

# Artificial Reef Structures As A Potential Tool For Enhancing Locally-managed Inshore Reefs: A Case Study From Wasini Island, Kenya

**Authors :** Jelvas Mwaura<sup>1</sup>, Dison Murae<sup>2</sup>, Juliet Karisa<sup>1</sup>

<sup>1</sup>*Kenya Marine And Fisheries Research Institute,* <sup>2</sup>*SEAECOLOGY*

**E-mail Address:** jmwaura@kmfri.co.ke

**ID:** 11768

## **Submission:**

### **Background**

Coral reefs are in degraded state of little coral cover and fish in many parts of western Indian Ocean (WIO) mainly due to widespread destructive fishing and episodic coral bleaching events. Techniques for active restoration using transplantation on artificial reef structures have been well developed and proved to be viable for reef rehabilitation of degraded reefs, yet their role in conservation of coral reef is rarely tested in the Western Indian Ocean. An important challenge to reef restoration, especially during this United Nations Decade of Ecosystems Restoration (2021-2030) is the need to demonstrate their success for greater projects outreach and as catalyst for future artificial reef projects.

### **Method**

In this study, we documented an artificial reef project in Wasini community-managed area, located southern coast of Kenya, aimed at adapting to climate change-related impacts by speeding up recovery of fish abundance and coral cover on a reef severely damaged by beach seine fishing and bleaching episodes. The project deployed artificial reef structures (concrete blocks) to stabilize sandy-rubble fields and to support transplanted coral fragments

### **Results**

After one year, the overall survival of the coral transplants ranged between 51-100% on 15 genera, with an average survivorship of 77%. Coral cover on artificial reef structures increased from a mean of 7 % 1 year after initial attachment of fragments to 30% after 2 years, with *Acropora* corals providing higher cover. The artificial reef structures were rapidly colonized by reef fish. Fish densities were  $18 \pm 13$  indiv./250m<sup>2</sup> after two years; about three folds higher than on natural reefs. Greater number of target (commercially-important) fishes (e. g., Lutjanids and Acanthurids) were observed on artificial while natural reefs harboured more of small sized fish (Pomacentrids and labrids).

### **Conclusion**

This artificial reef project demonstrates that creation of new habitats can be used in conjunction with other existing fisheries regulations and reef protection measures, to increase fish and coral abundance. This may in turn be for promoting conservation of coral reefs and fisheries enhancement where reefs have been severely degraded.