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TITLE: Drivers, trends, and potential impacts of long-term coastal reclamation in China from 1985 to 2010

AUTHOR: ['Bo Tian', 'Wenting Wu', 'Zhaoqing Yang', 'Yunxuan Zhou']

ABSTRACT:

The reclamation of coastal land for agricultural, industrial, and urban land use?a common worldwide practice?has occurred extensively in the coastal region of China. In recent decades, all coastal provinces and metropolises in China have experienced severe coastal reclamation related to land scarcity caused by rapid economic growth and urbanization. However, the value of coastal wetlands and ecosystems has not been well understood and appreciated until recent development of advantageous methods of restoring reclaimed land to coastal wetlands in many developed countries. The overall objective of this study is to provide detailed spatial and temporal distributions of coastal reclamation; analyze drivers such as coastal economy, population growth, and urbanization; and understand the relationships among the drivers and land reclamation. We used long-term Landsat image time series from 1985 to 2010 in 5-year intervals, in combination with remotely sensed image interpretation and spatial analysis, to map the reclamation status and changes across the coastal region of China. The Landsat images time-series analysis was also conducted to evaluate the effects of the economy, population, and urbanization drivers on coastal reclamation. The analysis results indicated that 754,697 ha of coastal wetlands have been reclaimed across all coastal provinces and metropolises from 1985 to 2010, and the trend increased sharply after 2005. High-intensity coastal reclamation was mainly driven by the booming economy, especially after 2000, associated with urbanization and industrial development in China's coastal region; this was closely correlated with the gross domestic product (GDP) per capita. The continuous large-scale coastal reclamation of its coastal region now means China is facing a great challenge, including the enormous loss of vegetated coastal wetlands, negative environmental effects, and potential disaster risks related to coastal flooding under future change climate conditions. Long-term ecosystem-based coastal protection and management are critical to support sustainable coastal ecosystems in China in the future.

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