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Climate change impacts outweigh conservation efforts in coral reefs that are highly exposed to thermal stresses in Zanzibar, Tanzania

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Climate change impacts outweigh conservation efforts in coral reefs that are highly exposed to thermal stresses in Zanzibar, Tanzania

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Abstract

With a greater range of management practices and so many threats to coral reefs, assessing coral reef resilience using social-ecological approaches is an important way towards understanding the climatic and non-climatic impacts, and proper conservation efforts in coral reefs. In this study, six reefs (Changuu, Chapwani, Chumbe, Kizimkazi, Mnemba East and Mnemba West) were selected as case study sites to explore resilience potential of coral reefs in Zanzibar in relation to contrasting conservation strategies. Data were collected through household surveys, key informant interviews and biological survey (line-intercept transect and direct observations). Results showed that, Chumbe reefs was perceived to be highly protected followed by Kizimkazi reefs, while Changuu and Chapwani were considered to be less protected. Fishing pressure, climate change, inadequate management and pollution were regarded as the most critical drivers of coral reefs degradation. Coral bleaching was identified to be a main cause of coral reef damage by communities in Chumbe and Mnemba East, whereas inadequate management, pollution and uncontrolled tourisms were identified as the major driver by those in Changuu and Chapwani. Overall, reefs from Kizimkazi was found to have the highest resilience potential as it is under community-based conservation compared to other reefs. We conclude that coral reef resilience is context-specific and influenced by multiple factors, and although conservation efforts have a positive impact on coral reef health, climate change effects outweigh conservation efforts in reefs that are highly exposed to thermal stresses, such as the Chumbe and Mnemba East reefs. We recommend further promotion of viable alternative livelihood activities to reef reliant communities and collaborative management for the improvement of corals' resilience and conservation in the study area.

Keywords

Coral reefs, Resilience, Conservation strategies, Anthropogenic activities, Climate change, Zanzibar