

## Beach Erosion-Coastal Protection and Rehabilitation related to Climate Change

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### Introduction

Long term data (1967 to 2012) available by aerial photographs and satellite images showed that about 11% of beaches around Mauritius were eroded, 30% accreted and 59% were stable. Percentage of living corals in the lagoon has been estimated to be 27% with a decrease from 50% (2001) to 27% (2012). Three coasts namely Albion, Bel Ombre and Mon Choisy have been severely eroded with most significant beach erosion taking place at Albion (-0.5m/year). The application of indicators in Integrated Coastal Zone Management (ICZM) and sustainable development in SIDS including Mauritius has become essential [1-4]. While environmental indicators have long been used to monitor the state of the coastal and marine environment, socioeconomic indicators have seen very limited application, and governance indicators have been applied mainly in reporting of the management process. A great challenge lies in using appropriate sets of governance and socioeconomic indicators that will allow decision-makers to determine whether ICZM interventions are achieving their intended goals such as beach rehabilitation against erosion [5-12]. The application of indicators in Integrated Coastal Zone Management (ICZM) to monitor the state of the coastal and marine environment together with socioeconomic indicators and governance indicators in relation to climate change is required. Development of ICZM related to climate change and coastal engineering online modules suit well in the constructivist context as it is of sharp contrast with behavioral approach where the instruction pathway is guided. The ICZM and coastal engineering learner-centered technique and the interactions between people in ICZM networked/mobile learning environments in synchronous/asynchronous mode can be useful. The interactions through text, audio, graphics, video, coastal modeling, shared workspaces or a combination of these forms are useful as networked learning is interactive, flexible and promotes active engagement as well as aiding reflective learning practice [13-15]. These attributes of networked learning for coastal engineering, ICZM and climate change learner-centred instruction framework is also being developed. Other objective can be to assess and compare aspects of biogeochemical cycles of some dissolved nutrients and trace metals in coastal waters, submarine groundwater discharge, estuarine sediment contamination and related to beach erosion. Studies now currently focus on dissolved nutrients (nitrate and phosphate) and some selected trace metals Cu, Zn and Pb along the coastline. The concentration of trace metals in both reduced and oxidised surface sediments and seasonal events during summer and winter which may lead to significant changes in trace metal deposition and dissolved nutrients is being studied and ligands which exhibit high selectivity for metal ions such as copper (II) for wastewater treatment is being investigated. Twelve beaches around Mauritius have also been preselected for development of coastal conservation plans. Two sites were selected for implementation of

demonstration projects and 5 sites for monitoring purposes. The two demonstration project site comprises one where Physical Intervention (PI) can be carried out and one where there would be No Physical Intervention (NPI). The criteria for selection of a specific site included natural and environmental conditions, obstacles to land use, importance for protection of hinter area, validity for future development plan, and national policy among others under the JICA Project "Capacity Building in Coastal Protection and Rehabilitation in the Republic of Mauritius" [16-19].

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