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## **Study of coastal land change in sand mining activities in Bandar Batauga Village, South Buton Regency, Indonesia**

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### **Abstract**

This research focused on land changes in Bandar Batauga Village, South Buton Regency, Indonesia, related to environmentally damaging sand mining activities. The primary objective of this research was to analyze land evolution in coastal settlement areas vulnerable to disasters, with an emphasis on the impact of sand mining until the year 2050. The research methods encompassed quantitative and qualitative approaches, including coastal change analysis using ArcGIS, in-depth interviews, and statistical methods. The research findings highlighted a significant increase in coastline changes, reaching an erosion area of 511.3 m<sup>2</sup> in 2022. Projections until 2050 indicate a potential maximum erosion of 1,157.22 m<sup>2</sup>. This research employed the analytic hierarchy process, focusing on social, economic, physical, and biotic environmental aspects to formulate disaster mitigation strategies. However, implementing environmental management policies faces challenges, such as a lack of competence in relevant departments and low awareness among mining permit owners. Therefore, strategic recommendations involve enhancing human resource capacity, strengthening oversight, and providing economic support as critical steps to reduce mining activities. Keywords: coastal area environment mitigation sand mining

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Introduction Coastal settlements, especially those in areas prone to land change, are often prime targets of natural disasters (Mentaschi et al., 2018), so it is crucial to analyze land change in disaster-prone coastal residential areas to understand their vulnerability and evaluate their impending environmental impacts (Wright, 2019). A comprehensive understanding of land change is necessary for settlement sustainability and a proactive step in

addressing potential disaster threats (Verburg et al., 2015; Turner et al., 2020). Using a land change analysis approach, we can investigate the dynamics and trends of change that occur in coastal settlements (Wang et al., 2021), accompanied by a deeper understanding of the characteristics of land change to find appropriate solutions and management strategies to increase the resilience of coastal settlements in the face of disaster risk (Abijith and Saravanan, 2021). Sometimes, sand mining becomes the primary cause of erosion and abrasion (Ranjith et al., 2019). The surrounding environment of the mine also suffers severe impacts on ecosystem sustainability. Environmental damage from mining activities can lead to significant ecological disturbances, detrimentally affecting the natural balance (Mngeni et al., 2016). The coastal areas in South Buton Regency, Indonesia exhibit environmental diversity and are vulnerable to changes, both physically and socio-economically. However, over the past five decades, there has been a change in the coastline due to sand mining activities, as land utilization practices such as sand mining along