

Global Warming / Climate Change, Its Impact and Mitigation Strategies in Egypt

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Abstract: Disasters are a reality of living in the natural world. Despite humans attempts to control nature, dating back to the early Egyptians and continuing to this century's massive flood control efforts, natural hazards continue. Climatological changes; such as global warming and sea level rise are one factor. For Egypt, most of Nile delta region; which represents the major bulk of agricultural area of Egypt will sink below the sea level. Many cities like Domietta and Kafr el Sheikh will be lost. This does not need long time; because the sea is rising 7 mm every year. So, it is expected within 50 years this will happen. So, discipline of mitigation can provide the means for reducing these impacts. Mitigation focuses on natural hazards mitigation effects and programs. Mitigation involves among other, land-use planners, construct and building officials, both public and private business owners, insurance companies, community leaders and politicians. We can transfer sand and gravels from our desert to our beaches; for building bulkheads or seawalls along the northern side of our international road on Mediterranean sea sure. But if more funds are available; we can make breakwaters along our sea sure. Also, building of a wall of Bentonite substance below along contact of delta with Mediterranean sea is needed; for prevention of flow of sea water below delta lands. Planting trees are important for supporting our land. Avoidance of loss of red sea corals is also supportive.

Keywords: Global warming - Climate change – Impacts – Mitigation – Egypt.

I. Introduction

Disasters are a reality of living in the natural world. Despite humans attempts to control nature, dating back to the early Egyptians and continuing to this century's massive flood control efforts, natural hazards continue (www.unisdr.org/eng/about_isdr/isdr-mission-objectives-eng.htm).

Over the last decade, the social and economic costs of disasters throughout the world have grown significantly (<http://www.nfpa.org/assets/files/PDF/NFPA1600.pdf>). Climatological changes; such as global warming and sea level rise are one factor. Oxford University stated that the northern pole will melt completely within 10 years due to global warming. Sea level will rise 1.5 meters within next 100 years. The rise of only 1 meter of sea level will have drastic effects on countries with lower level than the sea; especially those who did not do the necessary precautions for protection against the sea. Among prone countries; those of Middle East, East Asia, North Africa, Mauritania, Tunisia, Libya, Emirates, Kuwait, Qatar, Bangladesh, Sri Lanka, Vietnam and Egypt.

(http://www.unisdr.org/eng/about_isdr/bd-yokohama-strat-eng.htm).

Add to these changes, the effects of societal actions; such as increase development, deforestation and clear cutting migration of population to coastal areas and filling in of floodplains and recipe for disaster results (http://www.broadleaf.com.au/pdfs/trng_tuts/tut.standard.pdf).

Global warming results in sea level rise. Nile Delta represents 2.5% of Egypt; but 33% of Egyptians live on it. Delta region is below sea level in some areas, equal to sea level in others and 1 meter above in the remaining parts. Delta as agricultural area of Egypt produces 60% of Egyptian food. For Egypt, most of Nile delta region; which represents the major bulk of agricultural area of Egypt will sink below the sea. River Nile joins the Mediterranean sea for about 240 kilometers and about 10 000 square miles will disappear. It is expected that at least 15% of delta will be below the sea within this century. Many cities like Domietta and Kafr el Sheikh will be lost. Ras El Bar is expected to disappear within 25 years. Parts of the following cities will be lost including; Rommana, Port Foad, Kantara, Mataria, Manzala, Domietta, Faraskour, Balteem, Khalala, El-Hamoul, Sidi Salem, Edfina, Rasheed, Edkou, Damanhour, Kafr El-Dawar, Abou El-Matameer and Abou Keer. Within 100 years Rasheed city will become a gulf. Mediterranean brackish water arrived to Tanta City in the middle of Delta. Many cities in the world are at danger of sea water rise; including Cairo and Alexandria in Egypt. About 30% of Alexandria and Port Said cities will be lost in the sea. It is expected that the northern parts of Cairo will be on the Mediterranean sea. It is expected that sea flood will involve King Mariot lagoon and western part of Beheya Governorate (Lands below sea level) and northern delta region including Manzala and Borolos lakes. This does not need long time; because the sea is rising 7 mm every year or 70 cm within 100

years. So, it is expected within 50 years this will happen. *Suddeutsche Zeitung* Journal stated that if sea level increases less than 1 meter; about 7000 square kilometers of Egyptian coasts will be drown and this will be also due to erosion of subterrestrial areas of delta. Moreover, some areas of fertile agricultural lands in delta started to suffer from high level of surface water; which reached half a meter in some areas. Also, due to the rise of sea level, underground water is rising gradually and so the delta can sink below the sea from downwards upward, rather than from the sea coast. This is confirmed from the fact that during digging of wells in delta region, brackish sea water was obtained and this confirms the theory of underground drowning of delta; due to penetration of sea water in the partially sandy and partially muddy delta lands. Underground and Nile water will be mixed with sea water and will not be suitable for agriculture; and so loss of rice and wheat crops of Egypt will occur (World Bank, World Development Report 1992).

So, discipline of mitigation can provide the means for reducing these impacts. Mitigation is defined as sustained action to reduce or eliminate risks to people and property from hazards and their effects. Mitigation focuses on natural hazards mitigation effects and programs. The function of mitigation differs from other emergency managements disciplines; because it looks at long –term solutions to reducing risk as opposed to pre-paredness for hazards, the immediate response to a hazard, or the short –term recovery from a hazard event. Mitigation is usually not considered part of emergency phase of a disaster as in response, or as part of emergency planning as in pre-paredness (Strategic Environmental Research and Development Program, 1993).

Applying mitigation strategies should be a part of recovery from disaster; however even in this context, these are actions that will reduce the impacts or risks, over time. The recovery factor of emergency management still represents one of the best opportunities for mitigation and until recently, the phase in a disaster plan provided the most sustainable funding for mitigation activities.

Mitigation involves among others, land-use planners, construct and building officinal, both public and private business owners, insurance companies, community leaders and politicians.

Mitigation tools to reduce risk include:

- Hazard identification and mapping-
- Design and construction applications
- Land –use planning – Insurance
- Structural controls; including levees, seawalls, bulkheads, breakwaters, groins, jetties; aiming at stabilization of the beach or reduction of the impact of waves actions. But these structures are equally controversial; because they protect in one place and increase the damage in another (<http://www.emaponline.org/?342>).

We do not have to deny the risks .We have to reduce the risk and applying immediate mitigation programs from now. We have to put more funding; especially if we use public education and media attention that we will have a risk. Government have to provide short term rewards and incentives for business men ; who will participate in Egypt protection from global warming and sea level rise. Political vision in Egypt is with mitigation against effects of global warming and rise of sea level.

This is in spite of dissemination of other priorities; with lack of funds. We can transfer sand and gravels from our desert to our beaches; for building bulkheads or seawalls along the northern side of our international road on Mediterranean sea sures. But if more funds are available; we can make breakwaters along our sea sure. Also, building of a wall of Bentonite substance below along contact of delta with Mediterranean sea is needed; for prevention of flow of sea water below delta lands. Planting trees are important for supporting our land .Avoidance of loss of red sea corals is also supportive; through prevention of sewage disposal to the sea .Cultivation of rice in Kafr el-Sheikh governorate ; which needs much water acts as preventive force against flow of sea water through land of delta.

The Government of Egypt must put at least 5% of annual money expenditure for protection against delta loss and the remaining can be got through international aids .The latter is due to the presence of many of human culture and old buildings ; that need to be protected in Egypt. We must start now to ask the world to help us . Future strategic plan and the help of marine experts (especially in Netherland and Germany) is needed. A great project like that of Netherland for protection of delta and Egyptian sea shores is urgent and must start now.

The need for applying existing science and technology to reduce the impact of natural disasters is also important to be educated to every person in developing countries (International Strategy for Disaster Reduction. 2004). Also, promoting increased awareness of the importance of disaster reduction as an integral component of sustainable development, with the goal of reducing human, social, economic and environmental losses due to natural hazards and related technological and environmental disasters” (UNISDR, n.d.). Also, promotion of internationally coordinated efforts to reduce material losses and social and economic disruption caused by natural disasters, especially in developing countries. The stated mission of the IDNDR was to improve each

United Nations (UN) member country's capacity to prevent or diminish adverse effects from natural disasters and to establish guidelines for applying existing science and technology to reduce the impact of natural disasters. Also, IDNDR devises appropriate guidelines and strategies for applying existing scientific and technical knowledge, taking into account the cultural and economic diversity among nations. Moreover, dissemination of existing and new technical information related to measures for the assessment, prediction, and mitigation of natural disasters. proceeding further ; development of measures for the assessment, prediction, prevention, and mitigation of natural disasters through programs of technical assistance and technology transfer, demonstration projects, and education and training, tailored to specific disasters and locations, and to evaluate the effectiveness of those programs (United Nations, 1989). Regional and international cooperation will significantly enhance our ability to achieve real progress in mitigating disasters through the transfer of technology and the sharing of information and joint disaster prevention and mitigation activities. Bilateral and multilateral assistance and financial resources should be mobilized to support these efforts (International Strategy for Disaster Reduction. 1994).

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