5 Environmental Issues

5.1 Natural Environment

(1) Issues and Measures for Natural Environment

1) Biodiversity

a. Flora and Fauna

Egypt has rich natural heritage such as sand dunes, mangroves, oasis, coral reefs as well as coastal and marine resources. It also possesses many rare species. An estimated 18,000 species of flora and fauna are in the Egypt, but there are no quantified estimation of how far the biodiversity losses has gone in Egypt. Confirmed number of flora and fauna are; 132 species of mammals, 514 birds, 98 reptiles and 460 fishes in vertebrates, more than 7,000 of insects as a invertebrate and 2700 of spermatophyte. Among these, 44 animals and 2 deserticolous plants are recognized as endangered species.

Table 5.1: Flora and Fauna in Egypt

Category		No. of families	No. of species	No. of endangered species
Vertebrates	Mammals	24	132	6
	Birds	68	514	17
	Crawler	19	98	6
	Fin	101	460	14
Invertebrate	Insects	309	7,308	1
	Mullosk	106	466	
	Annelid	11	44	
	Crustacea	19	107	
	Brachyuran	22	185	
	Coelenterata	13	42	
	Echinodermata	52	253	
Plants	Spermatophyta	133	2,700	2
	Pteridophyte	12	25	
	Fungi	64	600	

Source: IUCN, *Red List*

Natural forest distribution is limited in the mountain area of the Gebel Elba, at latitude 22º ~ 22º30’ N, and tropical rainforest, mainly composed of acacias and mangrove forest, at the coastal area of the Red Sea. Protectorates of Elba, Ras Mohamed, Nabq, Abu Galum are existed in these areas.

(2) Biodiversity Degradation

1) Causes of Biodiversity Degradation

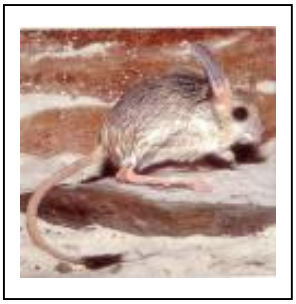
Main sources of biodiversity degradation are development of land, expansion of agricultural land, and disappearance of habitat from excessive grazing or application of agrochemicals, as well as habitats being polluted at the wetland of the Delta area, and hunting, fishing and tourism activities disturbing the natural habitat areas.

Regarding losses of habitats, habitat of mammals like African lion, raptors and bird species like geese & ducks, are in decrease with expansion of agricultural land or stockbreeding. Also animals like desert rats are threatened by development in coastal areas. Many species are adversely affected by human induced pollution, i.e. raptors like lesser kestrel (see Photo 5.4) are for soil pollution, bird species like white-tailed sea eagles and lesser flamingo, are affected for water degradation. On the other hands, mammals such as African lion and Fennec Fox, and bird species such as duck and snipe, are for game hunting, whereas various birds and sea turtles, and fish including gilthead and sandfish are in decrease for hunting for living. Human caused turmoil from tourism is threatening bird species living in coastal region.

Table 5.2: Causes of Biodiversity Degradation

Factors	Threatened Species	
Loss or degradation of habitat	Mammals	Four-toed Jerboa (Allactaga tetradactyla), Ruppell's Sand Fox etc. (Vulpes rueppelli etc.), African Lion(Panthera leo) etc.
	Birds	Saker Falcon, Grey Sea Eagle etc. (Falco cherrug、Haliaeetus albicilla etc.), Sociable Lapwing, Long-billed Curlew etc. (Vanellus gregarius、Numenius tenuirostris etc.), Lesser White-fronted Goose, White-headed Duck etc. (Anser erythropus, Oxyural leucocephala etc.)
	Reptiles	Green Turtle(Chelonia mydas)
	Fishes	Estuary Cod, Brown-marbled Grouper (Epinephelus coioides, Epinephelus fuscoguttatus)
Pollution of habitat, land pollution	Mammals	Flower's Shrew (Crocidura floweri)
	Birds	Hermit Ibis (Geronticus eremita), Black Crowned-crane (Balearica pavonina), Lesser Kestrel, Lapper-faced Vulture etc. (Falco naumanni, Torgos tracheliotus etc.) Great Bustard, Marbled Duck (Otis tarda、Marmaronetta angustirostris etc.)
Pollution of habitat, water pollution	Birds	White-headed Duck(Oxyural leucocephala), Gray sea Eagle(Haliaeetus albicilla), Lesser Flamingo(Phoenicopterus minor) etc.
Hunting for cultural, scientific or recreational demands	Mammals	African Lion(Panthera leo), Fennec Fox(Vulpes zerda)
	Birds	Lesser White-fronted Goose, Ferruginous Duck etc. (Anser erythropus, Aythya nyroca etc.), Black Crowned-crane (Balearica pavonina), Saker Falcon (Falco cherrug), Great Snipe (Gallinago media)

Effect factor	Extinct and threatened species	
Hunting for food	Reptiles	Green Turtle (Chelonia mydas)
	Birds	Hermit Ibis (Geronticus eremita), Yellow-breasted Bunting (Emberiza aureola), White-eyed Gull (Larus leucophthalmus) etc.
	Fishes	Giant Wrasse (Cheilinus undulates), Dusky Grouper, Brown-marbled Grouper (Epinephelus marginatus、Epinephelus fuscoguttatus) etc.
Human caused disturbance: tourism or recreation	Birds	Ferruginous Duck (Aythya nyroca), Grey sea Eagle (Haliaeetus albicilla), Audouin's Gull, White-eyed Gull (Larus audouinii, Larus leucophthalmus) etc.



Four-toed Jerboa
(Allactaga tetradactyla)
(Quoted from www.zoofachgeschaeft-nehils.de)

Fennec Fox
(Vulpes zerda)
(Quoted from www.bvet.admin.ch)

Grey sea Eagle
(Haliaeetus albicilla)
(Quoted from www.ppp.agencjaekoserwis.pl)

Photo 5.1: Some of Threatened Species

2) Status of Secondary Nature (Rural and Urban Areas)

Most agricultural areas that are maintained by human activities, or so-called Secondary Nature, are spread across Nile Valley and Nile Deltas. Almost all indigenous habitats and its species in those areas have long been replaced by valuable agricultural land. Thus, species suited for man-induced habitat – i.e. raptors include hawks, falconine, and barn owl, and bird like heron are inhabited there. Likewise, areas irrigated by groundwater in Northern Sinai and Oasis in Western Desert has similar environment where rare bird species like oxeye and Sinai woodpecker can be seen.

There are species whose habitat relies solely on the environmental condition of secondary nature, and threatened by disappearing habitat from development of social infrastructures, contamination of farmland, and hunting activities.

Due to loss and/or contamination of habitat, mammals like shrew, snipes and plovers, geese, and raptors are in decline.

Glimpse of Agricultural Landscape

Photo 5.2: Holm of River Nile (Cairo)

Rich farmland and waterfront environment can be seen in Cairo, indicating habitats for various wild species exist very close to urban area.

Photo 5.3 Farm and Canal (Saqqara)

Most of canal in agricultural areas is natural bank. Cattle and donkey seems play an important role in farming, and habitat is not likely shrinking by changing farming practices like introducing machineries instead of cattle and donkeys. It should be noted, however, that a large quantity of waste was observed in the canals near villages.

Keelies which sit on top of food chain were observed frequently not only in agricultural area but in urban suburb. Furthermore, Greater Pied Kingfisher and heron that catch and eat fish were also commonly seen in agricultural area. Agricultural area holds diverse biota in general.

Table 5.3: Threatened Species Living in the Secondary Environment

Habitat in Secondary Nature	Threatened Species	
Cultivated area	Mammals	Flower's Shrew, Egyptian Pygmy Shrew (Crcidura floweri, Crocidura religiosa)
	Birds	Sociable Lapwing, Long-bikked Curlew (Vanellus greganus, Numenius tenuirostris), Lesser White-fronted Goose etc. (Anser erythropus, Branta ruficollis etc.), Lesser Kestrel, Greater Spotted Eagle etc. (Falco naumanni, Aquila clanga etc.), Yellow-breasted Bunting (Emberiza aureola) etc.
Pasture area	Birds	Lesser White-fronted Goose, Red-breasted Goose, Great Bustard etc. (Anser erythropus、Branta ruficollis, Otis tarda etc.), Greater Spotted Eagle, Imperial Eagle etc. (Aquila clanga, Aquila heliaca etc.), Corn Crake (Crex crex) etc.
Farmer's backyard	Mammals	Pleasant Gerbil (Gerbillus amoenus)
Artificial waterfront	Birds	Whte-headed Duck, Ferruginous Duck etc. (Oxyural leucocephala、Aythya nyroca etc.), Long-bikked Curlew (Numenius tenuirostris), Baser Reed-waebler (Acrocephalus griseldis) etc.
Urban area	Birds	Lesser Kestrel (Falco naumanni)

Lesser Kestrel
(Falco naumanni)
(Quoted from
www.ittiofauna.org)

Sociable Lapwing
(Vanellus greganus)
(Quoted from www.oiseaux.net)

Photo 5.4 Bird Species Living in Secondary Environment

3) Nature Protectorates

Law 102 of 1983 was enacted as a basis of protective zone network, and EEAA has a responsibility of observing the execution of the law.

To date, 21 areas have been designated as protectorates, close to approximately 8% of the total landmass of Egypt. Egypt also intends to increase this ratio to 15% by 2017 by adding 19 new

protectorates. Those nature protectorates are playing an important role in protecting Egypt's distinctive natural environment, including gulf coastal areas and wetlands.

Table 5.4: Natural Protectorates

Name	Type	Area (km^2)	Year of decree	Objective	Feature
Ras Mohamed	Marine environment protection	480	1983	Protection on marine and land animals	Grassland beach, mangrove, marine animals, and stopover for migrating birds
Zaranik	Internationally important wetland	250	1985	Protection of migrating birds	Bird species including flamingo, pelican, and snipe.
Omayed	Biosphere protection	758	1981	Conservation, sustainable development and support	Coastal dune, saline and fresh water swamp area and animals/ plants.
Ahrash	Eco-system protection	8	1985	Protection of biodiversity in Mediterranean coast line	Forest of acacia, camphorwood and so on.
Elba	Natural protection, natural park	35,600	1985	Protection of unique habitat and biodiversity	Red sea mangrove, coral reef, saline lake, dugong etc.
Saluga and Ghazal	Nature protection	0.5	1986	Protection of precious bird species	Vast expanse of Shrub zone, habitat of migrating birds and resident birds
St. Catherine	Natural park	5,750	1996	Biodiversity protection	Upland ecosystem, ibex, striped hyena etc.
Ashtum El Gamil	Nature conservation	180	1988	Protection of migrating birds	Important wintering spot of birds
Lake Qarun	Internationally important wetland	230	1983	Protection of marine and land animals	Water birds and fishes
Wadi El Rayan	Protective zone	1,759	1989	Protection of unique ecosystem and geological/ cultural resources	Marine fossil, serows, sand fox, and bird species, etc.
Wadi Al Allaqi	Nature protection, biosphere preservation	30,000	1989/ 1993	Protection of genetic diversity of flora and fauna	Yearly and perennial plants, mammals, birds, invertebrate animals
Wadi El Assuti	Protective zone, valley	35	1989	Protection of genetic resources of desert	Deer, goats, bighorn, ostrich, some reptiles, and medical plants etc.
El Hassana Dome	Protective zone, desert	1	1989	Protection of geographical ruins	Precious plants in northern Egypt
Petrified Forest	Protective zone, desert	7	1989	Protection of geographical ruins	Fossil forest, acacia forest, scrub forest etc.
Sannur Cave	Protective zone	12	1992	Protection of geographical ruins	Vast cave result from alabaster
Nabq	Protective	600	1992	Protection of coral	134 species of plants,

Name	Type	Area (km^2)	Year of decree	Objective	Feature
	zone, coastal area			reef and mangrove	heronry, breeding area of osprey etc.
Abu Galum	Wildlife resource	500	1992	Protection of coral reef and mangrove	Mammals such as fox and ibex, lizards, snakes etc.
Taba	Protective zone, water springs	3,590	1998	Protection of rare animals and plants	Rare animals/plants, mammals, birds, 480 species of rate plants and ancient monuments of nomad
Lake Burullus	Protective zone, lake	460	1998	Protection of biodiversity in lake Al Manzara	135 species of land and marine plats, migrating birds etc.
Nile Islands	Protective zone, the Nile river basin	55	1998	Nature protection of 144 small islands in River Nile	16 governorates are involved.
Wadi Digla	Protective zone, valley	60	1999	Protection of unique nature of Digla valley	Valley plants, migratory birds, etc.

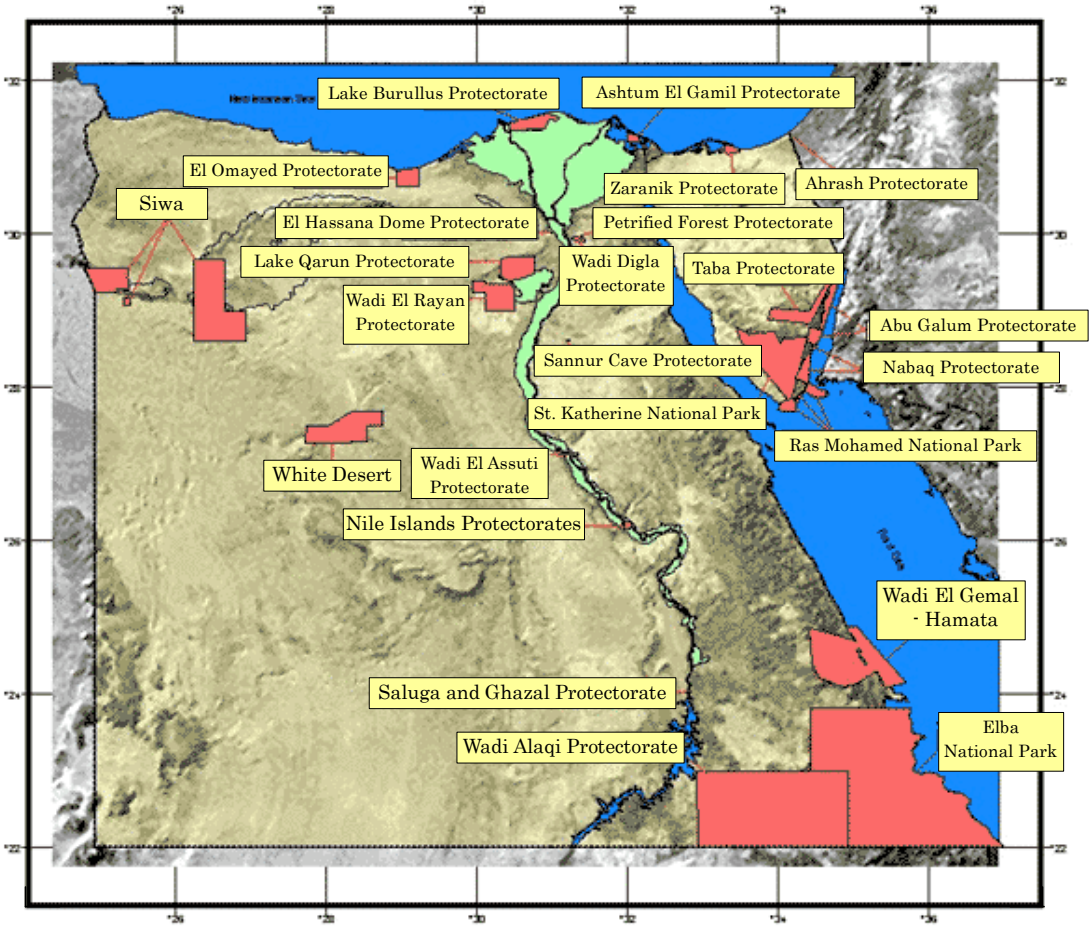


Figure 5.1: Map of Nature Protectorates

4) International Conventions

Egypt is a signatory on numerous international accords concerning biodiversity preservation, such as Convention on Biological Diversity (CBD), Ramsar Convention, and Washington Convention. Lake Bardawi and Lake Burullusl are registered in Ramsar Convention.

Table 5.5: International Conventions Regarding Biodiversity

Conventions	Concluded city	Concluded year
Convention Relative to the preservation of Fauna and Flora in their natural state	London	1933
Agreement for the Establishment of a General Fisheries Council for the Mediterranean	Rome	1951
International Plant Protection Convention	Rome	1953
International Convention for the Prevention of Pollution of the Sea by Oil	London	1963
Phyto-sanitary Convention for Africa	Kinshasa	1968
African Convention on the Conservation of Nature and Natural Resources	Algeria	1968
Convention for the Protection of the Mediterranean Sea Against Pollution	Barcelona	1976
Convention on International Trade in Endangered Species of Wild Fauna and Flora	Washington	1978
International Convention for Regulation of Whaling	Washington	1981
Convention on the Conservation of Migratory Species of Wild Animals	Bonn	1979
United Nations Convention on the Law of the Sea	Montego Bay, Jamaica	1982
Protocol Concerning Mediterranean Specially Protected Areas	Geneva	1983
Convention on Wetlands of International Importance especially as Waterfowl habitat	Ramsar, Iran	1971
Regional Convention for the Conservation of the Red Sea and Gulf of Aden Environment	Jeddah	1990
Convention on Biological Diversity	Rio de Janeiro	1992
Agreement for the Establishment of the Near East Plant Protection Organization	Rabat Morocco	1993
International Tropical Timber Agreement	Geneva	1994
Protocol Concerning Specially Protected Area and Biological Diversity in the Mediterranean	Barcelona	1995

5) Foreign Assistance

EEAA has been thrusting various projects for biodiversity conservation with support from international aid institutions. Projects aiming for improving management at protectorates and the capacity building regarding biodiversity conservation are currently undertaken.

Table 5.6: Projects by International Aid Institutions

International Aid Institutions	Projects	Periods
GEF/UNDP	Conservation of Wetlands of Coastal area in the Mediterranean Region	1999-2004
EU	Gulf of Aqaba Protectorate Development project	1995-2002
EU	St. Catherine National Park project	1995-2002
EU/SFD	Capacity building in South Sinai protectorate	1998-2005

International Aid Institutions	Projects	Periods
Government of Italy	Wadi El-Rayan protectorate development project	1998-2001
USAID/GEF	Development program of Red sea area	1998-2001
GEF/UNDP	Developing medical plants adapted to arid ecological systems	2000-2005
UNESCO/FAO/UNEP GEF/World Bank	Sustained management of the lake Nasser	1998-2003
UNESCO/UNEP/CBD GEF/UNDP	Capacity building on conservation and sustainable use of Egyptian biodiversity	1998-1999
UNESCO/FAO Japan aid programme GEF	Establishment of national germplasm bank(s) (natural history museum & captive breeding center)	1998-2003

(3) Desertification and Forest Conservation

1) Current Status of Desertification

Desertification is exacerbating in Egypt mainly from deterioration of irrigated farmland by using low quality water and of farmland utilizing rainwater in northern coastal area in north Sinai, and overgrazing in north costal area.

Desertification can be seen in areas with expanding urban areas, farmland exceeding its ecological capacity and applied excess pesticides, short fallow periods, and population increase, as well as vulnerable ecosystem and its weather, and surface condition – i.e. sand which would speed up the desertification.

United Nations Convention to Combat Desertification (UNCCD) is established in 1994 in which Egypt is a signatory.

In UNCCD, Egypt developed National Action Plan (NAP) for measures against desertification. In NAP, Egypt, from its characteristics of agri-ecosystem, is divided into four divisions – Northern coastal areas, Nile Valley, Oasis and Southern desert, and inland desert.

Aerial photos, satellite images, and GIS database are needed for promoting analysis on study for mechanism of desertification in connection with different land use.

2) Current Status of Afforestation

The government of Egypt is aggressively undertaking greening of environment and implemented in many cities and governorates. It is estimated that Egypt has 2,500 ha of planted forests, which were planted by public and private sector as a windbreak forest to prevent soil erosion and protect waterways and farmland as well as protection against desertification.

Afforestation plays following roles:

- Afforestation contributes to increase crop harvests as a windbreak forest in cultivated

areas.

- Producing economically valuable timbers for furniture by reusing treated water.
- Other than timber, planted trees are used for api- and seri-cultures, raw materials of glue, fodder for sheep and goat, packing materials and fuel.
- Prevent soil contamination by sewage.
- Provide job opportunities for local population.
- Afforestation contributes to preserve ecosystem and biodiversity by providing habitat for wild animals.

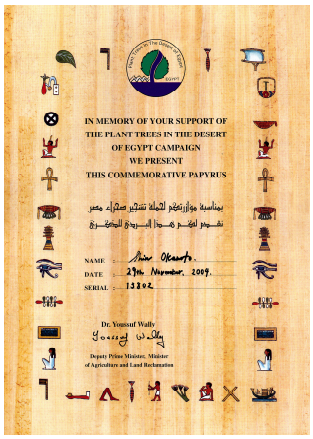


Figure 5.2: Commemorative Papyrus for Participating the Plant Trees in the Desert of Egypt Campaign

'Plant Trees in Desert' campaign is promoted as part of Egypt-Japan friendship effort, in which tourists/visitors can plant 'his/her' tree. The planted tree are given serial numbers, and the person who planted could come back and see the growth of 'his/her' tree in the later years.

3) Organization Involved in Afforestation

The projects are implemented by MALR (playing a central role), line ministries, and universities. These implementing bodies establish tree-planting policy, supply the seeds, introduce new species, carry out actual planting, and disseminate related technologies. Forestry in Egypt is taught in University of Alexisandria Forestry Department where there are programs for collection and analysis of seeds, planting of windbreak, stabilization of sand dune, and utilization of timbers. As for forest study, MALR, University of Alexisandria forestry and agricultural departments, Desert Development Center (DDC), Agricultural Research Center (ARC) are all involved in windbreak for stabilizing sand dunes, farming system in desert, strengthening of seed production, development of multi-purpose trees, and forest technologies.

Example of Afforestation Site

Photo 5.5: Recently Planted Trees (Japanese Friendship Forest)

Pines, eucalyptus, and Cupressus are planted. The trees are planted in 3-meter intervals with drop-irrigation.

Photo 5.6: Cultivation for Supplemental Planting

Nursery trees are grown in shaded area.

Photo 5.7: Growth of Planted Trees

Left: 6 – 7 years old eucalyptus. Already appears as forest.

Right: Having high salinity soil, early lot was very tough for the trees to grow. Nonetheless, tireless effort of staff has paid off and has grown to 6 – 7 meters high. Photo shows the very fast tree planted in this Japanese Friendship Forest.

Table 5.7: List of Organization Related to Afforestation

Ministry of Agriculture and Land Reclamation
The Agricultural Research Center
The Desert Research Center
University Alexandria
Environment Affairs Unit

4) Examples of Projects

MALR has promoting tree plantation using treated sewage water to produce high valued timber trees. The projects are in Menofia, Ismailia, Sinai, New Valley, Aswan, Luxor, Giza, and Behira, and giving positive impact on local economy and environment. It is anticipated to turn Egypt from timber consuming nation to timber producing country in 20 years.

Tree species being planted are African Mahogany (Khaya), Eucalyptus, Malberries, Cupressus, and Pinus, wich would be harvested in 10 to 30 years after the plantation. Tree thinning and pruning are performed, and thinned woods are utilized as timber.

Table 5.8: List of Afforestation Site Using Treated Wastewater

Governorate	Forest	Area (Feddan)[1]
Ismailia	Serabium	1,000
Menoufia	Sadat	500
Luxor	Luxor	1,700
Qena	Qena	500
South Sinai	Tour Sinai	200
Aswan	Edfu	300
New Valley	Al-Kharga	300
	Paris	100
Giza	Abu-Rawash	80
Alexandria	9N	60
South Sinai	Sharm El-Shiekh	60
Daqahlia	Gamassa	150
Giza	El Saff	500

[1] Feddan: 1 feddan = 42.01a or 1.038 acre

Table 5.9: List of Afforestation Site Using Treated Wastewater Under Establishment

Governorate	Forest	Area (Feddan) [1]
Aswan	Ballana	500
Aswan	Nasr-Elnuba	100
Aswan	Wadi El-Alakki	550
Beni Swif	El-Wasta	500
New Valley	Mout	700
Nouth Sinai	El-Arish	200
Asyout	Asyout	40
Sohag	Sohag	1,000
Sohag	Al-Kola	250
	Awlad Azaz	267
Red Sea	Hurgada	200
South Sinai	Noyebaa	200

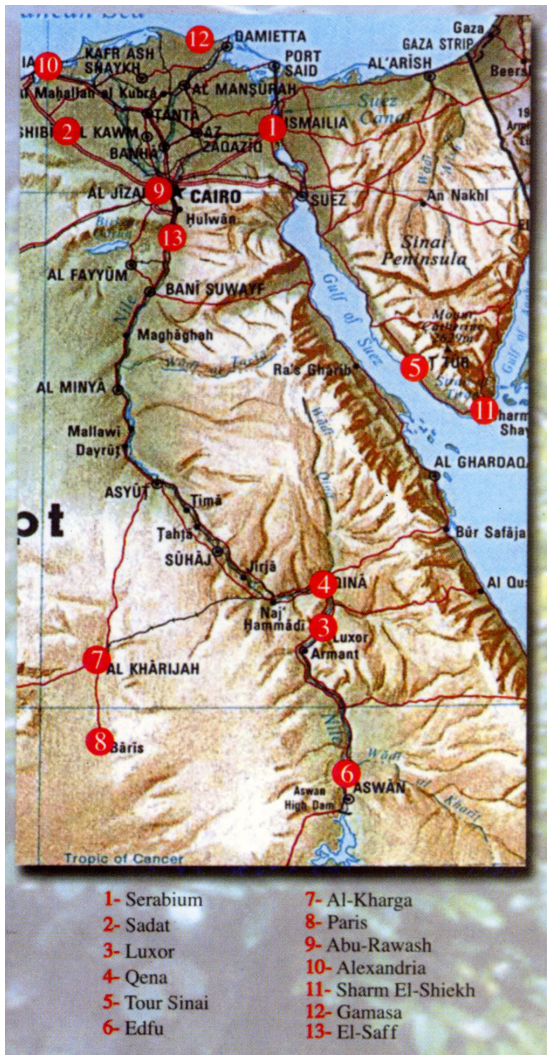


Figure 5.3: Map of Afforestation Site Using Treated Wastewater