

The Potential Impacts of Climate Change on Coastal Wetlands:

A Case Study of the Songor Ramsar Site

Boakye-Boaten, Nana Abayie

2010

ABSTRACT

Climate change with its concomitant effects such as global warming, increases in sea-levels, changes in rainfall patterns and increases in extreme weather conditions is adversely affecting coastal ecosystems around the world. The low-lying lagoonal coasts that characterizes major portions of Ghana's coast, are susceptible to erosion, inundation and extreme storm events, which render the human population and other systems in this area vulnerable to the impacts of climate change and sea-level rise. This study presents an assessment of the potential impacts of sea-level rise resulting from global warming on the coastal geomorphology, migratory water bird species and the socio-economic activities of the Songor Ramsar site especially the lagoon and immediate surroundings due to the low-lying nature of the terrain. Future sea-level rises were projected using an integrated coastal vulnerability assessment model, SimCLIM, for four global circulation models (GCMs) (CSIRO_MK2_GS, HadCM2_GS, CGCM1_GS and GFDL_R30_C_GS) under the Intergovernmental Panel on Climate Change (IPCC) best case (B2) and worst case (A1F1) scenarios. The rates of shoreline recession were also calculated based on a modified Bruun rule built within SimCLIM. The study showed high rates of sea-level rise for the area in the future. The assessment revealed that the Songor coastline could recede at best by about 38.89 meters by the year 2020 and at worst by about 405.64 meters by the year 2100 with baseline from 1970-1990. This could result in the loss of ca. 35.535 hectares of built up area, 180.82 hectares of mudflats, ca. 115.59 hectares of vegetation and 129.804 hectares of beach area. This is expected to affect roosting and feeding habitats of thousands of migratory waterbird species that make the Songor lagoon an internationally important wetland. Shoreline recession would potentially affect the socio-economic activities of the inhabitants of the Songor Ramsar Site. Fishing activities could be enhanced due to the fact that part of the Songor Lagoon could open to the sea, which will maintain higher water levels, especially during the dry season when the lagoon is noted to dry-up completely. However, farm-lands could be lost which will affect farming activities in the area. Salt winning, which is usually carried out during the dry

season can also be affected by shoreline recession in the area. This could severely affect the livelihoods of the communities, since salt winning, using both traditional and modern methods, is a major commercial activity in the villages around the lagoon, with the majority of the people deriving their household income from salt collection. A socio-economic survey conducted using questionnaires revealed that majority (86.4%) of inhabitants in the area were aware of sea-level rise and shoreline recession but did not fully understand the scientific basis of these. This study recommended that areas of high vulnerability or risk of inundation be demarcated as a matter of urgency, the creation of awareness on how salt mining can affect shoreline recession in the area and the development of an integrated shoreline management plan for the entire shoreline of the country.

SUPERVISORS

Prof. Ntiamoah-Baidu, Yaa

Prof. Attuquayefio, D. K.

Dr. Wiafe, George.