O	24.4	12.6
PFC	1.1	0.6
SF ₆	0.1	0.1
HFC's blend	0.1	0.1
Total	193.3	100

Source: Egypt Second National Communication Report (2010)

Table 5.7.2 and Table 5.7.3 show the total amount of GHG and CO₂ emissions in 2000 and 2009.

Table 5.7.2 GHG Emissions in Egypt (2000)

Year	Egypt's amount of GHG emissions (CO ₂ Year eq Mt)	Egypt's share of the global GHG emissions (%)
2000	193.3	0.64
2009	305.1	0.71

Source: Egypt Second National Communication Report (2010)

Table 5.7.3 CO₂ Emissions in 2000 and 2009

Year	Value CO ₂ (Mt)	Contribution to GHG emissions (%)	CO ₂ emissions per capita (tons / year)
2000	128.29	66.7	1.98
2009	217.3	71.2	2.8

Source: Egypt Second National Communication Report (2010)

GHG emissions by sector and process is shown in Table 5.7.4. Regarding GHG emissions from fuel combustion contribution of different sector is shown in Table 5.7.5. In this table contribution of transport sector is found to be 25 %³

Table 5.7.4 GHG Emissions by Sector and Process (2000)

Sector	Emissions (Mt CO ₂ Eq)	Emissions (%)
1 Fuel Combustion	105.5	55
2 Fugitive Fuel Emissions	10.8	6
3 Agriculture	31.7	16
4 Industrial Process	27.8	14
5 Waste	17.5	9
Total	193.3	100

Source: Egypt Second National Communication Report (2010)

Table 5.7.5 GHG Emissions from Fuel Combustion of Different Sectors (2000/2001)

Sector	Fuel Type Emissions						Total Emissions (Mt CO ₂ e)	Emissions (%)
	Gasoline	Kerosene	Gas Oil/Diesel	Fuel Oil	LPG	Natural Gas		
Industry	--	0.01	7.06	13.3	0.38	6.32	27.07	25.7
Transportation	7.26	1.45	16.38	1.85	--	0.28	27.22	25.83
Agriculture	--	0.22	0.01	--	--	--	0.23	0.22
Residential & Commercial	--	1.46	--	--	7.09	0.85	9.4	8.92
Electricity Generation	--	--	0.23	6.32	--	28.44	34.99	33.2
Petroleum Production and Industries	--	--	1.47	0.78	--	4.24	6.49	6.16
Total	7.26	3.14	25.15	22.25	7.47	40.13	105.4	100

Source: Egypt Second National Communication Report (2010)

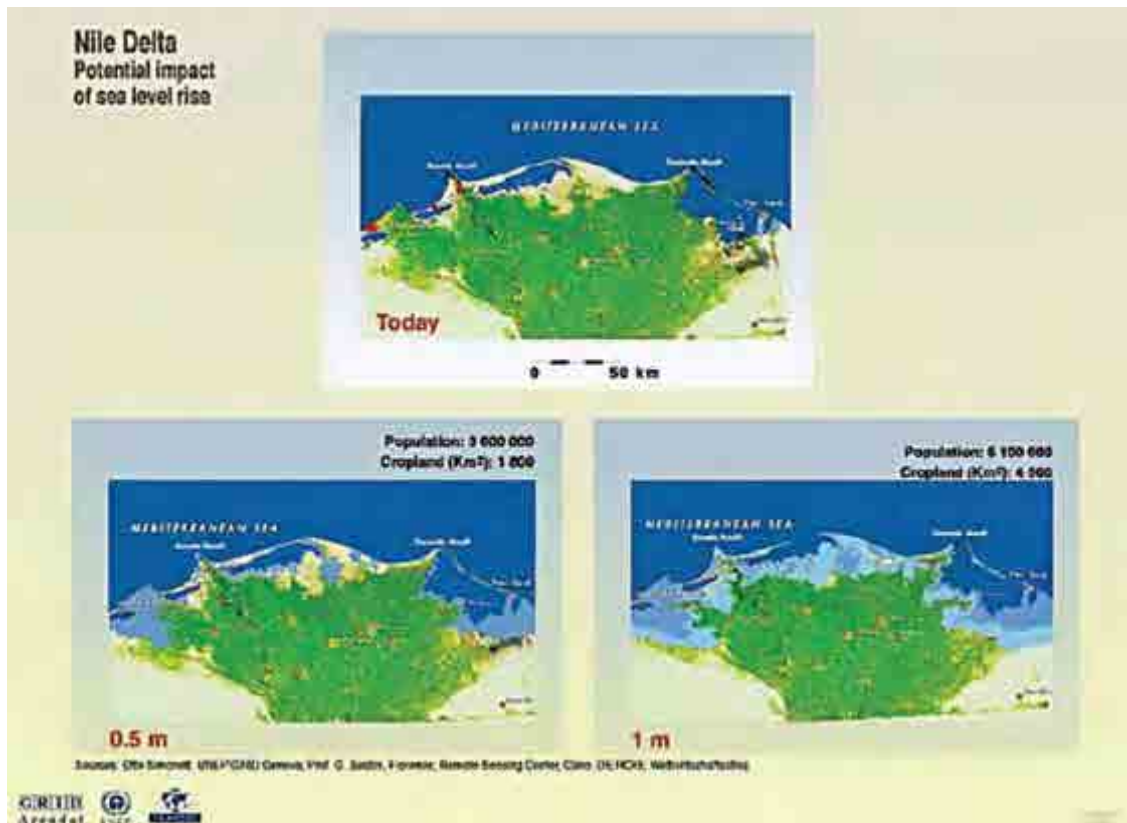
5.7.2. Adverse Impacts of Climate Change on Egypt

Based on the Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC) in 2007, it is expected that Egypt would be largely vulnerable to number of risks and threats, such as sea-level rise, high temperatures, followed by shortages in water resources, impacts on agricultural productivity and difficulty in cultivating some types of crops ; as well as impacts on tourist's areas, public health and infrastructure that would affect energy, industry, food safety and national economy sectors.

³ GHG emissions and climate change due to transport sector is described in more detail in Chapter 5.

1) Sea Level Rise

Studies have shown that a sea-level rise from 18 to 59 cm will lead to negative impacts on the low level coastal zones by submerging some of the north parts of the Nile Delta, Affecting the aquifer near the coast; also would affect quality of agricultural and reclaimed lands; in addition to impacts on tourism, trade and ports in the coastal areas. It would also lead to a decline in productivity of some food crops such as rice and wheat; difficulty in cultivating some crops, loss of agricultural land and change in Egypt's crop structure.



Source: Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) in 2007

Figure 5.7.1 Expected scenarios of Sea Level Rise on the Egyptian Delta

2) Temperature Rise

Increasing rates of temperature, severity of heat and cold waves will result in fluctuation of rainfall quantitatively and spatially leading to increased rates of desertification and drought that would also lead to lower productivity of some food crops such as rice and wheat. Additionally, there would be more difficulties to grow some other crops; increasing the consumption of water due to rising temperatures and high evaporation rates; the extinction of some organisms and the spread of malnutrition and some diseases such as malaria.

Temperature rise would also affect water level of the Nile River where it is expected to show decline in water flow until 2040 (according to most scenarios on this topic).

Only one scenario predicts a rise in water flow after 2045, while other scenarios

3) Impact on Water Resources and Irrigation

Water is the essence of life, so that it is the resource that humans must preserve and develop. Studies have shown that population growth and increasing consumption particularly in agricultural and industrial sectors

create great pressure on water resources; some other studies show the occurrence of expanded gaps between periods of rainfall with increase in rates of precipitation which might lead to increased possibilities of floods or longer periods of drought in addition to increased salinity of coastal aquifers due to the more intrusion of seawater.

4) Impact on Agriculture, Livestock and Food Sources

Agriculture plays an important role in the Egyptian national economy and contributes by about 20% of the Gross Domestic Product (GDP), more than 70% of agricultural land depends on low efficiency irrigation systems that causes loss of large quantities of water, deterioration of land productivity and increased problems with salinity.

Expected impacts on this sector can be summarized in the following:

- Lack of crops productivity and negative impacts on agriculture due to the change of heat waves' rates and times (such as during flowering period in citrus fruits).
- Associated social and economic impacts.
- Increased need for water, increased rates of soil erosion due to rising temperatures and high evaporation rates where agriculture consumes about 85% of the total annual water resources. Moreover, the continued use of unsustainable agriculture methods of planting and irrigation management would affect water resources in Egypt; this is in addition to changing crop distribution patterns, affecting the marginal agriculture lands and increasing the rates of desertification.

5) Impact on Coastal Zones

- Flooding of some low-lying parts of the northern Delta and some other coastal zones.
- Increasing rates of coastal erosion, penetration of salt water in soil, intrusion of seawater into groundwater and lack of agricultural productivity.
- A survey using GIS and remote sensing techniques has shown an impact on

the northern coast and cities of the Nile Delta on the long term due to Sea Level Rise.

- Impact on fish production due to the change in coastal zones' ecosystems and increase in sea temperature.
- Associated social and economic impacts

6) Impact on Health

There is no doubt that climate change affects basic requirements of health, clean air, drinking water, adequate food and safe shelter. Severe temperature rise contributes directly to death resulting from cardiovascular and respiratory diseases, especially among the elderly.

7) Impact on Tourism

Water level rise in the Red Sea and Mediterranean would result in a number of negative consequences on tourism projects, including over 600 hotels and resorts.

These projects and investments will be affected by rising of water temperatures - especially in the Red Sea area, which would affect the coral reefs causing bleaching and escaping of marine organisms, and difficulty

in fishing; in addition the lack of suitable beaches will negatively impact tourism services, leading to its rapid degradation, thus decreasing tourism rates and increasing unemployment rates.

As for the archaeological and historical touristic sites, the high temperature, dense concentration of carbon dioxide and variable weather conditions will lead to the rapid deterioration of historic monuments.

CHAPTER 6: EXISTING ENVIRONMENTAL IMPACTS DUE TO TRANSPORT ACTIVITIES

6.1. INTRODUCTION

In general transport activities are carried out to improve the mobility of goods and persons, which should result in improved economic development. Consequently, it will improve the social environment of the people involved. However, almost every activity has also negative impacts on the environment, being slight or severe.

In this chapter features of existing negative environmental impacts and mitigation measures planned and taken place are expressed for cases of vehicular air pollution, CO₂ emissions, freshwater pollution and coastal and marine pollution mostly referred to reports by EEAA and other organizations.

Table 6.1.1 shows negative environmental impacts due to activities of transport sub-sectors.

Table 6.1.1 Existing Environmental Impacts due to Transport Activities

Impact	Transport Operation			
	Road	Railway	IWT	Port
Air pollution	XXX		X	X
Noise	XX	X	X	X
Freshwater Pollution			X	
Coastal and marine Pollution				XX
Topographical & geological change				
Coastal Erosion				X
Water Resources			X	
Water flow conditions			X	X
Flora, Fauna and Biodiversity	X			X
Cultural, religious and heritage sites	X			
Global Warming (Greenhouse Gas Emissions)	XXX			X
Traffic accidents	XX	X		X

Note: Extent of impacts, XXX - significant impact, XX – considerable impact, X - some impact

Source: JICA Study Team

6.2. AIR POLLUTION DUE TO VEHICLE EXHAUST EMISSIONS

6.2.1. Air pollution due to vehicle Exhaust Emissions

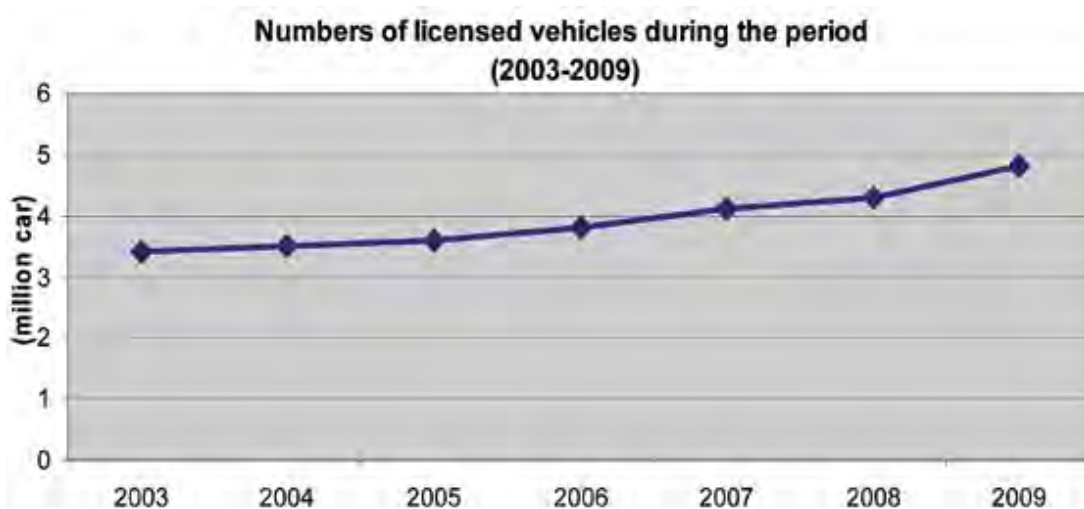
1) Introduction

Vehicles exhaust emissions are considered one of the most important factors causing air pollution in large cities with high traffic density, especially Greater Cairo due to traffic problems resulting from traffic jam, increased vehicles numbers and low vehicles speed (about 10km/hour).

Vehicles exhaust emissions represent approximately 26% from the total load of particulate matters in Greater Cairo, and more than 90% of total loads of carbon monoxide; it also contributes with 90% of total loads of hydrocarbons and 50% of total loads of nitrogen oxides. Additionally, these emissions have harmful effects on human health and ambient ecosystems.

2) Increase in licensed cars

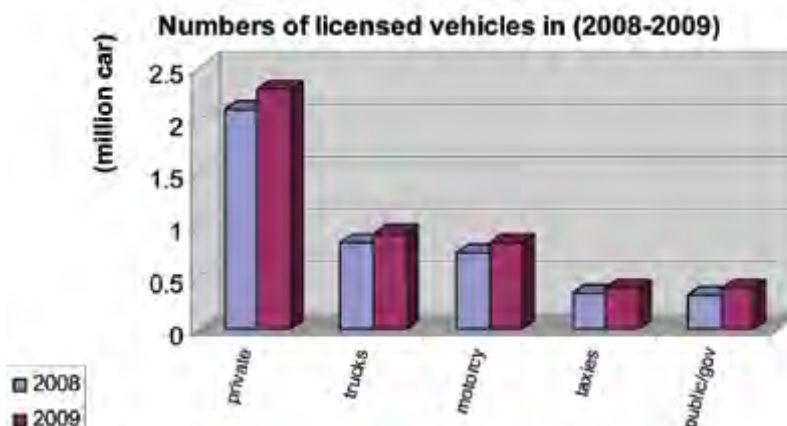
Number of licensed cars increased in 2009 to about 4.8 million vehicles; representing an increase of about 0.5 million vehicles compared to 2008, and more than double of 1993 (2.1million).



Source: General Directorate of Traffic

Figure 6.2.1 Number of Licensed Vehicles (2003-2009)

In 2009, the number of private vehicles amounted to 2.3 million representing 48% of the total vehicles numbers, followed by truck-trailer vehicles 19% (0.91 million), then motorcycles 17% (0.82 million), taxis 8% (0.38 million), public transportation, governmental vehicles and others 8% as shown in Figure 6.2.2.



Source: General Directorate of Traffic

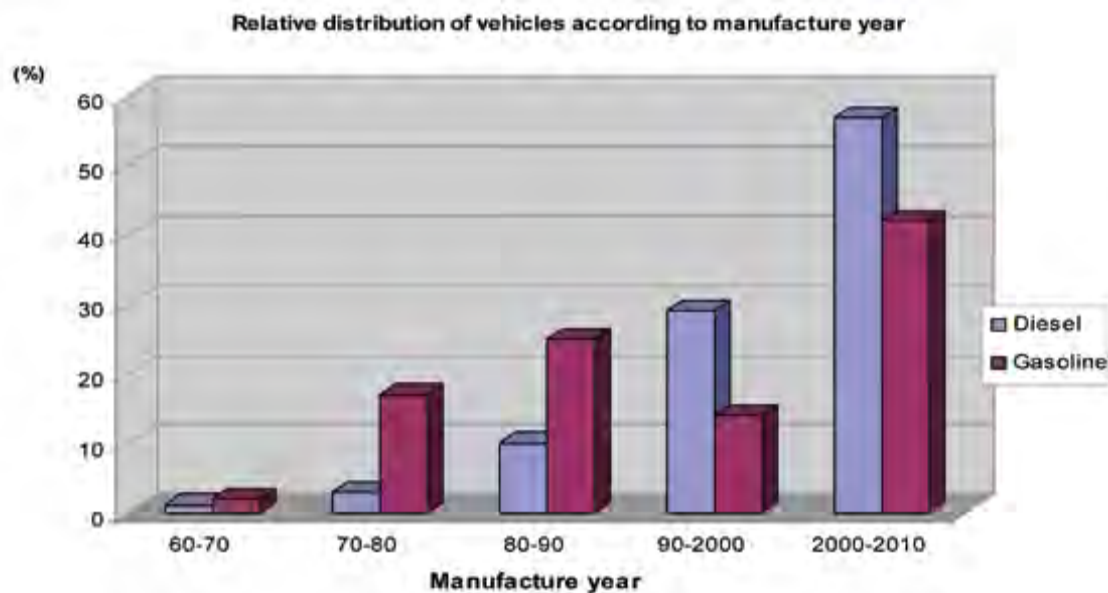
Figure 6.2.2 Licensed vehicles according to type of license 2008 -2009

6.2.2. Vehicles' contribution in causing air pollution

A study was prepared to estimate old vehicles' contributions in causing pollution, and to find the relationship between the manufacturing year and the possibility to pass road inspection test, through inspecting 4,063 gasoline vehicles and 1,700 diesel vehicles.

The results clarified the following:

- a) Numbers of new models of diesel vehicles have increased to 57% of total licensed diesel vehicles.



Source: SOE 2009 cited from General Directorate of Traffic

Figure 6.2.3 Relative distribution of vehicles on roads

- b) Highest percentage of vehicles passed road inspection test were new models (2000-2010) representing 36% of total inspected vehicles; however, (1980-1990 models) represents highest failure (13%), as shown in Figure 6.2.4.

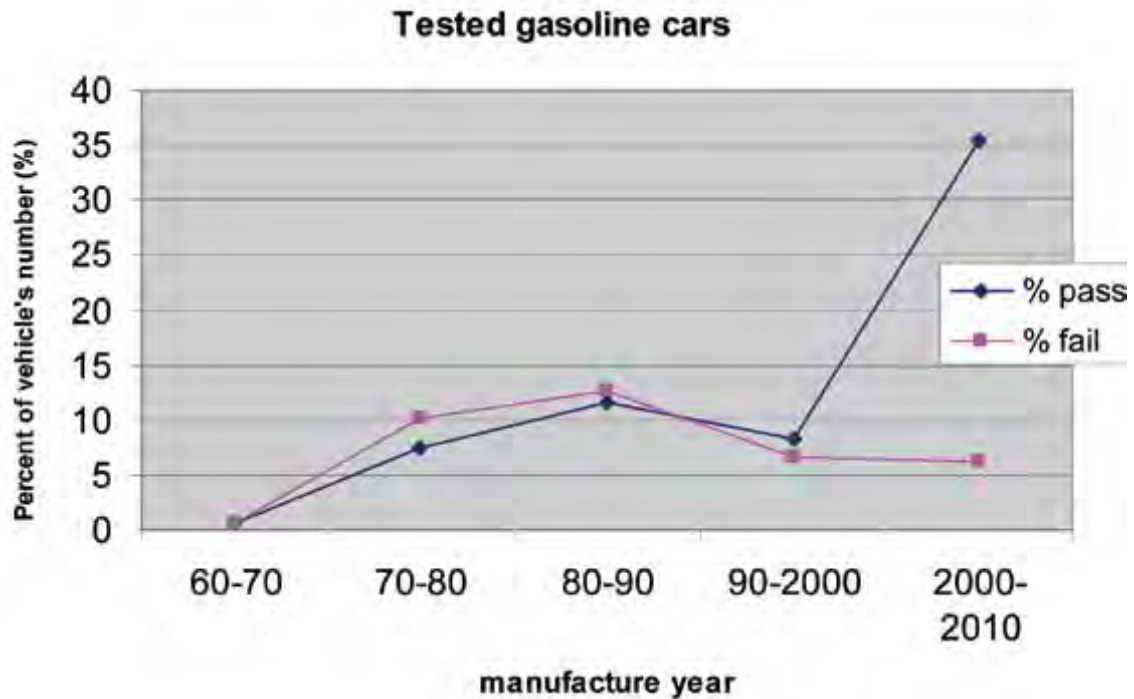


Figure 6.2.4 Result of testing gasoline vehicles on the roads

Highest percentage of diesel vehicles passed road inspection test were new models (2000-2010) representing 37.8% of total inspected vehicles. While (90-2000) models recorded highest failure percentage 19% as shown in figure (1-32). Nevertheless, article (37) of the Executive Regulation of Environment

Law No. 4/1994 stipulated that 30% is the allowed failure rate for all types of vehicles regardless of being new or old models. Therefore, identifying standards according to the year of production has been taken into consideration while amending Executive Regulation of Environment Law.

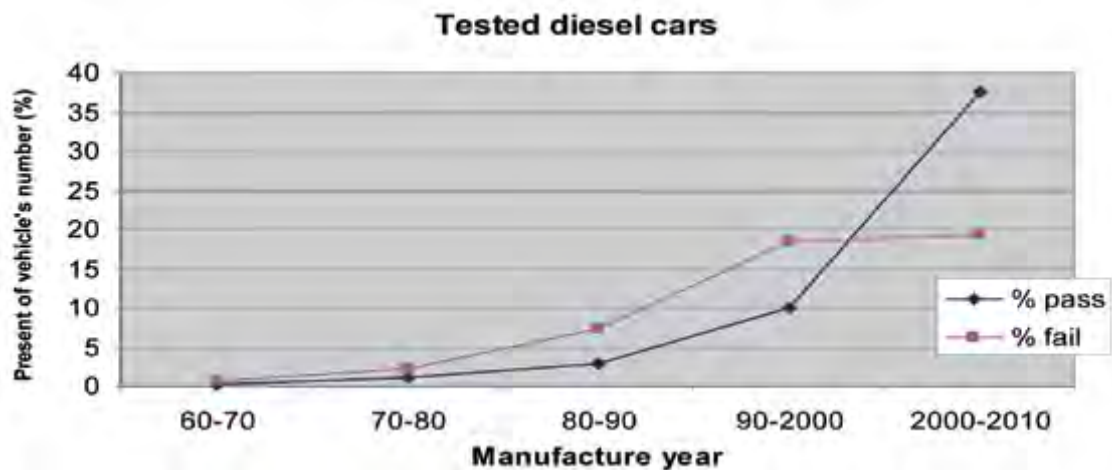


Figure 6.2.5 Result of testing diesel powered vehicles

6.2.3. Implemented programs to reduce pollution from vehicles emissions:

In order to reduce vehicular air pollution several programs were planned and conducted by MSEA, EEAA and relevant organizations.

1) Expanding in using natural gas in public transportation program

Public transportation vehicles exhaust emissions; significantly contribute in causing air pollution in Greater Cairo, as a result of using diesel fuel.

Extensive efforts to reduce pollution from vehicles has been programmed and implemented by MSEA in cooperation with Public Transportation Agency.

(1) Use of natural gas as fuel in public transportation

Increase number of natural gas public transportation buses to 209 during 2009 in addition, procedures are going on to provide more 80 buses to Public Transportation Authority.

Examine technical defects in locally produced natural gas buses to improve their efficiency through specialized technical committee composed of experts from different engineering faculties and "Engineering Company for Vehicles Industry."

(2) Convert governmental vehicles to natural gas

Within the framework of MSEA's efforts to implement an ambitious program to convert 5,000 government vehicles to natural gas, resulted in the following:

- 2,308 vehicles belonging to 112 government agencies were converted by the end of 2009.
- 3,010 vehicles belonging to 140 government agencies will be converted during next phase.
- 1,716 vehicles belonging to 108 government agencies have passed technical inspection and proved their validity for being converted to natural gas.

(3) Smart Card Program:

- Within the framework of MSEA's efforts to encourage use of natural gas as an environment friendly fuel, the Ministry in cooperation with Ministry of Petroleum has implemented the smart card program that helps car owners to finance their cars conversion to natural gas without paying any money so as to discount conversion value on stages from prices' difference between gasoline and natural gas, which resulted in finalizing the following:
- 120,000 vehicles were converted through smart card program sponsored by Ministry of Petroleum represented in its gas companies.
 - Natural gas stations were increased to 119 stations nationwide.
 - Natural gas pipe lines were extended to Minia and Sohag Governorates and work is currently going on for the establishment of natural gas stations, in those governorates.

(4) Capital Taxi Project in Greater Cairo:

MSEA in cooperation with Cairo Governorate (competent authority of capital taxi) is planning to convert 1136 vehicles to natural gas, among which 1047 have already been converted, and the remaining 89 taxis are currently under conversion.

2) Program of replacing old taxis in Greater Cairo

- During 2009 MSEA in cooperation with Ministry of Finance has finalized first phase of this project by replacing 1000 old taxis (1960-1979) in Greater Cairo area.

- Through cooperation between Ministry of Finance and Ministry of Environment to finalize the project, a fund has been established at Ministry of Finance to finance economic incentives necessary for taxis' owners in activation of Article (4) item (2) stipulated in New Traffic Law No. 121/2008 that (it is not authorized to license cars which have been manufactured since ten years including manufacturing year when it is licensed for the first time, and it is not permissible to license taxis, manufactured since twenty years). In all cases, Ministry of Finance has allocated 312 million pounds to cover replacement of 34 thousand old Taxis, manufactured since 30 years; 17 023 old taxis were replaced with modern ones and old taxis were scrapped . Waiting list includes more than 20 thousand taxi owners wishing to replace their old vehicles through this project.
- In addition to environmental returns achieved by the project, it led to an economic boom for automotive industry in Egypt despite the global crisis and decrease in car sales in the world.

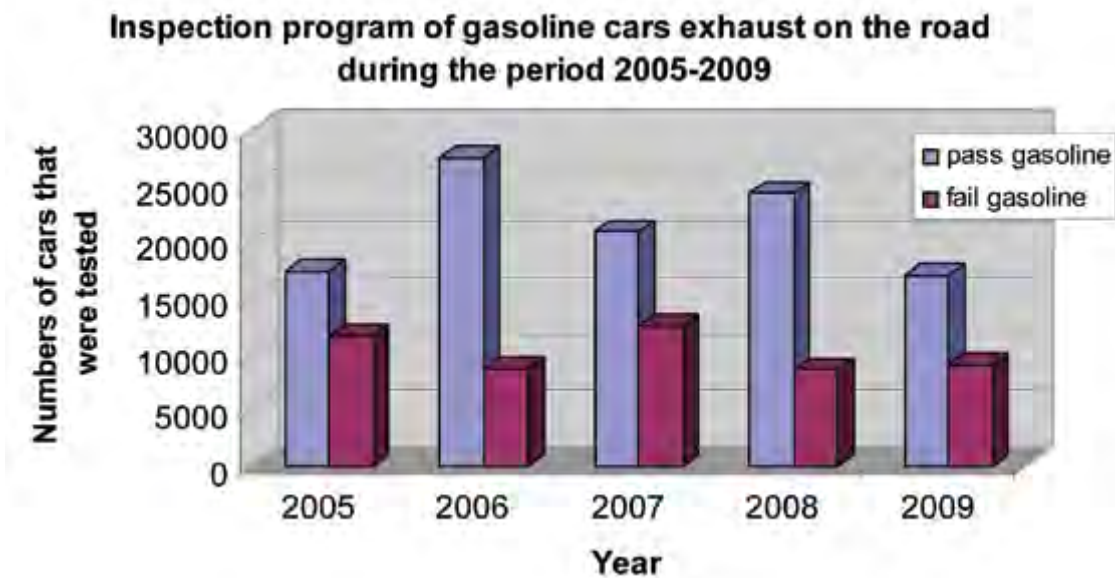
3) Inspection program of vehicles' exhausts in Traffic units:

- MSEA in cooperation with Ministry of Interior implemented a program to link vehicles licensing with their emissions levels. Vehicles inspection program has been finalized in 23 Governorates, representing 96% of total licensed vehicles in Egypt. Purchasing cost of inspection devices was amounted to 12 million Egyptian pounds approximately covered equally by ministries of Interior and State for Environmental Affairs.
- The fifth and last phase of the exhaust inspection program has begun during 2009 at the Traffic Units of (El-Monofia, Port-Said, Aswan and Ismailia Governorates), which represent 4% of the total licensed vehicles in Egypt. In coordination with Ministry of Interior a survey has been conducted to identify each governorates needs form inspection devices which amounted to 56 devices for inspecting gasoline exhausts and 56 for diesel exhausts. Total estimated cost was 4,256,000 Egyptian pounds covered equally by ministries of Interior and State for Environmental Affairs.
- Within the framework of EEAA's coordination with Public Traffic units a program has been implemented to follow up and review Traffic units to identify obstacles facing program implementation through a joint committee from EEAA's and Public Traffic Authority in 8 Governorates (El -DaKahlyia- Alexandria, Beni-suif, North Sinai, Demiata, El-Garbia, El-Behaira and Asyut).

4) Inspection program of vehicles' exhausts on Roads:

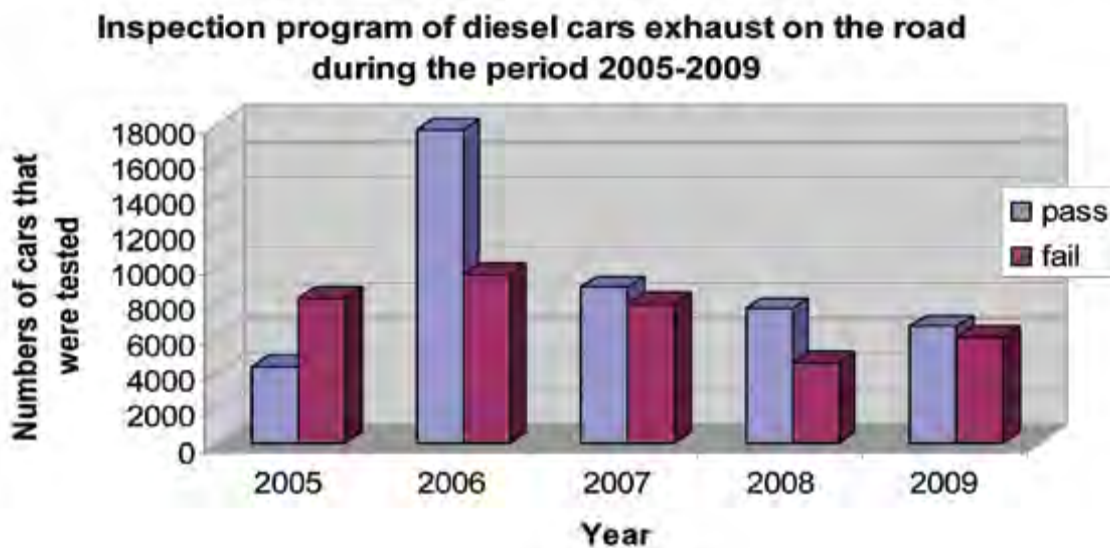
- MSEA in coordination with Traffic Authority and Environment Police has conducted inspection campaigns on vehicles on roads to insure their compliance with Executive Regulation of Environment Law, and taking legal actions against violating vehicles.
- During 2009, 38,332 gasoline and diesel vehicles were inspected compared to 45,012 vehicles in 2008. Passed vehicles were 23,287 and failed ones were 15,045, which represent 62% passed and 38% failed as shown in figures (1-33) and (1-34) respectively . Decreased number of inspection campaigns lead to decrease number of inspected vehicles in 2009. Therefore, MSEA has coordinated with Environment Police, to increase number of roads' campaigns to 5 daily, to reach the target of inspecting 50,000 vehicles annually.
- During the last quarter of 2009; 224 passenger transport vehicles (microbus) were inspected where 104 had passed and 120 had failed. Given the seriousness of this kind of vehicles and their

contributions to environmental pollution, great interest had been directed to examine large numbers of them and study how to reduce their emitted pollution in coordination with concerned authorities.



Source: SOE 2009

Figure 6.2.6 Results of inspection of emissions from gasoline-powered vehicles on roads



Source: SOE 2009

Figure 6.2.7 Results of inspection of emissions from diesel-powered vehicles on roads

5) Inspection Program of Cairo Transport Authority Buses

With regard to MSEA's efforts to reduce vehicles exhaust emissions, an inspection program for buses of Cairo Transport Authority and Greater Cairo Bus Company has been implemented. In 2009, 4020

buses were inspected compared to 4436 in 2008. This recorded decrease in buses number in 2009 was due to scrapping rest of out of services buses.

- Recorded results have shown that approximately 28% of the above total buses have passed the inspection, 32% failed and 40% were out of service at time of inspection, as shown in Figure 6.2.7.

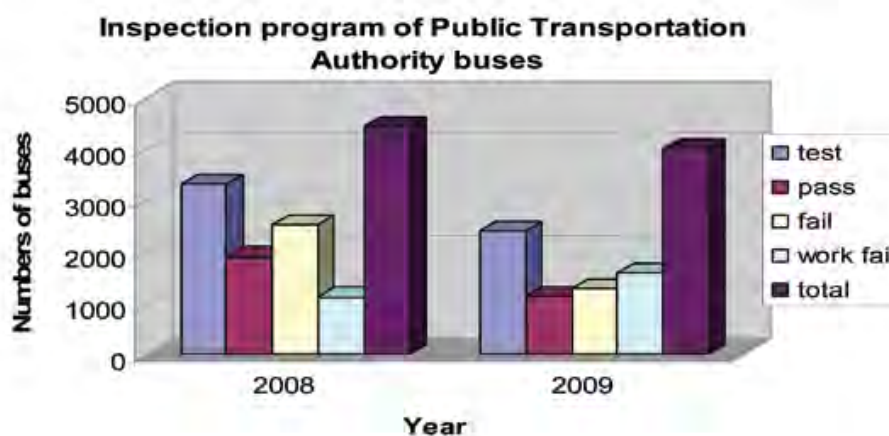


Figure 6.2.8 Inspection of Exhaust Emissions from Buses

- Public Transport Authority was notified with examination results and numbers of failed buses , a program has been prepared for re-examining them as soon as the Authority provides EEAA with a statement stating the finalization of their maintenance and re-operation.

6.3. NOISE POLLUTION DUE TO TRAFFIC

6.3.1. Negative Impacts of Noise

Traffic produced noise can cause considerable annoyance. It can interfere with daily life, like: work, sleep, study, communication and recreation. Long term exposure to noise can generate undesirable physical and psychological effects. In calm environments, generally sound levels of 30 - 50 dB (A) are measured. Disruptive sounds have noise levels higher than about 70 dB (A).

6.3.2. Noise Pollution due to Traffic

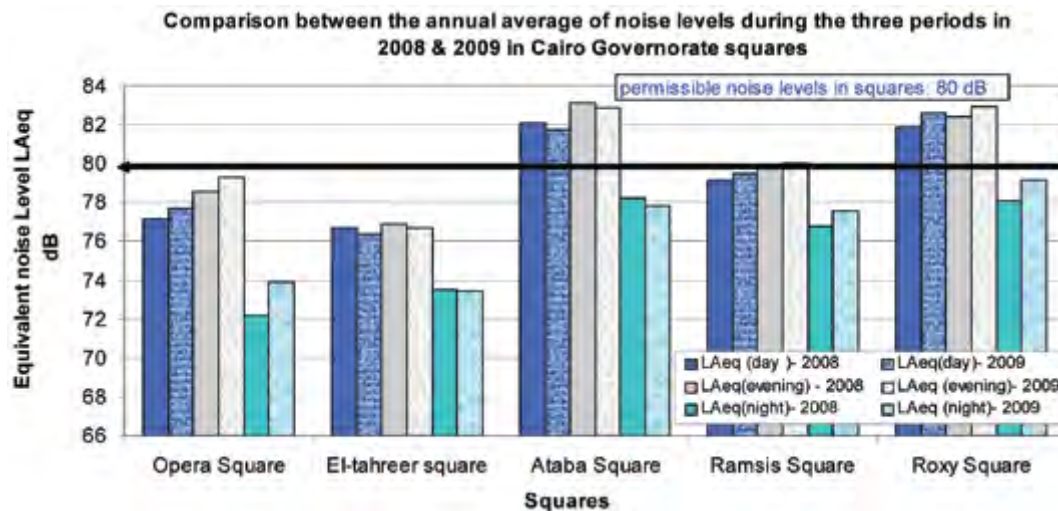
1) Situation of Noise pollution in 2008 and 2009

According to SOE 2009 by comparing 2008 & 2009 noise monitoring results in different areas of Cairo governorate, it indicates the stillness of high noise levels despite the adoption of noise reduction plan. This is mainly due to roads noise, annual increase of vehicles numbers that has reached 15% annually, or due to the limited capacity of roads infrastructures and the use of outdated vehicles especially heavy trucks causing high noise levels. Accordingly, standards have been included for controlling noise emitted from all types of vehicles during their manufacturing, licensing and operation. In addition, MSEA cooperated with Ministry of Interior through the General Directorate of Traffic Police to strictly enforce the new traffic law with respect to noise violations, which represent more than 60% of the total sources of noise in Greater Cairo according to results of noise-monitoring network.

2) Noise levels of main squares of Cairo Governorate

Monitored noise levels during day & night have exceeded the permissible limits at the monitoring locations in Ataba & Roxy, while the noise levels at the terminal sites at El-Tahreer, Ramses and Opera squares were acceptable according to the international limits.

By comparing noise levels of 2008-2009 which were measured continuously for three times per day (day-evening-night) at the monitoring sites in the above mentioned 5 squares, it was noticed that noise levels were higher by 1-2 dB in 2009 than those of 2008 in the Opera, Ramses and Roxy sites.



Source: SOE 2009

Figure 6.3.1 Equivalent noise levels for the three-day periods in main squares of Cairo Governorate

This was due to the increasing number of vehicles and commercial activities in these squares, where collected data from the General Directorate of Traffic Police, indicate that the number of licensed vehicles in Egypt increases annually by 10-15%. The increase of noise levels in the above-mentioned squares occurred despite the application of planning measures for traffic control, such as the presence of surveillance cameras

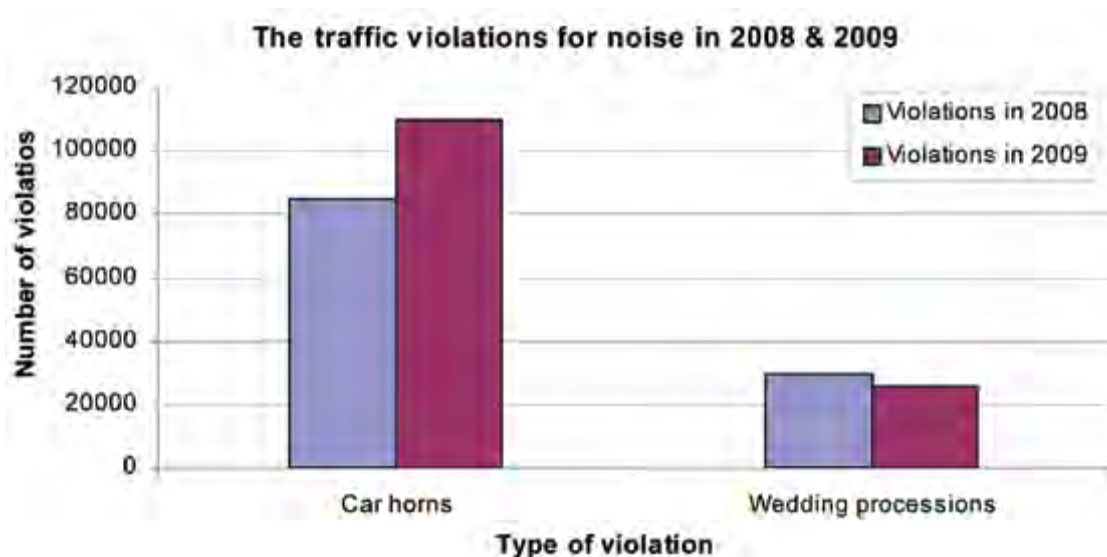
for vehicles and the strictness of enforcing new traffic law.

3) Noise levels in areas located on main roads

Monitored noise levels of 2009 on the main roads in northern, eastern and western regions are still exceeding the limits and standards of the Executive Regulation of the Environmental Law.

4) Traffic violation for noise

Traffic violations for noise were increased in 2009 resulting from the excessive use of car horns compared with 2008, while wedding processions violations decreased in 2009 compared to those of 2008. This is due to the enforcement of new traffic law and exerted efforts by the General Directorate of Traffic Police (Ministry of Interior) in monitoring these violations.



Source: Ministry of Interior (General Directorate of Traffic Police)

Figure 6.3.2 Traffic violation for noise in 2008 and 2009

6.4. FRESHWATER POLLUTION DUE TO INLAND WATERWAY NAVIGATION

6.4.1. Freshwater Pollution Source

In Egypt freshwater pollution sources of inland waterway navigation are passenger transport for Nile River cruising and freight cargo ship and shipyards.

Nile Cruisers coexist along Nile River from Aswan down to Cairo, with a limited number of them working in Cairo either at fixed locations or moving between Helwan and Giza; where food is presented in lunch and dinner trips daily.

These Cruisers equipped with storage tank to collect wastewater enough for at least 6 hours (time of the trip from Giza – Helwan – Giza), they have their own fixed anchorage through which wastewater is discharged into the sanitation network. There are about 300 Nile Cruisers working between Luxor and Aswan, all of them

have treatment units for liquid waste in accordance with law No. 481982/ and its Executive Regulation. The efficiency of most of these units is not good as a result of the inappropriate technology to wastewater quality as well as the inadequate storage tanks capacity, which lead to inconformity of treated wastewater with standards of law no. 481982/. In addition anchorages are insufficient to receive wastewater from the existent Cruisers. So that short-term plans were adopted in coordination with both owners and Chamber of Nile Cruisers to improve efficiency of treatment units, in addition to long-term plans to expand in establishing equipped anchorages to receive effluents from Nile Cruisers, where 4 anchorages have already been constructed and operated at Athar EL-Naby in Cairo, Menya, Assiut, and Sohag. And lately, anchorage of 900 m³/day capacity with an estimated cost of about 5 million L.E, inaugurated at Aqab area east of Aswan to receive and collect liquid waste and treat it to be used in cultivating 69 Feddan of timber forest through an expulsion pipe line of 4.5 km long instead of being discharged into the River without treatment. Currently, a study is conducted to establish a new anchorage at the north of Aswan city under the auspices of Ministry of Tourism and Aswan governorate to reduce the accumulation intensity of Nile Cruisers and to provide needed services. In addition to another study to establish a new anchorage with 3.5 km length at Luxor city, 33 anchorages along Aswan old cornish equipped with sanitation services and connected with the network system, beside the ongoing construction of a new anchorage at Edfu with 1292 meters length.

6.4.2. Measures against freshwater pollution due to Nile Cruisers

EEAA follows up construction of the 60 anchorages (4.8 km along Aswan new cornish) in coordination with Ministry of Tourism and Aswan governorate. In addition to the periodic inspection plans of fixed and mobile Cruisers and legal procedures taken against violators, which resulted in 1,451 violations along the Nile during 2008, 39 among them are violation of tourist Cruisers.

6.5. COASTAL AND MARINE POLLUTION BY SHIPPING

6.5.1. Sources of coastal and marine pollution

Many pollution sources affect the coastal and marine environment, as it receives many pollutants from land-based activities such as industrial and sewage water through estuaries and banks. Seaports are considered as one of the most important sources of marine pollution in addition to pollutants from ships such as sewage water, garbage, oily residues and contaminated ballast water, as well as pollutants resulting from accidents of oil tankers, leakage of fuel from ships and emissions resulting from their operation.

1) Source of Oil spill

According to JICA-EEAA report (2008) of all the oil spill incidents in Suez Gulf Region, incidents in which spilled oil sources were not identified account for 48 %. This indicates that finding out the sources of spilled oil is very difficult, resulting into the failure in identifying the sources of nearly half of the oil spill.

Among the sources of oil spills identified, movable sources like tankers and ships (cargo vessels, passenger ships, fishing ships, etc.) account for 25 %, the largest percentage. Next, oil spills caused by the breakdown or wrong operations in pipelines (especially seabed pipelines), and loading (including unloading) facilities account for large parts with 19 % and 5 %, respectively.

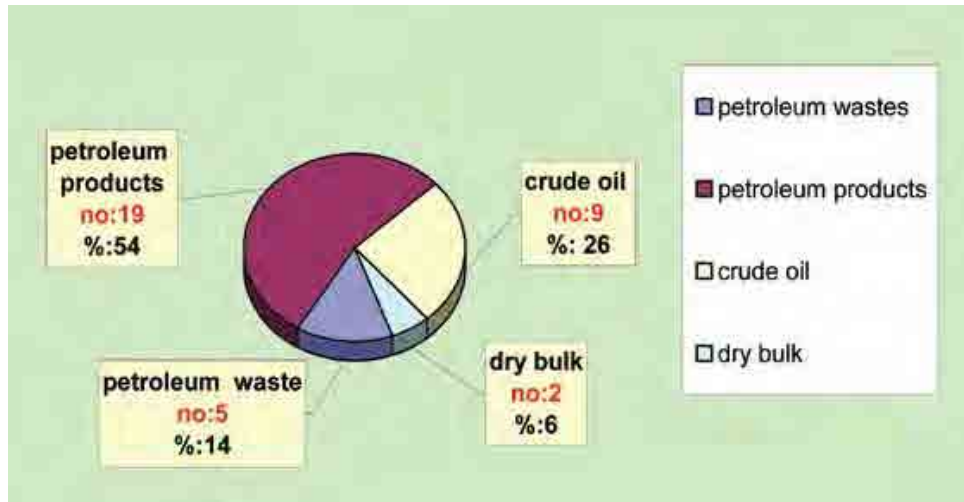
2) Accidental Pollution

MESA identified and analyzed data collected from accidental pollution (35 accidents) that causes damage to the marine environment.

(1) Pollutants causing Damage to the Marine Environment

Figure 6.5.1 represents the number and percentage of pollutants resulting from marine environmental pollution accidents, according to their type.

Refined petroleum products represent the highest percentage (54%) of pollutants resulting from accidents (19 accidents), followed by crude oil as 26%, and oily residues as 14% and dry bulk goods were 6%.



Source: SOE 2009

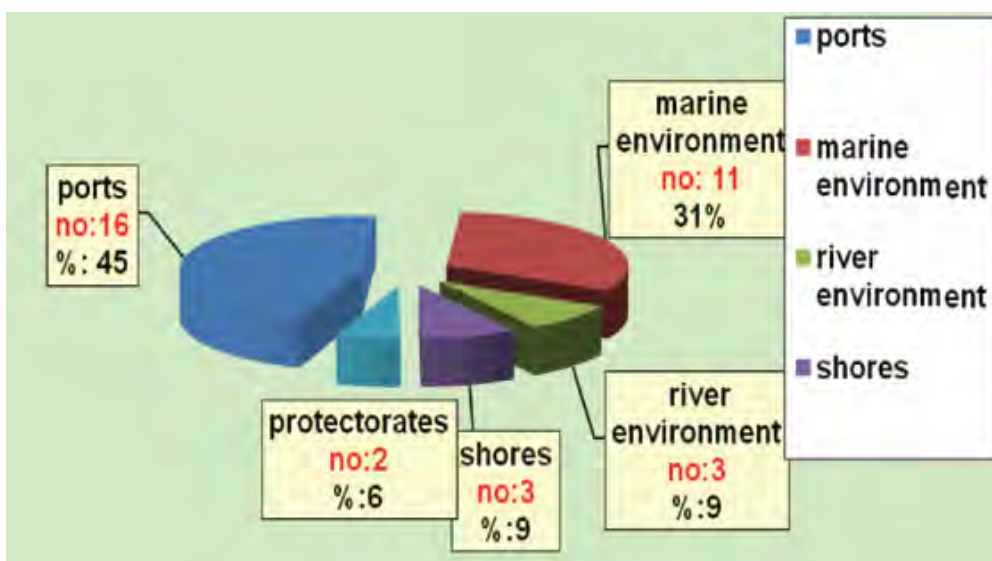
Figure 6.5.1 Number and percentage of pollutants resulting from accidents

(2) Areas occurring Pollution Accidents

Seaports recorded the highest percentage of areas affected by pollution accidents (16 accidents representing 45% of the total accidents); including 12 accidents at Alexandria and Dekheila ports.

Eleven accidents occurred in the marine environment, including 10 in the Red Sea, and only two in protected areas (Red Sea and South Sinai Protectorates).

Figure 6.5.2 illustrates the number and percentage of marine pollution accidents according to their areas of occurrence.



Source: SOE 2009

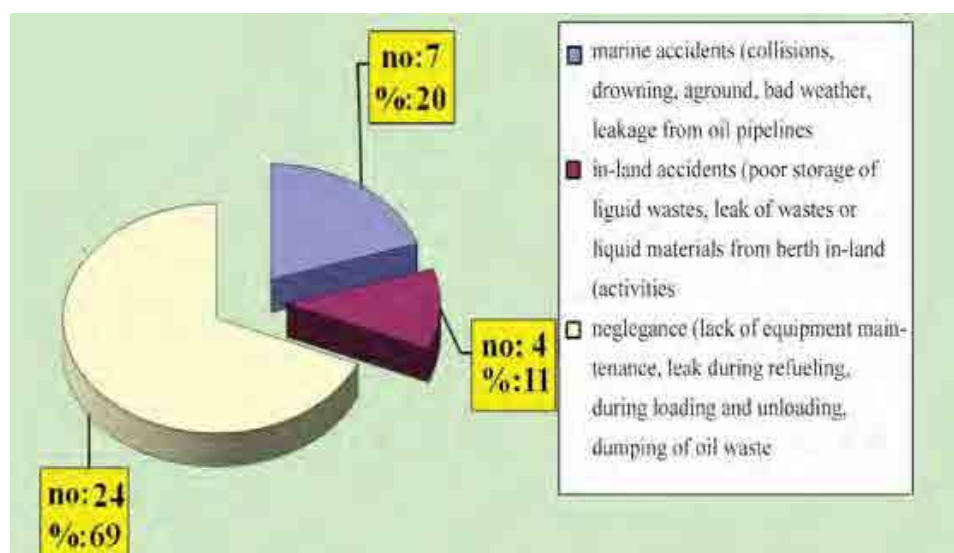
Figure 6.5.2 Number and percentage of accidents according to occurred areas

(3) Cause of Marine Pollution

Causes of accidents were identified and summarized as follows:

- -Failure to take required precautions for either human factors or the lack of maintenance of equipment in ports, and marine units.
- -Poor storage of liquid wastes.
- -Leakage during refueling.
- -Dumping of oily residues during loading and unloading is considered as one of the most important reasons that led to 24 accidents representing 69% of total number of accidents.
- -Seven accidents representing 20% of total accidents were resulting from collisions, drowning, ships grounding, and bad weather or due to leakage from oil pipelines.
- -Leakage of wastes or liquid materials from marine docks (11% of the total accidents).

Figure 6.5.3 illustrates number and percentage for causes of marine accidents.



Source: SOE 2009

Figure 6.5.3 Number and percentage of accidents as causes

6.6. GREENHOUS GASES (GHG) EMISSIONS BY TRANSPORT SECTOR

6.6.1. GHG Emissions by Sector

According to EEAA among GHG emissions from sector in Egypt electricity generation is the largest contributor, accounting for 32 % of the emissions, with transportation and industry each contributing about 25% of the emissions.

Table 6.6.1 GHG Emissions from Fuel Combustion of Different Sectors (2000/2002)

Sector Source Category by Sector	Fuel Type Emissions						Total Emissions (Mt CO ₂ e)	Emissions (%)
	Gasoline	Kerosine	Gas Oil/Diesel	Fuel Oil	LPG	Natural Gas		
Industry	--	0.01	7.06	13.3	0.38	6.32	27.07	25.7
Transportation	7.26	1.45	16.38	1.85	--	0.28	27.22	25.83
Agriculture	--	0.22	0.01	--	--	--	0.23	0.22
Residential & Commercial	--	1.46	--	--	7.09	0.85	9.4	8.92
Electricity Generation	--	--	0.23	6.32	--	28.44	34.99	33.2
Petroleum Production and Industries	--	--	1.47	0.78	--	4.24	6.49	6.16
Total	7.26	3.14	25.15	22.25	7.47	40.13	105.4	100

Source: EEAA (2010.3) Egypt Second National Communication - Under the United Nations Framework Convention on Climate Change

6.6.2. GHG emissions in transport sector

The transportation sector inventory is based on national statistics for national transportation facilities (vehicles, railway tractors, national aviation, etc.). Data are collected from fuel producers (Ministry of Petroleum, and the Egyptian General Petroleum Corporation) as well as fuel distribution companies. Calculations are primarily based on data available from international sources which take into account variation in local operating conditions (Hindawi, 2007).

The total number of vehicles registered in Egypt increased from 1,025,060 in 1990 to 2,292,576 in 2000, and railway locomotives increased from 774 to 870 units over the same period. The CO₂ equivalent emissions from the transportation sector increased from 21.368 Mt in 1990 to 27.21 Mt in 2000. The aggregate transportation sector inventory resulting from the total fuel combustion amounted to 27.27 Mt CO₂e per year and check-up by detailed bottoming-up calculations yielded 25.18 MtCO₂e per year.

6.6.3. Mitigation Measures for Reduction of GHG Emissions in Transport Sector

The transport sector accounted for about 27% of Egypt's GHG emissions in 2000. It is the most rapidly growing source of GHG emissions in Egypt, and the energy intensity in this sector is particularly high due to the low efficient-engines using hydrocarbon fuels (gasoline and diesel oil), and to the primary reliance on road transport as the main means of transportation.

Based on a Cabinet of Ministers decision, the Ministry of Transport developed a strategy for improving national transport and urban traffic, in addition to controlling exhaust emissions from road-going vehicles in Egypt. In this respect, the removal of lead from gasoline, and the removal of an increased quantity of sulphur from diesel oil is to be achieved by 2012.

Other mitigation options considered include public transport initiatives, energy efficiency improvements, fuel switching and new propulsion technologies:

- The management of public transport systems must be radically improved.

Measures include provision of new vehicles; expansions of public transport; and in non-motorized transport use, the integration of modes and timetables/services; the introduction of clear information and customer service training; increased maintenance of vehicles, stops and stations; and the restructuring of the shared taxi sector.

- Travel demand management offers significant opportunity to mitigate growth of emissions from private car users;
- Fuel switching could include liquefied petroleum gas, biochemical fuels, compressed natural gas, and electric and hybrid electric propulsion technology.
- Municipalities and operators should be encouraged to introduce a wide variety of more efficient public transport propulsion systems and pilot alternative fuel use. These technologies and systems include bus rapid transit and the use of bio fuels.
- Non-motorized transport can be encouraged through appropriate planning, provision of infrastructure, and marketing of these emissions-free, low cost modes.

Table 6.6.2 presents various mitigation options for the transport sector with their potential GHG emissions reduction. Implementation of most of these measures requires international financial and technical support.

Table 6.6.2 Opportunities for mitigation of GHGs emissions in Transport Sector

	Impact	Size
1	Automotive transport	<ul style="list-style-type: none"> - Shift to diesel (including bio-diesel) engines - Introduction of the hybrid car, including the plug-in hybrid electric vehicle (PHEV)
2	Rail Transport	<ul style="list-style-type: none"> - Development of urban transport in the cities of Cairo and Alexandria in the form of metros and tramways, and combinations of "light" and "heavy" rail passenger transport
3	Freight Transport	<ul style="list-style-type: none"> Nile barge freight transport - Rail freight transport (container inland ports)
4	Power Train Technologies	Power train technologies available today include ICE petrol (further development of the ICE can improve the fuel efficiency of petrol vehicles by 30% and that of diesel vehicles by around 20%); ICE diesel; compressed natural gas (CNG); and hybrids
5	Shifting from Diesel to Electrified Railways	Potential Shifts: <ul style="list-style-type: none"> - Electrification of Cairo – Alexandria Line around 2020 - Electrification of Cairo – Upper Egypt Line (to Assyuit to Aswan) around 2030
6	Fuel Cells Technology	<ul style="list-style-type: none"> - Numbers of vehicles utilizing fuel cells are anticipated to grow as their economics improve - Hydrogen generated as a by-product in industry will be used - More hydrogen could be generated via electrolysis of water using free carbon energy available from as solar cells, or wind energy

Source: EEAA (2010.3) Egypt Second National Communication - Under the United Nations Framework Convention on Climate change

CHAPTER 7: STRATEGIC ENVIRONMENTAL ASSESSMENT IN MASTER PLAN STUDY

7.1. STRATEGIC ENVIRONMENTAL ASSESSMENT AND PLANNING PROCESS

7.1.1. Need and definition of SEA

The need to address the environmental impact of policy, and plans, and programs is widely acknowledged. Regional and national plans are subject to environmental assessment procedures to identify, at a strategic level, potential environmental impacts likely to arise during implementation of the policy or plan. This level of environmental assessment is often referred to as Strategic Environmental Assessment (SEA). In other word, SEA is a system of incorporating environmental considerations into policies and plans.

In this regards, SEA term of "environment" is used as a wider meaning of description which covers not only natural and social conditions but also economic and financial engineering (technological) aspects. Currently, SEA is widely accepted in many countries as a tool to integrate environmental and social considerations into a decision-making process. It is generally understood as a process for assessing the environmental impacts caused by a policy, plan and program. SEA should be recognized as a supportive method to conduct appropriate decision-making from the point of view of environment and sustainable development.

An increasing number of countries and international organizations including World Bank, ADB and JICA have introduced SEA system. However, there are differences in the scope, comprehensiveness, duration in relation to policies, plans and programs. There is no single approach to SEA that can be applied to all cases and no internationally accepted definition of SEA. More importantly the decision making context at the strategic level is different at national versus regional level, at policy versus plan/program level, etc. SEA should be arranged reflecting differences in each situation of proposed policy, plan and program. The whole SEA process is intended to act as a support to planners and decision-makers, providing them with relevant environmental information on the positive and negative implications of policy, plans and programs.

SEA is a macro-planning tool that identifies the opportunities and constraints that the environment provides for the development process, while EIA focuses on identifying and containing the adverse impacts of the development process on the environment at the micro level. Hence, EIA and SEA are complementary planning tools that enable us to effectively mainstream environmental and social considerations in the development process.

7.1.2. SEA Definition According to JICA Guidelines

In JICA Guidelines for Environmental and Social Considerations (Amended April 2010), following definition and explanation are given:

- 1.3 Definitions 7. A “strategic environmental assessment” is an assessment that is implemented at the policy, planning, and program levels, but not at project-level EIA.
- 1.4 Basic Principles Regarding Environmental and Social Considerations. As one of seven principles to be very important, “measures for environmental and social considerations must be implemented from an early stage to a monitoring stage”.

JICA applies a Strategic Environmental Assessment (SEA) when conducting Master Plan Studies and encourages project proponents to ensure environmental and social considerations from an early stage to the monitoring stage. However, there are no further detailed description of SEA in the JICA Guidelines.

7.1.3. Components of SEA

In general most components of SEA are the following:

- Comprehensive assessment with integrated evaluation by environmental and social considerations as well as economic, financial and technical factors at the program, plan and policy levels;
- Impact assessment at the early decision-making stage (e.g. planning stage);
- Consideration of alternatives;
- Public participation and information disclosure at the earlier stages;
- Assessment of accumulated impacts beyond one project, if sub-projects are involved.

Regarding major components of SEA, as for comprehensive assessment it is conducted by using MCA as described later (6.2). As for public participation and information disclosure at the earlier stage frequent meetings with stakeholders were already held including seminars and workshops as well as meeting of Steering Committee in this Master Plan Study.

7.1.4. Role of SEA and Plans for Administrative Decision Level

As mentioned above SEA can also be applied to formulation of policies, plans and programs at a higher administrative level. Contents and evaluation factors for SEA are somewhat changed depending on the targeted levels of policies, plans and programs such as administrative, spatial and/or sectarian level. In view of SEA for necessary environmental and social considerations relation of policies and plans with environmental and social considerations are shown in Table 7.1.1.

Table 7.1.1 Development Plan and Strategic Environmental Assessment

No.	Development Plan (Master Plan etc.)		Necessary Environmental and Social Considerations	
	Policy, Strategy, Plan, Project	Example of Development plan	Examples of SEA/EIA	Tentative Evaluation Factors
1	National Level	National policy/strategy for sector and regional development	National Environmental Policy (NEP)	(1) The Constitution, (2) National Environment Policy, 2005, (3) National Transport Policy
2	Regional (Provincial/District Level)	Regional (Provincial/District) level policy/strategy for development	(1) SEA-Policy level-1, (2) SEA - Sector level	(1) NEP, (2) Regional/Governorate Environmental Management Plan (EMP), (3) Pollution loads (NO _x , PM etc.),

No.	Development Plan (Master Plan etc.)		Necessary Environmental and Social Considerations	
	Policy, Strategy, Plan, Project	Example of Development plan	Examples of SEA/EIA	Tentative Evaluation Factors
				(4) GHG emissions (CO ₂), (5) Consistency with land use and land regulation
3	Specific Sector Level	Transport sector (mode and type) development master plan (mode: road, railway, inland waterway, etc., type: passenger, freight)	(1) SEA-Policy level-1, (2) SEA - Sector level (Transport sector)	(1) NEP, (2) Regional/Governorate Environmental Management Plan (EMP), (3) Pollution loads (NO _x , PM etc.), (4) GHG emissions (CO ₂), (5) Consistency with land use and land regulation
4	Selection of Routes/ Areas	Candidate routes and/or areas (sites) for the project	(1) SEA-Project level, (2) SEA - Sector level	Alternative analysis based on identification of envisioned impacts on natural (including pollution) and social environment (wider range)
5	Implementation of Specific Development Project	Specific project with determined route or site	(1) EIA-specific project, (2) IEE -environmental scoping	(1) Full EIA study or partial EIA study, (2) EIA Form A or B.

Source: JICA Study Team

7.2. SEA IN MASTER PLAN STUDY

7.2.1. Basic Approach

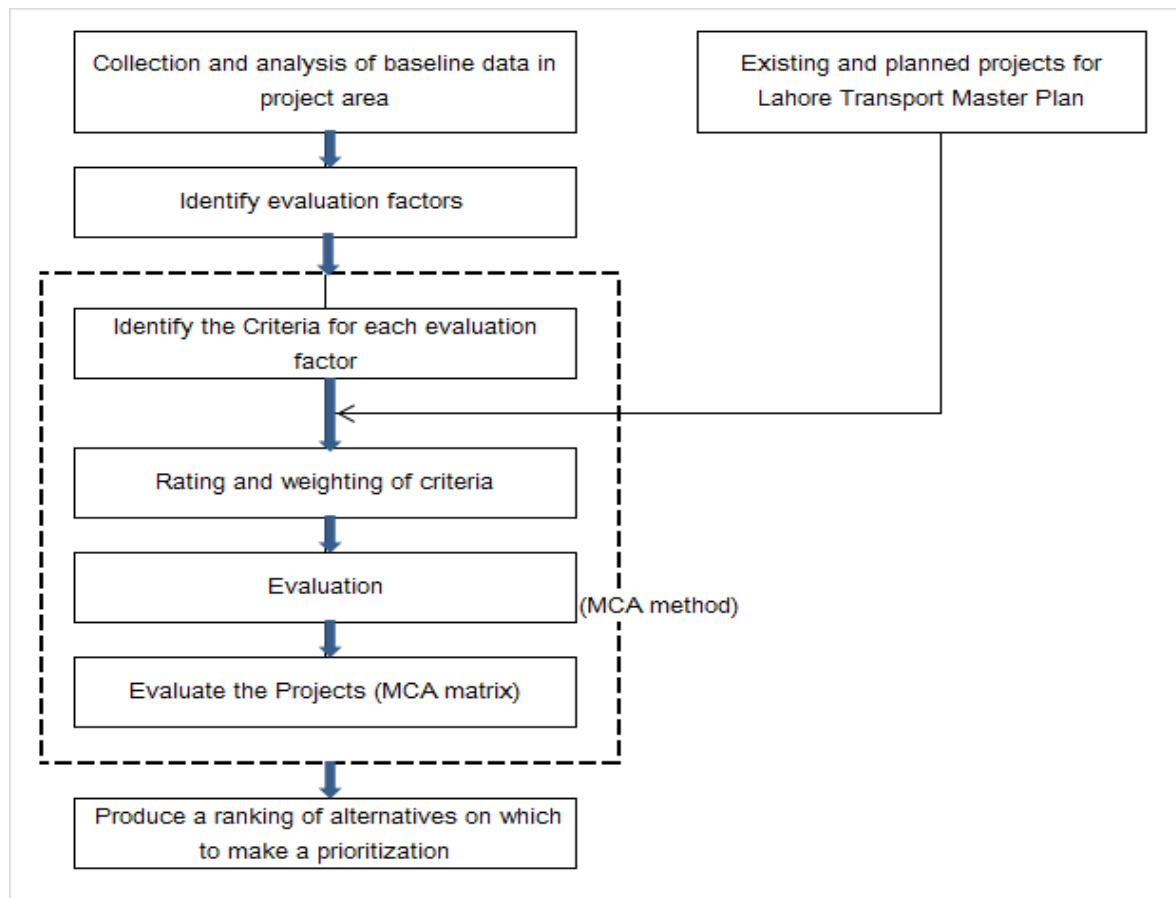
In conducting an environmental evaluation of the Master Plan, a SEA will be applied as a systematic process for comprehensively evaluating, at the earliest appropriate stage in the planning process. Several alternative options for the overall transport development project, thereby ensuring a full integration of the relevant environmental and social considerations as well as economic, engineering and financial aspects of the proposed Master Plan.

In accordance with the SEA concept, environmental considerations are sufficiently incorporated into the Master Plan. While a project-level environmental impact assessment (EIA) will be implemented after specifying the detailed transport development projects such as road and railway construction along designated route alignment in the Master Plan, the SEA introduces early and strategic environmental considerations before the details of plans of route alignments and their specifications are decided. In other words, the SEA method allows the planner to focus on the environmental affects for the optimum formulation of the Master Plan before specific transport development projects are finalized. Thus, in comparison with a project-level EIA, the SEA can take into account a broader range of alternative plans and projects and mitigation measures in the procedures of formulating the Master Plan.

7.2.2. Procedure of SEA

The main objective of the SEA method is to conduct a comprehensive impact assessment of the Master Plan by using a SEA methodology. It does not only deal with the negative impacts of the engineering, economic, financial, environmental and social aspects of the Master Plan but also the positive ones. The

typical SEA process begins with screening and scoping, and ends up with mitigation measures. Procedure of SEA in a Master Plan is shown in Figure 7.2.1.



Source: JICA Study Team

Figure 7.2.1 Procedure of SEA in Master Plan

1) Collection of Baseline Data and Information

The collection of the baseline information was carried out to establish benchmarks for natural environmental parameters and their attributes, including the socio-economic conditions in the affected areas. This includes a description of the physical, biological, and socio-economic environments with reference to project location and the proposed activities in the Master Plan.

2) Identification of Evaluation Factors

The details of the tentative primary evaluation items (i.e. engineering items), secondary items (i.e. economic and financial items), and tertiary items (i.e. environmental and social considerations items) are described. Evaluation items will be utilized for both impact assessment and the comparison of alternatives.

3) Evaluation of Rating and Impact Assessment

Rating and evaluation of expected impact are designed to identify and assess the potential environmental impacts of proposed alternatives, thereby assisting in the design of appropriate mitigation measures. Impact assessment will be implemented among several alternatives. The results of the impact assessment will be streamlined in the impact assessment matrix.

4) Multi-Criteria Analysis (MCA)

The scope of the SEA is not limited to environmental effects alone. The method provides a number of potential links with the socio-economic assessment, recognizing the idea of the SEA's inter-relationships with socio-economic issues or sustainability concerns. The so-called Multi-Criteria Analysis (MCA), which is a useful evaluation method that judges priorities under different development alternatives, is being employed as a key methodology for the overall SEA assessment.*

Since a wide range of positive effects and negative impacts are included in the evaluation criteria in the MCA, the methodology allows evaluators to utilize more practical evaluation procedures. The MCA provides a comprehensive evaluation matrix with different weights for each evaluation item, thereby aiding in the selection of alternatives. In general, the MCA will be conducted through the following steps:

(1) Selection and Rating of Evaluation Items

The selected evaluation items will be streamlined in the form of a 3 to 5 level evaluation system composed of the following:

- Engineering items related to project conditions,
- Economic and financial evaluation items related to project benefits and efficiency; and
- Environmental and social condition items related to project effects and impacts.

(2) Fixing Evaluation Indices and Rating Evaluation Scores

A wide range of indicators explaining the quantitative and qualitative evaluations on the proposed alternatives will be employed. Although it is desirable that evaluation indicators are quantifiable, indicators based on narrative descriptions of the evaluation items are likewise acceptable whenever difficulties in quantifying indicators arose. In order to obtain clear-cut evaluation results for selecting optimum alternatives, all the evaluation items will be rated through the use of a 3 to 5 grade scoring system.

(3) Calculation of Weights in the Total Evaluation Score

To reflect the significance of the evaluations, the weight of each evaluation item is assumed, and the total evaluation score will be calculated taking these weights into account. A five-grade evaluation score will be applied for the evaluation.

(4) Formulation of MCA Matrix

To summarize the results of the evaluation, an MCA matrix, which includes the weights and the scores of each evaluation item, will be prepared. The alternatives will be prioritized in accordance with the total evaluation score in the MCA matrix.

(5) Recommendation for Mitigation Measures

As a preventive tool on a wide range of impacts on the natural environment, mitigation measures will be formulated and incorporated into the SEA process in order to ensure that the environmental deterioration resulting from the Master Plan will be minimized. In accordance with the identified and assessed impacts, a comprehensive mitigation measures will be prepared in a concrete way.

(6) Information Dissemination and Public Participation

The JICA Guidelines on Environmental Considerations stipulates that in the environmental and social aspects in master planning, a series of stakeholder meetings will be conducted at key stages of the study, i.e. during the preparation of the draft of the scoping items, during the formulation of a rough outline of environmental and social considerations, and during the preparation of the draft final report.

As an integral part of the SEA process, a series of stakeholder meetings will be held involving the representatives of various stakeholders in order to disseminate relevant information on the proposed Master Plan, as well as eliciting responses on possible positive and negative impacts as perceived by the stakeholders. Results will be shared in the SEA process. The main objectives of the public consultation activities for the SEA process are:

- Enhance transparency in decision-making through the provision of information which will allow for the early identification and mitigation of impacts.
- Promote a more comprehensive understanding of the baseline environmental information. Provide stakeholders with relevant information on potential environmental effects at an early stage of the SEA process in order to avoid unnecessary controversies and delays in the decision-making process at latter stages due to public opposition arising from lack of understanding.

7.2.3. MCA applied in this Study- The Goal Achievement Matrix

In this study The Goal Achievement Matrix (GAM) is applied to MCA.

GAM is an analysis process developed in the 1960's. The method is generally accepted as a suitable process for evaluating the benefits and costs of large-scale investments². The GAM process relies upon the identification of a set of objectives (goals) that the recommended projects should achieve. Detailed methodology of GAM and results of application are described and discussed in Chapter 10 of Main report.

CHAPTER 8: ENVIRONMENTAL EVALUATION

8.1. ENVIRONMENTAL CRITERIA AND INDICATORS

8.1.1. Introduction

In this study following five indicators are selected as elements of environmental criteria for safe and comfortable transport system as shown in Table 8.1.1.

- a) Social environment – 1 land acquisition and resettlement
- b) Social environment – 2 location of project (land use of project site)
- c) Natural Environment 1 – location of Natural Protectorates
- d) Natural Environment 2 – greenhouse gases emissions which relate to global warming
- e) Environmental Pollution – air pollution (NOx and PM)

Environmental criteria are evaluated with numerical value resulting from rating, weighing and scoring of four indicators as described in 7.2 to 7.4.

Table 8.1.1 Environmental Criteria

	Criteria	Indicator	Reason/Expected Major Impacts
1	Impacts on Social Environment -1	Land acquisition and resettlement	Generation of Project Affected Persons (PAPs) due to loss of land, assets, income, livelihood by land taking for ROW
2	Impacts on Social Environment -2	Land use of project site	Agricultural land is utmost important comparing with urban land and desert land in terms productivity and national economy
3	Impacts on Natural Environment - 1	Natural Protectorates	Impacts on flora, fauna and ecosystem in protected areas
4	Impacts on Natural Environment - 2	Increase of CO ₂ emissions	Increase in greenhouse gases (GHG) emissions which affect global warming and climate change. Among them CO ₂ is one of the main gases which contribute to the increase of GHG emissions.
5	Environmental Pollution	Increase of NOx and PM emissions	Deterioration of ambient air quality

8.1.2. Criteria and Indicator of Social Environment – 1 Land Acquisition

Land acquisition and resettlement to secure for ROW and related land may cause significant negative impacts on social environment. The impacts are loss of land, assets, income and livelihood of owners and relating people and result in generation of Project Affected Persons (PAPs). As described Chapter 1.5

appropriate compensation and supports for land acquisition and resettlement are required, although kind and extent of compensation and supports depend upon entitlement and eligibility of PAPs.

In general land acquisition cost differs with land use, i.e. urban land for residential, commercial and industrial use, agricultural land and desert land. Based on the recent GARBLT projects (See [Chapter X Road construction](#)), unit cost for acquisition of land is as shown in Table 8.1.2. For railway line it is reasonable to the same cost can be applied, although data on railway line is not available.

Table 8.1.2 Unit Land Price for Acquisition

Land use	Unit Price
Desert land	25 LE/m ²
Agricultural land	100 LE/m ²
Urban land (land of residential, commercial, industrial use)	500 LE/m ²

Note: Price in 2011 based on the recent GARBLT projects

Source: JICA Study Team

Practically to get smoothly agreement and consensus with PAPs and stakeholders including PAPs and affected communities along section of planned road or railway line, other factors than land cost such as proper communication and consultation with stakeholders are more important and often takes both time and cost for achievement.

Therefore, in this study following criteria were chosen for evaluating impacts due to land acquisition and resettlement:

- a) Length (km) of planned section of road or railway line, instead of land area (m²)
- b) Measure-2 Introduction of Equivalent length to urban land (EqL, km)

Land use of all the section is classified to three categories: urban land, agricultural land and desert land. Length of each allocated land use is obtained by observation planned route on Google map. Assuming land price relation (urban land: agricultural land: desert land = 500 LE : 100 LE : 25 LE = 1: 0.2: 0.05) in Table 7.1.@ is applicable, extent of impacts are compared using "equivalent length to urban land (EqL)" as follows:

$$\text{EqL (km)} = S(\text{total length of urban land}) + (\text{total length of agricultural land}) \times 0.2 + (\text{total length of desert land}) \times 0.05$$

Calculated data of EqL are shown in Data Sheet for Environmental Evaluation in Appendix X.

- c) Measure 3 - Occurrence of land acquisition and resettlement
 - Projects for Construction of road and railway line – allocate full value of EqL
 - Projects for Upgrading and widening of existing road- allocate half value of EqL, because for existing road part of ROW has already secured.
 - Projects for (i) Change to double/triple tracking of existing railway line, (ii) improvement/rehabilitation of existing road and railway line, and (iii) software and humanware – are no requirement of land acquisition and resettlement.

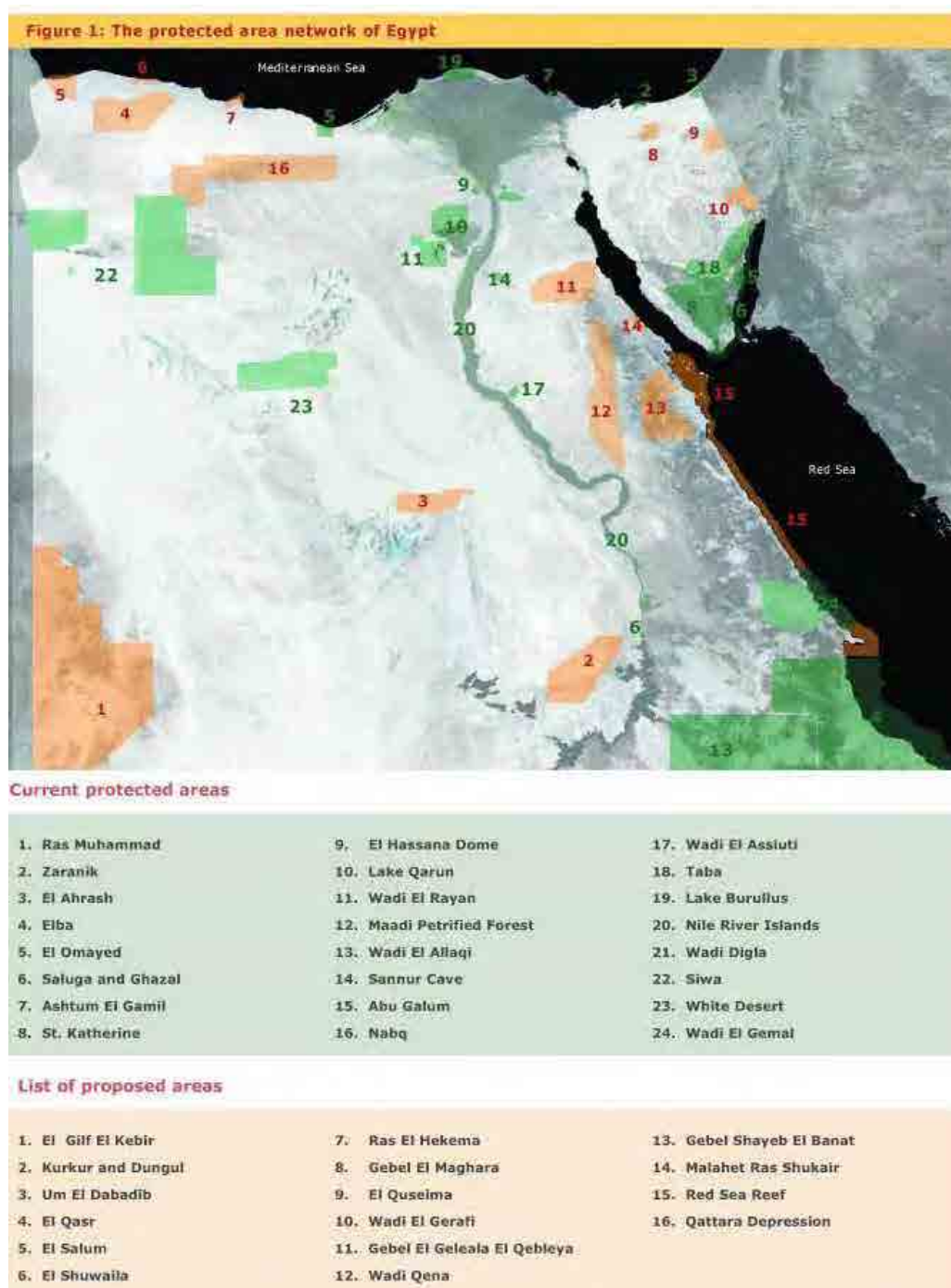
8.1.3. Criteria and Indicator of Social Environment -2 Land Use of Project Site

In Egypt crop production from agricultural land plays an important role in the economy. Thus the preservation of agricultural land is required more than that of urban land or desert land in terms of food production and national economy.

8.1.4. Criteria and Indicator of Natural Environment -1

Transport development projects may cause various negative impacts on natural environment such as damage to flora, fauna, ecosystem and biodiversity. In Egypt natural protectorates are treasuries of flora, fauna and biodiversity as well as places of cultural and geological characteristics, and require uppermost protection in the components of natural environment. They are also defined as any area on the ground, the territorial water or the inland water containing the creatures, plants, living animals, fish or the natural phenomena of cultural, scientific and tourist value, as determined by a Prime Minister Decree. Law 102/1983 of Protected Areas prohibits the construction of buildings, facilities, roads or driving any cars or exercise of any agricultural, industrial, or commercial activities in the protected area except by approval and license of the competent administrative authorities

Therefore, natural protectorate is selected as an indicator for impacts on natural environment. Location and area of existing and future (proposed) natural protectorates are shown in Figure 8.1.1 (See Chapter 2).



Note: Among proposed areas as of 2006 five areas were designated as Natural Protectorates.
 Source: EEAA (2006) Protected Areas of Egypt: Towards the Future

Figure 8.1.1 Existing and proposed Natural Protectorates

8.1.5. Criteria and Indicator of Natural Environment -2 Greenhouse gas emissions

As described in Chapter 4 and 5 increased rates and concentrations of greenhouse gases (GHG) emissions in the atmosphere are causing increased ability of the lower layers of the atmosphere to absorb long-wavelength radiation and leading to global warming, which may bring about climate change.

According to EEAA report (2010) transport sector contributes 25 % of the emissions.

The GHG are composed of CO₂, CH₄, Nitrous Oxide (N₂O), Perfluorocarbons (PFCs), Hydrofluorocarbons (HFCs) and Sulfur Hexafluoride (HF₆) and other gases. Among them CO₂ contributes mostly to the increase of GHG emissions. Thus, as an indicator of greenhouse gas (GHG) emissions CO₂ emissions are selected.

In addition, in order to promote the modal shift from road transport to railway and inland waterway transport, it is desirable to prove the priority of railway and inland waterway transport to road transport in terms of CO₂ emissions.

Regarding CO₂ emission factors many data have been reported for each transport sector. However, data which are capable to compare of all the transport sectors at the same condition or unit are rather few even in Japan. . Some of the data for CO₂ emission factors are shown in Table 8.1.3 to Table 8.1.6.

Table 8.1.3 CO₂ emission factors for Passenger transport in Japan (2004)

Passenger transport		g-C/km.person	g-CO ₂ -equivalent /km.pesron
1	Passenger vehicles	45	165
2	Bus	19	70
3	Railway	5	18
4	The Shinkansen	6	22
5	Aviation	30	110

Source: Outline of Transport related Statistics (2007) and report by Ministry of Land, Infrastructure, Transport and Tourism (http://www.mlit.go.jp/sougouseisaku/environment/sosei_environment_tk_000007.html)

Table 8.1.4 CO₂ emission factors for Freight Transport in Japan (2004)

Freight transport		g-C/km.t	g-CO ₂ equivalent/km.t
1	Heavy duty truck	48	176
2	Light duty truck	180	660
3	Aviation	402	1473
4	Marine Shipping	10	37
5	Railway	5	20

Source: Outline of Transport related Statistics (2007) and report by Ministry of Land, Infrastructure, Transport and Tourism (http://www.mlit.go.jp/sougouseisaku/environment/sosei_environment_tk_000007.html)

Table 8.1.5 CO₂ Emission Factors of Transport by year in Japan

Transportation	CO ₂ (g-CO ₂ /t-km)		
	2005	2007	2009
Heavy Duty Trucks (private use)*	1,046	660	946
Light Duty Trucks (commercial use)*	153	176	134
Ships	38	37	40
Railways	21	20	22
Aviation		1,473	

Note: * Fluctuation of values are partly due to different way for compilation by year

Source: Ministry of Land, Infrastructure, Transport and Tourism, Japan (2009, 2011)

Table 8.1.6 Comparison of Emission Factors of Inland ship and 36-t Truck

Pollutant	Transport	1990	2000	2002	2010
CO ₂ (g-CO ₂ /t-km)	Inland Ship	35	32	30	28
	36-t Truck(in fluid traffic)	116	115	113	110
	36-t Truck(in congested traffic)	162	160	159	157
NO _x (g/1,000t-km)	Inland Ship	760	570	530	500
	36-t Truck(in fluid traffic)	1,000	670	630	380
	36-t Truck(in congested traffic)	1,750	1,200	1,150	700
PM (g/1,000t-km)	Inland Ship	32	21	19	15
	36-t Truck(in fluid traffic)	62	35	28	18
	36-t Truck(in congested traffic)	120	60	56	22
SO ₂ (g/1,000t-km)	Inland Ship	37	31	30	16
	36-t Truck(in fluid traffic)	200	22	12	2
	36-t Truck(in congested traffic)	290	32	18	3

Note: Numerical values are obtained by reading from graphic data in Pamphlet

Source: Inland Navigation Europe – Water Transport Environmental Sustainability (Pamphlet)

<http://www.inlandnavigation.eu/>

8.1.6. Criteria and Indicator of Environmental Pollution – Air Pollution

In view of topographical and meteorological conditions in Egypt, where most areas are occupied with desert land and wind and fine weather condition in most of the year, emitted air pollutants can disperse easily and no profound impacts are expected except vicinity of road and urban areas such as Greater Cairo. In addition, air pollutant emissions from railway traffic and inland waterway transport are much less. Thus, air pollution is thought to be not an issue in nationwide scale.

However, this is not appropriate in this study. One reason is that air pollution is not a local issue, because some components of air pollutants are not easily destroyed or react in the atmosphere to form secondary pollutants. It is likely that these pollutants transfer in a longer distance and may cause transboundary pollution such as acid rain in neighboring countries considering case of yellow sand phenomena in Japan from mainland China.

Another reason is that proposed project sites are located in urban area for some section of roads and railway lines. In addition, transport modal shift is thought to be more effective with considering reduction of both CO₂ emission and air pollutant emissions at the same time.

Among air pollutants NO_x and PM are selected in view of their effects on human health as indicators of air pollution. Similar to the cases of CO₂ emission factors of NO_x and PM, which are capable to compare of all the transport sectors at the same condition or unit are rather few even in Japan, although many data were reported in each transport sector. Table 8.1.7 and Table 8.1.8 show some of data.

Table 8.1.7 NOx Emission Factors of Transport in Japan

Transportation	NOx (g/t-km)
Trucks	1,314
Railways	77
Ships	486
Railways	21

Source: Chiba Prefecture of Japan (1997) - Manual for Promotion of Modal Shift

Table 8.1.8 Air Pollutant Emission Factors for Vehicles (four types)

(1) Emission Factors for Passenger Cars

	Speed (km/h)	NOx (g/km)	CO (g/km)	CO ₂ (g/km)	PM (g/km)
1	7.5	1.161	10.759	319.5	0
2	14.7	1.042	9.351	211.7	0
3	23.4	1.011	7.766	166.2	0
4	33.3	0.908	8.893	150.2	0
5	42.9	0.884	4.727	141.2	0
6	70	0.698	3.890	117.3	0
7	90	1.058	20.000	128.7	0

(2) Emission Factors for Motorcycles*

	Speed (km/h)	NOx (g/km)	CO (g/km)	CO ₂ (g/km)	PM (g/km)
1	10.0	0.229	40.755	142.3	0
2	20.0	0.199	24.007	94.9	0
3	30.0	0.198	18.113	78.1	0
4	40.0	0.202	15.281	69.8	0
5	50.0	0.206	13.954	65.6	0
6	60.0	0.21	13.612	64.0	0
	70.0	0.213	14.032	64.3	0
7	80.0	0.214	15.103	66.3	0

Note: * Data are provided by Ministry of Environment, Japan

(3) Emission Factors for Buses

	Speed (km/h)	NOx (g/km/ton)	CO (g/km/ton)	CO ₂ (g/km/ton)	PM (g/km/ton)
1	4.966	2.994	2.213	178.2	0.135
2	9.231	2.162	1.341	128.6	
3	15.045	1.77	1.039	108.5	
4	22.831	1.5	1.046	101.2	
5	35.465	1.236	0.848	84.4	
6	63.081	-	-	-	
	60.104	1.041	0.185	58.8	
7	78.513	1.195	0.332	74.5	

(4) Emission Factors for Light Duty Trucks

	Speed (km/h)	NOx (g/km)	CO (g/km)	CO ₂ (g/km)	PM (g/km)
1	7.830	1.161	10.759	319.5	0.126
2	14.707	1.042	9.351	211.7	
3	23.213	1.011	7.766	166.2	
4	34.033	0.908	8.893	150.2	
5	46.887	0.884	4.727	141.2	
6	72.800	0.698	3.890	117.3	
	70.110	0.698	3.890	117.3	
7	90.173	1.058	20.000	128.7	

Source: Institute for Global Environmental Strategies (IGES) (2012) Mainstreaming Transport Co-benefits Approach - A Guide to Evaluating Transport Projects

8.2. ENVIRONMENTAL EVALUATION

8.2.1. Rating of Environmental Indicators

Rating and the point of the above mentioned five environmental indicators is shown in Table 8.2.1.

Table 8.2.1 Rating and Point of four Environmental Indicators

Environment Indicators	Rating Point	A 5.0	B 4.0	C 3.0	D 2.0	E 1.0
	1) Land acquisition and resettlement	Road project	No relation (Software/ Human ware)	Improvement/rehabilitation of existing road	Bridge/tunnel/facility construction	Land required: < 10 Eq-km length
Railway project		No relation (software/ human ware)	1) Improvement/rehabilitation of existing railway, 2) Upgrading to Double/Triple Tracking	Bridge/tunnel/facility construction	Land required: < 10 Eq-km length	Land required: > = 10 Eq-km length of section
Inland Waterway project		No relation (software/ human ware)	-	Improvement	-	Construction
2) Location of project site	All	Desert area	-	Urban area	-	Agricultural area
	Land use	Desert land	-	Residential, industrial, commercial etc. land > 10 km	-	Agricultural land > 10 km
3) Natural Protectorates (NP)	All	No relation (software/ human ware)	No crossing (road, railway, IWT)	Close to the area	Crossing proposed NP (road, railway, IWT)	Crossing existing NP (road, railway, IWT)
4) CO ₂ emission	All	Significant reduction	Some reduction	No impact	Some increase	Significant increase
		Railway project >= 100 km	Railway project < 100 km	No impact (Software, Human ware)	Road project < 100 km	Road project >= 100 km
5) NO _x /PM emissions	All	Significant reduction	Some reduction	No impact	Some increase	Significant increase
		Railway project >= 100 km	Railway project < 100 km	No impact (Software, Human ware)	Road project < 100 km	Road project >= 100 km

Source: JICA Study Team

8.2.2. Results of Rating for Candidate Projects

Results of rating for the projects by five indicators are indicated in Table 8.2.2.

Table 8.2.2 Results of Rating for Candidate Projects

Related Region	Project ID	Project Name	Rating				
			Land Acquisition and Resettlement	Location of Project	National Protectorates	CO ₂ Emissions	Air Pollutant Emissions
ITC (Intermodal Transport Corridor)	RD-300	3rd Cairo Alex Expressway	D	E	B	E	E
	RD-204	Cairo Alexandria Desert Expressway (Upgrade to 8-lanes)	E	E	B	E	E
	RD-301	3rd Stage Regional Ring Road (Southern Part of Expressway)	E	E	E	E	E
	RD-998	Alexandria Bypass	D	E	B	D	D
	RW-403	Double Tracking of Bypass Line for Cairo - New Alexandria	B	E	B	B	B
	RW-406	Railway Link for 6th of October City	E	C	B	B	B
	RW-407	Railway Link between Robeki to Helwan	D	A	B	B	B

Related Region	Project ID	Project Name	Rating				
			Land Acquisition and Resettlement	Location of Project	National Protectorates	CO ₂ Emissions	Air Pollutant Emissions
	RW-412	Improvement of Station Facilities for Freight Services (2 stations) (good intermodal connection & facilities, railway layout/arrangement, warehouse and station office)	B	C	B	B	B
	RW-420	Railway Link between Sokhna Port to Helwan	D	C	B	B	B
	L-1	VAL (Value Added Logistics) Center at 6 th of October City	D	C	B	D	D
	IW-1	IWT port for ITC	C	C	B	B	B
	RW-304	High Speed Railway for Cairo - Alexandria [High/Higer speed Alt-1]	E	E	B	A	A
	IW-5	Waterway Improvement on Cairo - Alexandria	C	C	B	B	B
	PT-1	Establishment of a Multi Purpose Terminal (Containers and General Cargo) at Alexandria Port	C	C	B	B	B
	PT-2	Development of management and Operation for Multi Purpose Terminal in El Dekheila Port	C	C	B	B	B
	PT-3	Dekheila Port: New Container Terminal	C	C	B	B	B
Cairo - Alexandria	RD-302	Cairo Alex Agriculture Bypass Kafr El Zayat - Alexandria	E	E	E	E	E
	RD-315	Shubra elkhema - Banha Agriculture Road (Expressway)	D	E	B	D	D
	RW-400	High Speed Railway for Cairo - Alexandria via Tanta [High/Higer speed Alt-2]	E	E	B	A	A
	RW-402-1	Improvement of Tracks: Cairo - Tanta - Alexandria	B	C	B	B	B
Inland Delta	RD-999	Cairo - Tanta Bypass	D	E	B	D	D
	RD-332	Zakaziq - Toukh	D	E	B	D	D
	RD-304	Rod El Farag Road	E	C	B	D	D
	RD-333	Tanta - Kafr El Sheikh	D	E	B	D	D
	RD-334	Al Mahalla - Kafr El Sheikh - Damanhour	D	A	B	E	E
	RD-318	Desouq Fowa Metobas Road	D	E	B	D	D
	RD-319	Imbaba Qalyub Tawfekia Road	D	E	B	D	D
	RD-320	El-Qanater El-Bagour Shebin El-Koum Tanta Mahalla Matboul Road	E	E	B	E	E
	RD-200	Belbeis-Banha-El Bagour-El Khatatba Regional Ring Road	E	E	B	D	D
	RD-214	Zagaziq Sinbellaween Road	C	C	B	D	D
	RD-215	Mansoura Talha Dekernes Mataria Road	C	C	B	D	D
	RD-216	Qantara Salheya Faqous Abu Kbeir Hehya Zagaziq Road	C	C	B	D	D
	RW-301	Single Tracking for Basion City	D	A	B	B	B
	RW-307	Double Tracking for Qalyoub - El Qnater	B	E	B	B	B
	RW-308	Triple Tracking for Qalyoub - Benha	B	E	B	B	B
	RW-401	Improvement of Track Arrangement for Cairo - Qalyub	B	C	B	B	B
	Cairo - Damietta/ Port Said	RD-308	Cairo Ismaillia Port Said Road (Expressway)	E	E	B	E
RW-313		Double Tracking to 10th of Ramadhan City	E	C	B	B	B
RW-302		Single Tracking for Kafr El-Batikh - New Damietta City	D	C	B	B	B
RW-309		Double Tracking for Mansoura - Damietta	B	E	B	B	B
RW-310		Improvement of Signaling System for Increase of Freight Trains for Tanta - Mansoura - Damietta	B	C	B	B	B
RW-402-2		Improvement of Tracks: Damietta - Port Said Line	B	C	B	B	B
IW-6		Waterway Improvement on Cairo - Damietta	C	C	B	B	B
Cairo - Suez	PT-4	Damietta Port: Study on Sedimentation	C	C	B	B	B
	PT-5	Port Said East: Logistic Center	C	C	B	B	B
Mediterranean	RD-310	Cairo -Suez Road (Expressway)	E	C	B	E	E
	RW-300	Double Tracking for Ain Shams - Robeki	B	C	B	B	B
	RD-323	Wadi Alnatroum Saloum Road	E	A	B	E	E
	RD-307	Alexandria-Saloum Road	E	E	E	E	E
	RD-309	Qantara-Rafah Road	D	E	E	E	E
	RD-316	Alamein Road	D	E	E	E	E
Sinai	RW-312	Single Tracking for Bir El Abd - Rafah	E	E	B	A	A
	RW-410	Rehabilitation of Tracks for El-Kab - Bir El Abd	B	C	B	B	B
	RD-311	Suez Ras elnakab Road (Expressway)	E	A	D	E	E
Upper Egypt	RD-327	Suez Canal Tunnel Ismaillia	C	A	B	D	D
	RD-328	Alawga Ismaillia Road	D	A	D	E	E
	RD-326	Albetrol Malwa Road	D	A	B	E	E
	RD-331	Oena Aswan Nile East Bank Road	E	A	B	E	E
	RD-312	Cairo - Asyut Desert Western Road (Expressway)	E	A	B	E	E

Related Region	Project ID	Project Name	Rating				
			Land Acquisition and Resettlement	Location of Project	National Protectorates	CO ₂ Emissions	Air Pollutant Emissions
	RD-313-1	Asyut Aswan Abu simble Desert Western Road (Expressway): Asyut to Aswan	E	A	D	E	E
	RD-225	El-Belina - Tahta Road	D	E	B	D	D
	RD-298	Kalabsha Bidge (Koum Ombo) (Aswan)	C	A	B	D	D
	RD-299	Abo Tiq Bridge and Selim Coast (Asyut)	C	C	B	D	D
	RW-999	(High) Speed Railway for Cairo - Aswan [Electrificated]	E	E	B	A	A
	RW-306	Development of Railway Bridge for Lemon - Abbasiya - Tora	B	C	B	B	B
	RW-402-4	Improvement of Tracks: 1) Track renewal, 2) New track maintenance machines on Cairo - Aswan	B	C	B	B	B
	RW-412-4	Improvement of Station Facilities for Freight Services (6 stations) (good intermodal connection & facilities, railway layout/arrangement, warehouse and station office)	B	C	B	B	B
	IW-2	IWT port improvornent for Upper Egypt	C	C	B	B	B
	IW-3	Lock Expansion with Comprehensive Lock Operation Improvement	C	C	B	B	B
IW-4	Waterway improvement on Cairo - Assyuit	C	C	B	B	B	
Red Sea	RD-321	El Ain El Sokhna - Zafarana Road	D	A	B	D	D
	RD-322	Safaga Baranis Halayeb Road	E	A	E	E	E
East-West	RD-324	Eldaba Albetrol Road	E	A	D	E	E
	RD-325	Albetrol Beni Mazar Road	D	A	E	E	E
	RD-994	Fayoum-Beni Suef Bypass	D	E	B	D	D
	RD-995	Wasta Bridge Connection	C	A	B	D	D
	RD-997	Helwan-Beni Suef Bridge	C	A	B	D	D
	RD-314	Zafarana Elkoraymat Road (Expressway)	D	A	B	E	E
	RD-305	Bahriya Siwa Road	E	A	E	E	E
	RD-306	Bahriya Minya Road	E	A	C	E	E
	RD-996	Minya Bridge	C	A	B	D	D
	RD-303	Upper Egypt East Desert Red Sea Road	E	A	E	E	E
	RD-329	Farafra Malwa Road	E	A	B	E	E
	RD-330	El-Dakhla Assyuit Road	E	A	B	E	E
	RD-226	Oena - Safaga Road	D	A	E	E	E
	RW-303	Single Tracking for Luxor - Hurghada [Electrificated]	E	A	E	A	A
	RW-409	Rehabilitation of Tracks for Oena - Safaga	B	C	B	B	B
	RW-408	Rehabilitation of Tracks for Oena - Kharga	B	C	B	B	B
RD-313-2	Asyut Aswan Abu Simbelle Desert Western Road (Expressway): South part from Aswan	E	A	D	E	E	
Suez Canal Development	RD-317	Ismailia Suez Road (Expressway)	D	E	B	E	E
Nationwide	P-1	Passenger Intermodal Facilities	D	C	B	D	D
	L-2	Logistic Center including improvement of Station facilities for Freight Services (4 stations)	D	C	B	D	D
Software	SW-1	Egyptian Transport Center (ETC)	A	A	A	C	C
	SW-2	Establishment of Dedicated Transport Funds	A	A	A	C	C
	SW-3	Development of Road Function based design and Capacity Standards	A	A	A	C	C
	SW-4	Road safety Initiative (3E: Engineer, Education and Enforcement)	A	A	A	C	C
	SW-5	Railway Safety Initiative	A	A	A	C	C
	SW-6	Introduction of State of the Art Raikway Systems and Control	A	A	A	C	C
	SW-7	Development of IWT management database and installation of IWT Navigation Information System	A	A	A	C	C
Humanware	HW-1	Strengthening of MOT's repsonibility covering all transport modes for integrated multimodal system and logistics	A	A	A	C	C
	HW-2	Training of Modern Traffic Management and Control System	A	A	A	C	C
	HW-3	Training of Modern Road Maitenance Techniques	A	A	A	C	C
	HW-4	Extension of Transformation Plan	A	A	A	C	C
	HW-5	Extension of NICHE program	A	A	A	C	C

8.3. OVERALL ENVIRONMENTAL EVALUATION

8.3.1. Calculation of Total Score

To conduct overall environmental evaluation weighting of each indicator is set up as shown in Table 8.3.1.

Table 8.3.1 Weighting of the Indicator

	Indicator	Weighting (%)
1	Land acquisition and resettlement	30 %
2	Location of project	30 %
3	Natural Protectorates	20 %
4	Increase of CO ₂ emissions	10 %
5	Increase of NO _x and PM emissions	10 %

Score for each indicator is obtained by multiplying corresponding to point for rating and weighting and total score for each project is obtained by adding scores for four indicators.

All the projects are classified into following five ranks (A to E) according to the numerical value of total score (Table 8.3.2)

Table 8.3.2 Rank and Total Score

Rank	Total score
Rank A	5.0 >= TS >4.0
Rank B	4.0 >= TS > 3.0
Rank C	3.0 >= TS > 2.0
Rank D	2.0 >= TS > 1.0
Rank E	1.0 >= TS

Results of environmental evaluation are arranged in order of total scores and classified into five ranks as shown in Table 8.3.3.

Table 8.3.3 Result of Environmental Evaluation in Order of Total Score

Project ID	Project Name	1) Land acquisition		2) Location		3) Protectorate		4) Global warming		5) Air Pollution		Total Score	Rank
		Rating	Weight	Rating	Weight	Rating	Weight	Rating	Weight	Rating	Weight		
SW-1	Egyptian Transport Center (ETC)	5.0	0.3	5.0	0.3	5.0	0.2	3.0	0.1	3.0	0.1	4.6	A
SW-2	Establishment of Dedicated Transport Funds	5.0	0.3	5.0	0.3	5.0	0.2	3.0	0.1	3.0	0.1	4.6	A
SW-3	Development of Road Function based design and Capacity Standards	5.0	0.3	5.0	0.3	5.0	0.2	3.0	0.1	3.0	0.1	4.6	A
SW-4	Road safety Initiative (3E: Engineer, Education and Enforcement)	5.0	0.3	5.0	0.3	5.0	0.2	3.0	0.1	3.0	0.1	4.6	A
SW-5	Railway Safety Initiative	5.0	0.3	5.0	0.3	5.0	0.2	3.0	0.1	3.0	0.1	4.6	A
SW-6	Introduction of State of the Art Railway Systems and Control	5.0	0.3	5.0	0.3	5.0	0.2	3.0	0.1	3.0	0.1	4.6	A
SW-7	Development of IWT management database and installation of IWT Navigation Information System	5.0	0.3	5.0	0.3	5.0	0.2	3.0	0.1	3.0	0.1	4.6	A
HW-1	Strengthening of MOT's responsibility covering all transport modes for integrated multimodal system and logistics	5.0	0.3	5.0	0.3	5.0	0.2	3.0	0.1	3.0	0.1	4.6	A
HW-2	Training of Modern Traffic Management and Control System	5.0	0.3	5.0	0.3	5.0	0.2	3.0	0.1	3.0	0.1	4.6	A
HW-3	Training of Modern Road Maintenance Techniques	5.0	0.3	5.0	0.3	5.0	0.2	3.0	0.1	3.0	0.1	4.6	A
HW-4	Extension of Transformation Plan	5.0	0.3	5.0	0.3	5.0	0.2	3.0	0.1	3.0	0.1	4.6	A
HW-5	Extension of NICHE program	5.0	0.3	5.0	0.3	5.0	0.2	3.0	0.1	3.0	0.1	4.6	A
RW-407	Railway Link between Robeki to Helwan	2.0	0.3	5.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.7	B

Project ID	Project Name	1) Land acquisition		2) Location		3) Protectorate		4) Global warming		5) Air Pollution		Total Score	Rank
		Rating	Weight	Rating	Weight	Rating	Weight	Rating	Weight	Rating	Weight		
RW-412	Improvement of Station Facilities for Freight Services (2 stations) (good intermodal connection & facilities, railway layout/arrangement, warehouse and station office)	4.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.7	B
RW-402-1	Improvement of Tracks: Cairo - Tanta - Alexandria	4.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.7	B
RW-401	Improvement of Track Arrangement for Cairo - Qalyub	4.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.7	B
RW-310	Improvement of Signaling System for Increase of Freight Trains for Tanta - Mansoura - Damietta	4.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.7	B
RW-402-2	Improvement of Tracks: Damietta - Port Said Line	4.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.7	B
RW-300	Double Tracking for Ain Shams - Robeki	4.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.7	B
RW-410	Rehabilitation of Tracks for El-Kab - Bir El Abd	4.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.7	B
RW-306	Development of Railway Bridge for Lemon - Abbasiya - Torá	4.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.7	B
RW-402-4	Improvement of Tracks: 1) Track renewal, 2) New track maintenance machines on Cairo - Aswan	4.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.7	B
RW-412-4	Improvement of Station Facilities for Freight Services (6 stations) (good intermodal connection & facilities, railway layout/arrangement, warehouse and station office)	4.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.7	B
RW-409	Rehabilitation of Tracks for Qena - Safaga	4.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.7	B
RW-408	Rehabilitation of Tracks for Qena - Kharga	4.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.7	B
RD-327	Suez Canal Tunnel Ismailia	3.0	0.3	5.0	0.3	4.0	0.2	2.0	0.1	2.0	0.1	3.6	B
RD-298	Kalabsha Bidge (Koum Ombo) (Aswan)	3.0	0.3	5.0	0.3	4.0	0.2	2.0	0.1	2.0	0.1	3.6	B
RD-995	Wasta Bridge Connection	3.0	0.3	5.0	0.3	4.0	0.2	2.0	0.1	2.0	0.1	3.6	B
RD-997	Helwan-Beni Suef Bridge	3.0	0.3	5.0	0.3	4.0	0.2	2.0	0.1	2.0	0.1	3.6	B
RD-996	Minya Bridge	3.0	0.3	5.0	0.3	4.0	0.2	2.0	0.1	2.0	0.1	3.6	B
IW-1	IWT port for ITC	3.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.4	B
IW-5	Waterway Improvement on Cairo - Alexandria	3.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.4	B
PT-1	Establishment of a Multi Purpose Terminal (Containers and General Cargo) at Alexandria Port	3.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.4	B
PT-2	Development of management and Operation for Multi Purpose Terminal in El Dekheila Port	3.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.4	B
PT-3	Dekheila Port: New Container Terminal	3.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.4	B
IW-6	Waterway Improvement on Cairo - Damietta	3.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.4	B
PT-4	Damietta Port: Study on Sedimentation	3.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.4	B
PT-5	Port Said East: Logistic Center	3.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.4	B
IW-2	IWT port improvement for Upper Egypt	3.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.4	B
IW-3	Lock Expansion with Comprehensive Lock Operation Improvement	3.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.4	B
IW-4	Waterway improvement on Cairo - Assyuit	3.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.4	B
RD-321	El Ain El Sokhna - Zafarana Road	2.0	0.3	5.0	0.3	4.0	0.2	2.0	0.1	2.0	0.1	3.3	B
RD-334	Al Mahalla - Kafr El Sheikh - Damanhour	2.0	0.3	5.0	0.3	4.0	0.2	1.0	0.1	1.0	0.1	3.1	B
RD-326	Albetrol Malwa Road	2.0	0.3	5.0	0.3	4.0	0.2	1.0	0.1	1.0	0.1	3.1	B
RD-314	Zafarana Elkoraymat Road (Expressway)	2.0	0.3	5.0	0.3	4.0	0.2	1.0	0.1	1.0	0.1	3.1	B
RW-403	Double Tracking of Bypass Line for Cairo - New Alexandria	4.0	0.3	1.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.1	B
RW-420	Railway Link between Sokhna Port to Helwan	2.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.1	B
RW-307	Double Tracking for Qalyoub - El Qnater	4.0	0.3	1.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.1	B
RW-308	Triple Tracking for Qalyoub - Benha	4.0	0.3	1.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.1	B
RW-302	Single Tracking for Kafr El-Batikh - New Damietta City	2.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.1	B
RW-309	Double Tracking for Mansoura - Damietta	4.0	0.3	1.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	3.1	B
L-1	VAL (Value Added Logistics) Center at 6 th of October City	3.0	0.3	3.0	0.3	4.0	0.2	2.0	0.1	2.0	0.1	3.0	C
RD-299	Abo Tiq Bridge and Selim Coast (Asyut)	3.0	0.3	3.0	0.3	4.0	0.2	2.0	0.1	2.0	0.1	3.0	C
RW-303	Single Tracking for Luxor - Hurghada [Electrified]	1.0	0.3	5.0	0.3	1.0	0.2	5.0	0.1	5.0	0.1	3.0	C
P-1	Passenger Intermodal Facilities	3.0	0.3	3.0	0.3	4.0	0.2	2.0	0.1	2.0	0.1	3.0	C
L-2	Logistic Center including improvement of Station facilities for Freight Services (4 stations)	3.0	0.3	3.0	0.3	4.0	0.2	2.0	0.1	2.0	0.1	3.0	C
RD-323	Wadi Alnatroum Saloum Road	1.0	0.3	5.0	0.3	4.0	0.2	1.0	0.1	1.0	0.1	2.8	C
RD-331	Qena Aswan Nile East Bank Road	1.0	0.3	5.0	0.3	4.0	0.2	1.0	0.1	1.0	0.1	2.8	C
RD-312	Cairo - Asyut Desert Western Road (Expressway)	1.0	0.3	5.0	0.3	4.0	0.2	1.0	0.1	1.0	0.1	2.8	C
RD-329	Farafra Malwa Road	1.0	0.3	5.0	0.3	4.0	0.2	1.0	0.1	1.0	0.1	2.8	C
RD-330	El-Dakhla Assyuit Road	1.0	0.3	5.0	0.3	4.0	0.2	1.0	0.1	1.0	0.1	2.8	C
RW-406	Railway Link for 6th of October City	1.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	2.8	C
RW-313	Double Tracking to 10th of Ramadhan City	1.0	0.3	3.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	2.8	C
RD-214	Zagaziq Sinbellaween Road	2.0	0.3	3.0	0.3	4.0	0.2	2.0	0.1	2.0	0.1	2.7	C

Project ID	Project Name	1) Land acquisition		2) Location		3) Protectorate		4) Global warming		5) Air Pollution		Total Score	Rank
		Rating	Weight	Rating	Weight	Rating	Weight	Rating	Weight	Rating	Weight		
RD-215	Mansoura Talha Dekernes Mataria Road	2.0	0.3	3.0	0.3	4.0	0.2	2.0	0.1	2.0	0.1	2.7	C
RD-216	Qantara Salheya Faqous Abu Kbeir Hehya Zagaziq Road	2.0	0.3	3.0	0.3	4.0	0.2	2.0	0.1	2.0	0.1	2.7	C
RD-328	Alawqa Ismailia Road	2.0	0.3	5.0	0.3	2.0	0.2	1.0	0.1	1.0	0.1	2.7	C
RD-306	Bahriya Minya Road	1.0	0.3	5.0	0.3	3.0	0.2	1.0	0.1	1.0	0.1	2.6	C
RD-325	ALbetrol Beni Mazar Road	2.0	0.3	5.0	0.3	1.0	0.2	1.0	0.1	1.0	0.1	2.5	C
RD-226	Oena - Safaga Road	2.0	0.3	5.0	0.3	1.0	0.2	1.0	0.1	1.0	0.1	2.5	C
RW-301	Single Tracking for Basion City	2.0	0.3	1.0	0.3	4.0	0.2	4.0	0.1	4.0	0.1	2.5	C
RD-304	Rod El Farag Road	1.0	0.3	3.0	0.3	4.0	0.2	2.0	0.1	2.0	0.1	2.4	C
RD-311	Suez Ras elnakab Road (Expressway)	1.0	0.3	5.0	0.3	2.0	0.2	1.0	0.1	1.0	0.1	2.4	C
RD-313-1	Asyut Aswan Abu simble Desert Western Road (Expressway): Asyut to Aswan	1.0	0.3	5.0	0.3	2.0	0.2	1.0	0.1	1.0	0.1	2.4	C
RD-324	Eldaba Albetrol Road	1.0	0.3	5.0	0.3	2.0	0.2	1.0	0.1	1.0	0.1	2.4	C
RD-313-2	Asyut Aswan Abu Simbelle Desert Western Road (Expressway): South part from Aswan	1.0	0.3	5.0	0.3	2.0	0.2	1.0	0.1	1.0	0.1	2.4	C
RW-304	High Speed Railway for Cairo - Alexandria [High/Higer speed Alt-1]	1.0	0.3	1.0	0.3	4.0	0.2	5.0	0.1	5.0	0.1	2.4	C
RW-400	High Speed Railway for Cairo - Alexandria via Tanta [High/Higer speed Alt-2]	1.0	0.3	1.0	0.3	4.0	0.2	5.0	0.1	5.0	0.1	2.4	C
RW-312	Single Tracking for Bir El Abd - Rafah	1.0	0.3	1.0	0.3	4.0	0.2	5.0	0.1	5.0	0.1	2.4	C
RW-999	(High) Speed Railway for Cairo - Aswan [Electrificated]	1.0	0.3	1.0	0.3	4.0	0.2	5.0	0.1	5.0	0.1	2.4	C
RD-322	Safaga Baranis Halayeb Road	1.0	0.3	5.0	0.3	1.0	0.2	1.0	0.1	1.0	0.1	2.2	C
RD-305	Bahriya Siwa Road	1.0	0.3	5.0	0.3	1.0	0.2	1.0	0.1	1.0	0.1	2.2	C
RD-303	Upper Egypt East Desert Red Sea Road	1.0	0.3	5.0	0.3	1.0	0.2	1.0	0.1	1.0	0.1	2.2	C
RD-998	Alexandria Bypass	2.0	0.3	1.0	0.3	4.0	0.2	2.0	0.1	2.0	0.1	2.1	C
RD-315	Shubra elkhema - Banha Agriculture Road (Expressway)	2.0	0.3	1.0	0.3	4.0	0.2	2.0	0.1	2.0	0.1	2.1	C
RD-999	Cairo - Tanta Bypass	2.0	0.3	1.0	0.3	4.0	0.2	2.0	0.1	2.0	0.1	2.1	C
RD-332	Zakaziq - Toukh	2.0	0.3	1.0	0.3	4.0	0.2	2.0	0.1	2.0	0.1	2.1	C
RD-333	Tanta - Kafr El Sheikh	2.0	0.3	1.0	0.3	4.0	0.2	2.0	0.1	2.0	0.1	2.1	C
RD-318	Desouq Fowa Metobas Road	2.0	0.3	1.0	0.3	4.0	0.2	2.0	0.1	2.0	0.1	2.1	C
RD-319	Imbaba Qalyub Tawfekia Road	2.0	0.3	1.0	0.3	4.0	0.2	2.0	0.1	2.0	0.1	2.1	C
RD-225	El-Belina - Tahta Road	2.0	0.3	1.0	0.3	4.0	0.2	2.0	0.1	2.0	0.1	2.1	C
RD-994	Fayoum-Beni Suef Bypass	2.0	0.3	1.0	0.3	4.0	0.2	2.0	0.1	2.0	0.1	2.1	C
RD-300	3rd Cairo Alex Expressway	2.0	0.3	1.0	0.3	4.0	0.2	1.0	0.1	1.0	0.1	1.9	D
RD-317	Ismailia Suez Road (Expressway)	2.0	0.3	1.0	0.3	4.0	0.2	1.0	0.1	1.0	0.1	1.9	D
RD-200	Belbeis-Banha-El Bagour-El Khatatba Regional Ring Road	1.0	0.3	1.0	0.3	4.0	0.2	2.0	0.1	2.0	0.1	1.8	D
RD-204	Cairo Alexandria Desert Expresway (Upgrade to 8-lanes)	1.0	0.3	1.0	0.3	4.0	0.2	1.0	0.1	1.0	0.1	1.6	D
RD-320	El-Qanater El-Bagour Shebin El-Koum Tanta Mahalla Matboul Road	1.0	0.3	1.0	0.3	4.0	0.2	1.0	0.1	1.0	0.1	1.6	D
RD-308	Cairo Ismailia Port Said Road (Expressway)	1.0	0.3	1.0	0.3	4.0	0.2	1.0	0.1	1.0	0.1	1.6	D
RD-310	Cairo-Suez Road (Expressway)	1.0	0.3	3.0	0.3	1.0	0.2	1.0	0.1	1.0	0.1	1.6	D
RD-309	Qantara-Rafah Road	2.0	0.3	1.0	0.3	1.0	0.2	1.0	0.1	1.0	0.1	1.3	D
RD-316	Alamein Road	2.0	0.3	1.0	0.3	1.0	0.2	1.0	0.1	1.0	0.1	1.3	D
RD-301	3rd Stage Regional Ring Road (Southern Part of Expressway)	1.0	0.3	1.0	0.3	1.0	0.2	1.0	0.1	1.0	0.1	1.0	E
RD-302	Cairo Alex Agriculture Baypass Kafr El Zayat - Alexandria	1.0	0.3	1.0	0.3	1.0	0.2	1.0	0.1	1.0	0.1	1.0	E
RD-307	Alexandria-Saloum Road	1.0	0.3	1.0	0.3	1.0	0.2	1.0	0.1	1.0	0.1	1.0	E

Source: JICA Study Team

8.4. PROFILES OF THE PROJECTS FOR EACH RANK

Features of the candidate projects classified into five ranks are as follows:

1) Rank A projects (4 < Total score =< 5)

Software and hardware projects (12 projects) are all classified into Rank A, because of their activities essentially may cause no negative impacts on environment. However, total score of 4.6 instead of full score of 5.0, means those projects may cause no positive impact on reduction of both CO₂ and air pollutant emissions in terms of environment.

2) Rank B Projects (3 < Total score =< 4)

Projects classified into Rank B (37 projects) are mostly as follows:

Road projects without land acquisition and not located in or near the protected area

Railway projects including improvement/rehabilitation of signaling, stations and tracks, and upgrading to double or triple tracking of existing railway lines

Improvement of port and inland waterway

Construction of new road/railway bridges and road tunnel

3) Rank C Projects (2 < Total score =< 3)

Projects classified into Rank C (41 projects) are mostly as follows:

Road projects for new construction and widening of existing road with shorter length of section and not located in or near the protected area

- Railway projects for new construction of railway line with longer length of section in desert area and land acquisition is required but and not located in or near the protected areas.
- Construction of logistic centers

4) Rank D Projects (1 < Total score =< 2)

Projects classified into Rank D are 9 projects for new construction of roads in desert area, which need land acquisition and resettlement, but not located in or near the protected areas.

5) Rank E projects (Total score <= 1)

Projects for construction of long distance expressway or arterial roads are classified into Rank E. Lower scores are due to necessity of land acquisition and resettlement, located in the protected areas and generation of higher amount of CO₂ and air pollutant emissions.

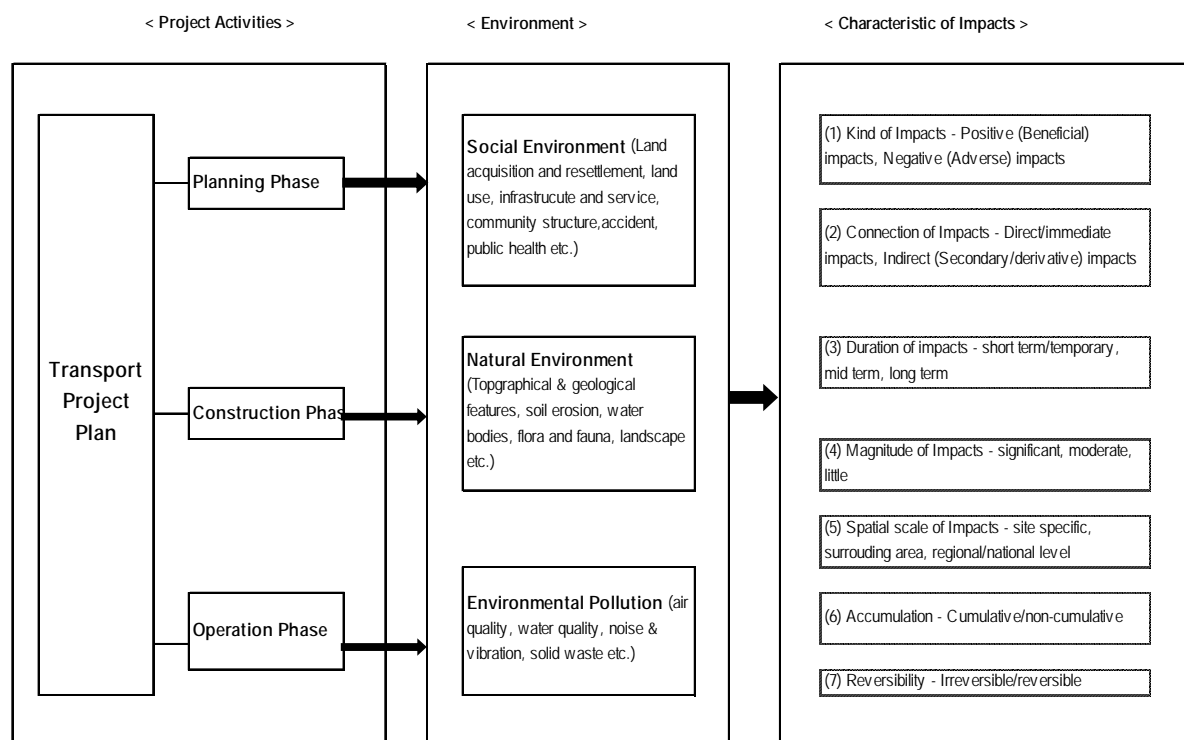
CHAPTER 9: OVERALL ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

9.1. INTRODUCTION

In general transport activities are carried out to improve the mobility of goods and persons, which should result in improved economic development. Consequently, it will improve the social environment. However, almost every activity has also negative impacts on the environment, being slight or severe.

In this Chapter at first identify roughly anticipated negative impacts due to candidate transport projects are roughly identified as a whole and possible mitigation measures against the impacts are examined. Then suggestions and recommendations for project plans desirable in general and to items of major negative impacts are described in terms of environmental and social aspects.

Figure 9.1.1 indicates schematic features of impact process due to transport projects activities in view of characteristics of the impacts.



Source: JICA Study Team

Figure 9.1.1 Schematic Features of Environmental Impacts

9.2. IDENTIFYING ANTICIPATED IMPACTS DUE TO CANDIDATE PROJECTS AND EXAMINING POSSIBLE MITIGATION MEASURES

9.2.1. Methodology of the Identification and the Examination

1) Setting of Environmental Items

- According to JICA Guidelines for Environmental and Social Considerations, anticipated impacts to be assessed include impacts on human health and safety, as well as on the natural environment, that are transmitted through air, water, soil, waste, accidents, water usage, climate change, ecosystems, fauna and flora, including trans-boundary or global scale impacts. These also include social impacts, including migration of population and involuntary resettlement, local economy such as employment and livelihood, utilization of land and local resources, social institutions such as social capital and local decision-making institutions, existing social infrastructures and services, vulnerable social groups such as poor and indigenous peoples, equality of benefits and losses and equality in the development process, gender, children's rights, cultural heritage, local conflicts of interest, infectious diseases such as HIV/AIDS, and working conditions including occupational safety.
- In addition to the direct and immediate impacts of projects, the derivative, secondary, and cumulative impacts as well as impacts associated with indivisible projects will also be assessed with regard to environmental and social considerations, so far as it is rational.
- In this examination thirty five (35) environmental items (social environment, natural environment and environmental pollution) are selected with taking into considerations the above and laws and relevant guidelines of Egyptian Government as well as feature of the project and location of project area.as shown in Table 9.2.1.

Table 9.2.1 Environmental Items

Environmental item		Remarks
(A) Social Environment		
1	Involuntary Resettlement (Land Acquisition and Resettlement)	Land acquisition and/or resettlement to secure Right of Way and land for transport related facilities and structures
2	Local economy	Situation of employment and livelihood etc.
3	Land use and utilization of local resources	Change of land use and utilization of local resources
4	Social institutions	Social infrastructure and local decision-making institutions, split of communities
5	Existing social infrastructures and services	Other than Transport infrastructures and services
6	Transport and traffic conditions	Including non-mechanized transport and walks
7	The poor, indigenous of ethnic people	1) Peoples living in slum areas (Katch Abbadas) and below poverty level, 2) dignity, human rights, economics and cultures of ethnic minority group
8	Misdistribution of benefit and damage	Equality of benefits and losses and equality involved in development process
9	Local conflict of interests	Possible cause for destruction of community structures
10	Cultural property and heritage	Cultural, religious, archaeological and heritage sites
11	Fishing Rights, Water Rights and Rights of Common	Existence of rights ownership
12	Public health and Sanitation	Health condition, prevalence of diseases and sanitary condition
13	Infectious diseases such as HIV/AIDS	Other developing countries infection of HIV/AIDS were often reported due to contact of workers with HIV/AIDS affected people at their camp.
14	Working condition	Including occupational safety
15	Hazard/risk (disaster, security)	Including cyclone, seismicity, free from danger (safety and security)
16	Accidents	Traffic accidents and accidents during construction work
(B) Natural Environment		
17	Topography and Geology	Specific/valuable feature of topography and geology

Environmental item		Remarks
18	Soil erosion/sand movement	Susceptibility to erosion or landslide
19	Groundwater	Major water supply resources of the area
20	River, canal and storm-water drainage	1) River and canal flow, 2) storm-water drainage water conditions
21	Coastal zone	Mediterranean and Red Sea coastal zone
22	Flora, Fauna and Biodiversity	1) Valuable and endangered species, 2) Trees and greens along the roads and surrounding area
23	Protected areas	1) National Parks, Nature Reserves, Bird Sanctuaries etc. 2) City parks
24	Landscape and visual amenity	Esthetic value of green area and landmarks
25	Meteorology	change of local climate condition
26	Global Warming	Greenhouse gas emissions from vehicles and construction machines
(C) Environmental pollution		
27	Air pollution	Air pollutants emissions such as NOx and PM from transport activities and construction work
28	Freshwater pollution	Discharge of water pollutants to Nile River and its Branch, canals, lakes from transport activities and construction work
29	Coastal and Marine Water Pollution	Discharge of water pollutants to coastal and marine environment from transport activities and construction work
30	Soil contamination	Contamination of toxic materials in soil
31	Bottom sediment	Contamination of toxic materials in bottom sediment of water bodies
32	Waste	Waste generation during construction work
33	Noise and Vibration	Noise and vibration due to vehicles and construction work
34	Ground Subsidence	Situation of foundation and pumping up of groundwater
35	Offensive odor	Bad smell due to exhaust emission and factories

Source: JICA Study Team

2) Identifying Project Activities

Activities which might affect environmental impacts due to the candidate projects are identified for three stages of implementation, i.e. planning, construction and operation stages as shown in Table 9.2.2.

Table 9.2.2 Activities due to Candidate Projects

Stage	Expected activities due to the projects	Projects				
		Roads	Railway	Inland waterway	Port	Software/ Human Ware
Planning Stage	Securing land for the project	XX	XX	XX	XX	
	Change in use of land, waters and sea, and local resources	XX	XX	XX	XX	
Construction Stage	Extraction and transportation of construction materials	XX	XX	XX	XX	
	Construction work (earth moving and engineering works)	XX	XX	XX	XX	
	Operation of plants, machines, vehicles, ships, etc. for construction work	XX	XX	XX	XX	
	Installation of warehouse, plants and worker's camp	XX	XX	XX	XX	
	Construction of roads and related facilities	XX			X	
	Construction of railway lines and related facilities		XX		X	
	Construction of inland waterways and related facilities			XX		
Operation Stage	Construction of ports and related facilities				XX	
	Operation of road transport (car, bus, truck, etc.)	XX			X	X
	Operation of road transport related facilities	XX			X	X
	Operation of railway transport (passenger, freight)					X
	Operation of railway transport related facilities		XX		X	X
	Operation of inland waterway transport (passenger and cargo)			XX		X
	Operation of inland waterway transport related facilities			XX		X
Operation of ports (passenger and cargo ship)				XX	X	

	Operation of port transport related facilities				XX	X
	Spatial occupancy of transport networks and related facilities	XX	XX	XX	XX	
	Capacity Building					XX

Note 1: xx - major activities, x - related activities

Source: JICA Study Team

3) Identifying of anticipated environmental impacts-1 Formulation of impact matrix

By correspondence each activity shown in Table 9.2.2 to each of 35 environmental items shown in Table 9.2.1, extent of anticipated environmental impacts are evaluated one by one with rating. In general, both positive (beneficial) impact (+) and negative (adverse) impact (-) are expected due to the project activities for three stages. Thus the following rating criteria are adopted depending on the extent of impacts:

A (+/-) – Significant positive/negative impact is expected,

B (+/-) – Positive/negative impact is expected to some extent,

C (+/-) - Extent of positive/negative impact is unknown or not clear (Further examination is needed. It should be taken into consideration that impacts may become clear as study progresses.),

Blank - Negligible or No impact is expected.

Overall rating - Overall rating is determined by adopting the worst (negative) value of rating among three stages.

Impact matrix was formulated by summarizing the results of rating for all the candidate projects with each item and stage three stages as shown in Table 9.2.3.

Table 9.2.3 Impact Matrix of Candidate Projects

Environmental item (2)	Rating (3, 4)				Remarks
	T	P	C	O	
(I) Social Environment					
1) Land acquisition and resettlement (Involuntary resettlement)	A-	A-			In case of land and assets requirement
2) Local economy such as employment and livelihood etc.	B+		B+	A+	
3) Land use and utilization of local resources	B-	B-	B-		
4) Social institutions such as social infrastructure and local decision-making institutions, a split of communities	B-	B-	B-	B-	
5) Existing social infrastructures and services	B-		B-	A+	
6) Transport and Traffic conditions	B-		B-	A+	
7) The poor, indigenous of ethnic people	C-	C-	C-	C-	
8) Misdistribution of benefit and damage (Equality of benefits and losses and equality involved in development process)	A-	A-	B-		Depends on projects
9) Local conflict of interests	A-	A-	B-		Depends on projects
10) Cultural property and heritage	B-		B-	C-	
11) Fishing Rights, Water Rights and Rights of Common	C-	C-	C-		
12) Public health and Sanitation	B-		B-	C-	
13) Infectious diseases such as HIV/AIDS	B-		B-		

Environmental item (2)	Rating (3, 4)				Remarks
	T	P	C	O	
14) Working condition including occupational safety	B-		B-		
15) Hazard/risk (disaster, drainage patterns)	B-		B-		
16) Accidents	B-		B-	C-	
(II) Natural Environment					
17) Topography and Geology	B-	C-	B-		
18) Soil erosion/sand movement	B-		B-		
19) Groundwater	B-	C-	B-	C-	
20) Movement of water/Hydrological situation	B-	C-	B-	C-	
21) Coastal zone	B-		B-		Port
22) Flora, Fauna and Biodiversity	B-		B-	C-	
23) Protected areas (National Parks, Bird Sanctuaries etc.)	C-	C-	C-	C-	
24) Landscape	B-		B-	C-	
25) Micro Climate	C-	C-	C-	C-	
26) Global Warming	B-/B+		B-	B-/B+	B+ (Railway, IWT, Port)
(III) Environmental pollution					
27) Air pollution	B-/B+		B-	B-/B+	B+ (Railway, IWT, Port)
28) Freshwater pollution	B-		B-	C-	B- (IWT)
29) Coastal and Marine pollution	B-		B-		B- (Port)
30) Soil contamination	B-		B-	C-	
31) Bottom sediment	C-		C-	C-	B- (IWT, Port)
32) Waste	B-		B-	C-	
33) Noise and Vibration	B-		B-	C-	
34) Ground Subsidence	C-		C-	C-	
35) Offensive odor	C-		C-	C-	

Note 1: Assuming cases of more serious negative impacts are anticipated. Thus the rating in the Table changes depending on the contents and scale of project plans.

Note 2: Environmental items are selected based on the JICA Guidelines for Environmental and Social Considerations (2010.4) referring to Guidelines of Principles and Procedures for Environmental Impact Assessment 2nd Edition (EAAA, 2009)

Note 3: (T) - Whole stages of project implementation, (P) - Planning stage, (C) - Construction stage, (O) - Operation stage.

Note 4: (i) Rating (Magnitude of impacts): In general, both beneficial impact (+) and adverse impact (-) are expected due to the project activities. A (+/-) - Serious impact is expected, B (+/-) - Some impact is expected, C (+/-) - Extent of impact is unknown or not clear (Further examination is needed. It should be taken into consideration that impacts may become clear as study progresses.), Blank - Negligible or No impact is expected. IEE/EIA is not necessary. (ii) Total rating: the worst value of rating among three stages.

Source: JICA Study Team

4) Identifying of anticipated environmental impacts-2 Provisional Scoping

Anticipated environmental and social impacts due to the project are also identified, predicted and evaluated with rating for 35 items according to the scoping procedure. In Table 9.2.4 results of provisional scoping assuming cases of more serious negative impacts are anticipated. Thus the rating in the Table 8.2.4 changes depending on the contents and scale of project plans.

Table 9.2.4 Results of Provisional Scoping

Environmental item (1)	Rating				Anticipated Impacts (positive/negative)
	T	P	C	O	
(I) Social Environment					
1) Land acquisition and resettlement (Involuntary resettlement)	A-	A-			(P) To secure the lands for transport and related facilities, there is a possibility of involuntary resettlement including land acquisition and generation of Project Affected Peoples (PAPs), although it depends on the project plan (site location/route, scale, components etc.).
2) Local economy such as employment and livelihood etc.	B+		B+	A+	(C, O) Beneficial impacts are expected on local economy: (i) creation of employment opportunity for construction work during construction stage, (ii) improvement of transport network may raise living condition and make easier access to social services. However, some adverse impacts are also expected by change in local economic structure and means of livelihood.
3) Land use and utilization of local resources	B-	B-	B-		(P) Some alteration of existing land use and utilization of local resources is expected depending on the project plan.
4) Social institutions such as social infrastructure and local decision-making institutions, a split of communities	A-	A-	B-	B-	(O) Accessibility to social services and communication among peoples will be promoted. However, there will be some possibility to cause a split of communities and conflict depending on the project plan.
5) Existing social infrastructures and services	B-		B-	A+	(O) Beneficial impacts such as expansion of commuting range and easier access to social infrastructure and services in remote area are expected due to the project.
6) Transport and Traffic conditions	B-		B-	A+	(C) Construction works may give rise to temporary traffic congestion and inconvenience for accessibility to social services. (O) Smooth access to offices and working places, and increase of convenience to social services such as hospitals, schools, churches, etc. are expected due to the improvement of the traffic condition.
7) The poor, indigenous of ethnic people	C-	C-	C-	C-	(C, O) Transport project is expected to contribute to creation of employment opportunity for public works during construction stage and to improve living condition and access to social services. However, it is unknown whether the poor and vulnerable are able to enjoy the benefit equally or not at present.
8) Misdistribution of benefit and damage	A-	A-	B-		(O) Beneficial impacts such as expansion of commuting range and easier access to social infrastructure and services in remote area are expected due to the project. However, there may be some possibility of misdistribution of benefit and damage depending on selection of route and location in the project plan.
9) Local conflict of interests	A-	A-	B-		(P, C, O) Beneficial impacts such as expansion of commuting range and easier access to social infrastructure and services in remote area are expected due to the project. However, there may be some possibility of occurring conflict of interests depending on selection of route and location in the project plan.
10) Cultural property and heritage	B-		B-	C-	(C) In Egypt sites of cultural properties and heritages including World Heritages as well as archaeological sites are distributed in the whole country and they are also important resources of income to the country by attracting foreign tourists. Thus, there is a possibility that the project may somewhat deteriorate them depending on the route and location in the project plan.
11) Fishing Rights, Water Rights and Rights of Common	C-	C-	C-		(P) There is a possibility of disturbing fishing rights, water rights and rights of common depending on the project plan. However, extent of impact is unknown at present.
12) Public health and Sanitation	B-		B-	C-	(C) There is a possibility of deterioration respiratory functions due to emission of air pollutants such as dust, NOx, etc. during construction. (P) Air pollution due to increase of traffic volume may cause adverse impacts on respiratory organs during operation stage.

Environmental item (1)	Rating				Anticipated Impacts (positive/negative)
	T	P	C	O	
13) Infectious diseases such as HIV/AIDS	B-		B-		(C) In many developing countries infection of HIV/AIDS were often reported due to contact of workers with HIV/AIDS affected people at their camp in case of transport infrastructure development . There is a possibility of occurrence of similar case during construction stage.
14) Working condition including occupational safety	B-		B-		Many workers would be engaged in construction work, although extent of number of workers depends upon the project plan. Thus, safety and health condition of the workers may be jeopardized due to construction work.
15) Hazard/risk (disaster, drainage patterns)	B-		B-		(C, O) No additional risk of disaster and security are anticipated due to the project. However, there is a possibility of increase in disaster risk, if construction of tunnels and bridges are included in the project plan.
16) Accidents	B-		B-	C-	(C, P) 1) Increase in occurrence of accident is expected somewhat due to construction vehicles, boats and machines during construction stage, and increase in number and frequency of transport services in operation stage.
(II) Natural Environment					
17) Topography and Geology	B-	C-	B-		(C) There is little possibility that a large-scale alteration of topographic and geologic features depending on the project plan. However, if construction of tunnels and/or bridges is included in the project, larger impact is expected.
18) Soil erosion/sand movement	B-		B-		(C) Occurrence of land slide and soil erosion are expected due to excavation and dredging work at river bank and earth moving work, and cutting and filling in sites of a soft ground, although surface is mostly flat in Egypt. (C, O) There is a possibility that transport structures such as road pavement and railway track are covered with sand due to sand movement and heaping by wind in desert area.
19) Groundwater	B-	C-	B-	C-	(C) If construction of tunnels and a large scale excavation are included in the project plan, there is a possibility of significant change of groundwater flow and quality.
20) Movement of water/Hydrological situation	B-	C-	B-	C-	(C, O) 1) There is a possibility that hydrological conditions such as water flow and water level are adversely affected due to dredging work and installation of piers and other structures in case of construction of bridges and port development. 2) There is also a possibility that water flow and water level are adversely affected due to excavation and dredging works of waterways during construction stage and waterway navigation of ships during operation stage.
21) Coastal zone	B-		B-		(C, O) Some adversely impacts are expected on oceanographic conditions; and deterioration of coastal vegetation, coastal erosion, and sedimentation of sand and soil due to port development projects.
22) Flora, Fauna and Biodiversity	B-		B-	C-	In Egypt there are found many habitats of precious species, protected area and ecologically important sites including Natural Protectorates and Important Bird Areas (IBAs) in the whole country. (C) Thus it is expected that exhaust emission, wastewater discharge and noise generation due to construction work may cause to disturb living and breeding conditions of plants and animals. (O) In addition, spatial occupancy and activities of transport network and relating facilities may impede the movement of livestock and wild animals, and threaten habitats.
23) Protected areas (National Parks, Bird Sanctuaries etc.)	C-	C-	C-	C-	In Egypt there are found many habitats of precious species, protected area and ecologically important sites including Natural Protectorates and Important Bird Areas (IBAs) in the whole country. (C) Thus it is expected that exhaust emission, wastewater discharge and noise generation due to construction work may cause to disturb living and breeding conditions of plants and animals. (O) In addition, spatial occupancy and activities of road network and relating facilities may impede the movement of animals and threaten habitats.
24) Landscape	B-		B-	C-	(O) In Egypt sites of cultural properties and heritages, and religious and historic facilities are distributed in the whole country and they consist of attractive landscape. There is a possibility of deterioration aesthetic value of landscape by spatial occupancy of transport network and related facilities depending on the project plan.

Environmental item (1)	Rating				Anticipated Impacts (positive/negative)
	T	P	C	O	
25) Micro Climate	C-	C-	C-	C-	(C, O) Most areas of Egypt are topographically flat and occupied by desert. Thus even a small change of topographical features such as appearance of new structures and facilities may cause influence to microclimate condition such as wind.
26) Global Warming	B-		B-	B-	(C, O) Generation of greenhouse gases (GHG) such as CO ₂ which may affects global warming are expected from plants, vehicles, boats and machines at construction work and operation of transport services and related facilities. Regarding factors of CO ₂ emissions from railway and inland waterway transport are less than that from road transport. Therefore, modal shift to railway and inland waterway transport is preferable in terms of prevention of global warming.
(III) Environmental pollution					
27) Air pollution	B-		B-	B-	(C) Air pollution is expected due to dust rising from earth moving and engineering works, and air pollutants such as dust (PM) and NO _x from construction plants, vehicles, ships and machines. (P) In general, higher emissions of air pollutants, which will be resulted from increased number of traveling vehicles. In addition, poor emission control of vehicles due to insufficient maintenance and inspection may accelerate to spew out bad smell and black smoke. However, most areas are occupied with desert land and wind and fine weather condition in most of the year in Egypt. Thus emitted air pollutants can disperse easily and no profound impacts are expected except vicinity of road and urban areas. In addition, air pollutant emissions from railway and inland waterway transport are much less.
28) Freshwater pollution	B-		B-	C-	(C) Water pollution is expected due to increase in SS and turbidity of river water by excavation and dredging works of riverbed and bottom mud, and discharge of wastewater from worker's camp during construction stage. (O) Water pollution is also expected due to discharge of wastewater and leakage of fuel oil from Nile Cruisers and freight ships, and related facilities during operation stage.
29) Coastal and Marine pollution	B-		B-		(C) Marine water pollution is expected due to excavation and dredging works in coastal area and discharge of wastewater from construction works and worker's camps is expected during construction. (O) Marine water pollution is expected due to discharge of wastewater and leakage of fuel oil from ships, ports and related facilities during operation stage.
30) Soil contamination	B-		B-	C-	(C) There is a possibility of soil contamination due to spill over of toxic materials such as lubricant oils, asphalt emulsifiers, heavy metals, etc., which are utilized at construction work.
31) Bottom sediment	C-		B-		(C) There is a possibility of bottom sediment contamination in Nile River and other water bodies due to excavation and dredging work of riverbed, if construction of bridges and tunnels is included in the project plan.
32) Waste	B-		B-	C-	C) Generation of construction waste and garbage from worker's camp during construction stage. O) Generation of various kind of wastes from road transport and relating facilities during operation stage.
33) Noise and Vibration	A-		A-	B-	(C, O) It is expected that generation of significant noise and vibration are expected from both construction vehicles, ships and machines and increases in number and speed of traveling vehicles during operation stage. However, flat and open areas are mostly distributed along the routes and location except the urban area and the vicinity of road and railway track. Thus, dispersion
34) Ground Subsidence	C-		C-		(C, O) There is a possibility of ground subsidence if extraction of a large scale extraction of groundwater is included in the project plan. Otherwise, it is hardly expected.
35) Offensive odor	C-		C-		(C) There is a possibility of offensive odor due to materials such as asphalt emulsifier at construction work. However, it is expected to be temporary and a small scale.

Source: JICA Study Team

5) Possible Mitigation Measures

Regarding the impacts anticipated through the scoping it is required to collect further baseline data or conduct baseline survey in case of lack of appropriate information and to examine the possible mitigation measures and monitoring against negative impacts as much as possible:

- -Baseline survey will be done to make further understanding of existing environment and the effects expected to be caused by the project activities.
- -Mitigation measures will minimize the negative impact to an acceptable level through the planning, construction and operation phases. Monitoring is required to ensure that the specified mitigation measures are properly carried out through construction and operation stages.

Possible mitigation measures are shown in Table 9.2.5.

Table 9.2.5 Possible Mitigation Measures

Environmental item	Possible Mitigation Measures
(I) Social Environment	
1) Land acquisition and resettlement (Involuntary resettlement)	(P) 1) Consider alternative plans to avoid and/or minimize the occurrence of involuntary resettlement. 2) Detailed inventory survey on plots, facilities, structures and peoples living along the planned railway routes. 3) Survey on encroachment on ROW (Right Of Way) of the planned site/alignment. 4) Examine procedure and condition of involuntary resettlement and compensation to PAPs taking relevant laws in Egypt and the JICA Guidelines into considerations. 5) From early stage of the project, pay attention to information disclosure and consultation with stakeholders including PAPs for thorough understanding of the issues or to make agreement as much as possible. 6) Elaborate Resettlement Action Plan (RAP), if involuntary resettlement is unavoidable.
2) Local economy such as employment and livelihood etc.	(P) 1) Promote cooperation with relevant development plans. 2) Give inhabitants in the project area preference to having a chance to construction work and training to get working skills.
3) Land use and utilization of local resources	(P) Promote cooperation with regional development plans and regulations of land and resources utilization.
4) Social institutions such as social infrastructure and local decision-making institutions, a split of communities	(P) 1) Survey on community structures, procedure of decision-making and opinion leaders in the project area. 2) Information disclosure and public participation should be fully considered for stakeholders including decision-makers of the communities from early stage of planning for obtaining thorough understanding and consensus of the people and communities.
5) Existing social infrastructures and services	(P) Promote integrated development master plan including other social infrastructure and services.
6) Transport and Traffic conditions	(C) Alternative traffic routes shall be provided during construction, and adequate warning signs installed at the approach to road crossings from both directions. Traffic management shall be undertaken in coordination with the local traffic police department.
7) The poor, indigenous of ethnic people	(P) 1) Give the vulnerable groups in the project area higher priority to having a chance to construction work and training to get working skills. 2) The vulnerable people should be taken fully considerations to compensate properly or support to restore the present living condition in case of involuntary resettlement, even if they are illegal occupants.
8) Misdistribution of benefit and damage	(P) 1) Information disclosure and public participation should be fully considered from early stage to obtain thorough understanding the project and consensus among the communities and PAPs in order to share with benefit and damage equally.
9) Local conflict of interests	(P) Information disclosure and public participation should be fully considered from early stage to obtain understanding the project and consensus among the communities and PAPs in order to avoid or minimize local conflict of interests.
10) Cultural property and heritage	(P) 1) Avoid the route penetrating or close to the sites of cultural properties, heritages and archaeological importance in the project plan. 2) If any buried cultural properties are found at construction work, report and consult with concerned organizations such as Ministry of

	Cultures without delay.
11) Fishing Rights, Water Rights and Rights of Common	(P) Promote participation of those who have the rights in order to get their opinion and ensuring understanding and making consent in the course of the stakeholder meeting from the planning stage
12) Public health and Sanitation	(P, C, O) 1) Monitor outbreak and prevalence of diseases. 2) Enlighten peoples about awareness of public health and sanitation.
13) Infectious diseases such as HIV/AIDS	(P, C, O) 1) Monitor cases of HIV/AIDS before and after the project. 2) Enlightenment and campaign on prevention and cure of HIV/AIDS.
14) Working condition including occupational safety	(C) 1) Prepare tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents accidents, and management of hazardous materials. 2) Plan and implement intangible measures for individuals involved in the project, such as the establishment of a safety and health program, and safety training for workers etc.
15) Hazard/risk (disaster, drainage patterns)	(P) 1) Avoid routes and sites with higher risk of disaster and security in the project plan. 3) Survey properly on topography, geology, soils and ground foundations in the project area.
16) Accidents	(P) 1) Consider proper preventive measures against accidents in the project plan. 2) Enlighten passengers, drivers, skippers and/or peoples in the project area about rules and manners of traffic safety.
<i>(II) Natural Environment</i>	
17) Topography and Geology	(P) 1) Avoid the routes and site of unstable ground condition. 2) Consider proper preventive measures against landslide at construction site, quarries and borrow pits in the project plan.
18) Soil erosion/sand movement	(C, O) 1) Avoid the site of unstable soil condition i the project plan. 2) Consider preventive measures such as retaining walls, and barriers of trees and vegetation against soil erosion and sand movement along roads, railway tracks and inland waterways in the project plan.
19) Groundwater	(P, C, O) 1) Monitor groundwater level and quality in the project area.
20) Movement of water/Hydrological situation	(P) 1) Consider proper preventive measures against dredging work, riverbed siltation and scouring in the project plan of bridge construction. 2) Avoid blocking of natural drainage patterns by construction work. (P,C, O) 1) Monitor hydrological conditions and water quality of water bodies.
21) Coastal zone	(C, O) 1) Consider proper preventive measures against coastal erosion, and sedimentation of sand and soil in the project plan. 2) Monitor oceanographic conditions, and coastal erosion and sedimentation of sand.
22) Flora, Fauna and Biodiversity	(P) 1) Avoid routes and sites protected area and ecologically important sites in the project plan. 2) Formulate environment management plan in the project area to comply with relevant National and/or Governorate Environment Action Plan.
23) Protected areas (National Parks, Bird Sanctuaries etc.)	(P) 1) Avoid routes and location of habitats of precious species, protected area and ecologically important sites in the project plan. 2) If the project sites are unavoidable to pass through or close to the above mentioned areas, minimize overlapped area and/or take mitigation measures such as setting speed-limit and putting up a sign of "No Entry" or the protected area.3) Instruct construction workers, passengers and drivers awareness of natural protection.
24) Landscape	(P) 1) Avoid routes and location of cultural properties and heritages, and religious and historic sites in the project plan. 2) Consider arrangement with green belt and tree planting to harmonize with existing landscape along the transport network and related facilities in the project plan, if necessary.
25) Micro Climate	(P, C, O) Monitor microclimate change in the project area, if necessary.
26) Global Warming	(P) 1) Estimate generation of greenhouse gases from construction work and operation of transport services and related facilities, and evaluate contribution due to the project comparing with other sectors, activities and sources. 2) Promote modal shift to railway and inland waterway transport as much as possible.
<i>(III) Environmental pollution</i>	
27) Air pollution	(P) 1) Consider preventive measures against air pollution due to construction vehicles, boats and machines during construction stage and transport services and related facilities during operation stage in the project plan. 2) Arrangement of preventive measures such as green belt and planting trees along roads to alleviate air pollution. (P, C, O) 1) Monitor air quality before and after operation.
28) Freshwater pollution	(P) 1) Consider preventive measures against water pollution due to construction work and operation of transport services especially inland waterway transport in the project plan. (P, C, O) 1) Monitor wastewater and water quality before and after operation.

29) Coastal and Marine pollution	(P) Consider preventive measures against water pollution due to construction work and operation of sea port activities in the project plan. (P, C, O) Monitor wastewater and water quality before and after operation.
30) Soil contamination	(P) 1) Survey on cases of soil contamination in the project area. (P, C, O) 1) Monitor soil contamination before and after operation.
31) Bottom sediment	(P) 1) Survey on cases of bottom sediment contamination in the project area. (P, C, O) 1) Monitor bottom sediment contamination before and after operation.
32) Waste	(P) 1) Survey on major source of generation of wastes and waste management system in the project area. 2) Consider preventive measures for reduction, proper treatment and disposal of solid waste during construction and operation stage in the project plan. 3) Reflect concept of 3R (Reduce, reuse and recycle) to the project plan. 4) Enlighten awareness of waste management.
33) Noise and Vibration	(P) 1) Inventory survey on major source of noise and vibration. 2) Collect data of complaint about noise and vibration. 3) Consider preventive measures against noise and vibration such as (i) using low noise and vibration machines, (ii) suspending construction work in night time, (iii) installation of soundproof walls and buffer zones in the project plan. 4) Develop method of road traffic noise and vibration measurement. (P, C, O) 1) Monitor environmental and railway noise and vibration before and after the operation.
34) Ground Subsidence	(P) 1) Survey on cases of subsidence in the project area. (P, C, O) 1) Monitor occurrence of subsidence, if necessary.
35) Offensive odor	(P, C, O) 1) Monitor occurrence of offensive odor, if necessary.

Note 1: Mitigation measures include (i) further necessary baseline study, (ii) Measures to prevent, minimize and alleviate adverse impacts, (iii) monitoring etc.

9.3. OVERALL SUGGESTIONS AND RECOMMENDATIONS IN TERMS OF ENVIRONMENTAL AND SOCIAL ASPECTS

9.3.1. General Considerations

1) Comply with both Laws of Egyptian Government and JICA Guidelines for Environmental and Social Considerations

Take fully considerations into differences of relevant environmental laws and regulations, procedure of Environment Approval, EIA Categorization and land acquisition and resettlement policy between two countries. As for EIA categorization of the projects are almost same but naming of the category is placed in reverse order to that of JICA Guidelines for Environmental and Social Considerations as described in Chapter 1.4. In addition, as for land acquisition and resettlement policies there are gaps in compensation and resettlement assistance between Egyptian Government and foreign donors as described Chapter 1.5. For example, resettlement assistance to illegal occupants for eligibility and non-depreciated value of structures and assets for valuation are included in the donors' policy, while there are no such considerations for compensation measures in Egyptian laws as shown in Table 9.3.1.

Table 9.3.1 Gaps of Land Acquisition Policies between Egypt and International Donors

	Item	Egyptian legislative requirements	WB policy requirement
1	timing of compensation payment	Prior to displacement	Prior to displacement
2	Calculation of compensation	According to prevailing prices in the affected area and assessed by a specialized committee for that purpose	Full replacement cost
3	Squatters	Not included in the legislation (Applied cases for resettlements revealed that squatters have been compensated as a result of political sensitivity)	Are to be provided resettlement assistance (but no compensation for land)

	Item	Egyptian legislative requirements	WB policy requirement
4	Resettlement	Affected occupants who are physically displaced are to be provided with another residential housing. They do not have the rights to object the location of the resettlement but only the housing suitability in terms of area, design or relevant issues. Their objection is submitted within 15 days after receiving the notification of the new housing, to a dedicated committee for the purpose, which should respond in one month.	Affected people who are physically displaced are to be provided with residential housing, or housing sites, or, as required, agricultural sites at least equivalent to the old site. Preference to be given to land-based resettlement for displaced persons whose livelihoods are land-based. The resettlement would be based on RAP in case there the affected people is 200 or more while for less than 200, an RAP would be conducted.
5	Resettlement assistance	Not included.	Affected people are to be offered support after displacement, for a transition period.
6	Vulnerable groups	Not included.	Particular attention to be paid to vulnerable groups, especially those below the poverty line, the landless, the elderly, women and children, indigenous peoples, ethnic minorities.
7	Information and consultation	Displaced persons are provided timely and relevant information. Not consulted on resettlement options. Not able to participate in planning, implementing and monitoring resettlement.	Displaced persons and their communities are provided timely and relevant information, consulted on resettlement options, and offered opportunities to participate in planning, implementing, and monitoring resettlement.
8	Grievances	(1) Specialized committee for that purpose and time. (2) One month to object the decision of resettlement. (3) Four months to object the compensation value.	Appropriate and accessible grievance mechanisms to be established.

Note 1: * Involuntary resettlement policy of JICA is basically the same as that of World Bank

Source: Governorate of Alexandria (2007.6) Alexandria Development Project, Integrated Environmental and Social Impact Assessment (IESIA) - Resettlement Policy Framework (by North South Consultants Exchange and Royal Haskoning) (WB-RP 457)

2) Public participation

As described Chapter 6 public participation is another pillar of SEA, information disclosure and public participation should be fully considered for all the stakeholders from early stage of planning for obtaining thorough understanding and consensus of the people and communities. In addition, delay or standstill of the project implementation and a split of communities may occur, if fully considerations are not taken to minimize misdistribution of benefits and damage, and to avoid local conflict of interest.

3) Alternative Comparisons

Proposed projects should be evaluated with alternatives including "no action" case in SEA process as described in Chapter 6.

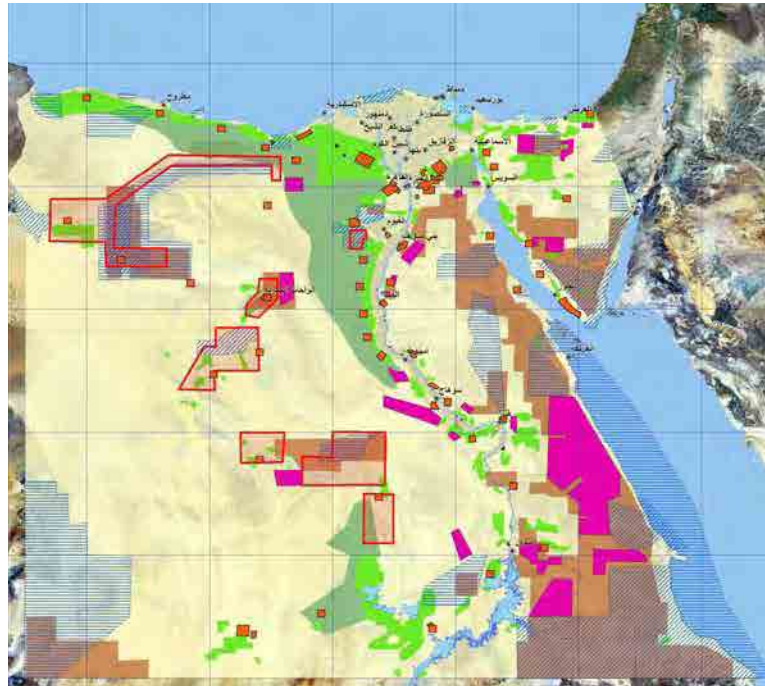
4) Selection of More Sustainable Transport Mode

In general road transport causes more significant air pollution through higher amounts of air pollutant emissions such as NO_x and PM and more contribution to global warming through greenhouse gases emissions such as CO₂. Thus, change of transport mode from road to other transport modes is effective and desirable in terms of environmental and social considerations.

5) Adjustment with Existing and Future Land Use Plan

To avoid or adjust overlapping of land use for transport activities with other allocated land uses such as protected areas, industrial zone, mining activities, tourism, land reclamation for agriculture, water resources, which are proposed in Development Strategy for Egypt 2017 (Investment opportunities map to 2017) and for Egypt 2050 (distribution areas of the proposed development activities until 2050) as shown in Figure 9.3.1.

Agricultural land is most important in Egypt for production of crops. Thus, It is desirable to avoid alignment of road and railway in agricultural land as much as possible.



Source: Strategic vision for the comprehensive development of Egypt 2050 (Ministry of Housing, Utilities and Urban Development, general Organization for Physical Planning and UNDP)

Figure 9.3.1 Distribution areas of the proposed development activities until 2050

6) Formulation of Environmental Management Plan

In general, to ensure and implement measures mitigation measures including monitoring, a comprehensive environmental management plan is needed. The plan portrays expected impacts, mitigation measures and responsible organizations for planning, construction and operation stages

9.3.2. Necessary Considerations to Social Environment

1) Land Acquisition and Resettlement Issues

One of the most critical issues in development projects is land acquisition and resettlement. In the transport development if land of Right of Way (ROW) is required for transport alignment and related structures, land acquisition and resettlement issues occur.

In order to make clear the occurrence of land acquisition and resettlement, following survey are needed in general:

- Survey on ownership, usage and usufruct right in the project site.
- Inventory survey on facilities and structures along corridor/road and encroachment on the ROW. -Identify the occurrence and features of land acquisition and resettlement and anticipated PAPs through the detailed survey of ROW based on cadastral map.

- Survey on legal and institutional framework for resettlement and compensation.

If the occurrence of land acquisition and resettlement are anticipated, project proponent should provide adequate information to PAPs and consult with stakeholders including PAPs to reach an agreement or thorough understanding of the issues from an early stage of the project plan as much as possible.

Project proponent should also formulate RAP (Resettlement Action Plan) according to Egyptian laws and JICA Guidelines and monitor result of compensation and restoring living conditions and livelihood after implementation.

2) To obtain thorough understanding and consensus with affected communities and stakeholders

In order to avoid or minimize to local conflict of interests and to share with benefit and damage equally due to projects, information disclosure and public participation should be fully considered for PAPs and relevant stakeholders including decision-makers of the communities from earlier stage of the projects.

3) Measures to Avoid a Split of Community and Hindrance to smooth Movement of People and Animals

Structures of road and railway line may impede moving nomad people such as Bedouins, Berbers and Abadbas, and animals living and grazing in desert areas. Therefore, measures to avoid hindrance of their movement are required in desert area such as designing lower embankment structure and underpass. In addition, even in urban and agricultural areas those structures may cause a split of community, i.e. interruption the movement of people and cattle to both side of road and railway line and may disturb communication in the communities.

4) Special concerns with heritage and archaeological sites

In Egypt there are found many sites of cultural properties and heritages, derived from the stock of the ancient Egyptian civilizations and natural environment throughout the country. The Law 17/1983 covers issues such as the definition of private property, system of ownership, and extension of protection – including registration, archeological excavations, and authorities responsible for protection. In the law following provisions are stipulated (See Chapter 1.2):

- During its construction work it is not allowed to demolish all or parts of antiquity structures, renovate or change the structures' features (Article 13).
- The Minister of Culture identifies beatification zones surrounding antiquity sites.
- These beatification zones are considered part of the site, and it is not allowed to construct or excavate or plant trees inside these zones (Articles 19 and 20).
- Each person who finds a movable antiquity, or parts of an antiquity structure, should notify the nearest administrative authority within 24 hours and should keep the antiquity in its discovered status. The antiquity becomes the State's property (Article 24).

5) The poor, indigenous of ethnic people

In general, the vulnerable groups such as poor, indigenous of ethnic people are easily damaged and are difficult to share with benefit from the projects. Therefore, give the vulnerable groups in the project area higher priority to having a chance to construction work and training to get working skills. In addition, the vulnerable people should be taken fully considerations to compensate properly or support to restore the present living condition in case of involuntary resettlement, even if they are illegal occupants.

6) Working Condition

A large scale of construction work including underground station requires a large number of construction workers would engage the work. Thus, safety and health condition of the workers may be jeopardized due to construction work.

- -Prepare tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents accidents, and management of hazardous materials.
- -Plan and implement intangible measures for individuals involved in the project, such as the establishment of a safety and health program, and safety training for workers etc.

7) Infectious Diseases such as HIV/AIDS

In general, workers and construction vehicle drivers engaged in construction work of transport infrastructure development are considered as having high potential for the spread of sexually transmitted diseases (STDs) and HIV/AIDS virus due to their mobility. Infection with HIV/AIDS and venereal disease was often reported at worker's camps during road construction in other countries.

The transport sector is especially vulnerable to HIV/AIDS. Transport workers including long distance truck drivers, seafarers, airline crews and infrastructure construction workers spend long periods of time away from home, often endure harsh working conditions, and may engage in unsafe behavior that can lead to infection. Their mobility makes it difficult to access health information and treatment, or to maintain drug regimen. Transport hubs and construction sites are often considered hot spots due to the influx and interaction that take place among the mobile workers. Furthermore, the sector works as a vector for HIV spread as the opening of new roads connects low and high prevalence areas.

9.3.3. Necessary Considerations to Natural Environment

1) Prevent Impacts due to Sand Movement

Due to topographic and geological condition in Egypt, where land is mostly flat and desert covers 90% of whole land, desert sand can be easily moved by wind and deposited on road surface and railway track resulting in difficulty of traffic management..

These are expected particularly road and railway projects located in desert area. Therefore, appropriate measures such as tree planting to protect invasion of sand, avoidance of location prone to sand storm should be considered at planning stage.

2) Special concerns with Protection of Flora, Fauna and Biodiversity

As described in Chapter 7.1.3 natural protectorates and Important Bird Area (IBA) are treasuries of flora, fauna and biodiversity as well as places of cultural and geological characteristics, and require uppermost protection in the components of natural environment in Egypt.

Law 102/1983 prohibits the construction of buildings, facilities, roads or driving any cars or exercise of any agricultural, industrial, or commercial activities in the protected area except by approval and license of the competent administrative authorities

3) Global warming

Generation of greenhouse gases (GHG) such as CO₂ which may affect global warming are expected from plants, vehicles, boats and machines at construction work and operation of transport services and related facilities. Regarding factors of CO₂ emissions from railway and inland waterway transport are less than that from road transport. Therefore, modal shift to railway and inland waterway transport is preferable in terms of prevention of global warming.

- Estimate GHG emissions from construction work and operation of transport services and related facilities, and evaluate contribution due to the project comparing with other sectors, activities and sources.
- Promote modal shift to railway and inland waterway transport as much as possible.

9.3.4. Necessary Considerations to Environmental Pollution

1) Air pollution

In general, higher emissions of air pollutants, which will be resulted from increased number of traveling vehicles. In addition, poor emission control of vehicles due to insufficient maintenance and inspection may accelerate to spew out bad smell and black smoke. However, most areas are occupied with desert land and wind and fine weather condition in most of the year in Egypt. Thus emitted air pollutants can disperse easily and no profound impacts are expected except vicinity of road and urban areas. In addition, air pollutant emissions from railway and inland waterway transport are much less.

Consider preventive measures against air pollution due to construction vehicles, boats and machines during construction stage and transport services and related facilities during operation stage in the project plan.

2) Freshwater Pollution

Freshwater pollution is somewhat expected due to discharge of wastewater and leakage of fuel oil from Nile Cruisers and freight ships, and related facilities.

Consider preventive measures against water pollution due to construction work and operation of transport services especially inland waterway transport in the project plan.

3) Coastal and Marine Water Pollution

Marine water pollution is expected due to excavation and dredging works and discharge of wastewater and leakage of oil from ships.

Consider preventive measures against marine water pollution due to construction work and operation of sea port activities in the project

APPENDIX

DATA SHEET FOR ENVIRONMENTAL EVALUATION

Data Sheet for Environmental Evaluation - Project ID-(RD-303-X)**1. Outline of the Project**

Project Name/ Implementing Agency	Upper Egypt East Desert Red Sea Road / GARBLT
Purpose/role of the project	Construction of New Expressway
Length (km)/ Lane/ Design speed (km/h)	543.0km/ 4 lane/ 80km/h
Others	runs to the east side of Nile river in desert



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	0 km	A=0	1) Land acquisition	E
(B) Agriculture	0 km	S=0	Estimated Land cost	-
(C) Desert/waste land	543 km	D=CX0.05=27.15	2) Land use	A
(C) Water bodies	No		3) Protected areas	E
Total	543 km	TC=A+S+D=27.15	4) CO ₂ emissions	E
			5) Air pollutants emissions	E
Natural Protectorate	Penetrating Proposed Gebel Shayeb El Banat NP, Wadi Qena NP and Red Sea NP			

3. Features of the Project Site

1	Starts 18km east side of Beni Mazar town and then runs southward in desert area to Assyuit (140km)
2	From Assyuit runs southward to Sohag 100km,
3	Runs eastward to desert and wadi area to connect to Qena Safaga road (to Red Sea area)
4	Branched to southern to near Qena (through Qena Safaga Road)

4. Google map

	
1) Google Map of the project site	2) Eastward to desert wadi area to connect to Qena Safaga road

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-304-X)

1. Outline of the Project

Project Name/ Implementing Agency	Rod El Farag Road / GARBLT
Purpose/role of the project	Construction of New Expressway
Length (km)/ Lane/ Design speed (km/h)	39.5km/ 6 lane/ 80km/h
Others:	connects from center of Cairo city to 6th of October



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	30 km	A=30	1) Land acquisition	E
(B) Agriculture	9 km	S=BX0.2=1.8	Estimated Land cost	770 MLE
(C) Desert/waste land	0 km	D=0	2) Land use	C
(C) Water bodies	No		3) Protected areas	B
Total	39 km	TC=A+S+D=31.8	4) CO ₂ emissions	D
Natural Protectorate	No		5) Air pollutants emissions	D

3. Features of the Project Site

1	Diverge from Ring Road at 6 km northwest of center of Cairo
2	Runs in agricultural area westward
3	Connects to Gamal Abl el Nasr Road in 6 th of October City

4. Google map

	
1) Google Map of the project site	2) From Ring Road runs in agricultural area westward

5. Comment

Data Sheet for Environmental Evaluation - Project ID (RD-200-X)

1. Outline of the Project

Project Name/ Implementing Agency	Belbeis-Banha-El Bagour-El Khataba Regional Ring Road/GARBIT
Purpose/role of the project	Construction of New Expressway
Length (km)/ Lane/ Design speed (km/h)	95.1 km/ 6 lane/ 100km/h
Others	forms Northern part of Outer Ring Road, also affects to ease traffic congestion in the "Inland Cairo"


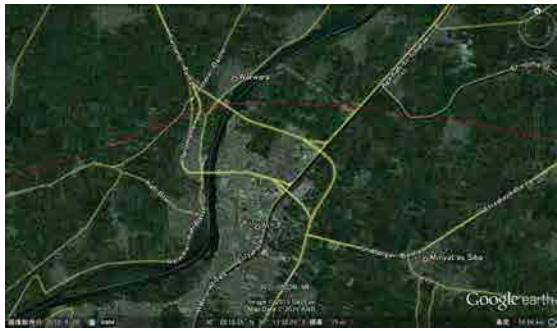
2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	15 km	A =15	1) Land acquisition	E
(B) Agriculture	80 km	S = B X 0.2 =16	Estimated Land cost	315 MLE
(C) Desert/waste land		D =C X 0.05 =0	2) Land use	E
(C) Water bodies	Crossing 3 Damietta Branch (0.3km) and 2 canals (10m width)		3) Protected areas	B
Total	95 km	TC = A+S+D=31	4) CO ₂ emissions	D
Natural Protectorate			5) Air pollutant emissions	D

3. Features of the Project Site

1	Connects to Ismailia Cairo Road near Bilbeis	
2	Runs westward to Benha for 35 km (Agricultural/residential use)	
3	From Benha westward to connect to Cairo Alex Agriculture Road for 60km (Agricultural area)	

4. Google map

	
1) Google Map of the project site	2) Runs westward to Benha for 35 km

5. Comment

Data Sheet for Environmental Evaluation - Project ID (RD-300-X)**1. Outline of the Project**

Project Name/ Implementing Agency	3 rd Cairo Alex Expressway/GARBLT
Purpose/role of the project	Construction of New Expressway
Length (km)/ Lane/ Design speed (km/h)	180.0 km/ 6 lanes / 120 km/h
Others (Total Project Cost/ land acquisition cost/etc.)	3500 MLE/315MLE, connects from Cairo to Borg el Arab



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	15 km	A=15 km	1) Land acquisition	D
(B) Agriculture	35 km	S=BX0.2=7 km	Estimated Land cost	234 MLE
(C) Desert/waste land	130 km	D =C X 0.05 =6.5	2) Land use	E
(C) Water bodies		No	3) Protected areas	B
Total		T=A+S+D=28.5 km	4) CO ₂ emissions	E
Natural Protectorate		No	5) Air pollutants emissions	E

3. Features of the Project Site

1	Starts in 6 th of October City, and passes through desert area west-northwestward (40km),then northeastward (25km) southern side of existing Cairo Alex Desert Road
2	Then runs through Desert reclamation area (20km) apart from 15 km from Bir Hooker settlement,
3	Then pass through again desert area (about 60km), crossing Tarik al Alamein Road, then (10km) desert area again,
4	Then passes through agricultural area (15 km) and reclaimed residential/industrial area (15km), including 0.2 km crossing lake Mariout reclamation area of Alexandria,
5	Finally connects to Alex- Marsa Matrouh Road at coastal area of Alexandria

4. Google map

	
1) Google Map of the project site	2) Agricultural and residential/industrial area and lake Maryout reclamation area of Alexandria,

5. Comment

Data Sheet for Environmental Evaluation - Project ID (RD-301-X)**1. Outline of the Project**

Project Name/ Implementing Agency	3 rd Stage Regional Ring Road/expressway/GARBLT
Purpose/role of the project	Construction of New Expressway
Length (km)/ Lane/ Design speed (km/h)	208.8km/6 lane/ 100km/h
Others	forms southern part of Outer Ring Road



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	1 km	A=1 km	1) Land acquisition	E
(B) Agriculture	27 km	S= BX0.2=5.4 km	Estimated Land cost	272 MLE
(C) Desert/waste land	181 km	D= CX0.05=9.05	2) Land use	E
(C) Water bodies	Crossing Nile river (0.7km)		3) Protected areas	E
Total	209 km		4) CO ₂ emissions	E
Natural Protectorate	Crossing existing Qarun NP		5) Air pollutants emissions	E

3. Features of the Project Site

1	Diverge from junction of Cairo Suez Road at 15km south of 10 th of Ramadan. Runs southward in desert area (25km), crossing Al Maadi- Bear Gendali – Al Katamia Road, then turns to westward in wadi area, crossing Al Kalimat Al Zafrana Road. Then runs through reclaimed agricultural land (4km) and settlement (1km) at 9km south of Minya and arrive at east bank of Nile.
2	Crosses Nile river westward(0.7km), runs in agricultural area (10km) and then runs in desert area (60km) crossing Cairo –Fayoum Desert Road, Fayoum-Wallat Road and What-Bahariya-Giza Road.
3	Turns to northward and then runs in desert area (45km) and agricultural area (15 km).
4	Connects to Cairo Alex Desert Road at 20km southwest of Bir Hooker..

4. Google map

	
1) Google Map of the project site	2) Google Map of route located near Alexandria

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-323-A)**1. Outline of the Project**

Project Name/ Implementing Agency	Wadi Alnatroum Saloum Road / GARBLT
Purpose/role of the project	Construction of New Arterial Road
Length (km)/ Lane/ Design speed (km/h)	416km/ 4 lane/ 80km/h
Others:	



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	0 km	A=0	1) Land acquisition	E
(B) Agriculture	0 km	S=0	Estimated Land cost	281 MLE
(C) Desert/waste land	416 km	D=CX0.05=20.8	2) Land use	A
(C) Water bodies	Crossing Rosetta Branch (0.6km), Maryuit Lake (0.8km) and canals (4 points)		3) Protected areas	B
Total	416 km	TC=A+S+D=20.8	4) CO ₂ emissions	E
Natural Protectorate	No		5) Air pollutants emissions	E

3. Features of the Project Site

1	Starts near the junction of Alex-Marsa Matrouh Road and Al Betrol Road
2	Runs westward in desert area of 15 km inland from existing Alex- Mars Matrouh Road
3	Connect to International Coastal Road at Musaid near border to Libya

4. Google map

	
1) Google Map of the project site	2) Connect to International Coastal road at Musaid near border to Libya

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-324-A)**1. Outline of the Project**

Project Name/ Implementing Agency	Eladaba Albetrol Road / GARBLT
Purpose/role of the project	Construction of New Arterial Road
Length (km)/ Lane/ Design speed (km/h)	288 km/ 4 lane/ 80 km/h
Others:	connects from Fayoum to Mediterranean sea (Borg el Arab)

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicatro	Rating
(A) Urban	0 km	A=0	1) Land acquisition	E
(B) Agriculture	0 km	S=0	Estimated Land cost	194 MLE
(C) Desert/waste land	288 km	D=CX0.05=14.4	2) Land use	A
(C) Water bodies			3) Protected areas	D
Total	288 km	TC=A+S+D=14.4 km	4) CO ₂ emissions	E
			5) Air pollutants emissions	E
Natural Protectorate	Crossing Proposed NP area (Siwa)			

3. Features of the Project Site

1	Diverges from Alex-Marsa Matrouh Road along Mediterranean coast
2	Runs southeastward in desert area
3	Connects to junction of Al Betrol Raod and Al Wahat Al bahariya –Al Giza Road in desert area

4. Google map

	
1) Google Map of the project site	2) junction of Al Betrol Raod and Al Wahat Al bahariya –Al Giza Road

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-325-A)**1. Outline of the Project**

Project Name/ Implementing Agency	Albetrol Beni Mazar Road / GARBLT
Purpose/role of the project	Cosntruction of New Arterial Road
Length (km)/ Lane/ Design speed (km/h)	137.5km/ 4 lane/ 80km/h
Others:	connects from Fayoum to Mediterranean sea (Borg el Arab)



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	0 km	A=0	1) Land acquisition	D
(B) Agriculture	1.5 km	S=BX0.2=0.3	Estimated Land cost	93 MLE
(C) Desert/waste land	136 km	D=CX0.05=6.8	2) Land use	A
(C) Water bodies	No		3) Protected areas	E
Total	137.5 km	TC=(A+S+D)=7.1	4) CO ₂ emissions	E
			5) Air pollutants emissions	E
Natural Protectorate	Crossing Existing NP Wadi El Rayan			

3. Features of the Project Site

1	Connects Junction of Al BetrolRaod and Al Wahat Al Bahareya-Al Farafa Road
2	Runs eastward for about 70 km in desert area
3	Turn round southern area of Wadi El Rayan Natural Protectorate about 60 km
4	Connect to Giza-Luxor road near south of Qalamshah and Fayoum

4. Google map

	
1) Google Map of the project site	2) Crossing Natural Protectorate No. 10 Wadi El Rayan

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-326-A)

1. Outline of the Project

Project Name/ Implementing Agency	Al Betrol Malwa Road / GARBLT
Purpose/role of the project	Construction of New Arterial Road
Length (km)/ Lane/ Design speed (km/h)	185 km/ 4 lane/ 80km/h
Others:	forms shortcut route from Borg el Arab to upper Nile (Asyut).



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	0 km	A=0	1) Land acquisition	D
(B) Agriculture	0 km	S=BX0.2=0	Estimated Land cost	125 MLE
(C) Desert/waste land	185 km	D=CX0.05=9.3	2) Land use	A
(C) Water bodies	No		3) Protected areas	B
Total	185 km	TC=A+S+D=9.3	4) CO ₂ emissions	E
Natural Protectorate	No		5) Air pollutants emissions	E

3. Features of the Project Site

1	Connects to Junction of Al Betrol Rd and Wahat Bahreya-Farafra Rd
2	Runs in desert area southeastward to near Mallawi (185 km)
3	Connects to Luxor –Giza Rd west of Tuna e Gabel

4. Google map

	
1) Google Map of the project site	2) Connects to Luxor –Giza Rd west of Tuna e Gabel

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-305-A)**1. Outline of the Project**

Project Name/ Implementing Agency	Bahriya Siwa Road / GARBLT
Purpose/role of the project	Construction of New Arterial Road
Length (km)/ Lane/ Design speed (km/h)	383.6 km/ 2 lane/ 80km/hr
Others	connects from Siwa to Bahariya oasis and Nile river


2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	0 km	A=0	1) Land acquisition	E
(B) Agriculture	0 km	S=0	Estimated Land cost	192 MLE
(C) Desert/waste land	384 km	D=CX0.02=19.6 km	2) Land use	A
(C) Water bodies	No		3) Protected areas	E
Total	384 km	TC=(A+S+D)=19.6	4) CO ₂ emissions	E
			5) Air pollutants emissions	E
Natural Protectorate	Crossing existing NP 70 km length, proposed NP 150 km			

3. Features of the Project Site

1	Diverges at Bahriya Oassis (Bawti) and runs in desert area (30km) northwestward
2	Turns to westward (km) on Bahaira –Seiwa Road
3	Connects to Matrouh-Siawa Raod at Siwa

4. Google map

	
1) Google Map of the project site	2) Bahariya Oasis, Bawiti

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-306-A)

1. Outline of the Project

Project Name/ Implementing Agency	Bahriya Minya Road / GARBLT
Purpose/role of the project	Construction of New Arterial Road
Length (km)/ Lane/ Design speed (km/h)	213.7km/ 2 lane/ 80km/h
Others:	conencts from Siwa to Nile river



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	2 km	A=2	1) Land acquisition	E
(B) Agriculture	2 km	S=BX0.2=0.4	Estimated Land cost	107 MLE
(C) Desert/waste land	210 km	D=CX0.05=10.5	2) Land use	A
(C) Water bodies			3) Protected areas	C
Total	214 km	TC=A+S+D=12.9	4) CO ₂ emissions	E
			5) Air pollutants emissions	E
Natural Protectorate	Near El Wahat El Bahriya NP			

3. Features of the Project Site

1	Diverges from junction of Wahat-Bahariya-Farafra Road at Bawiti, Bahriya Oasis, and runs- eastward in desert area (150 km)
2	Crosses Giza-Luxor Road, Giza-luxor desert Road, near Sandafa el Fara, agricultural 20km passing, land to West bank of Nile River at Beni Mazar
3	Crosses Nile river (1.2 km)
4	Runs eastward in town area (1km), agricultural area (2km) and desert area (12km)
5	Connects to Ras Ghareb El Shaikh Fadi Road

4. Google map

	
1) Google Map of the project site	2) Nile river crossing (1.2 km)

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-329-A)

1. Outline of the Project

Project Name/ Implementing Agency	Farafra Malwa Road / GARBLT
Purpose/role of the project	Construction of New Arterial Road
Length (km)/ Lane/ Design speed (km/h)	290.0km/ 4 lane /80km/h
Others:	connects from Farafra to Nile river


2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	0 km	A=0	1) Land acquisition	E
(B) Agriculture	0 km	S=BX0.2=0	Estimated Land cost	196 MLE
(C) Desert/waste land	290 km	D=CX0.05=14.5	2) Land use	A
(C) Water bodies	No		3) Protected areas	B
Total	290 km	TC=A+S+D=20	4) CO ₂ emissions	E
Natural Protectorate	No		5) Air pollutants emissions	E

3. Features of the Project Site

1	Starts settlement road near Farafra Oasis, connects to Farfra-Wahat Rd
2	Runs in desert area eastward (290 km)
3	Connects to Luxor Giza Rd and proposed Al Betrol Malwa Rd west of Tuna e Gabal and Mallawi

4. Google map

	
1) Google Map of the project site	2) Starts from Farafra settlement

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-330-A)**1. Outline of the Project**

Project Name/ Implementing Agency	El Dakhla Assyuit Road / GARBLT
Purpose/role of the project	Construction of New Arterial Road
Length (km)/ Lane/ Design speed (km/h)	271.4 km/ 4 lane/ 80km/h
Others	

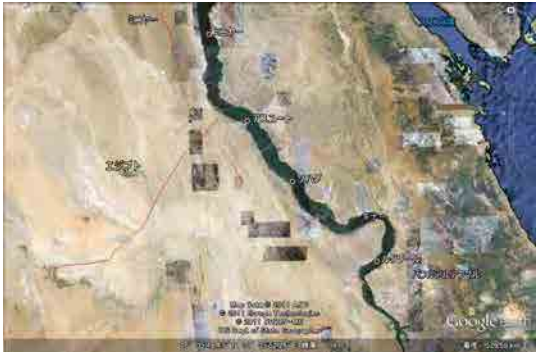

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	0 km	A=0	1) Land acquisition	E
(B) Agriculture	0 km	S=BX0.2=0	Estimated Land cost	183 MLE
(C) Desert/waste land	271 km	D=CX0.05=13.6	2) Land use	A
(C) Water bodies	No		3) Protected areas	B
Total	271 km	TC=A+S+D=20	4) CO ₂ emissions	E
Natural Protectorate	No		5) Air pollutants emissions	E

3. Features of the Project Site

1	Connects to Farfara-Wahat Rd near Budkhura
2	Runs in desert area eastward (65km)
3	Then also runs in desert area northeastward to Assyuit for 205km
4	Connects to Giza Luxor Rd and Bani Magd Rd near Beni Adi el Bahariya, Assyuit

4. Google map

	
1) Google Map of the project site	2) Near Assyuit connects to Luxor Giza road

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-331-A)**1. Outline of the Project**

Project Name/ Implementing Agency	Oena Aswan Nile East Bank Road / GARBLT
Purpose/role of the project	Construction of New Arterial Road
Length (km)/ Lane/ Design speed (km/h)	308.3 km/ 4 lane/ 80km/h
Others:	runs to the east side of Nile river in desert



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	0 km	A=0	1) Land acquisition	E
(B) Agriculture	0 km	S=BX0.2=0	Estimated Land cost	208 MLE
(C) Desert/waste land	308 km	D=CX0.05=15.4	2) Land use	A
(C) Water bodies	No		3) Protected areas	B
Total	308 km	TC=A+S+D=15.4	4) CO ₂ emissions	E
Natural Protectorate	No		5) Air pollutants emissions	E

3. Features of the Project Site

1	Connects to Oena Safaga Road inland Wadi area located east of Nile river
2	Runs in desert and wadi area southward for 308km
3	Connects to Halaieb Aswan Road at 70km east of Aswan town

4. Google map

	
1) Google Map of the project site	2) Connects to Halaieb Aswan Road at 70km east of Aswan

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-332-A)

1. Outline of the Project

Project Name/ Implementing Agency	Zagaziq –Toukh Road / GARBLT
Purpose/role of the project	Construction of New Arterial Road
Length (km)/ Lane/ Design speed (km/h)	37.5km/ 4 lane/ 80km/h
Others:	

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	3 km	A=3	1) Land acquisition	D
(B) Agriculture	34 km	S=BX0.2=6.8	Estimated Land cost	101 MLE
(C) Desert/waste land	0 km	D=CX0.05	2) Land use	E
(C) Water bodies	No		3) Protected areas	B
Total	37 km	TC=A+S+D=9.8	4) CO ₂ emissions	D
Natural Protectorate	No		5) Air pollutants emissions	D

3. Features of the Project Site

1	At Zagaziq connects to Zagaziq Abou Hammad Road
2	Runs through agricultural/settlement area southwestward to Toukh for 37km
3	Connects to Detour of Cairo Alexandria Agriculture Road (Kwisana-Qaliuop Road) at Toukh

4. Google map

	
1) Google Map of the project site	2) Zagaziq

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-994-A)**1. Outline of the Project**

Project Name/ Implementing Agency	Fayoum-Beni Suef Bypass / GARBLT
Purpose/role of the project	Construction of new Arterial Road
Length (km)/ Lane/ Design speed (km/h)	28.0km/ 2 lane/ 80 km/h
Others:	connects from Fayoum to Nile east side

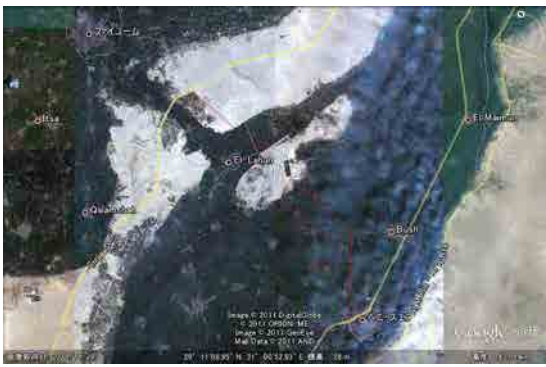

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Evaluation	Rating
(A) Urban	6 km	A=6	1) Land acquisition	D
(B) Agriculture	17 km	S=BX0.2=3.4	Estimated Land cost	0
(C) Desert/waste land	5 km	D=CX0.05=0.25	2) Land use	E
(C) Water bodies	No		3) Protected areas	B
Total	28 km	TC=A+S+D=9.7	4) CO ₂ emissions	D
			5) Air pollutants emissions	D
Natural Protectorate	No		Notice: Crossing 4km of Airport area	

3. Features of the Project Site

1	Connects to Junction of Giza Luxor Road-road from Fayoum
2	Runs through mixed areas of settlement, agriculture, desert and airport site southeastward to Markaz Nasr –Abshna road for 20km
3	Then runs in mostly agricultural area southward for 8km
4	Connects to junction of Salah Salem and Bani Sweif-Abashna Road at Ben Suef town

4. Google map

	
1) Google Map of the project site	2) Airport crossing

5. Comment

Change of the route to detour airport area.

Data Sheet for Environmental Evaluation - Project ID-(RD-998-A)

1. Outline of the Project

Project Name/ Implementing Agency	Alexandria Bypass / GARBLT
Purpose/role of the project	Construction of new Arterial Road
Length (km)/ Lane/ Design speed (km/h)	43.0km/ 4 lane / 80 km/h
Others:	forms urban ring road connects the Cairo-Alex Desert expressway

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	0 km	A=0	1) Land acquisition	D
(B) Agriculture	40 km	S=BX0.2=8	Estimated Land cost	-
(C) Desert/waste land	0 km	D=0	2) Land use	E
(C) Water bodies	Crossing Maryuit Lake area for about 3km		3) Protected areas	B
Total	43 km	TC=A+S+D=8	4) CO ₂ emissions	D
Natural Protectorate	No		5) Air pollutants emissions	D

3. Features of the Project Site

1	Connects to Interchange of Cairo Alexandria Road/Ring Road/International Coastal Road/Daoly Gaded Road
2	Runs in agricultural area (40km) and Mryuit lake area (3km)detouring southern area of Alexandria suburb
3	Connects to Marsa Matrouh Road near Hauwayr and Ikingi Maryuit

4. Google map

	
1) Google Map of the project site	2) Crossing Mayruit lake near Alexandria Interchange

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-999-A)**1. Outline of the Project**

Project Name/ Implementing Agency	Cairo – Tanta Bypass / GARBLT
Purpose/role of the project	Construction of New Arterial Road
Length (km)/ Lane/ Design speed (km/h)	45.0 km/ 4 lane/ 80 km/h
Others:	New line for passenger/cargo at west side connected only major cities.


2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	0 km	A=0	1) Land acquisition	D
(B) Agriculture	45 km	S=BX0.2=9	Estimated Land cost	-
(C) Desert/waste land	0 km	D=CX0.05=0	2) Land use	E
(C) Water bodies	No		3) Protected areas	B
Total	45 km	TC=A+S+D=9	4) CO ₂ emissions	D
Natural Protectorate	No		5) Air pollutants emissions	D

3. Features of the Project Site

1	Connects to Cairo Ring Road
2	Runs in agricultural area northward paralleling west side of Cairo Alexandria Agriculture Road to Bana for 45 km
3	At Benha connects to Hany Kamel Road after crossing cana

4. Google map

	
1) Google Map of the project site	2) Near Benha

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-315-UX)

1. Outline of the Project

Project Name/ Implementing Agency	Shubra elkhema-Benha Agriculture Road (Expressway) / GARBLT
Purpose/role of the project	Upgrade to expressway
Length (km)/ Lane/ Design speed (km/h)	43.8km/ 6 lane/ 100km/h
Others (Total Project Cost/ land acquisition cost/etc.)	Bypass road for Cairo to Benha in west side

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Evaluation	
(A) Urban	2 km	A=0	1) Land acquisition	D
(B) Agriculture	42 km	S=BX0.2=8.4	Estimated Land cost	0
(C) Desert/waste land	0 km	D=0	2) Land use	E
(C) Water bodies	No		3) Protected areas	B
Total	44 km	TC=A+S+D=10.4, EqL=TC*0.5=5.2	4) CO ₂ emissions	D
Natural Protectorate	No		5) Air pollutants emissions	D

3. Features of the Project Site

1	Connects at Shubra El Khema to Junction of Ring Road and Al Asher- Men Ramadan Road
2	Runs northward in agricultural area to Benha
3	Near Benha connects to Junction of Hany Kamel Road

4. Google map

	
1) Google Map of the project site	2) Shubra El Khema

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-317-UX)

1. Outline of the Project

Project Name/ Implementing Agency	Ismailia Suez Road / GARBLT
Purpose/role of the project	Road widening and upgrade to expressway
Length (km)/ Lane/ Design speed (km/h)	134.2km/ 4 lane/ 100km/h
Others:	Connects from Suez to Ismailia at west side of Suez Canal, connects to RD-308 (update to Expressway from Ismailia to Port Said)



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	3 km	A=3	1) Land acquisition	D
(B) Agriculture	66 km	S=BX0.2=13.2	Estimated Land cost	-
(C) Desert/waste land	65 km	D=CX0.05=3.25	2) Land use	E
(C) Water bodies	No		3) Protected areas	B
Total	134 km	TC=A+S+D=19.45, EQL=TC*0.5=9.7	4) CO ₂ emissions	E
Natural Protectorate	No		5) Air pollutants emissions	E

3. Features of the Project Site

1	Connects to junction of Ismailia-Zagaziq Road and Masr-Ismailia Desert Road 10 km southwest of Ismailia
2	Runs eastward 4km, then southward to Hurghada (exsiting Hurghada-Ismailia Road) in west side of Suez Canal, Abu Sultan, Fanara, Gineifa,
3	Runs through town area of Suez city (3km) to connect to Hurghada Ismailia Road

4. Google map

	
1) Google Map of the project site	2) Near Ismailia

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-204-UX)

1. Outline of the Project

Project Name/ Implementing Agency	Cairo Alexandria Desert Road (Expressway) / GARBLT
Purpose/role of the project	Upgrading to Expressway
Length (km)/ Lane/ Design speed (km/h)	170 km / 8 lane/ 120 km/h
Others:	Committed project is 6 lanes



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	5 km	A=5	1) Land acquisition	E
(B) Agriculture	145 km	S=BX0.2=29	Estimated Land cost	-
(C) Desert/waste land	20 km	D=CX0.05=1	2) Land use	E
(C) Water bodies	No		3) Protected areas	B
Total	170 km	TC=A+S+D=35 EqL=35	4) CO ₂ emissions	E
			5) Air pollutants emissions	E
Natural Protectorate	No			

3. Features of the Project Site

1	Runs mostly in agricultural area from outskirts of 6 th of October City to Alexandria
2	

4. Google map

	
<p>1) Google Map of the project site</p>	<p>2) Agricultural area near Phaira</p>

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-307-UX)**1. Outline of the Project**

Project Name/ Implementing Agency	Alexandria –Saloum Road / GARBLT
Purpose/role of the project	Upgrading to Expressway
Length (km)/ Lane/ Design speed (km/h)	491.8km/4 lane/ 100km/h
Others:	connects to Libya by expressway



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	30 km	A=30	1) Land acquisition	E
(B) Agriculture	40 km	S=BX0.2=8	Estimated Land cost	0
(C) Desert/waste land	420 km	D=CX0.05=21	2) Land use	E
(C) Water bodies	Canal crossing (50m) at 21 kilo Bridge (Alex)		3) Protected areas	E
Total	491 km	TC=A+S+D=69, EqL=69X0.5=34.5	4) CO ₂ emissions	E
			5) Air pollutants emissions	E
Natural Protectorate	Crossing Existing El Salum NP(near Saloum)			

3. Features of the Project Site

1	Connects to Junction of Alex-Cairo Rd/Marsa Matrouh Rd coastal area of west Alexandria
2	Runs along coastal area southwestward to El Alamein (70km)
3	Then Runs along coastal area westward through El Daba, Marsa Matrouh, Sidi Barani and El Saloum (410km)
4	Connects to Libyan Road Near Musaid, border of Libya (10km)

4. Google map

	
1) Google Map of the project site	2) Canal crossing (Alexandria)

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-308-UX)

1. Outline of the Project

Project Name/ Implementing Agency	Cairo Ismailia Port Said Road Expressway / GARBLT
Purpose/role of the project	Upgrading to Expressway
Length (km)/ Lane/ Design speed (km/h)	165.6km/ 6 lane/ 100km/h
Others:	Connects to Port Said



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	0 km	A=0	1) Land acquisition	E
(B) Agriculture	115 km	S=BX0.2=23	Estimated Land cost	0
(C) Desert/waste land	50 km	D=CX0.05=2.5	2) Land use	E
(C) Water bodies	No		3) Protected areas	B
Total	165 km	TC=A+S+D=25.5, EqL=TC*0.5=12.8	4) CO ₂ emissions	E
Natural Protectorate	No		5) Air pollutants emissions	E

3. Features of the Project Site

1	Connects to Ring Road at 20 km northeast from center of Cairo
2	Runs through 10 th of Ramadan City northeastward to Ismailia (90km)
3	Then runs along Suez Canal northward to Port Said (70km)
4	Connects to Junction of Alexandria Port Said/Ismailia Port Said Road

4. Google map

	
1) Google Map of the project site	2) Ismailia

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-309-UX)

1. Outline of the Project

Project Name/ Implementing Agency	Qantara-Rafah Road-Expressway / GARBLT
Purpose/role of the project	Upgrade to Expressway
Length (km)/ Lane/ Design speed (km/h)	209.6km/ 6 lane/ 100km/h
Others (Total Project Cost/ land acquisition cost/etc.)	connects to Israel by expressway


2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	0 km	A=0	1) Land acquisition	D
(B) Agriculture	40 km	S=BX0.2=8	Estimated Land cost	0
(C) Desert/waste land	170 km	D=Cx0.05=8.5	2) Land use	E
(C) Water bodies			3) Protected areas	E
Total	210 km	TC=A+S+D=16.5, EqL=TC*0.5=8.8	4) CO ₂ emissions	E
			5) Air pollutants emissions	E
Natural Protectorate	Crossing existing Zaranik NP-2			

3. Features of the Project Site

1	Connects to Al Ferdan Bridge crossing Ismailia ort Said Road 25km south of Qantarael Gahrbia
2	Then crosses Suez Canal, detours eastnorthward of Qanta el Sharqiya to Tell Ahmer
3	From Tell Ahmer runs northeastward and then westward near Romani
4	Runs coastal desert area south of Bardawili Lake, Nagila, Bir el Abd, Maadan, Arish (160km)
5	Through Dikla to Rafah, Israel border

4. Google map

	
1) Google Map of the project site	2) Rafah, border of Israel

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-310-UX)**1. Outline of the Project**

Project Name/ Implementing Agency	Cairo –Suez Road to Expressway / GARBLT
Purpose/role of the project	Upgrade to Expressway
Length (km)/ Lane/ Design speed (km/h)	112.0km/ 6 lane/ 100km/h
Others:	Connects to Suez

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	10 km	A=10	1) Land acquisition	E
(B) Agriculture	0 km	S=BX0.2=0	Estimated Land cost	0
(C) Desert/waste land	102 km	D=CX0.05=5	2) Land use	C
(C) Water bodies	No		3) Protected areas	B
Total	112 km	TC=A+S+D=15, EqL=TC*0.5=7.5	4) CO ₂ emissions	E
Natural Protectorate	No		5) Air pollutants emissions	E

3. Features of the Project Site

1	Connects to Interchange of Cairo Suez Raod, Ring Road, Circular Road
2	Runs eastward to Suez in desert area
3	Connects to Hurghada –Ismailia Road at Suez

4. Google map

	
1) Google Map of the project site	2) Suez City

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-311-UX)**1. Outline of the Project**

Project Name/ Implementing Agency	Suez Ras El Nakab Road (Expressway) / GARBLT
Purpose/role of the project	Upgrading to Expressway
Length (km)/ Lane/ Design speed (km/h)	272.8km/ 4 lane/ 100km/h
Others:	connects from Suez to Taba border



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	0 km	A=0	1) Land acquisition	E
(B) Agriculture	6 km	S=BX0.2=1.2	Estimated Land cost	0
(C) Desert/waste land	267 km	D=CX0.05=13.35	2) Land use	A
(C) Water bodies	Crossing Suez Canal		3) Protected areas	D
Total	273 km	TC=A+S+D=14.55, EqL=TC*0.5=7.3	4) CO ₂ emissions	E
			5) Air pollutants emissions	E
Natural Protectorate	Crossing proposed Wadi el Gerafi Proposed, near existing Taba NP-18			

3. Features of the Project Site

1	Connects to Cairo Suez Road near Agruda
2	Crosses Hurghada-Ismailia Road, Suez-Ismailia-Zerai Road and Suez Canal then connects to Ras SEdr- Al Qantara Shark Road
3	Then connects to Ras SEdr- Al Qantara Shark Road in Sinai
4	Runs in wadi area, Al Haytan –Al Shahid –Ahmed Helmy Tunnel, Wadi al Jifah (210 km)
5	Connects to El Nakab, near Taba border of Israel (Elat) and Jordan (Aqaba)

4. Google map

	
1) Google Map of the project site	2) Ras El Nakab, near Elat (Israel) and Aqaba (Jordan)

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-312-UX)**1. Outline of the Project**

Project Name/ Implementing Agency	Cairo-Assyuit Desert Western Road (Expressway)/ GARBLT
Purpose/role of the project	Upgrading to Expressway
Length (km)/ Lane/ Design speed (km/h)	361.5km/ 6 lane/ 100km/h
Others:	runs to the west side of Nile river in desert



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	0 km	A=0	1) Land acquisition	E
(B) Agriculture	4 km	S=BX0.2=0.8	Estimated Land cost	0
(C) Desert/waste land	356 km	D=CX0.05=17.8	2) Land use	A
(C) Water bodies	No		3) Protected areas	B
Total	360 km	TC=A+S+D=17.8, EqL=TC*0.5=8.9	4) CO ₂ emissions	E
Natural Protectorate	No		5) Air pollutants emissions	E

3. Features of the Project Site

1	Connects to Junction of Cairo-Fayoum Road/Cairo Wahat-Bahariya Road near Giza
2	Runs Existing Giza –Fayoum Desert Road, then connects to existing Giza –Luxor Road, passes eastside of Fayoum to Beni Suef and runs southward
3	Connects to Assyuit –Kharga Road Near Assyuit

4. Google map

	
1) Google Map of the project site	2) Runs eastside of Fayoum

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-314-UX)**1. Outline of the Project**

Project Name/ Implementing Agency	Zafarana Elkoraymat Road (Expressway)/ GARBLT
Purpose/role of the project	Upgrading to Expressway
Length (km)/ Lane/ Design speed (km/h)	221.0km/ 6 lane /100km/h
Others:	Creates expressway connection from Fayoum, Helwan to Red Sea (Zafarana)



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	0 km	A=0	1) Land acquisition	D
(B) Agriculture	0 km	S=BX0.2=0	Estimated Land cost	0
(C) Desert/waste land	221 km	D=CX0.05=11.05	2) Land use	A
(C) Water bodies			3) Protected areas	B
Total	221 km	TC=A+S+D=11.05, EqL=TC*0.5=5.5	4) CO ₂ emissions	E
			5) Air pollutants emissions	E
Natural Protectorate	Near of proposed Gebel El Geleala El Qebieya NP			

3. Features of the Project Site

1	Connects to Junction of Al Tibeen Al Aoutostrad St and Masanea road 26km north of Tabbin and 7 km south of Helwan
2	Then runs southward in desert area to El Maimun, 26km northeast of Beni Suef (65 km)
3	Then runs eastward to Zafarana, Red Sea Coastal area along existing Karimat- Zafarana Road (155km)

4. Google map

	
1) Google Map of the project site	2) South of Helwan

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-316-UA)

1. Outline of the Project

Project Name/ Implementing Agency	Alamein Road / GARBLT
Purpose/role of the project	Upgrade to Arterial Road
Length (km)/ Lane/ Design speed (km/h)	134.2km/ 4 lane/ 80km/h
Others:	Forms shortcut route from Cairo-Alex. Desert Road to Western Mediterranean



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	0 km	A=0	1) Land acquisition	D
(B) Agriculture	10 km	S=BX0.2=2	Estimated Land cost	-
(C) Desert/waste land	124 km	D=CX0.05=6.2	2) Land use	E
(C) Water bodies	No		3) Protected areas	E
Total	134 km	TC=A+S+D=8.2, EqL=TC*0.5=4.2	4) CO ₂ emissions	E
			5) Air pollutants emissions	E
Natural Protectorate	Crossing existing El Omayyed NP-4			

3. Features of the Project Site

1	Diverge from Cairo-Alex Desert Road at 20km northwest of Bir Hooker, north of Wadi Natroun (10km, agricultural land)
2	Runs westward in desert area, crossing el Omayyed NP-4 and to El Alamein, Mediterranean coast (124km desert)
3	Connects to Alex-Marsa Matrouh Road near El Alamein

4. Google map

	
1) Google Map of the project site	2) North of Wadi Natroun diverge from Cairo-Alex Desert Road

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-214-W)

1. Outline of the Project

Project Name/ Implementing Agency	Zaqaziq Sinbellaween Road / GARBLT
Purpose/role of the project	Widening of Existing Road
Length (km)/ Lane/ Design speed (km/h)	Km / 4 lane/ 80 km/h
Others:	under GARBLT 5 year plan (2007-2012)

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km	A=0	1) Land acquisition	D
(B) Agriculture	km	S=BX0.2=	Estimated Land cost	-
(C) Desert/waste land	km	D=CX0.05=	2) Land use	C
(C) Water bodies	No		3) Protected areas	B
Total	km	TC=A+S+D=	4) CO ₂ emissions	D
Natural Protectorate	No		5) Air pollutants emissions	D

3. Features of the Project Site

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4. Google map

	
1) Google Map of the project site	2) Near Zagaziq

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-215-W)

1. Outline of the Project

Project Name/ Implementing Agency	Mansoura Talha Dekernes Mataria Road / GARBLT
Purpose/role of the project	Widening of Existing Road
Length (km)/ Lane/ Design speed (km/h)	km/ 4 lane/ 80 km/h
Others:	under GARBLT 5 year plan (2007-2012)

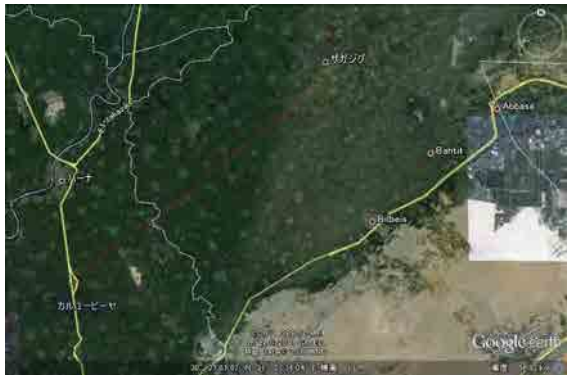
2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km	A=	1) Land acquisition	D
(B) Agriculture	km	S=BX0.2=	Estimated Land cost	-
(C) Desert/waste land	km	D=CX0.05=	2) Land use	C
(C) Water bodies			3) Protected areas	B
Total	km	TC=A+S+D=	4) CO ₂ emissions	D
Natural Protectorate	No		5) Air pollutants emissions	D

3. Features of the Project Site

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4. Google map

	
1) Google Map of the project site	2) Zagaziq

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-216-W)

1. Outline of the Project

Project Name/ Implementing Agency	Qantara Salheya Faqous Abu Kbeir Hehya Zagaziq Road / GARBLT
Purpose/role of the project	Widening of Existing Road
Length (km)/ Lane/ Design speed (km/h)	Km / 4-lanes, 80km/h
Others:	under GARBLT 5 year plan (2007-2012)

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km	A=	1) Land acquisition	D
(B) Agriculture	km	S=BX0.2=	Estimated Land cost	-
(C) Desert/waste land	km	D=CX0.05=	2) Land use	C
(C) Water bodies			3) Protected areas	B
Total	km	TC=A+S+D=	4) CO ₂ emissions	D
Natural Protectorate	No		5) Air pollutants emissions	D

3. Features of the Project Site

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4. Google map

	
1) Google Map of the project site	2) Zagaziq

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-225-W)**1. Outline of the Project**

Project Name/ Implementing Agency	El-Belina - Tahta Road / GARBLT
Purpose/role of the project	Widening of new Arterial Road (Bridge)
Length (km)/ Lane/ Design speed (km/h)	52.9 km/ 4 lane/ 80km/h
Others:	Connects from RD-312 (Desert Western) to West side agricultural road, for widening under GARBLT 5 year plan (2007-2012) without any progress



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Evaluation	Rating
(A) Urban	0 km	A=0	1) Land acquisition	D
(B) Agriculture	13 km	S=B \times 0.2=2.6	Estimated Land cost	50 MLE
(C) Desert/waste land	42 km	D=C \times 0.05=2.1	2) Land use	E
(C) Water bodies	No		3) Protected areas	B
Total	53 km	TC=A+S+D=4.7, EqL=TC \times 0.5=2.4	4) CO ₂ emissions	D
Natural Protectorate	No		5) Air pollutant emissions	D

3. Features of the Project Site

1	Starts at Giza – Luxor Road junction
2	Runs northeastward in desert area of Nile west (about 40km)
3	Runs in agricultural area (12km)
4	Connects to Teraat –Nagaa- hamadi road at Maragha near Tahta

4. Google map

	
1) Google Map of the project site	2) Maragha and Tahta located west bank of the Nile

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-226-W)**1. Outline of the Project**

Project Name/ Implementing Agency	Oena - Safaga Road / GARBLT
Purpose/role of the project	Widening of Arterial Road
Length (km)/ Lane/ Design speed (km/h)	161.0 km/ 4 lane/ 80km/h
Others:	Connects from Oena to Safaga for widening under GARBLT 5 year plan (2007-2012) without any progress



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	5 km	A=5	1) Land acquisition	D
(B) Agriculture	0 km	S=BX0.2=0	Estimated Land cost	-
(C) Desert/waste land	156 km	D=CX0.05=7.8	2) Land use	A
(C) Water bodies	No		3) Protected areas	E
Total	161 km	TC=A+S+D=12.8, EqL=TC*0.5=6.4	4) CO ₂ emissions	E
			5) Air pollutants emissions	E
Natural Protectorate	Crossing Proposed Gebel Shayeb El Banat NP			

3. Features of the Project Site

1	Connects to junction of Cairo –Aswan Road at Qena (east bank of Nile)
2	Runs northeastward in desert area to Red Sea coastal area
3	Connects to junction of Gahrdaqa-Qeana Road at Safaga

4. Google map

	
1) Google Map of the project site	2) Qena

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-318-W)

1. Outline of the Project

Project Name/ Implementing Agency	Desouq Fowa Metobas Road / GARBLT
Purpose/role of the project	Road Widening of Arterial Road ? GARBLT
Length (km)/ Lane/ Design speed (km/h)	26.3km/ 4 lane/ 80km/h
Others:	located right side of Rosetta branch near Alexandria

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	1 km	A=1	1) Land acquisition	D
(B) Agriculture	25 km	S=BX0.2=5	Estimated Land cost	-
(C) Desert/waste land	0 km	D=0	2) Land use	E
(C) Water bodies	No		3) Protected areas	B
Total	26 km	TC=A+S+D=6, EqL=TC*0.5=3	4) CO ₂ emissions	D
Natural Protectorate	No		5) Air pollutants emissions	D

3. Features of the Project Site

1	Connects to Damnhour-Desouq Road in town area of Desouq
2	Runs northwestward along right side (east side) of Rosetta branch to Mutubis
3	Connects to Road at Mutubas near Motobus Dairy Road at southend of Mutubis settlement

4. Google map

	
1) Google Map of the project site	2) Desouq

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-319-W)

1. Outline of the Project

Project Name/ Implementing Agency	Imbaba Qalyub Tawfekia Road / GARBLT
Purpose/role of the project	Road Widening of Atrterial Road
Length (km)/ Lane/ Design speed (km/h)	71.2km/ 4 lane/ 80km/h
Others:	located along Rosetta branch (Nile river) left side from Cairo

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	2 km	A=2	1) Land acquisition	D
(B) Agriculture	69 km	S=BX0.2=13.8	Estimated Land cost	125 MLE
(C) Desert/waste land	0 km	D=0	2) Land use	E
(C) Water bodies	No		3) Protected areas	B
Total	71 km	TC=A+S+D=15.8, EQL=TC*0.5=7.9	4) CO ₂ emissions	D
Natural Protectorate	No		5) Air pollutants emissions	D

3. Features of the Project Site

1	Connects to Ring Road at 6km west side of center of Cairo
2	Runs northward to west side of Rosetta branch to Qanatir el Qahiriya in agricultural area
3	Runs westward/northwestward to existing Mnashi-Tawfekeya Road
4	Connects to junction of Mnash—Tawfekeya Road near Gizai,

4. Google map

	
1) Google Map of the project site	2) Near Brigat/Gizai

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-321-W)

1. Outline of the Project

Project Name/ Implementing Agency	El Ain El Sokhna - Zafarana Road / GARBLT
Purpose/role of the project	Road Widening of Arterial Road
Length (km)/ Lane/ Design speed (km/h)	65.7km/ 4 lane/ 80km/h
Others:	Nothern side of Red Sea coastline

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	0 km	A=0	1) Land acquisition	D
(B) Agriculture	0 km	S=BX0.2=0	Estimated Land cost	22 MLE
(C) Desert/waste land	66 km	D=CX0.05=3.3	2) Land use	A
(C) Water bodies	No		3) Protected areas	B
Total	66 km	TC=A+S+D=3.3, EqL=TC*0.5=1.7	4) CO ₂ emissions	D
Natural Protectorate	No		5) Air pollutants emissions	D

3. Features of the Project Site

1	Connects to Road Ain Sokhna
2	Runs southward along Red Sea Coast
3	Connects to Karmat Zafarana Road/Zafarana Ras Gareb Road at Zafarana

4. Google map

	
<p>1) Google Map of the project site</p>	<p>2) Zafarana</p>

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-322-W)**1. Outline of the Project**

Project Name/ Implementing Agency	Safaga Baranis Halayeb Road / GARBLT
Purpose/role of the project	Road Widening of Arterial Road
Length (km)/ Lane/ Design speed (km/h)	632.2km/4 lane/ 80km/h
Others:	Southern side of Red Sea coastline



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Evaluation	Rating
(A) Urban	0 km	A=0	1) Land acquisition	E
(B) Agriculture	0 km	S=Bx0.2=0	Estimated Land cost	214 MLE
(C) Desert/waste land	632 km	D=Cx0.05=31.6	2) Land use	A
(C) Water bodies	No		3) Protected areas	E
Total	101 km	TC=A+S+D=31.6, EqL=TC*0.5=15.8	4) CO ₂ emissions	E
			5) Air pollutants emissions	E
Natural Protectorate	Crossing existing Wadi El-Gemal/Hamata NP-24 and proposed Red Sea NP			

3. Features of the Project Site

1	Connects to Al Asher Men Ramadan Road at Safaga Port, Red Sea
2	Runs southward along Red Sea coast, then passes through Berenice Troglodytica (Existing Halaieb We Shalatein Road)
3	Connects to Gezirat Halaib El-kebir near border of Sudan

4. Google map

	
1) Google Map of the project site	2) Halaib

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-328-W)

1. Outline of the Project

Project Name/ Implementing Agency	Alawga Ismailia Road / GARBLT
Purpose/role of the project	Road Widening of Arterial Road
Length (km)/ Lane/ Design speed (km/h)	210.7km/ 4 lane/ 80km/h
Others (Total Project Cost/ land acquisition cost/etc.)	connects from Ismailia to Alawaga border (Israel) inland in Sinai



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	0 km	A=0	1) Land acquisition	D
(B) Agriculture	4 km	S=BX0.2=0.8	Estimated Land cost	0
(C) Desert/waste land	206 km	D=CX0.05=10.3	2) Protected areas	A
(C) Water bodies	No		3) Protected areas	D
Total	210 km	TC=A+S+D=11.1, EQL=TC*0.5=5.6	4) CO ₂ emissions	E
			5) Air pollutants emissions	E
Natural Protectorate	Crossing proposed Gebel El Maghara NP			

3. Features of the Project Site

1	Connects to Nuzana Abou Ewaygala- Al Oga Road at Israel border
2	Runs in desert area westward to Abu Aweigilla and Wadi al Hajaiyb
3	Then runs westward (Al Bohairat Al Mora –Al Gafgafa road), crossing Al kantara East-Al Tasa Road
4	Connect to Junction Res Sedr Al QantaraShark Road and Al Bohairat Al Mora –Al Gafgafa road, Sinai 10km east side of Ismailia

4. Google map

	
<p>1) Google Map of the project site</p>	<p>2) Connects to road ocated border of Israel (Nitsanei Sinai/Kadesh Barnea, Israel)</p>

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-333-W)

1. Outline of the Project

Project Name/ Implementing Agency	Tanta-Kafr El Sheikh / GARBLT
Purpose/role of the project	Road Widening of Arterial Road
Length (km)/ Lane/ Design speed (km/h)	35.4km/ 4 lane/ 80km/h
Others:	forms regional road for north bound from Tanta

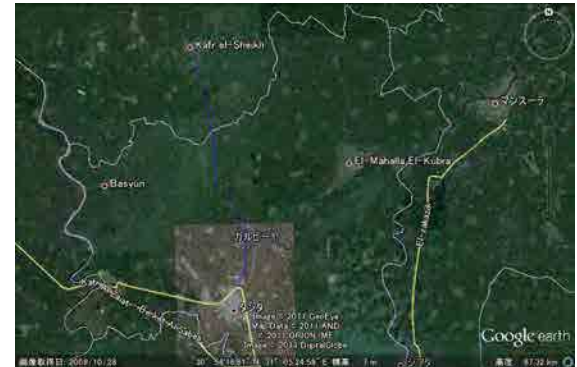
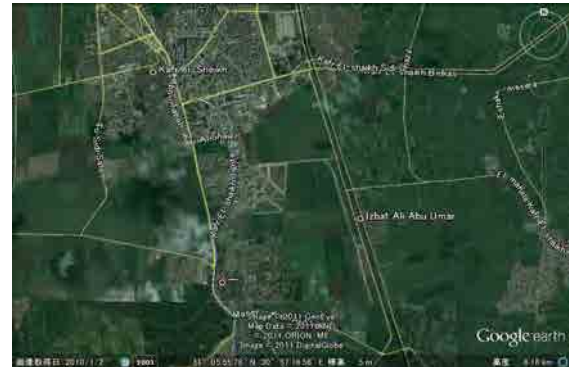
2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	3 km	A=3	1) Land acquisition	D
(B) Agriculture	32 km	S=BX0.2=6.4	Estimated Land cost	48 MLE
(C) Desert/waste land	0 km	D=0	2) Land use	E
(C) Water bodies	No		3) Protected areas	B
Total	35 km	TC=A+S+D=9.4, EqL=TC*0.5=4.7	4) CO ₂ emissions	D
Natural Protectorate	No		5) Air pollutant emissions	D

3. Features of the Project Site

1	Connects to Cairo Alex Agriculture Road near Sibirbai, northern town area of Tanta
2	Runs northward through Kunaiyiset Damshit (existing Kotor-Tanta Road) to Kafr el Sheikh
3	Connects to junction of kafr el Sheikh Belkas Road at Kafr el Sheikh

4. Google map

	
1) Google Map of the project site	2) Near Kafr El Sheikh

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-334-W)

1. Outline of the Project

Project Name/ Implementing Agency	Al Mahalla-Kafr El Sheikh –Damanhour / GARBLT
Purpose/role of the project	Road Widening of Arterial Road
Length (km)/ Lane/ Design speed (km/h)	67.4km/ 4 lane/ 80km/h
Others:	connects regional road located on the north side of Tanta


2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	2 km	A=2	1) Land acquisition	D
(B) Agriculture	65 km	S=BX0.2=13	Estimated Land cost	91 MLE
(C) Desert/waste land	0 km	D=0	2) Land use	E
(C) Water bodies	Crossing Rosetta Branch (0.4km), canals (3m and 6m)		3) Protected areas	B
Total	101 km	TC=A+S+D=15, EqL=TC*0.5=7.5	4) CO ₂ emissions	E
Natural Protectorate	No		5) Air pollutants emissions	E

3. Features of the Project Site

1	Connects to Tanta Mansoura St at northern area of Al Mahalla town
2	Runs westward in agricultural area to Qallin
3	Connects to junction of Cairo Alexandria Agriculture Road at Damanhour

4. Google map

	
1) Google Map of the project site	2) Near Shubra Khit, crossing Nile River (0.5km)

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-327-T)**1. Outline of the Project**

Project Name/ Implementing Agency	Suez Canal Tunnel Ismailia / GARBLT
Purpose/role of the project	Construction of New Arterial Road (Tunnel)
Length (km)/ Lane/ Design speed (km/h)	14.0km/ 4 lane/ 80km/h
Others:	New tunnel at Suez Canal to connect RD-311

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	0 km	A=0	1) Land acquisition	C
(B) Agriculture	0 km	S=BX0.2=0	Estimated Land cost	-
(C) Desert/waste land	0 km	D=0	2) Land use	A
(C) Water bodies			3) Protected areas	B
Total	km	TC=A+S+D=0	4) CO ₂ emissions	D
Natural Protectorate	No		5) Air pollutants emissions	D

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-995-B)**1. Outline of the Project**

Project Name/ Implementing Agency	Wasta Bridge Connection / GARBLT
Purpose/role of the project	Construction of Ne Arterial Road (Bridge)
Length (km)/ Lane/ Design speed (km/h)	10.0km/ 4 lane/ 80km/h
Others:	connects from Fayoum to Nile east side

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	0 km	A=0	1) Land acquisition	C
(B) Agriculture	0 km	S=Bx0.2=	Estimated Land cost	-
(C) Desert/waste land	0 km	D=0	2) Land use	A
(C) Water bodies			3) Protected areas	B
Total	km	TC=A+S+D=	4) CO ₂ emissions	D
Natural Protectorate	No		5) Air pollutants emissions	D

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-996-B)**1. Outline of the Project**

Project Name/ Implementing Agency	Minya Bridge / GARBLT
Purpose/role of the project	Construction of New Arterial Road (Bridge)
Length (km)/ Lane/ Design speed (km/h)	18.0km/ 4 lane/ 80km/h
Others:	cross the Nile river

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	0 km	A=0	1) Land acquisition	C
(B) Agriculture	0 km	S=BX0.2=0	Estimated Land cost	-
(C) Desert/waste land	0 km	D=0	2) Land use	A
(C) Water bodies			3) Protected areas	B
Total	0 km	TC=A+S+D=0	4) CO ₂ emissions	D
Natural Protectorate	No		5) Air pollutants emissions	D

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-997-B)**1. Outline of the Project**

Project Name/ Implementing Agency	Helwan-Beni Suef Bridge / GARBLT
Purpose/role of the project	Construction of new Arterial Road (Bridge)
Length (km)/ Lane/ Design speed (km/h)	3.0 km/ 4 lane/ 80km/h
Others:	connects from Fayoum to Nile east side

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Evaluation	Rating
(A) Urban	0 km	A=0	1) Land acquisition	C
(B) Agriculture	0 km	S=0	Estimated Land cost	-
(C) Desert/waste land	0 km	D=0	2) Land use	A
(C) Water bodies			3) Protected areas	B
Total	0 km	TC=A+S+D=0	4) CO ₂ emissions	D
Natural Protectorate	No		5) Air pollutants emissions	D

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-298-B)**1. Outline of the Project**

Project Name/ Implementing Agency	Kalabsha Bidge (Koum Ombo) (Aswan) / GARBLT
Purpose/role of the project	Construction of new Arterial Road (Bridge)
Length (km)/ Lane/ Design speed (km/h)	10 km/ 4 lane/ 80km/h
Others:	connects to both side of Nile river

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	0 km	A=0	1) Land acquisition	C
(B) Agriculture	0 km	S=BX0.2=0	Estimated Land cost	-
(C) Desert/waste land	0 km	D=0	2) Land use	A
(C) Water bodies	Crossing Nile River		3) Protected areas	B
Total	km	TC=A+S+D=	4) CO ₂ emissions	D
Natural Protectorate	No		5) Air pollutants emissions	D

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RD-299-B)**1. Outline of the Project**

Project Name/ Implementing Agency	Abo Tig Bridge and Selim Coast (Asyut) / GARBLT
Purpose/role of the project	Construction of new Arterial Road (Bridge)
Length (km)/ Lane/ Design speed (km/h)	km/ 4 lane/ 80km/h
Others:	connects to both side of Nile river

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	0 km	A=0	1) Land acquisition	C
(B) Agriculture	0 km	S=Bx0.2=0	Estimated Land cost	
(C) Desert/waste land	0 km	D=0	2) Land use	C
(C) Water bodies	Crossing Nile River		3) Protected areas	B
Total	km	TC=A+S+D=20	4) CO ₂ emissions	D
Natural Protectorate	No		5) Air pollutants emissions	D

3. Features of the Project Site

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4	

4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RW-420-C)**1. Outline of the Project**

Project Name/ Implementing Agency	Railway Link between Sokhna Port and Helwan / ENR
Purpose/role of the project	Construction of New Line
Length (km)/ Lane/ Design speed (km/h)	km/ S/ 30km/h
Others:	New freight railway line for direct link from Sokhna to 6 th of October city

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km	A=1	1) Land acquisition	D
(B) Agriculture	km	S=BX0.2=	Estimated Land cost	-
(C) Desert/waste land	km	D=CX0.05=	2) Land use	C
(C) Water bodies			3) Protected areas	B
Total	km	TC=A+S+D=	4) CO ₂ emissions	B
Natural Protectorate	No		5) Air pollutants emissions	B

3. Features of the Project Site

1	Connects to Sokhna Port
2	Runs in desert area
3	Connects to Helwan

4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RW-999-C)

1. Outline of the Project

Project Name/ Implementing Agency	(High) Speed Railway for Cairo – Aswan / ENR
Purpose/role of the project	Construction of New Line
Length (km)/ Lane/ Design speed (km/h)	750.0km/ D / 300km/h
Others:	New line for passenger/cargo at west side connected only major cities



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	45 km	A=45	1) Land acquisition	E
(B) Agriculture	55 km	S=BX0.2=11	Estimated Land cost	841 MLE
(C) Desert/waste land	650 km	D=CX0.05=32.5	2) Land use	E
(C) Water bodies	No		3) Protected areas	B
Total	750 km	TC=A+S+D=88.5	4) CO ₂ emissions	A
Natural Protectorate	No		5) Air pollutants emissions	A

3. Features of the Project Site

1	Starts from Cairo RW Station
2	Runs southwestward in town area of Giza (45km)
3	Runs in desert area (45km) and runs in agricultural area of Fayoum (55km)
4	Then runs southward in desert area of west side of Giza-Luxor Road (west side of Nile to Aswan)
5	Connects to Aswan RWSt

4. Google map

	
1) Google Map of the project site	2) Crossing fertile agricultural land of Fayoum

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RW-301-C)**1. Outline of the Project**

Project Name/ Implementing Agency	Single Tracking for Basion City / ENR
Purpose/role of the project	Construction of New Line
Length (km)/ Lane/ Design speed (km/h)	27.0km/ S/ 30km/h
Others:	not in main line between Cairo - Alex.

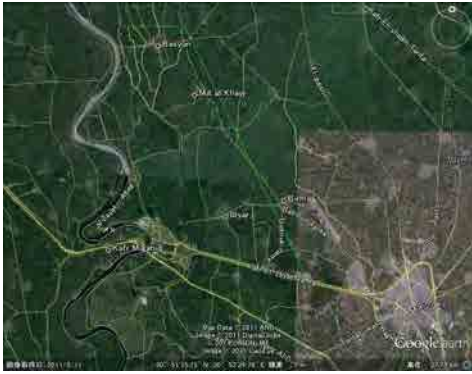

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	1 km	A=1	1) Land acquisition	D
(B) Agriculture	26 km	S=Bx0.2=5.2	Estimated Land cost	39 MLE
(C) Desert/waste land	0 km	D=Cx0.05=0	2) Land use	E
(C) Water bodies	Canal Crossing (10m)		3) Protected areas	B
Total	27 km	TC=A+S+D=6.2	4) CO ₂ emissions	B
Natural Protectorate	No		5) Air pollutants emissions	B

3. Features of the Project Site

1	Connects to Kewisna Tanta railway suburb of Tanta
2	Runs northwestward to Basion City
3	Connects to terminal near Basion-Desouk Road

4. Google map

	
1) Google Map of the project site	2) Tanta

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RW-304-C)

1. Outline of the Project

Project Name/ Implementing Agency	High Speed Railway for Cairo - Alexandria [High/Higer speed Alt-1] / ENR
Purpose/role of the project	Construction of New Line
Length (km)/ Lane/ Design speed (km/h)	220.0km/D /300km/h
Others:	Italian proposal connects to Alex. to Cairo (6th of October, Smart city) along Cairo - Alex. dessert road, directly

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	20 km	A=20	1) Land acquisition	E
(B) Agriculture	160 km	S=BX0.2=32	Estimated Land cost	513 MLE
(C) Desert/waste land	40 km	D=CX0.05=2	2) Land use	E
(C) Water bodies	No		3) Protected areas	B
Total	137.5 km	TC=A+S+D=54	4) CO ₂ emissions	A
Natural Protectorate	No		5) Air pollutants emissions	A

3. Features of the Project Site

1	From Cairo Giza RW Station runs westward, crossing Ring Road, then runs westward in mixed residential/agricultural areas
2	Runs through 6 th of October City, then runs in parallel to Cairo Alexandria Desert Road in mostly agricultural area
3	Suburb of Alexandria (30km apart from the city center) turns to right, runs northeastward to Alex railway station by detouring Alex. Airport Mayruit Lake
4	

4. Google map

<p>1) Google Map of the project site</p>	<p>2) Alexandria (terminal)</p>

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RW-305-C)**1. Outline of the Project**

Project Name/ Implementing Agency	Cairo Metro Line No. 4 / ENR
Purpose/role of the project	Construction of New Line
Length (km)/ Lane/ Design speed (km/h)	14.0km/ D/
Others:	connects to 6th of October

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	14 km	A=0	1) Land acquisition	D
(B) Agriculture	0 km	S=BX0.2=0.3	Estimated Land cost	133 MLE
(C) Desert/waste land	0 km	D=CX0.05=6.8	2) Land use	C
(C) Water bodies			3) Protected areas	B
Total	14 km	TC=A+S+D=7.1 km	4) CO ₂ emissions	B
Natural Protectorate	No		5) Air pollutants emissions	B

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RW-312-C)

1. Outline of the Project

Project Name/ Implementing Agency	Single Tracking for Bir El Abd – Rafah / ENR
Purpose/role of the project	Construction of New Line
Length (km)/ Lane/ Design speed (km/h)	120.0km/ S /70km/h
Others:	connects to Israel



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	0 km	A=0	1) Land acquisition	E
(B) Agriculture	40 km	S=BX0.2=8	Estimated Land cost	90 MLE
(C) Desert/waste land	80 km	D=CX0.05=4	2) Land use	E
(C) Water bodies	No		3) Protected areas	B
Total	120 km	TC=A+S+D=12	4) CO ₂ emissions	A
Natural Protectorate	No		5) Air pollutants emissions	A

3. Features of the Project Site

1	From Bir El Abd town in North Sinai Governorate to eastward inland of Al Kantara Shark-Al Arish Road, desert land (80km) and semiarid agri. Land (40km) ,Zaraniq, Maadan, Arish, Sheikh Zwayid,
2	Connects to national border near Rafah of Israel
3	

4. Google map

	
1) Google Map of the project site	2) National border with Israel (Near Rafah of Israel)

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(Rw-313-C)

1. Outline of the Project

Project Name/ Implementing Agency	Double Tracking to 10th of Ramadhan City / ENR
Purpose/role of the project	Construction of New Line
Length (km)/ Lane/ Design speed (km/h)	39.1km/ D / 90km/h
Others :	connects between Zagazig to Robeki through Logistic Center



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	10 km	A=10	1) Land acquisition	E
(B) Agriculture	0 km	S=BX0.2=0	Estimated Land cost	109 MLE
(C) Desert/waste land	29 km	D=CX0.05=1.5	2) Land use	C
Others	Penetrating airport site for 4km		3) Protected areas	B
Total	39 km	TC=A+S+D=11.5 km	4) CO ₂ emissions	B
Natural Protectorate	No		5) Air pollutants emissions	B

3. Features of the Project Site

1	Diverge railway line at Rabeiqi
2	Runs northwestward through Ramadan City to Bilbeis
3	Near Bilbeis crossing airport site
4	

4. Google map

	
1) Google Map of the project site	2) At Bilbeis, crossing air port site

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RW-400-C)

1. Outline of the Project

Project Name/ Implementing Agency	High Speed Railway for Cairo - Alexandria via Tanta [High/Higer speed Alt-2] / ENR
Purpose/role of the project	Construction of New Line
Length (km)/ Lane/ Design speed (km/h)	196.0km/D /300km/h
Others:	Alternative route for Italian proposal [RW-304 Alt-1]

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	16 km	A=16	1) Land acquisition	E
(B) Agriculture	180 km	S=BX0.2=36	Estimated Land cost	456 MLE
(C) Desert/waste land	0 km	D=CX0.05=0	2) Land use	E
Water bodies	Crossing Damietta Branch, Rosetta Branch, canal near Siyafa and El Mahmoudeya Canal		3) Protected areas	B
Total	196 km	TC=A+S+D=52	4) CO ₂ emissions	A
Natural Protectorate	No		5) Air pollutants emissions	A

3. Features of the Project Site

1	At Yathreb settlement in Cairo starts, crossing Ring Road, then runs northwestward in agricultural area to Ausim Town
2	Then runs northward through Prutouth settlement, Ard Al Lewa Rd and Kornish Al Nile Rd, and Rosetta Branch
3	Runs northward, then crossing Rosetta Branch of Nile near Ghunamiya, then passes through agri. land northward to Tanta
4	In Tanta turns to westward, then runs in agri. land along Cairo Alex Agri.Rd (southern side), Kafr El-zayat Tanta Rd., then crossing Rosetta distributary (0.7km) ,
5	Then runs westnorthward in agricultural area (85km), crossing International Coastal Rd, Alex. Ring Road, to Alex. City area.
6	In Alex.city area (4km) runs in west side of Alex.Airport site, crossing El mahmoudeya Canal (0.5km), and finally arrives in Alexandria RW Station.

4. Google map

	
1) Google Map of the project site	2) Near Ghunamiya, crossing Rosetta Branch

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RW-406-C)

1. Outline of the Project

Project Name/ Implementing Agency	Double Tracking to 6th of October City / ENR
Purpose/role of the project	Construction of New Line
Length (km)/ Lane/ Design speed (km/h)	41.5km/D/ 90km/h
Others:	connects from RW-403 and Baharia line via L-1


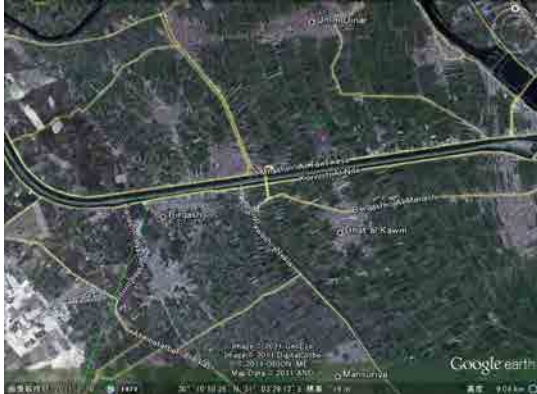
2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	35 km	A=35	1) Land acquisition	E
(B) Agriculture	2 km	S=BX0.2=0.4	Estimated Land cost	338 MLE
(C) Desert/waste land	4 km	D=CX0.05=0.2	2) Land use	C
(C) Water bodies	No		3) Protected areas	B
Total	41 km	TC=A+S+D=35.6	4) CO ₂ emissions	B
Natural Protectorate	No		5) Air pollutants emissions	B

3. Features of the Project Site

1	Diverge form Railway line near Birqash (Qnatar el Qahiriya)
2	Runs southwestward and passes through 6 th of October City
3	Merges to railway line near western part of the City
4	

4. Google map

	
1) Google Map of the project site	2) Birqash

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RW-407-C)**1. Outline of the Project**

Project Name/ Implementing Agency	Single Tracking for Robeki – Helwan / ENR
Purpose/role of the project	Construction of New Line
Length (km)/ Lane/ Design speed (km/h)	67.3km/ S/ 90km/h
Others:	forms a part of south ring railway route



2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	7 km	A=7	1) Land acquisition	D
(B) Agriculture	0 km	S=Bx0.2=0	Estimated Land cost	73 MLE
(C) Desert/waste land	60 km	D=Cx0.05=3	2) Land use	A
(C) Water bodies	No		3) Protected areas	B
Total	67 km	TC=A+S+D=10	4) CO ₂ emissions	B
Natural Protectorate	No		5) Air pollutants emissions	B

3. Features of the Project Site

1	Diverge from railway line at Ribeiqi
2	Runs southward in desert area, crossing 15 may City area, airport site
3	Merges to Cairo Aswan railway line at southern part of Helwan
4	

4. Google map

	
1) Google Map of the project site	2) Ribeiqi

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RW-308-DT)

1. Outline of the Project

Project Name/ Implementing Agency	Triple Tracking for Qalyub –El Qnater / ENR
Purpose/role of the project	Doubling Tracking
Length (km)/ Lane/ Design speed (km/h)	30.0km/ T/ 70km/h
Others :	connects Cairo - Qalyoub (4-track) with triple tracks

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	5 km	A=	1) Land acquisition	B
(B) Agriculture	25 km	S=	Estimated Land cost	No land acquisition
(C) Desert/waste land	0 km	D=	2) Land use	E
(C) Water bodies	No		3) Protected areas	B
Total	30 km	TC=A+S+D=	4) CO ₂ emissions	B
Natural Protectorate	No		5) Air pollutants emissions	B

3. Features of the Project Site

1	Runs from Qalyuob to Benha
2	
3	

4. Google map

	
1) Google Map of the project site	2) Benha

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RW-309-DT)

1. Outline of the Project

Project Name/ Implementing Agency	Double Tracking for Mansoura – Damietta /ENR
Purpose/role of the project	Double Tracking
Length (km)/ Lane/ Design speed (km/h)	62.0km/D /60km/h
Others:	connects to Damietta

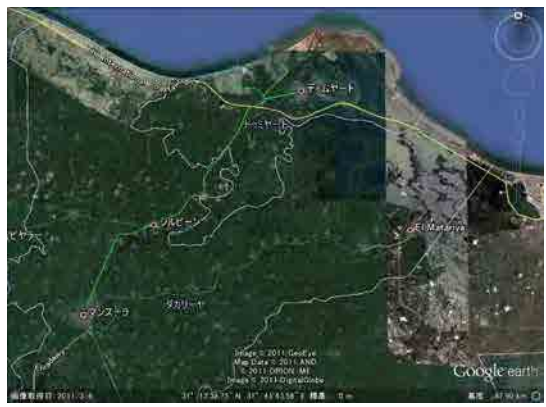
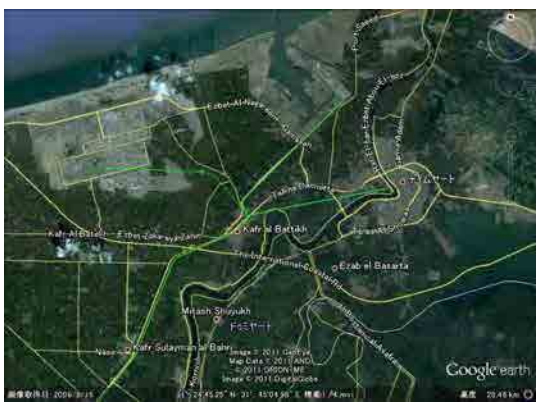
2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	8 km		1) Land acquisition	B
(B) Agriculture	54 km		Estimated Land cost	No land acquisition
(C) Desert/waste land	0 km		2) Land use	E
(C) Water bodies	No		3) Protected areas	B
Total	62 km		4) CO ₂ emissions	B
Natural Protectorate	No		5) Air pollutants emissions	B

3. Features of the Project Site

1	Starts from Mansoura
2	Runs northeastward in agricultural area
3	Connects to Damietta RW Station

4. Google map

	
1) Google Map of the project site	2) Damietta

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RW-300-DT)

1. Outline of the Project

Project Name/ Implementing Agency	Double Tracking for Ain Shams – Robeki / ENR
Purpose/role of the project	Doubling Tracking
Length (km)/ Lane/ Design speed (km/h)	50.0km/ D/ 30-40km/h
Others :	located near Cairo section


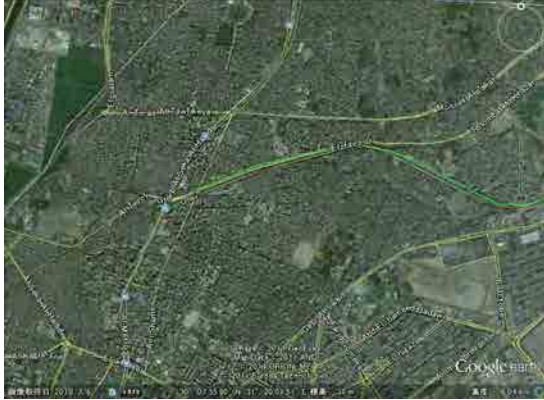
2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	20 km	A=20	1) Land acquisition	B
(B) Agriculture	0 km	S=BX0.2=0	Estimated Land cost	No land acquisition
(C) Desert/waste land	30 km	D=CX0.05=0	2) Land use	C
(C) Water bodies	No		3) Protected areas	B
Total	50 km	TC=A+S+D=6.2	4) CO ₂ emissions	B
Natural Protectorate	No		5) Air pollutants emissions	B

3. Features of the Project Site

1	Starts from Ain Sham railway St
2	Runs eastward to Robeki
3	Connects to Robeki

4. Google map

	
1) Google Map of the project site	2) Ain Shams

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RW-307-DT)

1. Outline of the Project

Project Name/ Implementing Agency	Double Tracking for Qalyoub - El Qnater / ENR
Purpose/role of the project	Double Tracking
Length (km)/ Lane/ Design speed (km/h)	10.0km/D /30km/h
Others:	not in main line between Cairo - Alex.

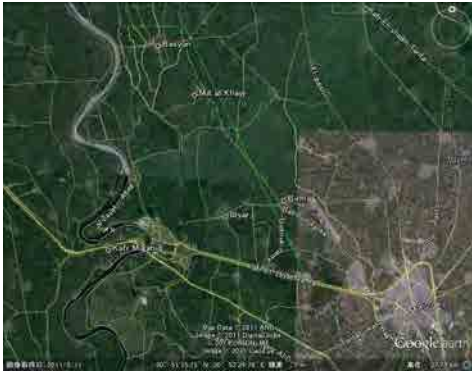

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	5 km	A=	1) Land acquisition	B
(B) Agriculture	5 km	S=	Estimated Land cost	No land acquisition
(C) Desert/waste land	0 km	D=	2) Land use	E
(C) Water bodies	No		3) Protected areas	B
Total	10 km	TC=	4) CO ₂ emissions	B
Natural Protectorate	No		5) Air pollutants emissions	B

3. Features of the Project Site

1	Connects to Kewisna Tanta railway suburb of Tanta
2	Runs northwestward to Basion City
3	Connects to terminal near Basion-Desouk Road

4. Google map

	
1) Google Map of the project site	2) Tanta

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RW-408-I)**1. Outline of the Project**

Project Name/ Implementing Agency	Rehabilitation of Tracks for Qena – Kharga / ENR
Purpose/role of the project	Track Improvement
Length (km)/ Lane/ Design speed (km/h)	255.0km/ S /30km/h
Others:	for passenger, even the paralelled cargo line from Kharga to Qena are existed

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	B
(B) Agriculture	km		Estimated Land cost	No land acquisition
(C) Desert/waste land	km		2) Land use	C
(C) Water bodies			3) Protected areas	B
Total	km		4) CO ₂ emissions	B
Natural Protectorate	No		5) Air pollutants emissions	B

3. Features of the Project Site

1	
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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RW-409-I)**1. Outline of the Project**

Project Name/ Implementing Agency	Rehabilitation of Tracks for Qena – Safaga / ENR
Purpose/role of the project	Track Improvement
Length (km)/ Lane/ Design speed (km/h)	170.0km/ S/ 30km/h
Others (Total Project Cost/ land acquisition cost/etc.)	for passenger, even the paralleled cargo line from Kharga to Qena are existed

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	B
(B) Agriculture	km		Estimated Land cost	No land acquisition
(C) Desert/waste land	km		2) Land use	C
(C) Water bodies			3) Protected areas	B
Total	km		4) CO ₂ emissions	B
Natural Protectorate	No		5) Air pollutants emissions	B

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RW-402-I)**1. Outline of the Project**

Project Name/ Implementing Agency	Improvement of Tracks / ENR
Purpose/role of the project	1) Track renewal, 2) New track maintenance machines
Length (km)/ Lane/ Design speed (km/h)	
Others:	Cairo – Tanta - Alexandria

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	B
(B) Agriculture	km		Estimated Land cost	No land acquisition
(C) Desert/waste land	km		2) Land use	C
(C) Water bodies			3) Protected areas	B
Total	km		4) CO ₂ emissions	B
Natural Protectorate	No		5) Air pollutants emissions	B

3. Features of the Project Site

1	
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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID-(RW-402-I)**1. Outline of the Project**

Project Name/ Implementing Agency	Improvement of Tracks / ENR
Purpose/role of the project	1) Track renewal, 2) New track maintenance machines
Length (km)/ Lane/ Design speed (km/h)	
Others:	Damietta – Port Said Line

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	B
(B) Agriculture	km		Estimated Land cost	No land acquisition
(C) Desert/waste land	km		2) Land use	C
(C) Water bodies			3) Protected areas	B
Total	km		4) CO ₂ emissions	B
Natural Protectorate	No		5) Air pollutants emissions	B

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID (IW-4)

1. Outline of the Project

Project Name/ Implementing Agency	Waterway Improvement on Cairo - Asyut / RTA
Purpose/role of the project	Improvement of port
Length (km)/ Lane/ Design speed (km/h)	
Others	aims to dredging for safe navigability preventing from sedimentation (width 40m x dredging depth 2m x200km).

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	C
(B) Agriculture	km		Estimated Land cost	-
(C) Desert/waste land	km		2) Land use	C
(C) Water bodies			3) Protected areas	B
Total			4) CO ₂ emissions	B
Natural Protectorate	No		5) Air pollutants emissions	B

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID (IW-5)

1. Outline of the Project

Project Name/ Implementing Agency	IWT port for ITC / RTA
Purpose/role of the project	Improvement of port
Length (km)/ Lane/ Design speed (km/h)	
Others	aims to dredging for safe navigability preventing from sedimentation (width 40m x dredging depth 1.5m x203km).

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	C
(B) Agriculture	km		Estimated Land cost	-
(C) Desert/waste land	km		2) Land use	C
(C) Water bodies			3) Protected areas	B
Total			4) CO ₂ emissions	B
Natural Protectorate	No		5) Air pollutants emissions	B

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID (IW-6)

1. Outline of the Project

Project Name/ Implementing Agency	Waterway Improvement on Cairo – Damietta / RTA
Purpose/role of the project	Improvement of port
Length (km)/ Lane/ Design speed (km/h)	
Others	aims to dredging for safe navigability preventing from sedimentation (width 40m x dredging depth 2m x200km).

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	C
(B) Agriculture	km		Estimated Land cost	-
(C) Desert/waste land	km		2) Land use	C
(C) Water bodies			3) Protected areas	B
Total			4) CO ₂ emissions	B
Natural Protectorate	No		5) Air pollutants emissions	B

3. Features of the Project Site

1		
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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID (IW-1)

1. Outline of the Project

Project Name/ Implementing Agency	IWT port for ITC / RTA
Purpose/role of the project	Improvement of port
Length (km)/ Lane/ Design speed (km/h)	
Others	connects to south ring railway route around Helwan, Tebbin port improvement, includes waterway, navigation and lock operation improvement.

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	C
(B) Agriculture	km		Estimated Land cost	-
(C) Desert/waste land	km		2) Land use	C
(C) Water bodies			3) Protected areas	B
Total			4) CO ₂ emissions	B
Natural Protectorate	No		5) Air pollutants emissions	B

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID (IW-2)

1. Outline of the Project

Project Name/ Implementing Agency	IWT port improvement for Upper Egypt / RTA
Purpose/role of the project	Port improvement
Length (km)/ Lane/ Design speed (km/h)	
Others	connects roads/ railway smoothly, Asyut and Quena ports port improvement, includes waterway, navigation and lock operation improvement.

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	C
(B) Agriculture	km		Estimated Land cost	-
(C) Desert/waste land	km		2) Land use	C
(C) Water bodies			3) Protected areas	B
Total	km		4) CO ₂ emissions	B
Natural Protectorate			5) Air pollutants emissions	B

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID (IW-3)

1. Outline of the Project

Project Name/ Implementing Agency	Lock Expansion with Comprehensive Lock Operation Improvement
Purpose/role of the project	Improvement of port
Length (km)/ Lane/ Design speed (km/h)	
Others	upgrades the present capacity of Asyut Barrage Lock by expansion and improves operation of other locks.

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	C
(B) Agriculture	km		Estimated Land cost	-
(C) Desert/waste land	km		2) Land use	C
(C) Water bodies			3) Protected areas	B
Total			4) CO ₂ emissions	B
Natural Protectorate	No		5) Air pollutants emissions	B

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID (PT-5)

1. Outline of the Project

Project Name/ Implementing Agency	Port Said East: Logistic Center
Purpose/role of the project	Improvement of port
Length (km)/ Lane/ Design speed (km/h)	
Others	exist the plan by 1st Stage in 2008, not sure the detail

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	C
(B) Agriculture	km		Estimated Land cost	-
(C) Desert/waste land	km		2) Land use	C
(C) Water bodies			3) Protected areas	B
Total			4) CO ₂ emissions	B
Natural Protectorate	No		5) Air pollutants emissions	B

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID (PT-3)

1. Outline of the Project

Project Name/ Implementing Agency	Dekheila Port: New Container Terminal
Purpose/role of the project	Improvement of port
Length (km)/ Lane/ Design speed (km/h)	
Others	to ensure future cargo demand in 2027 as a window of Intermodal Transport Corridor, to access to railway and road with smooth and well organized connection, Breakwater construction project is under implementation

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	C
(B) Agriculture	km		Estimated Land cost	-
(C) Desert/waste land	km		2) Land use	C
(C) Water bodies			3) Protected areas	B
Total			4) CO ₂ emissions	B
Natural Protectorate	No		5) Air pollutants emissions	B

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID (PT-4)**1. Outline of the Project**

Project Name/ Implementing Agency	Damietta Port; Study on Sedimentation problem
Purpose/role of the project	Improvement of port
Length (km)/ Lane/ Design speed (km/h)	
Others	detailed study (10mil.LE) is required to find suitable solution to sedimentation problem. Note that Damietta port authority used about 75mil.LE for annual maintenance for dredging.

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	C
(B) Agriculture	km		Estimated Land cost	-
(C) Desert/waste land	km		2) Land use	C
(C) Water bodies			3) Protected areas	B
Total			4) CO ₂ emissions	B
Natural Protectorate	No		5) Air pollutants emissions	B

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID (L-1)

1. Outline of the Project

Project Name/ Implementing Agency	VAL (Value Added Logistics) Center at 6 th of October City / GARBLT
Purpose/role of the project	Construction of New facility
Length (km)/ Lane/ Design speed (km/h)	
Others	New VAL/ Distribution Center

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	C
(B) Agriculture	km		Estimated Land cost	-
(C) Desert/waste land	km		2) Land use	C
(C) Water bodies	No		3) Protected areas	B
Total	km		4) CO ₂ emissions	D
Natural Protectorate	No		5) Air pollutants emissions	D

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID (P-1)

1. Outline of the Project

Project Name/ Implementing Agency	Passenger Intermodal Facilities /
Purpose/role of the project	Construction of New facility
Length (km)/ Lane/ Design speed (km/h)	
Others	50 locations nationwide

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	C
(B) Agriculture	km		Estimated Land cost	-
(C) Desert/waste land	km		2) Land use	C
(C) Water bodies	No		3) Protected areas	B
Total	km		4) CO ₂ emissions	D
Natural Protectorate	No		5) Air pollutants emissions	D

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID (SW-7)

1. Outline of the Project

Project Name/ Implementing Agency	Development of IWT management database and Installation of IWT Navigation Information System / RTA
Purpose/role of the project	provides guaranteed navigation information to any IWT users for waterways, fleets, navigation aids and RIS, and IWT management database including these improvement and development

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	A
(B) Agriculture	km		Estimated Land cost	0
(C) Desert/waste land	km		2) Land use	A
(C) Water bodies			3) Protected areas	A
Total			4) CO ₂ emissions	C
Natural Protectorate	No		5) Air pollutants emissions	C

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID (SW-1)

1. Outline of the Project

1) Project Name/ Implementing Agency	Egyptian Transport Center (ETC) / MOT
2) Purpose	
1) Others	has the function of transport related database, planning tools and model development and maintenance, training of transport planner, development of traffic accident database and as National Road Traffic Safety Board

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	A
(B) Agriculture	km		Estimated Land cost	0
(C) Desert/waste land	km		2) Land use	A
(C) Water bodies			3) Protected areas	A
Total			4) CO ₂ emissions	C
Natural Protectorate	No		5) Air pollutants emissions	C

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID (SW-2)

1. Outline of the Project

Project Name/ Implementing Agency	Establishment of Dedicated Transport Fund
Purpose/role of the project	researches and arranges the matter of subsidy/carbon tax/envi. incentive tax or subsidy for future earmarked road funds

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental indicator	Rating
(A) Urban	km		1) Land acquisition	A
(B) Agriculture	km		Estimated Land cost	0
(C) Desert/waste land	km		2) Land use	A
(C) Water bodies			3) Protected areas	A
Total			4) CO ₂ emissions	C
Natural Protectorate	No		5) Air pollutants emissions	C

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID (SW-3R)

1. Outline of the Project

Project Name/ Implementing Agency	Road safety initiative (3E; Engineer, Education and Enforcement) / GARBLT
Purpose/role of the project	examines historical traffic accident data and conducts safety audit, then takes effective countermeasures (hard and soft) for reducing traffic accidents.

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	A
(B) Agriculture	km		Estimated Land cost	0
(C) Desert/waste land	km		2) Land use	A
(C) Water bodies			3) Protected areas	A
Total			4) CO ₂ emissions	C
Natural Protectorate	No		5) Air pollutants emissions	C

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID (SW-4)

1. Outline of the Project

Project Name/ Implementing Agency	Road safety initiative (3E; Engineer, Education and Enforcement) / GARBLT
Purpose/role of the project	examines historical traffic accident data and conducts safety audit, then takes effective countermeasures (hard and soft) for reducing traffic accidents.

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	A
(B) Agriculture	km		Estimated Land cost	0
(C) Desert/waste land	km		2) Land use	A
Water bodies			3) Protected areas	A
Total			4) CO ₂ emissions	C
Natural Protectorate	No		5) Air pollutants emissions	C

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID (SW-5)

1. Outline of the Project

Project Name/ Implementing Agency	Railway Safety Initiative / ENR
Purpose/role of the project	modernization of railway crossing to automatic system (696, half of crossings in Egypt are improved by ENR funds till 2017) and continued improvement.
Others	

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	A
(B) Agriculture	km		Estimated Land cost	0
(C) Desert/waste land	km		2) Land use	A
(C) Water bodies			3) Protected areas	A
Total			4) CO ₂ emissions	C
Natural Protectorate	No		5) Air pollutants emissions	C

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID (SW-6)

1. Outline of the Project

Project Name/ Implementing Agency	Introduction of State of the art Railway Systems and Control / ENR
Purpose/role of the project	apply modern railway signal control system and improvement of workshop facilities.

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	A
(B) Agriculture	km		Estimated Land cost	0
(C) Desert/waste land	km		2) Land use	A
(C) Water bodies			3) Protected areas	A
Total			4) CO ₂ emissions	C
Natural Protectorate	No		5) Air pollutants emissions	C

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID (HW-5)

1. Outline of the Project

Project Name/ Implementing Agency	Extension of NICHE program / RTA
Purpose/role of the project	
Others	targets to extension of current support to RTA officers capacity development , especially RTA management and operation capacities and strengthening of marketing and logistics knowledge and skill, including utilization of database.

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	A
(B) Agriculture	km		Estimated Land cost	0
(C) Desert/waste land	km		2) Land use	A
(C) Water bodies			3) Protected areas	A
Total			4) CO ₂ emissions	C
Natural Protectorate	No		5) Air pollutants emissions	C

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID (HW-1)

1. Outline of the Project

Project Name/ Implementing Agency	Strengthening MOT's responsibility covering all transport modes for integrated multimodal transport system and logistics
Purpose/role of the project	includes civil aviation, tourism and the Suez Canal
Others	

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	A
(B) Agriculture	km		Estimated Land cost	0
(C) Desert/waste land	km		2) Land use	A
(C) Water bodies			3) Protected areas	A
Total			4) CO ₂ emissions	C
Natural Protectorate	No		5) Air pollutants emissions	C

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID (HW-2)

1. Outline of the Project

Project Name/ Implementing Agency	Training in modern traffic management and control systems / GARBLT
Purpose/role of the project	targets to GARBLT officers to regulate the traffic management on roads (traffic safety control and warning system, traffic information provision, facilities).
Others	

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	A
(B) Agriculture	km		Estimated Land cost	0
(C) Desert/waste land	km		2) Land use	A
(C) Water bodies			3) Protected areas	A
Total			4) CO ₂ emissions	C
Natural Protectorate	No		5) Air pollutants emissions	C

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID (HW-3)

1. Outline of the Project

Project Name/ Implementing Agency	Training in modern road maintenance techniques / GARBLT
Purpose/role of the project	targets to GARBLT officers for improving overload control and asset (roads and bridges) management
Others	

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	A
(B) Agriculture	km		Estimated Land cost	0
(C) Desert/waste land	km		2) Land use	A
(C) Water bodies			3) Protected areas	A
Total			4) CO ₂ emissions	C
Natural Protectorate	No		5) Air pollutants emissions	C

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment

Data Sheet for Environmental Evaluation - Project ID (HW-4)

1. Outline of the Project

Project Name/ Implementing Agency	Extension of Transformation Plan
Purpose/role of the project	targets to extension of current support to ENR officers capacity development for proper operation and marketing for passenger and freight transport.
Others	

2. Land use /Environmental Evaluation

Land use	Length (km)	Equivalent length (km)	Environmental Indicator	Rating
(A) Urban	km		1) Land acquisition	A
(B) Agriculture	km		Estimated Land cost	0
(C) Desert/waste land	km		2) Land use	A
(C) Water bodies			3) Protected areas	A
Total			4) CO ₂ emissions	C
Natural Protectorate	No		5) Air pollutants emissions	C

3. Features of the Project Site

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4. Google map

1) Google Map of the project site	2)

5. Comment