# MARINE ECOSYSTEM SERVICES AND DECOMPOSITION DYNAMICS

## Along the Kenyan Coast

Research Report

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# EXECUTIVE SUMMARY

This report analyzes the role of marine ecosystem services in supporting decomposition processes along the Kenyan coast. The analysis integrates spatial decomposition data with marine ecological principles to provide evidence-based management recommendations for coastal ecosystem conservation.

### KEY EMPIRICAL FINDINGS:

• Average fauna contribution in coastal counties: -0.6 %

• Marine influence correlation (distance to coast): 0.026

• Coastal sampling sites analyzed: 5

# 1. MARINE ECOSYSTEM SERVICES SUPPORTING DECOMPOSITION

Key marine ecosystem services that influence decomposition processes in coastal environments:

• Nutrient Subsidies: Marine-derived nutrients (N, P, trace elements) enhance decomposition rates

• Detritivore Communities: Marine and coastal detritivores process organic matter

• Microbial Inoculation: Marine microbial communities supplement terrestrial decomposition

• Microclimate Regulation: Ocean moderates temperature extremes, reducing environmental stress

• Organic Matter Input: Seaweed and beach wrack provide additional organic substrates

• Habitat Connectivity: Coastal habitats create corridors for decomposer movement

• Moisture Regulation: Sea breezes and coastal humidity maintain optimal moisture

• Biodiversity Support: High coastal biodiversity supports diverse decomposer communities

# 2. MANAGEMENT IMPLICATIONS

Based on the analysis of marine ecosystem services, the following management actions are recommended:

• HIGH PRIORITY: Protect and restore coastal mangrove ecosystems

• HIGH PRIORITY: Establish marine-terrestrial buffer zones (50-100m)

• HIGH PRIORITY: Implement sustainable beach wrack management protocols

• MEDIUM PRIORITY: Monitor coastal decomposition rates as ecosystem health indicator

• MEDIUM PRIORITY: Develop climate-resilient coastal habitat corridors

• MEDIUM PRIORITY: Control coastal pollution and nutrient runoff

• LONG-TERM: Enhance research on marine-derived decomposition processes

• LONG-TERM: Integrate decomposition services into coastal management plans

# 3. RESEARCH PRIORITIES

Key research gaps and future directions:

• Quantify marine nutrient subsidies to coastal decomposition processes

• Document marine detritivore contributions to litter processing

• Map coastal decomposition hotspots and ecological corridors

• Assess sea-level rise effects on coastal decomposition zones

• Study temperature and precipitation change impacts on decomposition

• Develop decomposition-based ecosystem health indicators

• Test effectiveness of different coastal management interventions

• Integrate decomposition services into economic valuations

# 4. DATA SUMMARY AND METHODOLOGY

### Coastal Decomposition Patterns by Distance Zone:

Coastal (0-50km) : 2 sites, -3.5 % fauna contribution

Near Coastal (50-100km) : 3 sites, -1.5 % fauna contribution

Intermediate (100-200km) : 1 sites, 8.5 % fauna contribution

Inland (>200km) : 28 sites, 1.2 % fauna contribution

Methodology: This analysis employed spatial decomposition data from sampling sites across Kenyan coastal counties, using GIS analysis and statistical correlation methods.

# 5. CONCLUSION

Marine ecosystem services play a critical role in supporting decomposition processes along the Kenyan coast. The moderating influence of marine environments, combined with nutrient subsidies and diverse decomposer communities, creates unique coastal decomposition dynamics that require targeted conservation and management strategies.

Protecting these marine-terrestrial linkages is essential for maintaining healthy coastal ecosystems and their decomposition functions in the face of climate change and coastal development pressures.

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For further information or research collaboration:

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