



## **STUDI ADAPTASI PERUBAHAN IKLIM DAN PENGURANGAN RISIKO BENCANA DI PESISIR KABUPATEN DEMAK**

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### **INTISARI**

Pesisir Kabupaten Demak merupakan salah satu kawasan paling rentan terhadap dampak perubahan iklim yang ditandai dengan ancaman bencana kepebisiran berupa abrasi pantai dan banjir rob yang berlangsung secara kontinyu selama beberapa dekade terakhir. Penelitian ini merupakan sebuah studi komprehensif yang bertujuan untuk menganalisis dampak perubahan iklim terhadap dinamika perubahan garis pantai, tingkat kerentanan pesisir dan pola inundasi rob. Selain itu juga menganalisis kebijakan dan aksi mitigasi pemerintah daerah serta menganalisis bentuk-bentuk adaptasi dan kapasitas adaptif lokal masyarakat pesisir Demak.

Penelitian ini menggunakan pendekatan *mixed methods* dengan desain *explanatory sequential*. Analisis kuantitatif dilakukan melalui penginderaan jauh dan Sistem Informasi Geografis (SIG) menggunakan data citra Landsat periode 1993–2023 untuk memodelkan perubahan garis pantai menggunakan *Digital Shoreline Analysis System* (DSAS), menilai kerentanan pesisir melalui *Coastal Vulnerability Index* (CVI), serta memetakan pola dan luasan inundasi rob ditiap kecamatannya. Analisis kualitatif dilakukan melalui studi dokumen kebijakan, wawancara mendalam, dan observasi lapangan untuk mengkaji kebijakan pengurangan risiko bencana, aksi mitigasi, serta kapasitas adaptif dan strategi adaptasi lokal masyarakat pesisir. Informan penelitian dikumpulkan melalui *purposive sampling* yang berasal dari organisasi perangkat daerah, pemerintah desa dan warga desa terdampak.

Hasil penelitian menunjukkan bahwa pesisir Kabupaten Demak mengalami perubahan garis pantai yang sangat dinamis selama tiga dekade terakhir, dengan abrasi paling ekstrem terjadi di Kecamatan Sayung yang mengalami kemunduran garis pantai hingga 3.315 meter dan kehilangan lahan lebih dari 3.900 hektar. Penilaian CVI menunjukkan bahwa sebagian besar wilayah pesisir Demak berada pada kategori kerentanan tinggi hingga sangat tinggi, terutama di kawasan dengan topografi rendah dan degradasi mangrove. Inundasi banjir rob terus meluas secara sistematis dari dekade ke dekade, dipengaruhi oleh kombinasi kenaikan muka air laut dan penurunan muka tanah.

Dari sisi kelembagaan, Pemerintah Kabupaten Demak telah melakukan upaya pengurangan risiko bencana pesisir melalui kerangka kebijakan API dan PRB yang relatif komprehensif, ditopang oleh sedikitnya 17 dokumen multilevel dari nasional



hingga kabupaten yang mengatur tata ruang, relokasi, konservasi pesisir, dan infrastruktur adaptif. Implementasinya dijalankan oleh berbagai OPD melalui kombinasi mitigasi struktural dan non struktural—seperti tanggul laut, jalan sabuk pesisir, kolam retensi, rumah pompa, normalisasi sungai, hunian adaptif, pemecah ombak, dan penanaman mangrove, integrasi PRB dalam perencanaan pembangunan, edukasi kebencanaan, penguatan ekonomi masyarakat pesisir, dan pemantauan penurunan muka tanah serta kenaikan muka air laut. Namun, efektivitas upaya tersebut masih dibatasi oleh keterbatasan pendanaan, koordinasi lintas sektor yang belum optimal, rendahnya keterlibatan masyarakat, dan belum terbangunnya pendekatan yang sepenuhnya integratif dan adaptif secara sosial dalam menghadapi dinamika banjir rob jangka panjang.

Sementara itu, masyarakat pesisir Demak menunjukkan kapasitas adaptif yang beragam dan dinamis, yang dipengaruhi oleh lima parameter kerangka ACCRA-LAC yakni kondisi ekonomi, dukungan kelembagaan dan akses informasi yang kuat, serta kemampuan berinovasi dan pengambilan keputusan yang tepat. Kelompok masyarakat dengan kerentanan rendah cenderung memiliki tingkat kapasitas adaptasi yang relatif tinggi, sementara kelompok lain dengan kerentanan tinggi menunjukkan kapasitas adaptif yang rendah. Beragam strategi adaptasi lokal masyarakat pesisir Demak—baik fisik, ekonomi, lingkungan, dan sosial-budaya—telah berkembang selama beberapa dekade terakhir, meliputi; peninggian jalan dan bangunan, pembangunan rumah apung dan rumah panggung, relokasi mandiri maupun komunal, pemanfaatan informasi peringatan dini rob, pelestarian tradisi sedekah laut dan bumi, perubahan serta diversifikasi mata pencaharian, konservasi mangrove, dan pengembangan desa wisata pesisir. Ragam strategi tersebut menunjukkan akumulasi pengalaman panjang masyarakat pesisir Demak yang hidup dan beradaptasi dalam lingkungan rob dan abrasi ekstrem yang menjadi aset penting dalam memperkuat ketahanan komunitas.

**Kata Kunci:** Adaptasi Perubahan Iklim, Pengurangan Risiko Bencana, Banjir Rob, Abrasi Pantai, Pesisir Demak



## **CLIMATE CHANGE ADAPTATION AND DISASTER RISK REDUCTION STUDY IN THE COASTAL AREA OF DEMAK REGENCY**

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### **ABSTRACT**

The coastal area of Demak Regency is among the regions most vulnerable to the impacts of climate change, characterized by persistent coastal hazards in the form of shoreline erosion and tidal flooding (rob) that have occurred continuously over the past several decades. This study constitutes a comprehensive investigation aimed at analyzing the impacts of climate change on shoreline dynamics, coastal vulnerability levels, and the patterns of tidal inundation. In addition, the study examines the mitigation policies and actions implemented by the local government, as well as the forms of adaptation and the local adaptive capacity of coastal communities in Demak.

This research employs a mixed-methods approach using an explanatory sequential design. Quantitative analysis was conducted through remote sensing and Geographic Information Systems (GIS) using Landsat satellite imagery from the period 1993–2023 to model shoreline changes with the Digital Shoreline Analysis System (DSAS), assess coastal vulnerability through the Coastal Vulnerability Index (CVI), and map the spatial patterns and extent of tidal inundation in each sub-district. Qualitative analysis was carried out through policy document reviews, in-depth interviews, and field observations to examine disaster risk reduction policies, mitigation actions, and the adaptive capacity and local adaptation strategies of coastal communities. Research informants were selected through purposive sampling and consisted of representatives from local government agencies, village administrations, and residents of affected villages.

The results indicate that the coastal area of Demak Regency has experienced highly dynamic shoreline changes over the past three decades, with the most severe erosion occurring in Sayung Sub-district, where the shoreline has retreated by up to 3,315 meters and resulted in the loss of more than 3,900 hectares of land. The CVI assessment shows that most coastal areas of Demak fall within the high to very high vulnerability categories, particularly in zones characterized by low topography and significant mangrove degradation. Tidal flooding has continued to expand systematically from decade to decade, driven by the combined effects of sea-level rise and land subsidence.

From an institutional perspective, the Demak Regency Government has undertaken efforts to reduce coastal disaster risks through relatively comprehensive frame-



works for climate change adaptation (API) and disaster risk reduction (PRB). These efforts are supported by at least 17 multilevel policy documents ranging from national to regency levels that regulate spatial planning, relocation, coastal conservation, and adaptive infrastructure. Implementation is carried out by various local government agencies through a combination of structural and non-structural mitigation measures, including seawalls, coastal ring roads, retention ponds, pumping stations, river normalization, adaptive housing, breakwaters, and mangrove planting; the integration of disaster risk reduction into development planning; disaster education; strengthening the coastal community economy; and monitoring land subsidence and sea-level rise. However, the effectiveness of these efforts remains constrained by limited funding, suboptimal cross-sectoral coordination, low levels of community participation, and the absence of a fully integrative and socially adaptive approach to addressing long-term tidal flooding dynamics.

Meanwhile, coastal communities in Demak demonstrate diverse and dynamic adaptive capacities influenced by five parameters of the ACCRA-LAC framework, namely economic conditions, strong institutional support and access to information, as well as the capacity for innovation and effective decision-making. Community groups with lower vulnerability tend to possess relatively higher levels of adaptive capacity, while groups with higher vulnerability exhibit lower adaptive capacity. Various local adaptation strategies—spanning physical, economic, environmental, and socio-cultural dimensions—have developed among coastal communities in Demak over the past several decades. These include elevating roads and buildings, constructing floating and stilt houses, undertaking both individual and communal relocation, utilizing tidal flood early warning information, preserving cultural traditions such as *sedekah laut* and *sedekah bumi*, modifying and diversifying livelihoods, conserving mangrove ecosystems, and developing coastal tourism villages. These diverse strategies reflect the accumulation of long-standing experiences of Demak’s coastal communities in living with and adapting to environments characterized by extreme tidal flooding and coastal erosion, which constitute a valuable asset for strengthening community resilience.

**Keyword:** Climate Change Adaptation, Disaster Risk Reduction, Tidal Flooding, Coastal Erosion, Demak Coastal Area.