Quantitative Approach for Environmental Spatial Planning of Urban Coastal Regions in Developing Countries

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1. Introduction

- The process of environmental spatial planning in coastal regions involves classification of areas into different categories by retaining the synergy between environmental conservation and urban development.
- Existing coastal regulations for classification of coastal regions in India are lack scientific rigorousness.

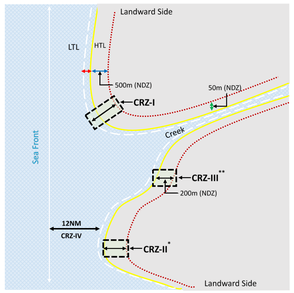

Figure 1 Prevailing spatial planning

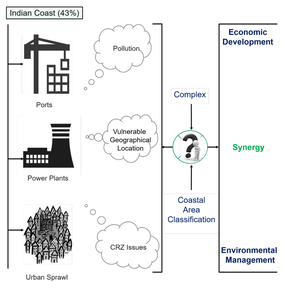

Figure 2 Problem definition

2. Objectives

- To develop a data driven site specific methods for classification of urban coastal areas.
- To assess the quantitative comparison of prevailing and proposed coastal area classification approach.

3. Study Area

- We selected Mumbai, as primary study area as a case study for evaluation and validation of coastal area classification methods.
- Mumbai is an island city facing Arabian sea along the west coast of India is always under reclamation over the recent decades for urban developmental activities.
- Coastal area of Mumbai has high environmental value territory exposed to anthropic activities.

4. Methodology

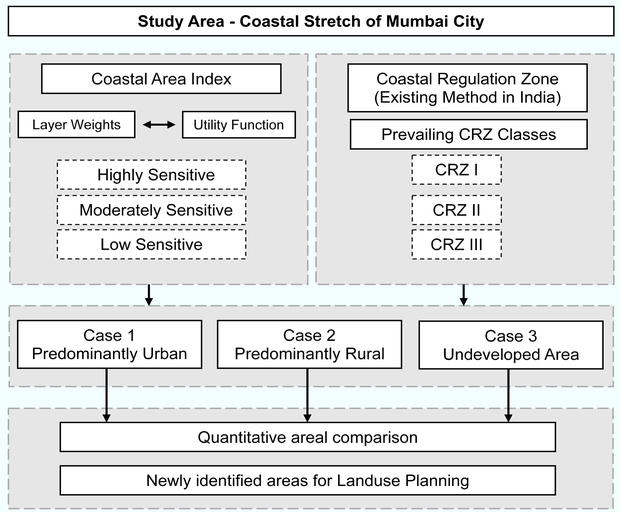

Figure 3 Methodological framework for environmental spatial planning of coastal regions

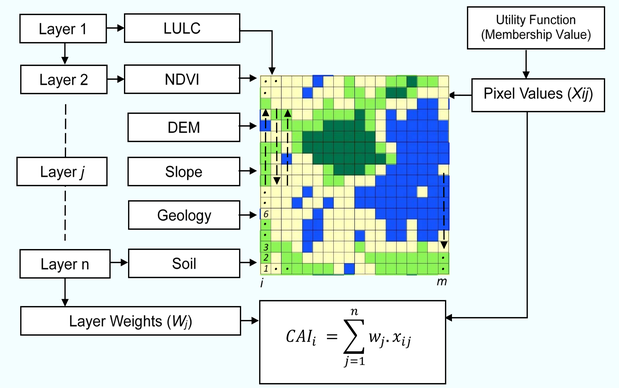

Figure 4 GIS coupled multicriteria decision analysis approach for Coastal Area Index (CAI)

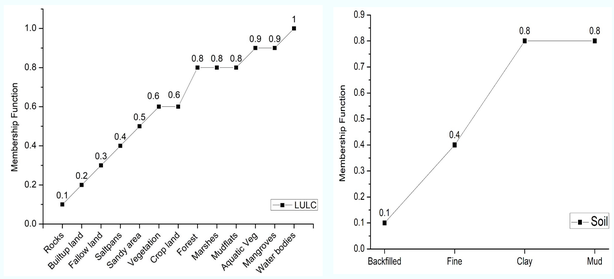

Figure 5 Membership function of LULC and Soil type based on expert opinions

5. Results

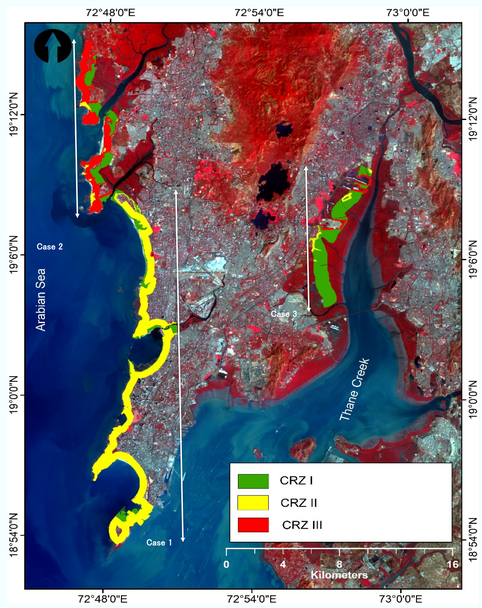

Figure 6 Coastal Regulation Zone areas along coast of Mumbai

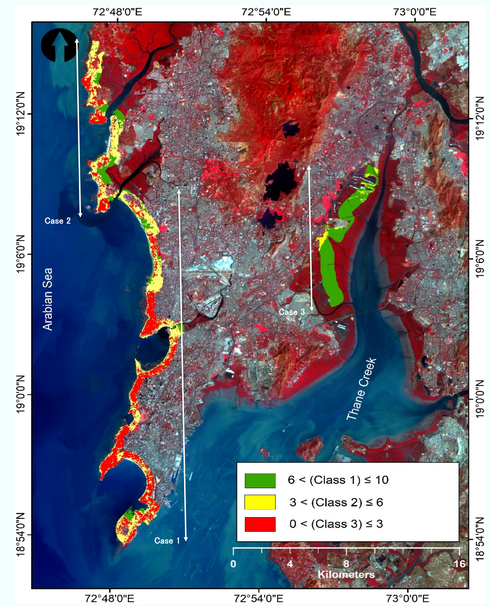

Figure 7 Coastal Area Index for coast of Mumbai

5.1. Comparison of CRZ and CAI Areas

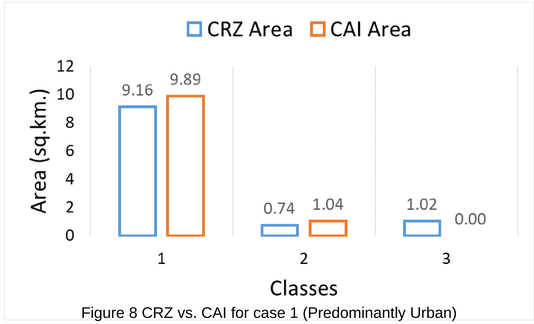

Figure 8 CRZ vs. CAI for case 1 (Predominantly Urban)

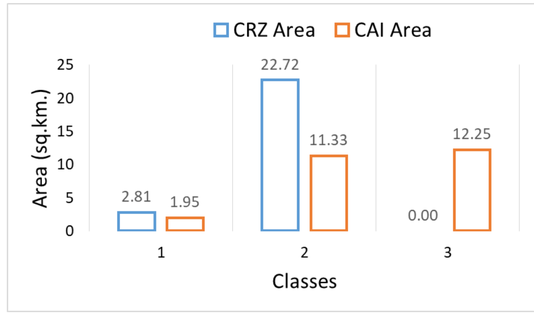

Figure 9 CRZ vs. CAI for case 2 (Predominantly Rural)

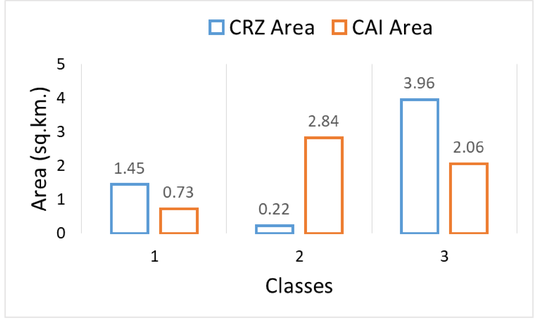

Figure 10 CRZ vs. CAI for case 3 (No Development Zone)

6. Conclusions

- The developed CAI computation approach is transparent, granular, scalable and modular in nature and applicability is easy for different locations and datasets.
- The developed method uses scientific approach to protect and best utilize the urban coastal land resources.

Dhiman, R., Kalbar, P., & Inamdar, A. B. (2018). GIS coupled multiple criteria decision making approach for classifying urban coastal areas in India. Habitat International, 71, 125-134.