



An Overview of Engineering Solutions for Coastal Erosion and Environmental Economic Analysis

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DESCRIPTION

Coastal regions in underdeveloped nations are particularly susceptible to the consequences of sea level rise. Engineering and natural solutions can both be used to adapt to sea level rise through protective measures. However, comparable economic assessments across both types of solutions are sparse. Furthermore, time payments rather than monetary rewards are becoming more popular in stated preference studies used in poor nations to quantify the benefits of adaptation initiatives. It's unclear how this payment method will affect policy recommendations. Cost-Benefit Analyses (CBA) are performed that take into account the outcomes of discrete choice experiments with monetary and time payments for both engineering and a natural solution. Variety of sensitivity analyses, the efficiency of the measures, cost projections, and various benefit calculations. Focus group discussions' qualitative inputs are included to these quantitative CBAs. When applying money payments negative net present values for both engineering- and nature-based erosion solutions, but positive values when using time payments. The disruptive consequences of erosion on regional livelihoods are described using qualitative findings.

Due to the negative effects of sea level rise, including coastal erosion, floods, and submersion, coastal areas are particularly vulnerable to climate change worldwide. The effects and risk of sea level rise are made worse by coastal projects, changes in land use, and population increase. Greater groundwater salinity, the need to relocate, infrastructure loss, and increased food poverty are some of the societal issues that follow. Due to their limited ability to stop and absorb the repercussions of ongoing changes and disasters, developing nations are typically more susceptible to the effects of sea-level rise. Additionally, the current coastal alterations could halt development efforts and reverse or slow economic progress. Additionally, impoverished nations have made less progress in coastal adaptation toward resilient and sustainable coasts than has the industrialized world.

Due to their inability to prevent and fully absorb the effects of natural disasters and continuing change, developing nations are typically more susceptible to the effects of sea level rise. Additionally, the current coastal alterations could halt development efforts and cause economic progress to be reversed or curtailed. Additionally, developing nations have made less progress than the industrialized world in terms of coastal adaptation toward resilient and sustainable coasts. Beach nourishment, ecosystem restoration, construction of hard structures, retreat, zoning regulations, and building laws are a few potential adaption measures in coastal locations. Engineering-based and naturally based solutions can be used to distinguish the adaption methods that attempt to provide coastal protection. Engineering options include traditional adaptation strategies like seawalls and revetments, which are increasingly challenged for their negative effects on downslope and their expensive investment and upkeep costs. As an alternative, nature-based solutions are rapidly being researched and used. They are frequently claimed to be more advantageous because they require little upkeep and offer a wide range of additional benefits. Cost-Benefit Assessments (CBA) is frequently performed to inform decisions on whether and how to adapt to sea level rise. Economic consequences of engineering-based solutions and those based on nature differ.

There are particularly few economic analyses of coastal adaptation in underdeveloped nations. Many benefits of coastal adaptation are non-market in nature, therefore revealed preference methods, like indirect market valuation, and stated preference methods, such discrete choice experiments, are viable means of valuation. Approaches based on revealed preferences employ active markets to value non-market products. For instance, the qualities that the adaptation measure would safeguard can help establish the value of the adaptation measure. For revealed preference techniques to produce accurate estimates there must be a sufficient amount of existing data. While this is a difficult task in industrialized nations, it is harder in underdeveloped nations due to the lack of data availability.

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Received: 05-Aug-2022, Manuscript No. JCZM-22-17979; **Editor assigned:** 08-Aug-2022, Pre QC No. JCZM-22-17979 (PQ); **Reviewed:** 26-Aug-2022, QC No. JCZM-22-17979; **Revised:** 1-Sep -2022, Manuscript No. JCZM-22-17979 (R); **Published:** 8-Sep -2022, DOI: 10.35248/2473-3350.22.25.517

Citation: Maximin A (2022) An Overview of Engineering Solutions for Coastal Erosion and Environmental Economic Analysis. J Coast Zone Manag. 25:517.

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The use of payment vehicles is one of the main obstacles to the implementation of expressed preference research in underdeveloped nations. There are still concerns about the payment vehicle's impact on the welfare estimates that result, and it is unclear how this will affect the findings of CBAs and, ultimately, the choice of whether and how to conserve coastlines through policy and investment. thereby not only contribute to

the literature by contrasting the welfare effects of engineering with a nature-based solution in a developing country context, but also offer fresh perspectives on the utilization of various payment vehicles in these countries, thereby producing pertinent data for both policy makers and practitioners in stated preference.