

# **Agricultural Re-Use of Treatment Wastewater**

**Proposed Project**

**Forestation the Central Coastal Strip of the Nile Delta**

**By**

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# **Introduction**

**The project aims to re-use treatment wastewaters to cultivate the central part of the coastal strip in Nile Delta with timber and non-productive trees. Attention to forests in the world has been increased, especially with the increasing awareness of forests role in the global carbon cycle. In addition to, at the time of economic crisis also forests provide jobs and livelihood for a large proportion of the population, especially in developing countries.**

# **Environmental Objectives**

## **The main objectives are :-**

1. To prevent the disposal of wastewater in fresh water stream or coastal water
2. To increase the opportunities of safe disposal of treated sewage wastewater.
3. To reduce the most significant sources of pollution which includes municipal waste, urban wastewater and industrial pollution.
4. To maximize sustainable water management policies and practices given the context of increasing water scarcity.
5. To combine pressure on water resources from a wide range of users and desertification processes.
6. To adopt and mitigate the climate change manifestations.

# Environmental Justifications

## 1- According to Environmental Contamination

About **14402407m<sup>3</sup>/d** of treated and untreated wastewater disposal in Mediterranean Sea throughout the following sources:-

❖ About **63981 m<sup>3</sup>/d** of municipal treated wastewater from coastal cities:-

- Gamasa city: 38888 m<sup>3</sup>/d
- New Damietta Sea Port: 830 m<sup>3</sup>/d
- New Damietta Town: 24263 m<sup>3</sup>/d

❖ About **14338426 m<sup>3</sup>/d** of acceded agricultural drainage wastewater coming from four the main agricultural drains:-

- Agricultural drain No. (6): 1209722 m<sup>3</sup>/d
- Agricultural drain No. (1): 1756944 m<sup>3</sup>/d
- Agricultural drain No. (2): 2592000 m<sup>3</sup>/d
- Al-Gehad Agricultural drain: 1382500 m<sup>3</sup>/d
- Main Gharbiya Agricultural drain (Kitchener drain): 7397260 m<sup>3</sup>/d



# Environmental Justifications

## 1- According to Environmental Hazards

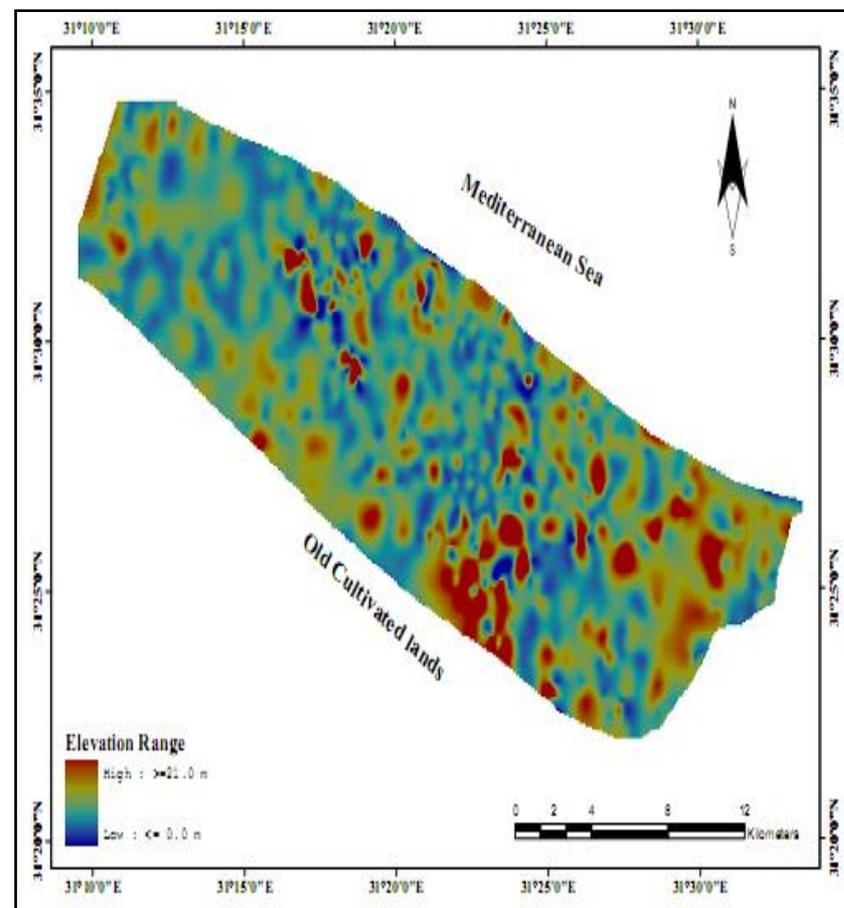
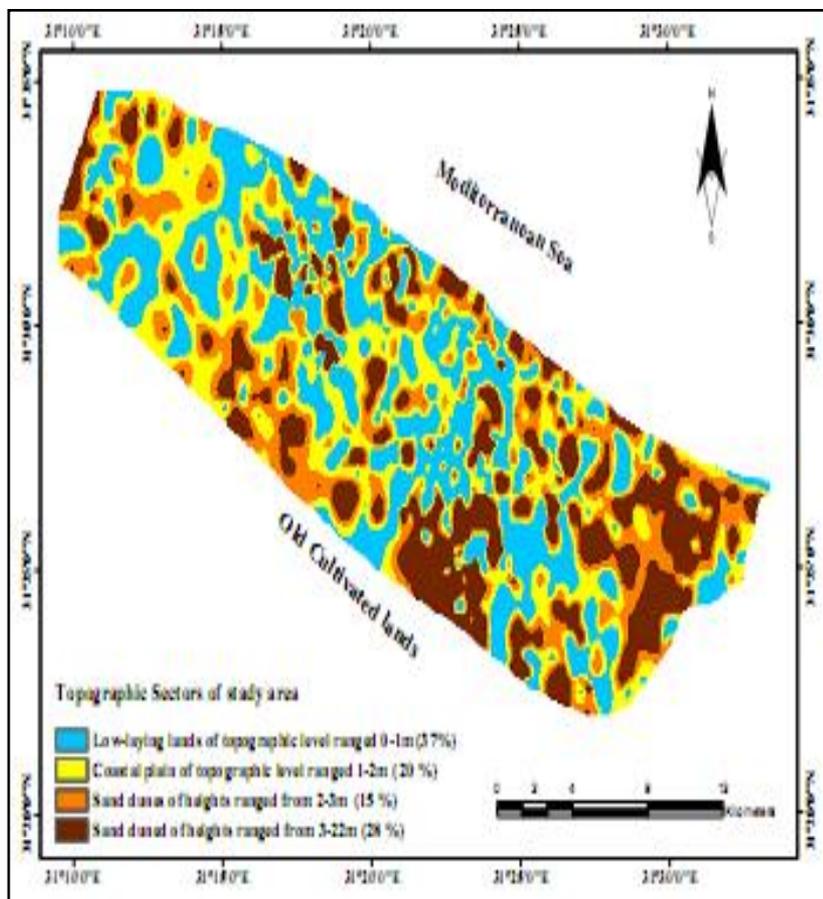
- Climate change is sweeping the world and putting its disastrous overshadows on the most countries, Those conflicting and leading to an imbalance in the stable ecological environment.
- The Nile Delta area has become more vulnerable of climate change manifestations.
- Climate change manifestations threaten the sustainable development projects and then the life of many local residents and who appreciate by about 92000 people in addition to 8 million people are living in major coastal cities

# Sea water intrusion into the coastal strip

- Sea water intrusion is the most dangerous environmental problem affecting the coastal strip of Nile Delta in Egypt.
- Currently; as to the level of Mediterranean sea, there is continuing increase with rates ranging between **1.4** to **1.5** mm/y.
- It is expected that Mediterranean sea will rise to levels ranging between **1** to **2** m in the next century.
- Several world's studies confirmed that rising of sea level by 1 m will affect about **12.5%** of the whole **cultivated** area in Egypt, while the damage will affect about **6%** of the whole **urban areas**, and about **22%** of the **coastal wetlands**

- The main reasons of sea level rising are:
  1. Increasing the concentrations of green houses gases.
  2. Delta Subsidence due to accumulating of sediments and the over pumping from coastal boreholes.
  3. Sand dunes elimination due to human interferences and which act as the natural barriers.
- The depth to sub-ground water reaches only **10cm** from the ground surface.
- Number of saline swamps are increasing day after day where the low-lying lands (elevation **<1m**) represent about **37%**.
- The hydro-chemical analysis of the water samples indicated that the origin of accumulated water in the coastal swamps is marine water





# Benefits of Forestation Project

- Fixing the sand dunes accumulations and reducing the risk of continued erosion
- Mitigation of climate change by reducing the carbon dioxide concentration in the atmosphere.
- ♣ Every meter of wood in the forests consumes 1.8 tons of carbon dioxide and releases 1.2 tons of oxygen.
- ♣ Each one square kilometer planted by poplar plants during the growing season gives about 1200 tons of oxygen and absorb 1640 tons of carbon dioxide.
- ♣ Every hectare of forest purifies 18 million cubic of air throughout the year
- Reducing the effects of seawater intrusion; *by process of transpiration and the stems of the trees act as a barrier to water flow*
- Improving the quality of the soil.

- Improving air quality and reducing dust and particulate matters. (*forest of trees can stop yearly up to 80 tons/of dust per hectare*).
- Improving the coastal environment, supporting the eco-system, provide natural habitats and increasing the chances of bio-diversity.
  - Per hectare of rainforest includes about 300 species of trees.
  - An area of 5 km<sup>2</sup> of rainforest includes more than 1300 species of bed and 600 species of birds.
  - One tree includes 43 species of ants

- Increasing the production of timbers which used in different industrial purposes and then extend in environment -friendly manufactures; Estimated amount of timber extracted from the forests globally about 34 billion cubic meters from 2003: 2007
- Maximizing the general landscape and visual quality of the coastal area

# The Main Idea of Proposed Project

- The project aims re-use treated wastewater to cultivate the central part of the coastal strip in Nile Delta with timber and non-productive trees.
- The total surface area is estimated by 120 km<sup>2</sup>.
- This area is trapped between the shore line of Mediterranean Sea and the international coastal high way.
- The species of tree, methods of planting and time table should determine according to the result of appropriate studies for soil quality and subsurface water.
- The main sources of irrigation water are treated municipal sewage water from the coastal cities and the agricultural drainage water in northern agricultural drains (*maintained before*).

**Mediterranean Sea**

**Central coastal strip of Nile delta**

Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Image © 2012 DigitalGlobe  
Image © 2012 GeoEye

Google earth

Imagery Date: 8/15/2009

31°29'33.36" N 31°15'13.63" E elev 3 ft

Eye alt 30.85 mi

# Implementation Plan

- **First: *Experimental stage.***

- The scientific study and appropriate laboratory analysis for coastal soil quality will prepare to identify the type, physical and chemical properties, and its fertility, as well as the environmental studies for subsurface water.
- Experimental planting of various species of trees will be done during the first year in parallel. Treated waste waters are using in irrigation in order to study the levels and density of growth, and the most appropriate times , types of processors and the amounts of water required for different species.
- Nurseries will be prepared for producing trees in mass production with demand lengths

# Implementation Plan

## *Second: The actual planting stage*

- In this stage the actual cultivation process will started for specific species of tresses which are suitable to the soil quality, may be that one or more species.
- The proposed area will classify into sectors according to its topography.
- Firstly the high lands and the hills will cultivate because these areas don't affect sub-soil saline water and the roots of these hills store the fresh rain water.
- The actual planting phase starts in the next year after the experimental phase has finished.

# Third: The proposed Timetable

No	Stages	Time
1	<p><b>Experimental stage</b></p> <p>Studying the properties and quality of coastal soil as well as the quality of sub-sub-surface water</p> <p>Experimental planting of timber tress suited to the soil quality and processing nurseries</p>	<p>First year</p> <p>First year in parallel</p>
2	<p><b>Actual planting stage (100 km length 1.2 km width(120 km<sup>2</sup>))</b></p> <p>First zone: ~ 24 km<sup>2</sup> =20%</p> <p>Second zone: ~18 km<sup>2</sup> =15%</p> <p>Third zone: ~ 33.6 km<sup>2</sup> =28%</p> <p>Fourth zone: ~ 44.4 km<sup>2</sup> =37%</p>	<p>Next five years</p> <p>Second year-----</p> <p>-----Third year</p> <p>-----Forth year-1/2Fifth year</p> <p>-----1/2 Fifth year- Sixth year</p>

# Recommendations

- I hope that the Egyptian governorate adapt this proposal as soon as possible.
- Egyptian governorate should establish a National researches center on one of the coastal cities for climate change mitigation.
- Many other studies should deal with the related social, healthy, and economy issues.
- Developed countries should support and fund such ideas in context of application of United Nation's framework agreement of climate change.

**THANK YOU FOR YOUR ATTENTION**