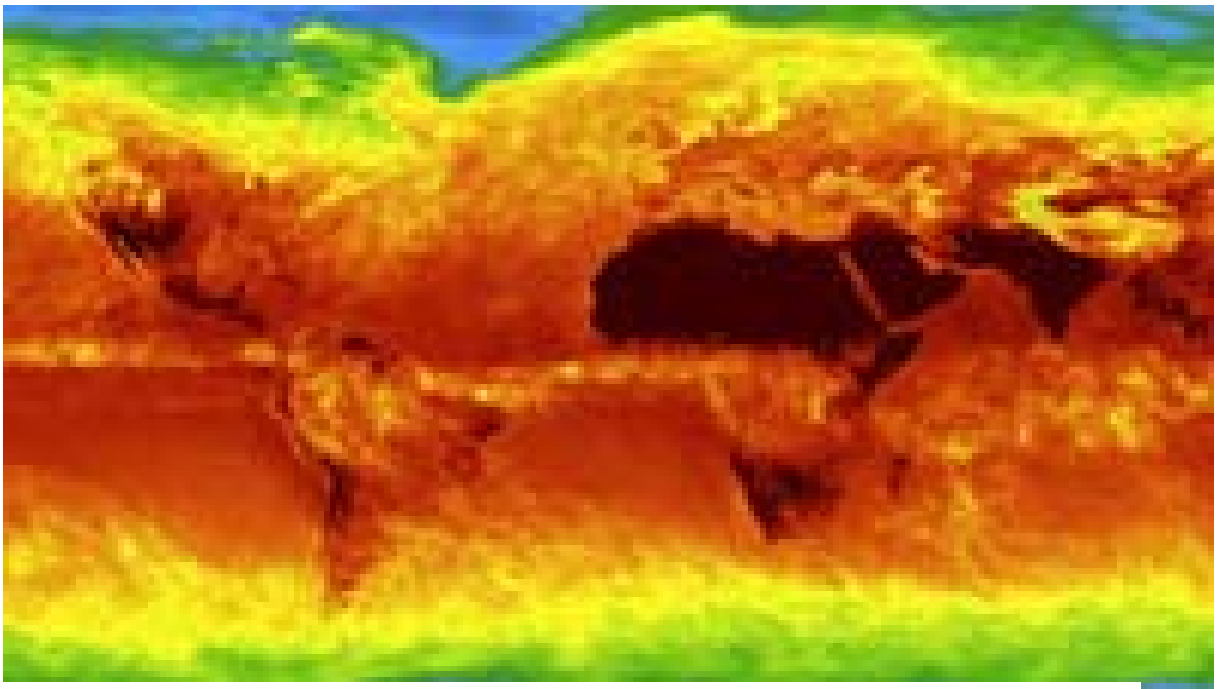

3- Climate Change

Introduction

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

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

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

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

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

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

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

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

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

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

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

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

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

Impacts of climate change on Egypt:

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

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

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

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

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

1. Agricultural
2. Tourism
3. The Egyptian Delta

This is due to:

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

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

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

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

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

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

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