Rising Sea Levels threatens the Nile Delta

Like many other deltas, Egypt is particularly vulnerable to the effects of global warming. A relative rise in sea-level of 1 m would submerge much of the delta region within 30 km of the coast during the next 100 years. Rising sea levels would have significant long-term impacts on physical, biological and socio-economic conditions of the Nile Delta. These include the damage and destruction of buildings near beaches, erosion of beaches, salt-water intrusion, and flooding more than 1,200 km2 of Egypt's Delta Coastline [1].



Climate change may threaten coastal development the city of Alexandria on Egypt's Mediterranean coast is vulnerable to sea-level rise. (Source: TerraServer 2004)

The Coastline is a vital region for Egypt. It contains tourism and most of the agricultural land, and much of the industry and residential areas. The sea level rise affects the coastal population of six million people. Besides, the coastal region hosts several ecological systems of this region. The coastal ecosystem of the Nile Delta includes: (i) the Rosetta and Damietta Nile branch consisting of agricultural land, clusters of palm trees, sand dunes residues scattered in the middle of the area, wide sandy beaches, (ii) River Nile basin, (iii) different classes of Lakes and land cover. On the other hand, the urban environment is expressed in a hierarchy of urban clusters varying in size starting from a vast number of villages and farms and towns to large urban conglomeration resembling the main cities of Coastal Delta region.



Egypt Delta --- Image by © NASA/Corbis

To protect this very important coastal region, numerous water defense strategies have been intensified along beaches of Alexandria and the vulnerable delta shores to combat beach erosion. These strategies are mainly technical solutions, including protection works such as inlet lagoon and harbor jetties, groins, seawalls, detached breakwaters, as well as beach nourishment. Mitigation measures, which started as early as 1780 are in progress and others, are planned for the future. Along the Nile delta coast, the oldest structure is Abu Quir seawall with an elevation of 1.4 m above mean water level and a length of 10 km. It was initially built in 1780 and is still functioning to protect the low-lying cultivated land behind it from sea flooding. At Alexandria several beach nourishment projects were completed between 1987 and 1995 to mitigate shore erosion [2]& [3].



Abu Quir Seawall, one of the protection works along the Delta Coast, Alexandria --- Image by © Google Earth

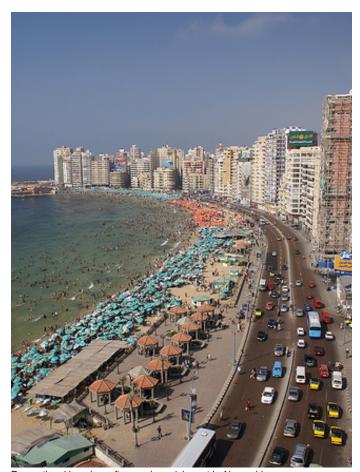
Some of these projects were implemented with short groins. Along Alexandria Coast the government prefers beach nourishment as a response to mitigate erosion problems and to maintain wide recreational beaches. Modifying and reinforcing some of these structures are being continued.

Unfortunately, no national mitigation and adaptation strategy for sea levels rise has been outlined in Egypt. However, several important decisions are necessary for sustainable development of the region. These decisions include the (i) initiation of a large scale plan for development of this region based on a coastal defense strategy. This strategy should focus on protecting and developing natural protections like natural dune sea walls, wetlands and adding structures such as levees, floodwalls, and flood gates. In addition to integrating the urban development, tourism and industry within the land uses patterns and urban water planning strategies. (ii) Also there should be an identification of gaps of capabilities and needs of the local community, in addition to, build up of institutional capability based on knowledge dissemination to identify long time progression indicators of performance. (iii) This should be pursued up by building up a monitoring program for follow up and continuous assessment of performance, ecology and socio-economic characteristics of the region.

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Recreational beaches after sand nourishment in Alexandria