



USAID | **EGYPT**
FROM THE AMERICAN PEOPLE

Egypt Biodiversity Conservation Assessment

Draft Report – April 2015

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY	5
2. INTRODUCTION.....	6
2.1 Purpose and Objectives of the Analysis	7
2.2 Methodology.....	7
2.3 2.3 Environmental Requirements for USAID Strategic Plans.....	7
3. STATUS OF BIODIVERSITY:	8
3.1 Definition and Elements of Biodiversity:.....	8
3.1.1 Eco System Diversity:.....	8
3.1.2 Species Diversity	9
3.1.3 Protected Areas:.....	10
3.1.4 Ecosystem Services	11
3.2 Values and Economics of Biodiversity in Egypt:	12
3.3 Sources of Biodiversity Information:.....	14
4. SOCIAL ECONOMIC AND POLITICAL CONTEXT:	15
4.1 Social and Political Environment:	15
4.2 Institutions, Laws and Policies Effecting Conservation in Egypt:	16
4.2.1 Protected Area System.....	17
4.2.2 Endangered Species Protection	17
4.2.3 Participation in International Treaties	18
5. GOVERNMENT, NGOS AND DONOR PROGRAMS AND ACTIVITIES:	21
5.1 Government Programs and Activities:	21
5.2 NGO Programs and Activities:	23
5.3 Donor Programs and Activities:	24
6. THREATS TO BIODIVERSITY IN EGYPT:	24
6.1 Threat to Coastal ecosystem:.....	25
6.2 Threat to Bird Migration\ Protected Areas.....	26
6.3 Threat on Sustainable Agriculture:	26
6.4 Threats of Global Climate Change	27
7. ACTIONS NEEDED TO CONSERVE BIODIVERSITY IN EGYPT:.....	28

8. LINKS TO USAID STRATEGY AND PROGRAM	29
8.1 Extent to Which Proposed USAID/Egypt Actions Meet Needs:	29
8.2 Threats from Proposed USAID Activities:	29
8.3 Opportunities for Linkages with Proposed USAID Activities:	29
8.4 Climate-Change Resilience: climate-related sectoral risks, mitigation-adaptation strategies, and current activities	

ACRONYMS

BCWUA	Branch Canal Water User Associations
CAIP	Cairo Air Improvement Project
EEAA	Egyptian Environmental Affairs Agency
EEPP	Egyptian Environmental Policy Program
FAO	Food and Agriculture Organization of the United Nations
FDI	Foreign Direct Investment
GCC	Global Climate Change
GDA	Global Development Alliance
GDP	Gross Domestic Product
GDEPE	General Department of Environment and Population Education
GHG	Green House Gases
GOE	Government of Egypt
HEPCA	Hurghada Environmental Protection and Conservation Association
The Intergovernmental Panel on Climate Change (IPCC)	
IUCN	International Union for Conservation of Nature
IWMD	Integrated Water Management Districts
LIFE	Livelihoods and Income From the Environment
MSEA	Ministry of State for Environmental Affairs
MWRI	Ministry of Water Resources and Irrigation
NBU	National Biodiversity Unit
NPS	Nature Protection Sector (of EEAA)
RSG	Red Sea Governorate
RSP	Red Sea Protectorate
TDA	Tourism Development Authority
USAID	United States Agency for International Development
WGPNP	Wadi Gemal National Park (Wadi Gemal-Hamata Protected Area)

1. Executive Summary

As a means of promoting an understanding of the importance of Biodiversity – The United Nations has declared 2010 as the Year of Biodiversity, inviting the world to take action to safeguard the variety of life on earth.

Despite being dominated by desert and drought, Egypt's biodiversity is of global significance, its uniqueness of the Nile as a conduit from tropical Africa contributes a great deal to a diverse fauna and flora. Its geographical location between the Mediterranean and the Red Sea which provides rich marine biodiversity and the northern coral reef system that is becoming more unique with the recent changes in the climate. And in spite of the relatively low diversity of species, as compared to other parts of the world, in Egypt they are narrowly distributed or highly localized making habitat conservation crucial.

This report is a US Government mandated assessment prepared with the formulation of a new country strategy, mainly to inform USG investment in conservation of forests (when available) and biodiversity. USAID/Egypt [has justis](#) drafting a CDCS for Fiscal Years 2016 - 2020 to provide new directions in on going Economic assistance provided to Egypt. The report conducts a literature review of the status of biodiversity in Egypt within a socioeconomic and environmental policy context, listing institutions, policies and efforts of the Egyptian Government working to protect the environmental heritage of the country. The report points out major threats resulting from human use and encroachment, and highlights USAID past and on going efforts to overcome these challenges. The report also makes recommendations on additional opportunities for linkages between the new strategy and Egypt's on going biodiversity needs.

Biodiversity is simply the sphere of life; diversity of species that provide agriculture, livestock and medicinal services in addition to allowing scientific research and a rich cultural heritage. Egypt faces the challenge of increased population and expansion of industrial, agricultural and touristic activities aiming to achieve economic development, leading in turn to increase stress on renewable natural resources. Measures towards protecting natural habitat such as declaration of protected areas have increased during the implementation USAID strategy 2000-2009, six additional areas were declared, including the Wadi El Gemal protected area in the South of the Red Sea, which was a result of direct USAID assistance to the Government of Egypt.

Egypt has also taken some positive steps towards the improvement of the health of its ecosystems. In turn this has lead to better support to socioeconomic development and improved standard of living and health by raising the quantity and quality of water, food, energy, and different uses of biodiversity. New policies and strategies promoting better management and conservation of water resources have been applied; to maximize the value and protect natural resources, directions toward developing new tourist destination that are eco-friendly have been introduced and applied in some regions such as the Red Sea and the Siwa oasis in the Western desert; use of traditional knowledge and maintaining traditional industries such as medicinal plants as well as scientific recording have also been introduced in the past decade.

The Ministry of State for Environmental Affairs (MSEA) and its executive arm, the Egyptian Environmental Affairs Agency (EEAA), amended Environment Law no. 4/1994 to a Law

9/2009 providing improvements to the effectiveness of legislations governing protected areas including marine areas and solid waste management, to better allow Egypt to comply with the implementation of International treaties. Egypt has had environmental laws since 1982, however several constraints including lack of finance and human capacity have regularly challenged law enforcement.

The Government of Egypt has been heavily relying on donor assistance with regard to environmental activities. USAID alone in the past fifteen years invested in this sector \$60 million for the Cairo Improvement Project (CAIP); \$170 million for the Egyptian Environmental Policy Program (EPPP) in addition to the \$34.5 million and LE 142 million under the completed and on going projects of the Livelihood and Income from the Environment (LIFE) program. Civil Society also plays a role, however small, in the promotion of Environmental awareness. And in some cases such as HEPCA, they were the main force behind actual change to existing legislation to protect the natural environment.

Human use of the natural systems seems to constitute the largest threat identified to coastal and marine life through a growing tourism industry, along with disposal of solid waste generated from the tourism industry threatening the natural habitat and bird routs of migrant birds. Hopes of high economic revenues from agriculture, without much consideration of other aspects of development, threatens the loss of wildlife, soil health and water resources. A World Bank Report¹ puts Egypt as the second largest population in the world that would be impacted by climate change, specifically a 1 meter rise in sea levels, leading to the loss of the north coast of Egypt and parts of the Nile Delta, which in turn would result in loss of 10.56% of the Egyptian population, as well as agriculture land and food shortage among others. Climate Change is mainly attributed to rising levels of CO₂ in the air due to industrial pollution; while Egypt is not categorized as a main emitter of CO₂ it does contribute to the phenomenon and would need to take serious steps towards applying adaptation measures.

To reduce the threats to biodiversity in Egypt, steps toward building the capacity of Egyptian governmental institutions to develop, enforce and sustain protection measures is necessary; enable scientific research and enhance people's understanding and awareness of local natural wealth to safeguard their inheritance; as well as promoting sustainable economic use of natural resources such as clean and renewable sources of energy and eco-tourism.

In conclusion, USAID/Egypt's previous investments heavily addressed biodiversity conservation; however the previous Bridge Strategy for FY 09 and 10 and the upcoming CDCS do not directly target this sector, but potentially indirect impacts can be attained. Opportunities for cross-sectoral linkages that may address threats to biodiversity can be achieved through the majority of focus areas. The report identified scientific research, education and awareness raising, sustainable economic trade polices as means to reduce identified threats on biodiversity.

2. Introduction

¹ The Impact of Sea Level Rise on Developing Countries: A Comparative Analysis By Susmita Dasgupta Benoit Laplante; Craig Meisner; David Wheeler and Jianping Yan - http://econ.worldbank.org/external/default/main?pagePK=64165259&theSitePK=469372&piPK=64165421&menuPK=64166322&entityID=000016406_20070209161430 – p.28 & figure 6B p. 41 - 2007

2.1 Purpose and Objectives of the Analysis

The purpose of this biodiversity analysis is to ensure USAID compliance with FAA Section 119 and help inform and guide USAID/Egypt planning with respect to biodiversity needs during fiscal year 2014 and the upcoming country development strategy. The objectives of this desk analysis is to update the 119 analysis conducted for the previous 10-year Strategy to carry over and insure that all activities under the CDCS are in compliance with Environmental Regulations.

2.2 Methodology

The assessment was conducted through a desk review of relevant public material published by the Egyptian Government, Donor Agencies and other Research Institutions as well as USAID documents— this included USAID/Egypt’s major environmental achievements under the previous strategy of the past 10 years.

The report mainly addresses FAA 119 requirements, specifically biodiversity issues, needs, and recommendations. Limited environmental issues in Egypt were also highlighted. Since Egypt does not have natural forests, forestry was not included in this report.

To guide the development of this report the USAID document “Tropical Forestry and Biodiversity (FAA 118 and 119) Analyses: Lessons Learned and Best Practices from Recent USAID Experience” was utilized in putting together this report.

2.32.3 Environmental Requirements for USAID Strategic Plans

USAID Egypt will submit a CDCS for FY 16 -20 to guide design and implementation of activities in four development objectives. This environmental review provides a brief analysis of the current environmental conditions, while shedding some light on USAID projects in the previous strategy, and guiding recommendations for the FY 2016 – 2020 strategy.

The U.S. Foreign Assistance Act (FAA) of 1961, Section 119, requires USAID to assess national needs for biodiversity and potential USAID contributions to these needs in all Operating Unit strategy documents. Specifically, FAA Section 119(d), Country Analysis Requirements, states:

“FAA Sec 118 (e) Country Analysis Requirements. Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of
(1) the actions necessary in that country to achieve conservation and sustainable management of tropical forests, and (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified.” and: “FAA Sec 119 (d) Country Analysis Requirements.--Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of-
(1) the actions necessary in that country to conserve biological diversity, and
(2) the extent to which the actions proposed for support by the Agency meet the needs thus identified.”

This requirement is also articulated in USAID's Automated Directives System (ADS), Section 201.3.4.1.3, on mandatory environmental analysis for strategic plans. The ADS regulations also indicate that while not required, an Operating Unit "can save time and be more efficient by including all aspects of environment when undertaking the mandatory biodiversity and tropical forestry work." For example, these environmental aspects may include topics such as water resources, urban environmental issues and private sector concerns.

3. Status of Biodiversity:

3.1 Definition and Elements of Biodiversity:

"Biological diversity, simply stated, is the diversity of life...As defined in the proposed US Congressional Biodiversity Act, HR1268 (1990), "biological diversity means the full range of variety and variability within and among living organisms and the ecological complexes in which they occur, and encompasses ecosystem or community diversity, species diversity, and genetic diversity."²

Genetic diversity is the combination of different genes found within a population of a single species, and the pattern of variation found within different populations of the same species. Species diversity is the variety and abundance of different types of organisms which inhabit an area. Ecosystem diversity encompasses the variety of habitats that occur within a region, or the mosaic of patches found within a landscape."

Biodiversity in any country provides the wealth of raw material that feeds into industries in addition to creating new ones such as ecotourism, which in the case of Egypt has the potential to provide high economic return without depleting or jeopardizing the main resource.

3.1.1 Eco System Diversity:

Egypt has been endowed with a unique variety of ecosystems and a corresponding variety of wildlife with great diversity in species of both marine and terrestrial habitats and a rich fauna and flora.

Egypt falls within a unique position of the world which 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 often subdivided into four natural regions – the Nile Valley and Delta, the Western Desert, the Eastern Desert, and the Sinai Peninsula. Only about 35,000 km², 3.5% of the total land area, is cultivated and permanently settled. Most of the country lies within the wide band of desert that stretches from Africa's Atlantic coast across the continent and into southwest Asia"³

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

² D.B. Jensen, M. Torn, and J. Harte, "In Our Own Hands: A Strategy for Conserving Biological Diversity in California," 1990 http://biodiversity.ca.gov/Biodiversity/biodiv_def2.html

³ Rundel, Philip W; "Comparative Ecology and Hotspots of Biodiversity in Egypt and California" http://solarcities.eu/egypt_energy_and_the_environment.pdf

richest in the world, as well as stands of mangroves that play a vital role in the health of the sea. The reefs and the mangroves of the red sea are among the most important vehicles of biodiversity in the world. And with the recent coral bleaching events that have taken place at the great barrier reef of Australia – the Egyptian reef system might become the last remaining of its kind.

3.1.2 Species Diversity

Egypt lacks species abundance but has a relatively large number of eco-zones and habitats making the preservation of both especially important.⁴ So far there have been 145 species placed on the Red list of threatened species⁵. The fauna and flora of the Red Sea for example is essentially a modified version of threatened Indo-Pacific species, and 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 (see figure 1 for lists types and number of flora and Fauna in Egypt)⁶.

Taxa	No. of species	Notes
FLORA		
Bryophyta	337	Liverworts and mosses
Pteridophyta	16	Non-flowering vascular plants
Spermatophyta: Gymnospermae	6	Plants with no protective casing on the seeds
Angiospermae	2075	Flowering plants; 62 endemic species.
TERRESTRIAL FAUNA		
Invertebrata: Insecta	±10000	More recent studies ± 15000 species.
Arachnida	± 1517	Mostly spiders, mites and ticks including 24 scorpion species
Vertebrata: Amphibia	9	Including 1 endemic species
Reptilia	103	Recent figures inc. 63 endemics or near endemic & 1 endangered
Aves	470	Resident breeders 150; Migratory and wintering 320
Mammalia	92	Including 6 endemic and 20 endangered species
MARINE FAUNA		
Invertebrata	1740	This may be a low estimate
Vertebrata: Fish (Chondrichthyes & Osteichthyes)	+ 1300	This is an extremely low estimate
Reptilia (turtles)	5	All five species of turtles are endangered
Mammalia	14	Additionally, the Monk Seal and the Killer Whale may be found
FRESHWATER FAUNA		
Invertebrata	124	A low estimate
Vertebrata: Fish (Osteichthyes)	70	Fifteen species have become extinct in the last century
Reptilia	3	The Nile Crocodile, the Nile Monitor and the Nile Soft-shelled Turtle

(Figure 1).

Environment continues to be a key issue for many Egyptians whose quality of life and incomes are directly affected by environmental degradation, since Egypt is one of the most populated countries in the Middle East with more than 80 million inhabitants. The Egyptian economy and people depend on adequate water supplies, clean air, soil, and economic growth models of development that utilize and sustain Egypt's natural resource base.

Sustainability of Egypt's economic development is threatened by major challenges to environmental and natural resources, mainly limited access to fresh water resources, loss of soil productivity and agriculture land, air pollution and increased urban solid waste, deterioration of

⁴ http://www.eeaa.gov.eg/English/main/protect_bio.asp

⁵ <http://www.beaah.com/home/Env-articles/redlist/egypt-list3.html>

⁶ <http://www.biomapegypt.org/biodiversity/Biodiversity/index.html>

Egypt's coral reefs and marine habitat due to tourism, overfishing, in addition the threats identified as result of global climate change.

3.1.3 Protected Areas:

Since the passage of the relevant law 102 of 1983, twenty-seven Protected Areas have been declared in Egypt. However, there are other important hotspots, which will be included in the future. Plans are in place to increase the number of Protectorates to 40 and the land area covered to 17% by the year 2017. Recently the Northern Red Sea Islands, Umm el-Dabadib and Gifl Kebir have been added to Egypt's Protected Areas.⁷

Since the 119 review conducted in 1999, six new protectorates have been declared including the Wadi El Gemal National Park in the south Red Sea. Declaration of this sensitive area was directly supported by USAID's assistance to the Egyptian Environmental Affairs Agency (EEAA) through funding from the Egyptian Environmental Policy Program (EPPP) (1999 – 2004), all necessary studies, documentation and delineation of boundaries were prepared by USAID allowing the GOE to declare protection. Given the political and security instability since the last 119 review in 2009, no new areas have been declared as protected.

The amendment of Environment law 4/1994 by law no. 9/2009, increases prohibited acts in Protected areas, such as trading and offering to sell all endangered living organisms of fauna and flora species; it also strengthens the protection measures and penalties against any kind of violation in the territories of protected areas.⁸

Protectorates declared in the framework of Law 102 of year 1983⁹

No.	Protectorates Names	Declaration Date	Area Km ²	Governorate	Prime Ministerial Decree
1	Ras Mohamed National Park	1983	850	South Sinai	Decrees 1068/1983 and 2035/1996
2	Zaranik Protectorate	1985	230	North Sinai	Decrees 1429/1985 and 3379/1996
3	Ahrash Protectorate	1985	8	North Sinai	Decrees 1429/1985 and 3379/1996
4	El Omayed Protectorate	1986	700	Matrouh	Decrees 671/1986 and 3276/1996
5	Elba National Park	1986	35600	Red Sea	Decrees 450/1986 and 642/1995
6	Saluga and Ghazal Protectorate	1986	0.5	Aswan	Decree 928/1986
7	St. Katherine National Park	1988	4250	South Sinai	Decrees 613/1988 and 940/1996
8	Ashtum El Gamil Protectorate	1988	180	Port Said	Decrees 459/1988 and 2780/1998
9	Lake Qarun Protectorate	1989	250	El Fayoum	Decrees 943/1989 and 2954/1997
10	Wadi El Rayan Protectorate	1989	1225	El Fayoum	Decrees 943/1989 and 2954/1997
11	Wadi Alaqi Protectorate	1989	30000	Aswan	Decrees 945/1989 and 2378/1996
12	Wadi El Assuti Protectorate	1989	35	Assuit	Decrees 942/1989 and 710/1997
13	El Hassana Dome Protectorate	1989	1	Giza	Decree 946/1989
14	Petrified Forest Protectorate	1989	7	Cairo	Decree 944/1989
15	Sannur Cave Protectorate	1992	12	Beni Suef	Decrees 1204/1992 and 709/1997
16	Nabaq Protectorate	1992	600	South Sinai	Decrees 1511/1992 and 33/1996
17	Abu Galum Protectorate	1992	500	South Sinai	Decrees 1511/1992 and 33/1996
18	Taba Protectorate	1998	3595	South Sinai	Decree 316/1998
19	Lake Burullus Protectorate	1998	460	Kafr El Sheikh	Decree 1444/1998

⁷ http://www.biomapegypt.org/biodiversity/Eco_tourism/index.html

⁸ http://www.eiecop.org/ambiente2/projects_2/lifp.htm

⁹ <http://www.eeaa.gov.eg/English/ProtectorNamesEn.doc>

20	Nile Islands Protectorates	1998	160	All Governorates on the Nile	Decree 1969/1998
21	Wadi Digla Protectorate	1999	60	Cairo	Decrees 47/1999 and 3057/1999
22	Swia	2002	7800	Matrouh	Decree 1219/2002
23	White Desert	2002	3010	Matrouh	Decree 1220/2002
24	Wadi El-Gemal/Hamata	2003	7450	Red Sea	Decree 143/2003
25	Red Sea Northern Islands	2006	1991	Red Sea	Decree 1618/2006
26	El Gulf El Kebeer	2007	48523	New Valley	Decree 10/2007
27	El-Dababya	2007	1	Qena	Decree 109/2007



3.1.4 Ecosystem Services

Defining ecosystem services is a means to translate environment into social and economic values. Provision of ecosystem services in Egypt can be categorized as (1) Providing provisions such as food from agriculture, raw material for industries fiber, fuel and water (2) Regulating services (e.g. water quality, flood and erosion control), (3) Cultural services which include recreation and tourism destination, aesthetic and spiritual values in different regions of the country, and (4) creating supporting services such as carbon sequestration, water, nutrient cycling. Due to large-scale developmental activities (including tourism and industries), the majority of Egypt's ecosystems have been significantly changed in the last 50 years and capacity to provide services declined significantly.¹⁰

¹⁰ Ahmad K. Hegazy http://www.greekgeo.noa.gr/docs/geo_symp/Egypt2.pdf

Ecosystems are fragile and, contrary to general perception, can be depleted with excessive or harmful uses. And with the loss of the natural resource comes the loss of the service it used to provide for specific human function. An example to demonstrate the threat of losing a vital system in Egypt would be poor management of water resources arriving through the River Nile and therefore the loss of fresh water supply; another example includes eco systems of West of North Sinai where a study funded by UNDP indicated that a growing mining industry in the region lead to degradation in biological diversity, and with it came the loss of a valuable eco system, leading to further impoverishment of the local population of the region.¹¹ Basically enhancing ecosystems services has a direct impact on human wellbeing.

3.2 Values and Economics of Biodiversity in Egypt:

Basic Data: Egypt covers an area of about one million km²; population is approximately 90 million¹², living on 8% of Egypt's total area. During the first decade of 21st century, cultivated agricultural land amounted to 8.3 million Feddan (about 3.5% of Egypt's area). Results obtained from the National Centre for Planning State Land Uses indicated that land used has now reached approximately 14 to 15% of Egypt's total areas, and if the 148,000 km² of protected areas is also added land used amounts to 30%, leaving 70% of Egypt's area intact.

Water: Depleting water resources is one of the main issues for Egypt today, and is a growing concern for the not so far future. Egypt is ranked ¹³ on the list of the poorest 35 countries in the world in its property of fresh water resources, as share of the Egyptian citizen in 1974 reached 2604 m³/year and decreased over the years till it reached 860 m³/year in 2003. It is possible that the share of the individual by 2025 will be reduced to 582 m³/year. The River Nile is considered the main source of fresh water for River Nile basin States. Currently, Ethiopia's under construction Renaissance Dam is a huge threat to Egypt's food and national security.

"The River Nile is the main source of water for Egypt, with an annual allocated flow of 55.5 km³/year under the Nile Waters Agreement of 1959. Internal renewable surface water resources are estimated at 0.5 km³/year. This brings total actual renewable surface water resources to 56 km³/year. Internal renewable groundwater resources are estimated at 1.3 km³/year. The overlap between surface water and groundwater being considered negligible, the total actual renewable water resources of the country are thus 57.3 km³/year. The Nubian Sandstone aquifer located under the Western Desert is considered an important groundwater source, but this is fossil groundwater. The main source of internal recharge is percolation from irrigation water in the Valley and the Delta."¹⁴

The Nile is exposed to different sources of pollution such as industrial sewage waste, agricultural sewage, thermal pollution from electrical power stations, among others. Food and Agriculture Organization of the United Nations (FAO) have declared that the main challenge for the sustainability of water resources is the control of water pollution. The Government of Egypt is making effort to implement policies that prohibit industrial waste dumping in the river, as well as promoting organic farming to reduce the use of chemical pesticides and fertilizers. A great deal more still remains to be done to secure the survival of this vital resource.

¹¹ El Maghara, North Sinai: Local knowledge, Biodiversity, and Poverty Alleviation <http://www.millenniumassessment.org/en/SGA.Egypt.aspx>

¹² Latest CAPMAS census

¹³Naeema Ramadan Soliman, "Impact of River Nile Pollution on Water Crisis in Egypt", P.107.

¹⁴ FAO Egypt Profile 2009. <http://www.fao.org/nr/water/aquastat/countries/egypt/index.stm>

USAID has been and continues to provide assistance to the Government of Egypt with regard to water resource management, working very closely with the Ministry of Water Resources and Irrigation (MWRI), which has adopted a National Water Resources Plan through 2017 to respond to the growing water scarcity challenges. Under phase I of the USAID LIFE Water Resource Management Project (LIFE/IWRM), technical assistance, training and commodities in support of decentralization of water management and decision-making by rural residents was provided, and resulted in 27 Integrated Water Management Districts (IWMD) and 600 Branch Canal Water User Associations (BCWUA) being established and operating to improve water and irrigation management. Under phase II of the same program (2009 - 2012), the government of Egypt MWRI will continue integrating the management of the water resources through development of Integrated Water Management Districts and Directorates.

The agriculture sector consumes the greatest amount of water, about 59.3 billion cubic meters representing 85.6% of all available water.¹⁵ The government is planning to reclaim 3.4 million Feddan by 2017 to satisfy Egyptians' increasing need for food. Agricultural, poultry, livestock and fish resources estimated at LE 92.2 billion, while agricultural products constitute 20% of total exported goods; the agriculture sector also employs 30% of Egypt's total manpower (6 million).

USAID/Egypt has been supporting the Agriculture sector for the past 32 years with an investment of \$1.3 billion, with most projects concentrated in Lower (northern) Egypt. Through USAID-funded research by U.S. and Egyptian universities in the early 1980s, policy makers came to recognize the high economic cost of existing crop planting controls, government export monopolies, crop delivery quotas, and other Soviet inspired agricultural policies from the early 1960s. The GOE and USAID embarked on a series of programs in support of sector policy reform, research, and technology transfer. As a result of these efforts, farmers have been freed from specific cropping restrictions, input markets have been liberalized, and horticultural exports have expanded from \$8.2 million in 1975 to \$541 million in 2005. USAID's investment through a Global Development Alliance (GDA) with Heinz has contributed to sustainable rural development by enhancing the capacity of smallholder farmers to profitably serve as reliable suppliers of high-value horticulture to processors and other buyers.

Incomes generated from **mineral resources** is estimated to be LE 1 billion annually, in addition to Red Sea "coral reefs and mangroves" estimated with 80 million LE/km²; as well as all the invaluable benefits of biodiversity, such as the micro-organisms "biotechnology" and natural substances produced by coral reefs used in treating many diseases such as cancer. Coral reef system also has an impact on fisheries; however in the Red Sea the tourism industry has had a great impact on fish supply in the area.

Egyptian **coasts** are approximately 3000 km in length extending for about 1,150 km along the Mediterranean Sea from Sallum in the west to Rafah in the east, as for the Red Sea length about 1850 km covering the main Red Sea basin (about 1200 km) and both Gulf of Suez and Gulf of Aqaba (about 650 km). Egypt marine and coastal areas contains a lot of natural resources with high economical and environmental value as Coral reefs, Mangroves and Sand dunes (which act as natural barriers for storms, floods and erosion processes) and coastal systems as wetlands which absorb (excess nitrogen element, pollution from land base sources and decrease effects of pollution resulting from land to marine environment), therefore coastal

¹⁵ http://www.msrintranet.capmas.gov.eg/ows-img2/ray/fsl2_h_e.doc

areas are considered fragile systems that must be sustainably managed and conserved for present and future generations.¹⁶

Coral Reefs: In 2003 USAID Egypt conducted an economic valuation of the Egyptian Red Sea coral reef, the study indicated that by far, the most important use for reefs is as tourist attractions, although the reefs do have value for fishing, shoreline protection, research, and other uses. Tourism is the largest foreign exchange earning sector in Egypt with over 5 million foreign tourists per year; coastal tourism is the largest sub-sector within the Egyptian tourism market. Among the 2.1 million coastal tourists, more than 540,000 are foreign dive tourists who are especially economically attractive because they are willing to spend much more on their holidays than other coastal tourists – if the reefs are attractive and the facilities are of good quality.¹⁷ Therefore USAID funded projects addressing Economic Growth, with a specific focus on Environment, and continued to support natural resource management in the south of the Red Sea through consecutive projects with the most recent being the Livelihood and Income from the Environment (LIFE) Sustainable Economic Growth Project in the Red Sea Governorate. The objective was to promote sustainable tourism development in the region that meets the needs of current tourists and local residents and protects the region's natural and cultural assets while enhancing economic opportunities for the future. One of the main project achievements with regard to Sustainable tourism was developing The Destination Management Plan to guide the government of Egypt in creating a new environmentally and financially sustainable approach to tourism development.¹⁸

Lakes represent a vital economic resource for Egypt as they are an important source for fishing resources. Consecutive governments exerted great efforts to secure provision of food for the steady increase of population through fisheries' development because fish is considered an important source of protein. Egyptian lakes vary between fresh and salty water and can be divided according to their location into three internal lakes (Qarun – Al-Rayan - Nasser) and six coastal lakes located along Mediterranean Sea among which four are located in the Delta region (Manzala, Burullus, Edco , Mariout); in addition to two lakes located in the east of Suez Canal (Malahet Port Fouad and Bardawil).¹⁹

3.3 Sources of Biodiversity Information:

Support for scientific research in Egypt is not sufficient which also reflects on the availability of sources of information for biological information. However efforts to establish a scientific database for different species have been underway, one example is the BioMap Project, supported by UNDP and the Italian Donor Agency. The project's primary objective was the development and strengthening of biodiversity research, monitoring and assessment across Egypt. It has built an extensive database to map the distributions of species across Egypt. (however at the time of this report access to the database on line was not available) www.biomapegypt.org.

“The Egypt's National Strategy and Action Plan for Biodiversity Conservation” was published in 1998 and has set out 6 guiding principles to research, assess and manage biodiversity; to

¹⁶ Egypt State of the Environment Report 2008 – p. 177 http://www.eeaa.gov.eg/English/info/report_search.asp

¹⁷– by Herman Cesar, “Economic Valuation of the Egyptian Red Sea Coral Reefs” August 2003 (USAID funded Study under EPPP)

¹⁸ LIFE Red Sea Final Report, October 2008 (USAID document).

¹⁹ Egypt State of the Environment Report 2008 – p. 166 http://www.eeaa.gov.eg/English/info/report_search.asp

develop national strategies and legal frameworks as supporting measures, and to build and mobilize national capacities and resources to implement and monitor projects. Great attention is given to endangered species.²⁰ Egypt is also actively working to achieve the set goals of 2010 – whether they will be able to meet them is to be unveiled during the course of this year. In addition Egypt also developed the National Environmental Action Plan (2002 – 2017) which includes biological diversity and safety as well as management of protected areas as one of the main objectives.

The Egyptian Environmental Affairs Agency (EEAA) has also been active at annually publishing scientific research and findings through their “State of Environment Report” with a comprehensive Chapter on Biodiversity. Biodiversity information is also made available through the efforts of the International Union for Conservation of Nature (IUCN) who is active in different regions of the country.

4. Social Economic and Political Context:

4.1 Social and Political Environment:

During the past decade, the Government of Egypt (GOE) has taken steps towards improving the country’s development status and increasing Egyptians’ welfare. National income increased and Gross Domestic Product (GDP) growth rates went above world emerging markets with an average of 7% during the period starting 2006 and ending 2008. Improving the investment climate and increasing private sector engagement has paid off by a soaring Foreign Direct Investment (FDI) reaching around \$13 billion (8.1% of GDP) in 2007/08. The efficiency of the GOE in managing fiscal, financial and monetary tools to withstand repercussions of the recent global crisis proved that Egypt is ready to take off in a number of its large economic sectors.

On a social level, the GOE managed to increase school enrollment, enhance girls’ access to schools, and issue laws and regulations that improved teachers’ educational quality and upgraded schools management techniques. Still, the production of the education system did not prove to be capable of meeting labor market demands and employers’ standards. As such, Egypt’s largest challenge remains in its human capital lacking appropriate skills to increase productivity and boost economic growth. Moreover, environmental education in schools and awareness of environmental values remains a challenge and is not wide spread within the formal education system, in spite of the establishment of a General Department of Environment and Population Education (GDEPE) within the Ministry of Education, the GDEPE remains underpowered and underutilized.

Given the importance of a clean environment on Egyptians’ well being, the Ministry of State for Environmental Affairs has taken measures to increase environment friendly sources of energy, reduce pollution and address environment problems. In 1994, the GOE established the Environment Protection Fund that would receive all environment related funds to coordinate efforts in environment development project and related investment costs. In fact, the GOE, with donor assistance, succeeded to establish the wind energy stations in the Zaafarana region and to reduce lead emissions from vehicles and industries (with USAID’s support). The government also formulated a national strategy to increase water resources, protect fresh water from pollution and rationalizing water consumption in Egypt. Ministry of Environment source indicate

²⁰ Convention on Biodiversity – Country Profile Egypt: <http://www.cbd.int/countries/profile.shtml?country=eg>

that the GOE invested LE 23.2 million in 2008 to upgrade the infrastructure of natural protectorates and to train management personnel on conserving the existing ones.

Currently, the GOE has a priority of establishing new power plants (such as the Koraymat plant financed by the WB) and upgrading existing ones to overcome the frequent power outages experienced nationwide. The GOE is also negotiating with the Government of Russia the establishment a nuclear plant to respond to the electricity shortage.

Political will to protect environmental resources is in place; however it is not necessarily a government priority when compared to other economic sectors and political stability. One cannot associate the reduction in power subsidy, lately implemented, to environmental protection, but hopefully this increase in the prices of energy resources in Egypt, will work as a good incentive for industries to consider cleaner resources of energy.

4.2 Institutions, Laws and Policies Effecting Conservation in Egypt:

The Ministry of State for Environmental Affairs and the Egyptian Environmental Affairs Agency, established in 1982 are the main institutions charged with implantation of Law 4/1994 (recently amended by law 9/2009). In the year 1990s the Government of Egypt established regulatory frameworks for environmental management through the National Environmental Action Plan (NEAP); and the Environmental Law (Law 4/1994) and its Executive Regulations.

Law 4/1994, (Amended by Law 9/2009) cuts across different governmental sectors, the law has been designated as the highest coordinating body in the field of the environment and formulates the general policy and prepares the necessary plans for the protection and promotion of the environment.

Other important “environmental” laws include the

- Law 48 of 1982 for the protection of the River Nile and its waterways.
- Presidential Decree 631 of 1982 establishing the Egyptian Environmental Affairs Agency.
- Law 102 of 1983 concerning natural protectorates.
- Law 101 of 1985 levying a charge on air tickets earmarked for tourist development and environmental protection

However it is necessary to mention that the degree of enforcement of laws and compliance with their standards has varied throughout the years, leaning mostly towards lenient enforcement. Most significantly the laws regarding the River Nile pollutants that have been charged with untreated municipal and industrial sources of pollution. Absence of realistic phasing of discharge reductions to meet standards set in the law is one of the main impediments.

Challenges encountered by the Egyptian Environmental laws have been attributed to planning and law formulation where considerations of affordability, practicality, realism and flexibility have not been taken into account. Factors restricting the implementation of the law have been identified as:

- “High costs of environmental monitoring and testing;
- Lack of skilled and trained human resources;
- Unclear roles, responsibilities and legal requirements;
- Inadequate flexibility (for instance permitting); and

- Devising legal tools for promoting changes in environmental perception and behavior”²¹

The Environment Law of 9/2009 was completed with the assistance of the Italian Donor and UNDP in Egypt. This law improves the effectiveness of legislations of protected areas; harmonized and integrated legislation of solid waste management with recent developments; enhanced the legislation for the protection of marine environment through a more effective implantation of international and national legislation. ²²

4.2.1 Protected Area System

Has already been mentioned earlier in Section 3.1.3 of this report.

4.2.2 Endangered Species Protection

Egypt is a signatory of eight international agreements with provisions for nature conservation. The Nature Protection Sector (NCS) of the Egyptian Environmental Affairs Agency (EEAA) has limited capacity but nonetheless has been active in following-up on convention compliance. The government has taken steps to improve regulation of international trade in endangered wildlife as obligated under the CITES convention of 1979. However Egypt’s enforcement of the convention has been lacking, and illegal trade of ivory and primates is still rampant. A report published by Species Survival Network discussed the illegal trade in Egypt, indicated that Long-standing occurrence of international illegal trade in CITES listed species through Egypt is well-established. And that Egypt has not made any arrests or prosecuted any criminals for illegal wildlife trade, confiscations are rare, and the means of disposal of confiscated specimens may reward those involved in illegal trade.²³

The Government of Egypt has completed putting together an electronic BioMapping Data Base with Donor assistance <http://www.biomapegypt.org> and has actively been tracking different species as published in the GOE Biodiversity Report of 2009. Egypt’s Red List was published in 2007 and it includes mammals (111 species), insects mainly butterflies (63 species) and *odonata* (40 species), in addition to two plant families *Apocynaceae* (22 species) and *Euphorbiaceae* (51 species). Distribution of species are found in the below maps.²⁴

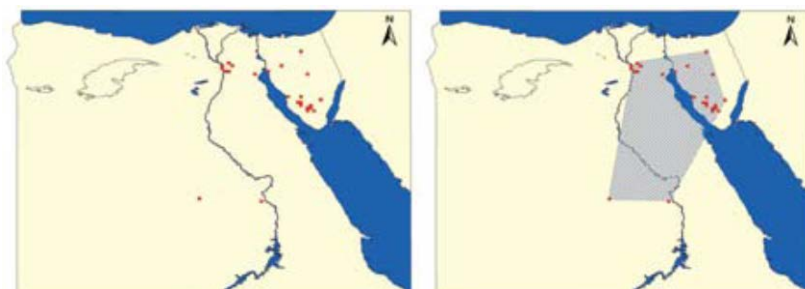


Figure 2: distribution of Species 1 Occupied area by individuals of a species Actual distribution of the species

USAID worked on building the capacity of the Nature Protection Sector for monitoring and enforcement since the year 2000 under the Egyptian Environmental Policy Program. The training and equipping of over forty Nature Conservation Service Rangers stationed along the Red Sea coast had a great impact on imposing environmental laws in the region. As a result of coordination among government entities and the development of a management zoning plan for

²¹ Genena, Tarek “From Environmental Planning to Enforcement: A Case Study from Egypt” item 2.2.

²² Egyptian Italian Environmental Cooperation Program http://www.eiecop.org/ambiente2/projects_2/lifp.htm

²³ SSN Enforcement-needs Assessment Mission to Egypt http://www.ssn.org/Meetings/sc/sc57/SSN_on_Egypt_Enf_EN.pdf

²⁴ Egypt State of the Environment Report P. 226

the southern Red Sea coast, the government declared the “Wadi El Gamal” a new protected area. Support continued under the LIFE/Red Sea project where additional training led to Red Sea Rangers’ capacity to regularly patrol 190,000 hectares of marine and 450,000 hectares of terrestrial area of the Wadi El Gamal Protectorate (an increase of more than 800% of what was originally patrolled) in addition to their increase capacity to cover more area for the purpose of monitoring for research and management of biodiversity.

4.2.3 Participation in International Treaties

Egypt is a signatory of several International treaties as posted on the EEAA web site – a table showing all treaties can be found below and at:

<http://www.eeaa.gov.eg/English/main/intlaw.asp>.

Egypt’s international commitments, made by ratification on environmental agreements comes from a conviction of dealing with international environmental issues through national effort.

Multilateral Environmental Agreements to which Egypt is a Signatory

<http://www.eeaa.gov.eg/english/main/intlaw.asp>

Environmental Category	Name of Multilateral Environmental Agreement	Date of Ratification(R)	Date of Entry Into Force(E)	Date of Signature(S)
Biodiversity and Natural Resources	Convention on Wetlands of International Importance Especially as Water Fowl Habitat (RAMSAR)	09/09/1988	09/09/1988	
	Convention Relative to the Preservation of Fauna and Flora in their Natural State	21/02/1935	14/01/1936	
	International Plant Protection Convention	22/07/1953		
	African Convention on the Conservation of Nature and Natural Resources	16/03/1972		
	Protocol to Amend the Convention on Wetlands of International Importance Especially as Water Fowl Habitat	09/09/1988		
	Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES)	04/01/1978	04/04/1978	
	Convention on the Conservation of Migratory Species of Wild Animals (Bonn)	11/02/1982	01/11/1983	
	Convention on Biological Diversity (CBD)	02/06/1994		
	Agreement for the Establishment of the Near East Plant Protection Organisation	13/04/1995		
	Convention Concerning the Protection of the World Cultural and Natural Heritage	07/02/1974		
	United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa	07/07/1995		
	Agreement for the Establishment of a Commission for Controlling the Desert Locust in the Near East	06/07/1967	21/04/1969	
	International Tropical Timber Agreement	16/01/1986		

	International Tropical Timber Agreement, 1994			08/11/1994
	Protocol Concerning Mediterranean Specially Protected Areas	08/07/1983		
	Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean			10/06/1995
Oceans and Seas	International Convention for the Regulation of Whaling		18/09/1981	
	Regional Convention for the Conservation of the Red Sea and Gulf of Aden Environment (Jeddah)		20/08/1990	
	Agreement for the Establishment of a general Fisheries Council for the Mediterranean		08/07/1952	
	United Nations Convention on the Law of the Sea	26/08/1983		
	Agreement Relating to the Implementation of Part XI of the United Nations Conventions on the Law of the Sea of 10 December 1982			22/03/1995
	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			05/12/1995
	United Nations Convention on Conditions for Registration of Ships	09/01/1992		
	International Convention for the Prevention of Pollution of the Sea by Oil		22/07/1963	
	International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties		04/05/1989	
	Protocol Concerning Cooperation in Combating Pollution of the Mediterranean Sea by Oil and Other Harmful Substances in Cases of Emergency	24/08/1978	23/09/1978	16/02/1976
	Protocol Relating to Intervention on the High Seas in Cases of Pollution by Substances Other than Oil		04/05/1989	
	Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter	30/06/1992		
	Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972			
	Protocol of 1978 Relating to the International Convention for the Prevention of Pollution from Ships, 1973		07/11/1986	
	Convention for the Protection of the Mediterranean Sea Against Pollution (Barcelona)	24/08/1978	23/09/1978	
	Amendment to the Convention for the Protection of the Mediterranean Sea Against Pollution			10/06/1995
	Protocol for the Prevention of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft	24/08/1978	23/09/1978	
	Amendment to the Protocol for the Prevention of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft			10/06/1995
	Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources	18/05/1983	17/06/1983	

	Amendment to the Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources			07/03/1996
	International Convention on Civil Liability for Oil Pollution Damage	03/02/1989	04/05/1989	
	Protocol of 1992 to Amend the International Convention on Civil Liability for Oil Pollution Damage, 1969	21/04/1995		
	Protocol Concerning Regional Cooperation in Combating Pollution by Oil and Other Harmful Substances in Cases of Emergency		20/08/1990	
	International Convention on Oil Pollution Preparedness, Response and Cooperation	29/06/1992		
	International Convention on Salvage	14/03/1991	14/07/1996	
Hazardous Materials and Chemicals	Convention on Early Notification of a Nuclear Accident	06/07/1988	06/08/1988	
	Convention Concerning Prevention and Control of Occupational Hazards Caused by Carcinogenic Substances and Agents	25/03/1982	25/03/1983	
	Convention on the Prohibition of the Development, Production and Stock-Piling of Bacteriological (Biological) and Toxin Weapons, and on their Destruction			10/04/1972
	Protocol on the Prevention of Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal			01/10/1996
	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	08/01/1993	05/05/1992	13/02/1992
	Amendment to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	13/12/2003		22/09/1995
	Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa	15/05/2004	12/05/1994	30/01/1991
	Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency	17/10/1988	17/11/1988	
	Joint Protocol Relating to the Application of the Vienna Convention (on Civil Liability for Nuclear Damage) and the Paris Convention (on Third Party Liability in the Field of Nuclear Energy)	10/08/1989	27/04/1992	21/09/1988
	Convention on Nuclear Safety			20/09/1994
	Vienna Convention on Civil Liability for Nuclear Damage	05/11/1965	12/11/1977	
	Convention on the Prohibition of Military or any other Hostile Use of Environmental Modification Techniques	01/04/1982	01/04/1982	
	Stockholm Convention on Persistent Organic Pollutants (POPs)	02/05/2003	17/05/2004	17/05/2002
Atmosphere and Air Pollution	United Nations Framework Convention on Climate Change	05/12/1994	05/03/1995	09/06/1992
	Kyoto Protocol	12/01/2005	16/02/2005	15/03/1999
	Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water	10/01/1964		

	Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space Including the Moon and Other Celestial Bodies	10/10/1967
	Vienna Convention for the Protection of the Ozone Layer	09/05/1988
	Montreal Protocol on Substances that Deplete the Ozone Layer	02/08/1988
	(London) Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer	13/01/1993
	(Copenhagen) Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer	28/06/1994
Health and Worker Safety	Convention Concerning the Protection of Workers Against Occupational Hazards in the Working Environment due to Air Pollution, Noise and Vibration	04/05/1988
	<u>Convention Concerning the Protection of Workers Against Ionising Radiation</u>	18/03/1964
Institutional and Other Topics	Treaty Establishing the African Economic Community	26/01/1993

5. Government, NGOs and Donor Programs and Activities:

5.1 Government Programs and Activities:

The Egyptian Environmental Affairs Agency (EEAA), established in 1982, is the executive arm of the Ministry of State for Environmental Affairs – it act as the national authority in charge of promoting environmental relations between Egypt and other States, as well as Regional and International Organizations. EEAA formulates environmental policies in Egypt and prepare environmental protection plans and manages environmental projects. Nature Protection Sector of EEAA is charged with the management and protection of nature and preservation of biodiversity in coordination with concerned and responsible authorities, planning of running and monitoring of natural protectorates, implementation of international agreements and conventions on biodiversity, and public awareness about regulations and means of nature protection. NP is in charge of enforcing Law No 102 of 1983 for Nature Protectorates. EEAA also established a National Biodiversity Unit, within its Nature Protection sector, that has formulated the “National Biodiversity Action Plan” in 1992 and began the implementing of the National Strategy and Action Plan for Biodiversity Conservation in 1997.

The National Biodiversity Unit established biodiversity bank to promote monitoring and management of biological resources, genetic bank to promote growth of and preserve genetic resources of endangered species, and project for developing



USAID long assistance and capacity building of EEAA’s Nature Conservation Sector has contributed to increased enforcement, specifically in the Red Sea region. An example of such assistance has been the establishment of a management system to the Samadai Island where reef and bay constitute home and nursing area for a population of Spinner Dolphins (*Stenella longirostris*), and where USAID was able to establish a management plan for fee collection to reduce the number of visitors per day and create income to cover cost of nature conservation in the southern zone of the Red Sea, while protecting this rare species.

Natural History Museum to conduct study and education on Egypt's rich biodiversity. A web site for the activities of the unit can be accessed at: <http://www.eeaa.gov.eg/nbd/nbu/> However this does not seem to be updated on regular basis. The NBU and NPS have taken steps in the development and protection of biodiversity in Egypt – however more capacity building and better institutional management is still necessary.

EEAA is still very dependent on donor assistance both technical assistance and operational cost since funding is not sufficient to meet actual management needs. USAID has been attempting to institutionalize a fee management system for protectorates in the Red Sea since 2000, to increase stability and sustainability of environmental management funding. Revenue generation plans were developed with the Ministry of Environment and EEAA, however implementation of these plans has not yet taken place in Egypt.

Biodiversity is also a cross cutting area and therefore governmental authorities with regard to safeguarding natural resources are usually distributed among more than one government agency. A good example of the complexity of dealing with issues regarding Coastal Zone management is illustrated in the below table showing the different Ministries/agencies involved in the process.

Responsible Institutions of Coastal Environment Conservation of Egypt:²⁵

Authority Affiliated/Agency	Coastal Zone Responsibility
Shore Protection Authority (SPA)	<ul style="list-style-type: none"> • Shoreline protection and management • Regulation activities within coastal setback areas in coordination with EEAA
Minister of State for Environmental Affairs, Egyptian Environmental Affairs Agency (EEAA)	<ul style="list-style-type: none"> • Coordination of the CZM plan. <input type="checkbox"/> • Review and evaluation of EIA's • Regulation activities within coastal setback area in coordination with SPA • Implementing marine ambient water quality monitoring • Enforcement for the provisions of law 4/1994, in coordination with Governorates <input type="checkbox"/> • Management of marine protected areas • In coordination with other organizations, preparing oil spill contingency plans

²⁵ Overseas Environmental Cooperation Center –Japan “Study Report on Comprehensive Support Strategies for Environment and Development in the Early 21st Century” http://www.env.go.jp/earth/coop/coop/c_report/egypt_h16/english/pdf/001.pdf p. 69 - 2005.

Ministry of Tourism, Tourism Development Authority (TDA)	<p>According to the provisions of law 7/1991 and the presidential decree 374/91</p> <ul style="list-style-type: none"> • Preparation of tourism development plans and setting priorities for their implementation • Preparation, review and evaluation of tourism development program and projects and monitoring their implementation • Carrying out preliminary land allocation for tourism development projects • Execution of infrastructure projects and developing infrastructure framework schemes for tourism development • Participation in the EIA process as the Competent Administrative Authority
Ministry of Petroleum, Egyptian General Petroleum Corporation (EGPC)	<ul style="list-style-type: none"> • Exploration and concessions
Local Administration Governorates	<ul style="list-style-type: none"> • Governorate development plan • Coordination of environmental activities within Governorate • Environmental inspection and enforcement in coordination with EEAA • Participation in the EIA process as the Competent Administrative Authority
Ministry of Planning	<ul style="list-style-type: none"> • Integrated development plans for a number of coastal areas

5.2 NGO Programs and Activities:

USAID has recognized the value of cooperating with civil society in different sectors including the protection of natural heritage. The Ministry of State for Environmental Affairs has also established a Unit to support the efforts of Environmental NGOs in Egypt. However, despite the growing number of NGOs, both environmental and other, many lack the funds and capacity to play an effective role. Under the Egyptian Environmental Policy Program (EPPP) of USAID, grants were provided to seventeen environmental NGOs to promote a more pluralistic natural resources management working on issues relevant to EPPP. Through providing strategic planning, institutional strengthening and networking opportunities for the NGO Unit of the EEAA to promote more productive working relationships with the NGO community, the project strengthened the capacity of at least another 120 NGOs active in the areas of water sanitation, air quality, energy, solid waste management and conservation of Red Sea natural resources. Networking amongst NGOs working on similar issues and/or in the same geographic area were also established.

One of the main lessons learned from the above project is that public education and awareness-raising of environmental issues are among the *strongest* contributions that NGOs and community Development Associations can make to environmental action in Egypt.

In spite of all the challenges several examples of successful Environmental NGOs do come to mind. The Association for the Protection of the Environment (<http://www.ape-egypt.com/>), and the Hurghada Environmental Protection and Conservation Association (HEPCA) (<http://www.hepca.com/>) which has partnered with USAID on the protection and development of the Red Sea – a committed NGO lobbying for change to existing legislation and interdiction of new legislation to protect natural resources. HEPCA’s efforts have succeeded in changing more than 32 laws and decrees to protect islands, coral reef system, sharks as well as the installation of the largest Mooring system in the Middle East.

5.3 Donor Programs and Activities:

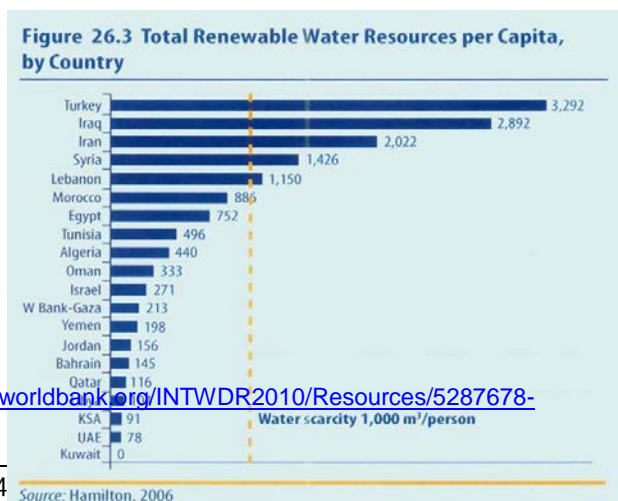
The government of Egypt has been highly dependent on donor support specifically in the area of nature conservation. Egypt received a total amount of LE 950 million (Egypt Pounds) from 1992 – 2002 based on the National Environmental Action Plan (NEAP). Funds were allocated towards technical and institutional support of EEAA and the Ministry of State for Environmental Affairs, 12% percent of donor funds went into unilateral environment protection project, while the majority of funds were managed through bilateral agreements with USAID, Government of Italy, The German Bank for Construction and Development, known as KfW, Britain’s Department for International Development (DFID), The Finnish Agency for International Development (FINNIDA), The Global Environment Facility (GEF), and the Canadian International Development Agency (CIDA).

Egypt continues the trend of donor dependence with regard to environmental activities, a donor matrix indicating on going and recently completed projects by other donors is included in Annex (2) of this report.

“Worth noting is Egypt being one of the very first countries that will benefit from the Clean Technology Fund, a \$5.2 billion multidonor initiative established in 2008, to provide low-interest financing for demonstration, deployment, and transfer of low-carbon technologies. In 2009 the Arab Republic of Egypt, Mexico, and Turkey are to be the first countries to benefit from a combined \$1 billion of financing from this fund.”²⁶

6. Threats to Biodiversity in Egypt:

The main threats to biodiversity in Egypt can be attribute to the increase population (estimated in 2009 to be above 80+ million) coupled with an ambitious development program embarked upon by the government which began with the industrialization of Egypt in the 1950tis. Water being a main resource in Egypt is also under great pressure by the increased population as well as increased agricultural demands.



²⁶ World Development Report 2010 <http://siteresources.worldbank.org/INTWDR2010/Resources/5287678-1226014527953/WDR10-Full-Text.pdf> P. 302

Egypt is currently under the water poverty line, at 900 cubic meters per capita per annum, below the water poverty index of 1,000 cubic meters per capita per annum (as shown in the country graph). According to World Bank findings the figure is expected to fall to "670 cubic metres by 2017. The agriculture sector has also increased use of fertilizers, while the construction of the Aswan High Dam in 1969 lead to the decline of soil fertility as a result of lack of silt and clays that accompanied the annual flood; as for coastal land and marine life, a booming tourism industry based on mass tourism threatens the loss of valuable and irreplaceable coral system on the Red Sea. Other sources of threats to biodiversity in Egypt are illegal hunting and mainly lack of an environmental education among the local population, contributing to the abuse and threat of depleting natural resources.

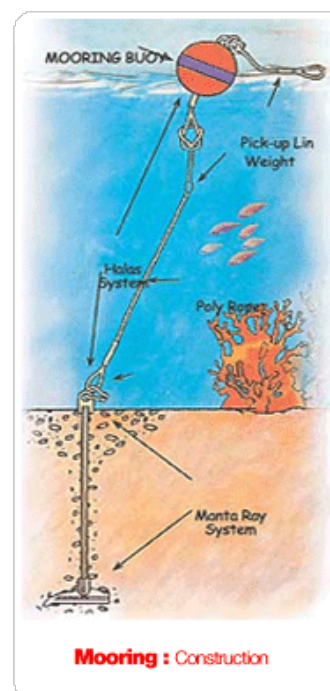
6.1 Threat to Coastal ecosystem:

One of the main threats to Egypt's coastal ecosystem generates from the rise of tourism in those areas. As mentioned earlier in the report, USAID recognized this threat and provided assistance to the Nature Conservation Sector of EEAA through provision of technical assistance and commodities to enhance park rangers' ability to enforce their authority in nature conservation.

USAID/Egypt conducted several studies and analyses of the Wadi El Gemal National Park under the Egyptian Environmental Policy Program (EEPP) between 1999 and 2004. Under the EEPP, surveys of the coastal and land areas provided baseline data for the topography, geomorphology, physical features, geology, and other relevant environmental systems that may be affected by the execution, and/or the existence of anticipated development. Sites which would be capable of supporting tourism, industrial or domestic activities were identified, and a number of management options were outlined. In 2005, LIFE/Red Sea began to implement and demonstrate to the Government of Egypt (GOE) options for environmentally sustainable development, with a focus on sustainable tourism.

This ecosystem is not restricted to corals only but it supports a highly diverse fauna and flora including approximately 30% of all known fish species. Coral reefs are found throughout tropical and subtropical oceans, so the majority of them lie within the waters of developing countries. Red Sea and Gulf of Aden are one of the coral reefs hotspots in the world. Egypt is home to over 1800 km of diverse fringing coral reefs with 261 fish species, from which 27 are commercial species representing over 48% of the total landings. Also "Ras Mohamed Protected Area" is one of the richest coral reef areas in Egypt, threats facing coral reef ecosystem still appear due to recreational SCUBA diving and snorkeling. Divers and snorkelers from tourists put stress on the coral reef system and surrounding marine life. Dive boats are another source of damage when anchoring in different locations.

Environmental education and awareness have constantly been part of all USAID programs in the area of the Red Sea. Cooperation with the active NGO in the region HEPCA has also resulted in the establishment of the largest Mooring buoys in the Middle East. Environmental impact assessments were also instituted within



EEAA and are currently a requirement for the approval of any new hotels.

6.2 Threat to Bird Migration/ Protected Areas

Egypt is listed on the World Heritage tentative list under the natural category as an important bird route subjected to several threats in the areas of North Sinai, Eastern Desert, Red Sea Governorate and Aswan located south of Egypt. Birds are valuable environmental indicators and their declining can lead to a dangerous environmental trouble. Unfortunately, about 11% of the world's bird populations face extinction this century mainly because of human activities. The Zaranik protected area, located along



the Mediterranean coast of Sinai Peninsula is one of the main routes for several species of migrating birds, and while hunting is prohibited, birds are still faced with netting. In recent years birds have also been exposed to new threats resulting from pollution of wetlands, as in the case of the Sharm El Sheikh where inappropriate disposal of solid waste by hotel and tourism industries leads to hundreds of injured birds. Habitat destructing, pollution and over exploitation of natural resources are a great threat to birds migrating through Egypt.

6.3 Threat on Sustainable Agriculture:

Agro biodiversity in Egypt faces many challenges, mostly fauna and flora genetic resources and over use of chemical fertilizers and pesticides, leading to the disappearance of most of its wildlife like “owl, fox, mongoose and wild cat”. Other factors contributed to wildlife loss like lack of agriculture rotation that is useful to land and cultivation of some high yield crops due to their high economic revenue. In addition to the fact that total average of effective compounds in fertilizers used in Egypt annually were about 5800 tons containing large amount of sulphur and copper compounds over last four years (2005 – 2008), with an average of 414 g/ Feddan/year (Ministry of Agriculture and Land Reclamation 2008). Over grazing of natural grasslands and their conversion to agricultural lands, lead to biodiversity loss. Furthermore, threats of illegal urbanization and building on agriculture lands are greatly increased, although legislations prohibit these actions ; this leads to a considerable loss of fertile lands with an average of 47.7 thousand Feddans annually, (Osama Bedeir 2008). Invasive species are from the other threats facing agro biodiversity, especially Red Palm Weevil pest that lead to the loss of more than 10 million trees, in addition to different weeds and agricultural pests that had caused considerable economic loss. Fragmentation of agricultural tenure, poverty in rural areas, marketing problems due to low quality of agriculture products have led to migration from rural to urban areas, leading to an increased pressure on Egypt's natural resources.²⁷

²⁷ Egypt State of the Environment Report 2008, p. 221-222

6.4 Threats of Global Climate Change

A World Bank (WB) report,²⁸ published also in 2007 shows Egypt as one of the top five countries expected to be mostly impacted with the 1m of sea rising level. The Intergovernmental Panel on Climate Change (IPCC) indicates that various studies conducted on the Egyptian coast predict sea-level rise as a possible threat to the northern coast of Egypt on the Mediterranean on the Egyptian coast “sizable proportion of the northern part of the Nile delta will be lost to a combination of inundation and erosion, with consequent loss of agricultural land and urban areas. Furthermore, agricultural land losses will occur as a result of soil salinization” (Please note graphs below for predicted scenarios)



The coastal zone of the Nile Delta in Egypt is perceived as vulnerable to the impacts of climate change, not only because of the impact of sea level rise (SLR), but also because of the impacts of climate change on water resources, agricultural resources, tourism and human settlements. This also includes the coastal lakes that are renowned for their abundant bird life and the first line of defense keeping saline sea water from seeping into the river water. Environmental and socio economic impacts of GCC on Egypt vary according to proximity to the coasts, therefore high risk cities in addition to Alexandria are Portsaid, Beheira, Damietta and the Suez canal cities.

However Egypt is also subjected to rising temperature as result of green house gases emissions, which is anticipated to change Egypt climate and lead to increased flooding in Egypt and all of the African continent. Egypt is an emitter of Green House Gases (GHG) mainly from vast areas of rice crop as well as fuel burning. “Within the energy related emissions, the main emitters of GHG in Egypt were fuel combustion in the power sector (22%), in industry (21%), in the transport sector (18%) and small combustion (9%). Recent information from IEA/OECD

²⁸ Dasgupta, S., B. Laplante, S Murray, and D. Wheeler (2009) *Sea-Level Rise and Storm Surges*. Policy Research Working Paper 4901, Washington: The World Bank- Development Research Group- Environment and Energy Team.

database indicates that the share of the emissions of the energy (power and small combustion) and transport sectors have increased between 1990 and 2006 from 31% to about 42% and from 18% to 21%, respectively, while the share of other sectors have come down. Transport sector CO₂ emissions contributed over 30 million tons in 2005. Recent data from the US Energy Information Administration (EIA) database shows the growing trend.”²⁹

Environmental impacts of GCC on Egypt relate to decreased water resources, impacts on soil and coastal zones, while as a result socio-economic impacts include tourism, health threats due to food security and possible health threats due to internal immigration and rising sea levels.

Egypt’s formal position with regard to GCC is clearly acknowledgment of the situation and a clear understanding of the seriousness of the threats. Egypt’s view are posted on the EEAA web site at http://www.eeaa.gov.eg/English/main/env_ozone_ecc_neg.asp and with the several steps that have been initiated by different ministries, funding remains a main issue and there has been emphasis on the expectation for the developing countries to allocate resources, as well as transfer of technology to developing countries. This was reiterated also in the Statement by Egypt to the UN Summit on Climate Change at New York on September 22nd 2009.³⁰ <http://www.ipcc.ch/ipccreports/sres/regional/index.php?idp=30>

7. Actions needed to conserve Biodiversity in Egypt:

Drivers to reduce threats to Biodiversity in Egypt need to address the *government’s institutional capacity to enforce laws* and regulations pertaining to safeguarding and investing natural and environmental resources of the Country. Since the management of natural resources are not solely under the authority of the Ministry of State for Environmental Affairs or EEAA, given the cross cutting nature of Environment – a great deal of coordination is necessary to insure that other Ministries such as Ministry of Water Resource and Irrigation, Trade and Industry, Tourism among others are aware and capable of enforcing similar laws. Coordination and mainstreaming of biodiversity and conservation with Governorates who have direct jurisdiction over land and other resources is also imperative. Examples of such efforts that have been undertaken by USAID include the protection of natural resources in the Red Sea, where coordination between 1) the Ministry of Tourism’s Tourist Development Authority (TDA) (charged with selling land for touristic development) and 2) The Governorate of the Red Sea and 3) EEAA in order to insure proper management of the protected areas in the south Red Sea region. In spite of visible impacts in terms of improved conservation of natural resources, models for sustainable development and livelihood opportunities for local communities that the USAID projects managed to achieve, further development of ecotourism and additional institutional changes with regard to self sustainability of protectorate’s financial resources, for example, remains a challenge to protecting Egypt’s biodiversity. Additional training and resources are needed for the Nature Conservation Sector of EEAA to effectively manage and carry out their duties within protected areas.

Scientific and Environmental Education: Ignorance of environmental issues and problems prevails in Egypt – a sociological study conducted by AUC in 2003³¹ on people’s attitudes towards pollution in Egypt indicated that people have no incentive towards addressing

²⁹ Clean Technology Fund – Investment Plan for Egypt. January 19, 2009 – p. 2

³⁰ Egypt to the UN Summit on Climate Change at New York on September 22nd 2009
<http://www.un.org/webcast/pdfs/climatechangesummit/egypt.pdf>

³¹ Hopkins, Nicolas and Mehanna, Sohair; “Living with Pollution in Egypt”
<http://www.springerlink.com/content/mr2p7410g34n508h/fulltext.pdf>

environmental issues, and that the government does not mobilize people for any such efforts. Ignorance has also been flagged with regard to use of renewable energies and energy conservation by government officials on several occasions. However Egypt does not have a clear strategy policy with regard to environmental education or raising awareness of the general public nor decision maker – in spite of including some environmental messages in public curriculum. A strategic, consistent and aggressive educational policy addressing the value of the countries biodiversity and natural resources is necessary for conservation and long term impact, as well as scientific advancement and providing accurate data about different species for example. Promotion of scientific knowledge and education through formal and non formal education venues as well as increasing funding for scientific research should have direct impact on recording and protecting biodiversity in Egypt.

Promote Economic incentives: Egypt's ambitious plans for development and increase trade and exports must be coupled with a wise use of natural resources to insure sustainable development takes place. Striking a balance between conservation and development activities and maximizing economic and social revenues of natural resources is critical in the coming years. Therefore private sector involvement in the protection of natural resources as well as maximized economic benefits need to be stressed. Future efforts towards policies promoting nature based industries such eco-tourism, green buildings, medicinal plants, organic farming, and use of renewable and clean energies will require access to information, enabling policies and trained and education labor force.

Use of *renewable energy resources* has direct impact on reduced pollutants that threaten the survival of different species, as well contribute to reduced green house gas emissions

8. Links to USAID Strategy and Program

8.1 Extent to Which Proposed USAID/Egypt Actions Meet Needs:

Since 2010, due to Egypt's volatile political climate, USAID/Egypt has had no mission strategy. Moreover, USAID/Egypt has no immediate plans to develop another mission strategy due to the host country's instability. Mission programming, however, has been guided by results frameworks for each program area. Each results framework includes a development objective, intermediate results, and sub-intermediate results and indicators. Planned activities are screened for any impact they may have on the country's biodiversity.

8.2 Threats from Proposed USAID Activities:

This analysis did not identify any proposed USAID programs that impose any threat on the biodiversity of Egypt. The Agency's adherence to implementing the Environmental Regulations (22 CFR 216) will further insure and more closely examine future projects prior to approval or implementation.

8.3 Opportunities for Linkages with Proposed USAID Activities:

Program Area	Program Element	Opportunity to address Conservation and Biodiversity Needs
--------------	-----------------	--

Investing in People	Basic Education	<ul style="list-style-type: none"> Through building the capacity of teacher cadre program, re-initiate emphasis on Environmental, as well as sustainable Education and incorporating it within the teacher certification programs; additional teacher training can be provided on environmental education and promote hands-on and out-door scientific and environmental research; continue support of school sanitation and hygiene education in more schools.
	Higher Education	<ul style="list-style-type: none"> Create dual degree programs in environmental management, ecology, or environmental science. Create higher education partnerships with conservation NGOs.
	Health	<ul style="list-style-type: none"> Protection of the natural system is necessary for good health – therefore health programs can promote biodiversity conservation and management into disease prevention and control programs.
Governing Justly and Democratically	Effective civil society and increased respect for human rights	<ul style="list-style-type: none"> Work with human rights organization to promote environmental rights – the right to a clean environment – the right to safe guard our natural heritage for the next generation. Provide grants to Environmental NGOs, and build their capacity to advocate for environmental issues Train journalists to better understand issues relating to Egypt’s natural heritage, to advocate environmental issues and educate the general public, as well as maintain a consistent focus on environmental topics in the spot light.
	Good Governance	<ul style="list-style-type: none"> Promote understanding of environmental laws and rights among local government officials as part of skill development training. Provide environmental management to governorates and promote cooperation with Ministry of Environment regional offices in each governorate.
	Transparent and participatory political processes	<ul style="list-style-type: none"> Promote knowledge and enforcement of Environmental laws (Law 9/2009) among all structures of governing institutions including judges.
Economic Growth	Trade and Investment Capacity	<ul style="list-style-type: none"> Technical assistance to promote compliance and understanding of international environmental standards, which lead to
	Private Sector Productivity	

	Increased	<p>sustainable use of natural resources and thereby promoting Egyptian Exports.</p> <ul style="list-style-type: none"> • Introduce policies that reduce taxes on photovoltaic panels (currently at 32%) to encourage use of renewable energy technologies, along with other policy changes to create an enabling environment for clean and renewable energy industries
	Agriculture	<ul style="list-style-type: none"> • Agricultural technical schools are already a great contribution to protection of biodiversity. • Consideration to utilize agro-waste as source of renewable energy and fuel should be incorporated into agricultural and workforce development programs • Given the critical value of fish as a main source of nutrition to Egypt – USAID Egypt should consider technical assistance and intervention to rearrange the fisheries value chain, starting with fishing techniques, establishing fishermen associations, cooling chain, maintenance, packing, marketing, etc.
	Sustainable tourism	<ul style="list-style-type: none"> • Introduce programs to increase tourist satisfaction as a result of sustainable management of destinations. For example, work to increase the number of hectares of biological significance and/or natural resources under improved management. • As a part of workforce development, train tourism enterprises and guides on environmental stewardship.

8.4 Climate-Change Resilience: climate-related sectoral risks, mitigation-adaptation strategies, and current activities

Climate change is one of many challenges Egypt must recognize and respond to in planning for the future. By increasing risks to human health, welfare, and ecosystems, climate impacts can threaten primary development goals such as reducing poverty, increasing access to education, improving child health, combating disease, or managing natural resources sustainably.³² The following analysis provides an initial look at climate considerations in development decision-making, within the Egypt context. These considerations are aimed at promoting climate-resilient development by taking into account climate stressors and both climate variability and change, within USAID/Egypt’s development goals.

USAID defines climate-resilience as the following: the capacity of a system to “anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions.”³³ Applied to social systems, resilience is the capability to anticipate, prepare for, respond to, and recover from significant stressors with minimum damage to social well-being, the economy, and the environment. Essentially, the more resilient a system (e.g., ecosystem, village, country) is, the less vulnerable it is to climate change (and climate variability such as extreme events).

³² Taken from USAID’s “Climate Resilient Development,” March 2014. http://pdf.usaid.gov/pdf_docs/PBAAA245.pdf

³³ IPCC. 2012. Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. IPCC. Cambridge University Press, Cambridge, UK and New York. p. 5.

Climate Change in Egypt: By the year 2100, the mean global temperature is expected to rise by 3-3.5 degrees Celsius³⁴, and sea levels are projected to rise between 0.5 and 1 m. For Egypt, these climatic and environmental changes will be felt in five primary areas: inundation of the Nile Delta by sea level rise (SLR), changes in water resources, changes in agro-climatic conditions, negative impact on public health, and threats to touristic sites.

Sea Level Rise: Estimates of inundated land due to SLR in the Nile Delta, by the year 2100, range between 4,006 and 8,769 km² (22 to 49%, respectively)³⁵. The uses of this inundated land include urban areas, cultivated land, undeveloped land and wetlands. Compounding the influence of SLR, is the phenomenon of land subsidence in much of the urbanized coastal areas. This has occurred because of geologic destabilization caused by salt-water intrusion. Overexploitation of groundwater resources in urban areas has lowered the freshwater water table, leading to salt-water intrusion. Land subsidence has already resulted in the formation of cavities and spontaneous sinkholes, impacting the structural integrity of buildings in Alexandria. Land subsidence is exacerbating the influence of SLR on coastal areas, speeding up the impact of climate change in that region. Cultivated lands make up approximately 60% of the land that will be inundated by SLR. The Nile Delta contains the majority of the prime agriculture land in Egypt, and contributes 30-40% of Egypt's agriculture production. A recent interdisciplinary assessment on the impact of SLR on the Nile Delta reported that with a 0.5m SLR, approximately 13% of Egypt's total agriculture land will become uninhabited³⁶. This same report estimates that approximately 3.8 million people will be directly impacted by a 0.5m SLR. The residents of impacted areas, mostly employed in the agriculture sector, will have to relocate. This will put strain on the public infrastructure of migration points (often urban centers).

The Government of Egypt has developed a strategy of adaptation to climate change (December 2011), including the impact of SLR to the Nile Delta. They propose four strategies to meet this challenge: 1) develop and enforce rules about building and the development of lowlands; 2) structural and architectural interventions; 3) rehabilitation of roads and protective structures; and, 4) reinforce natural protection.

USAID/Egypt has spent considerable resources in the past on water and sanitation infrastructure in the Nile Delta region, particularly in Alexandria. The water treatment centers, which purify Nile River water, reduce the need to pump groundwater for domestic consumption. As previously discussed, groundwater extraction is a major cause of land subsidence and increases the vulnerability of areas to the impacts of SLR. Other USAID programming, such as agriculture, has refocused their resources to regions less susceptible to the impacts of climate change (Upper Egypt). In order to improve the climate change resilience of the population in the Nile Delta region, future programming should include job training for people that will lose their land and source of livelihood. This should be in partnership with GOE and private sector efforts to develop industrial zones in the 'new-land' areas.

Water Resources: The Nile River supplies Egypt with approximately 95% of its total water needs. In 1959, Egypt signed the Nile Water Treaty allocating it 55.5 billion cubic meters of water per year. This represented an abundant supply of water for the population of Egypt at that time (25 million in 1959), however the present day population is 87 million and water share per capita has reached the 'water scarce' classification. Additional sources of water can be classified into two categories: conventional and unconventional³⁷. Conventional sources of water and their annual contribution (in billions of m³) to supplies include deep groundwater (2.0), rainfall-flash floods (1.3) and desalination (0.2). Unconventional sources of water include shallow groundwater (6.2) and the re-use of agriculture drainage water (16.0). The total water supply, including these additional sources, is 81.2 billion m³. However, this accounting method double counts some water as it is first used for agriculture and then reused when pumped out of shallow wells or recirculated out of drainage canals. Approximately 70% of all freshwater is consumed by the agriculture sector (discussed in more detail below), with only small portions going to drinking water and industry, 2 and 3% respectively. The remainder of the balance is lost in drainage to the sea and evaporation.

Groundwater is increasingly becoming an important source of water as land is being developed away from the Nile. The primary aquifers in Egypt are the Nile Valley aquifer, the Nile Delta aquifer, the Nubian sandstone (NSA) aquifer and the Post Nubian carbonate aquifer. The Nile Valley and Nile Delta aquifers are alluvial and are recharged by return flows from agriculture and sporadic rainfall. These are shallow aquifers ranging from 100m to

³⁴ Met-Office of Hadley Centre (2011) in the Jan. 2013 CC adaptation report

³⁵ Hassaan, M.A. and M.A. Abdrabo. 2013. Vulnerability of the Nile Delta coastal areas to inundation by sea level rise. *Environ. Monit. Assess.* 185:6607-6616.

³⁶ Susnik, J., Vamvakieridou-Lyroudia, L.S., Baumert, N., Kloos, J., Renaud, F.G., Jeunesse, I.L., Mabrouk, B., Savic, D.A., Kapelan, Z., Ludwig, R., Fischer, G., Roson, R. and Zografos, C. 2015. Interdisciplinary assessment of sea-level rise and climate change impacts on the lower Nile delta, Egypt. *Science of the Total Environment.* 503-504: pg. 279-288.

³⁷ Climate change adaptation strategy for the Ministry of Water Resources and Irrigation, Egypt. 2013. Pg. 16.

1000m in depth. Abiye and Mmayi (2014) conducted a rapid assessment of these aquifers using published data. The Nile Valley aquifer has reached the limits of its exploitation where abstraction rates are equal to the recharge rate ($\sim 1.3 \times 10^9 \text{ m}^3/\text{yr}$). The Nile Delta aquifer is still underutilized at this point, however with SLR and saltwater intrusion increasing in the future, it is uncertain how viable this aquifer will be in future years. The Post Nubian carbonate aquifer lies above the NSA aquifer (200-900m), and is recharged via upward leakage from the NSA and downward percolation from the Nile River. Its recharge and abstraction rates are unknown, but it represents a significant amount of water storage ($25 \times 10^{12} \text{ m}^3/\text{yr}$). The NSA is a vast but nonrenewable source of water. The ^{14}C signature for groundwater from the NSA places the age of the water at 20,000 to 45,000 years. While its storage capacity is estimated to be $285 \times 10^{12} \text{ m}^3/\text{yr}$, development plans based on utilization of this aquifer would not be sustainable as there is no aquifer recharge.

The Nile River will continue to be the dominate source of water in Egypt for the foreseeable future. The treaty that once governed access to the Nile's water, are now being rethought as upstream countries have begun to develop irrigation and hydroelectricity schemes. Climate change scenarios in the Nile Basin are not unified, where some predict more flow and others less. Under a scenario of increased flow, with upper Nile projects, total water allotment to Egypt in 2050 would be 57.48 billion m^3/yr ³⁸. Despite this increase in flow, the per capita water share by 2050 will be 399 $\text{m}^3/\text{cap}/\text{yr}$ (below the absolute water scarcity threshold) due to rapid population growth. Under a dry scenario, the situation is even worse. Egypt's portion of the Nile flow will drop to 40.38 billion m^3/yr , and the per capita water share will be 290 $\text{m}^3/\text{cap}/\text{yr}$. There will be a water crisis in Egypt by 2050 regardless of the impact of climate change, primarily due to population growth.

The GOE has developed an adaptation strategy to reduce the impact of climate change on water resources. 1) The GOE will improve the flexibility of the flood control system along the Nile River. This will create resilience in the face of water resource uncertainty. 2) The GOE will adapt their systems to increased/decreased water flow in the Nile. In the case of less flow, they will need to prioritize uses and begin to price the use of water to create incentives for conservation. 3) The GOE will maximize the use of rainwater and flash flood waters (in applicable areas). This includes building water retention/storage structures which can be accessed during dry periods.

Over the last several decades, USAID/Egypt has partnered with the GOE to develop Egypt's water management infrastructure, and the human capacity to facilitate its sustained use. This includes large sand filtration stations and small desalination unit located throughout Egypt, to help bring potable water to the Egyptian people. Large investments in sanitation facilities have also been made, so that water resources can be reused in certain types of agriculture. A majority of Egypt's water resources is used by agriculture. USAID/Egypt agriculture interventions have worked to improve irrigation infrastructure and reduce seepage losses. Technical assistance has also been given to farmers to help them improve their irrigation efficiency. This has resulted in a reduction of water loss and improved supply for downstream users. These interventions in the drinking/sewage/irrigation sectors will help Egypt to respond to changes in water resource availability, which are expected to result from climate change.

Agriculture:

What is Egypt's strategy to address these issues³⁹?

- Agriculture
 - Build an effective institutional system for crisis and disaster management
 - Biodiversity-in terms of protection and as a resource for adapted species
 - Plant production-breeding programs to select adapted plants.
 - Soil and Agriculture Lands Management-mitigate salinity
 - Management of water resources Farm Irrigation-increased irrigation efficiency, saline tolerant plants, improve water holding capacity of soils.
 - Livestock production-disease control for new diseases that are expected to appear with climate change.
 - Fish wealth-determine the risks to the sector, preserve genetic diversity.
 - Modification and improvement of agriculture economic systems-crop insurance, diversity of cropping, staple crops, price forecasts.
 - Rural community-develop capacity to adapt farming practices, and resource management.
- Health

³⁸ Climate change adaptation strategy for the Ministry of Water Resources and Irrigation, Egypt. 2013. Pg. 63.

³⁹ Egypt's National Strategy for Adaptation to Climate Change And Disaster Risk Reduction. December 2011. <http://cairoclimatetalks.net/sites/default/files/Adaptation%20Strategy%20-%20Final%20-%20E.pdf>

- Raising the efficiency of the health care sector to deal with climate change-surveillance system for infectious diseases (particularly malaria), coordination with CSOs, capacity of emergency services.
- Early warning systems for disasters-prevent injury
- Raise awareness of risks.
- Promotion of scientific research-establish trends for early action.
- Improvement of social and economic conditions and population characteristics-population pressure on resources.
- Tourism
 - Protection of marine and wildlife protectorates.
 - Implementation of integrated environmental management systems in touristic sites.
 - Assessing the degree of fragility and vulnerability to risk of touristic sites and sites of archaeological value.
 - Orienting tourism growth away from environmentally sensitive areas and areas that are most at risk to less sensitive and vulnerable ones.
 - Developing a monitoring system for the expected impacts of climate change in touristic sites.
 - Analyzing the effectiveness of the enforcement of environmental protection laws, and their development over the past years, since the approval of the protectorates law in the early 1980s, before environmental laws and regulations were issued in 1994.
 - Encouraging and supporting civil society organizations to participate in applying strategic operational policies.
 - Direct positive defensive measures-engineering solutions.

References:

D.B. Jensen, M. Torn, and J. Harte, "In Our Own Hands: A Strategy for Conserving Biological Diversity in California," 1990 http://biodiversity.ca.gov/Biodiversity/biodiv_def2.html

Rundel, Philip W; "Comparative Ecology and Hotspots of Biodiversity in Egypt and California"
http://solarcities.eu/egypt_energy_and_the_environment.pdf

http://www.eeaa.gov.eg/English/main/protect_bio.asp

http://www.eeaa.gov.eg/English/main/protect_bio.asp

<http://www.beaah.com/home/Env-articles/redlist/egypt-list3.html>

<http://www.biomapegypt.org/biodiversity/Biodiversity/index.html>

http://www.biomapegypt.org/biodiversity/Eco_tourism/index.html

http://www.eiecop.org/ambiente2/projects_2/lifp.htm

<http://www.eeaa.gov.eg/English/ProtectorNamesEn.doc>

Ahmad K. Hegazy http://www.greekgeo.noa.gr/docs/geo_symp/Egypt2.pdf

EI Maghara, North Sinai: Local knowledge, Biodiversity, and Poverty Alleviation
<http://www.millenniumassessment.org/en/SGA.Egypt.aspx>

World Bank figures for Egypt in 2008 – last updated January 20, 210
http://www.google.com/publicdata?ds=wb-wdi&met=sp_pop_totl&idim=country:EGY&dl=en&hl=en&q=Egypt+Population

Naeema Ramadan Soliman, "Impact of River Nile Pollution on Water Crisis in Egypt", P.107.

FAO Egypt Profile 2009. <http://www.fao.org/nr/water/aquastat/countries/egypt/index.stm>

http://www.msrintranet.capmas.gov.eg/ows-img2/ray/fsl2_h_e.doc

Egypt State of the Environment Report 2008 – p. 177 http://www.eeaa.gov.eg/English/info/report_search.asp

by Herman Cesar, "Economic Valuation of the Egyptian Red Sea Coral Reefs" August 2003 (USAID funded Study under EEPP)

LIFE Red Sea Final Report, October 2008 (USAID document).

Egypt State of the Environment Report 2008 – p. 166 http://www.eeaa.gov.eg/English/info/report_search.asp

Convention on Biodiversity – Country Profile Egypt: <http://www.cbd.int/countries/profile.shtml?country=eg>

Genena, Tarek "From Environmental Planning to Enforcement: A Case Study from Egypt" item 2.2.

Egyptian Italian Environmental Cooperation Program http://www.eiecop.org/ambiente2/projects_2/lifp.htm