

# **Artisanal catch rates of Kawakawa tuna in relation to satellite derived environmental parameters in Pemba channel.**

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## **Background**

The Tanzanian offshore and particular pelagic fish resources are underexploited due to inadequate knowledge of locating potential fishing grounds. Pelagic fish resources especially Tuna and tuna-like species are migratory and distributed over very large oceanic extent of fishing potential. The wide distribution cause longer search time which is costly and time consuming. Therefore, predicting fishable aggregations make the search more efficient and economical. To achieve this, it would be useful to analyse long-term fish catch rate and oceanographic data that could affect the temporal and spatial distribution of pelagic fish resources.

## **Methodology**

8 days mean values of Chlorophyll-a (Chl-a) and Sea surface temperature (SST) were derived from images of Moderate Resolution Imaging Spectroradiometer Satellite (MODIS) at 4 km spatial resolution obtained from an e-station at Tanzania Fisheries Research Institute - Dar es Salaam. The Chl-a and SST data used in this study were from pilot fishing grounds frequently visited by artisanal fishers targeting tuna and tuna-like species. Catch rates of Kawakawa tuna were obtained from artisanal fishers at Nungwi northern tip of Unguja island, Fundo at Pemba island and Deepsea landing site at Tanga. Two statistical models, generalized linear model (GLM) and generalized additive model (GAM) were applied to assess the relationships between catch rate of Kawakawa tuna and satellite derived Chl-a and SST.

## **Results**

The results indicated that there was a significant correlation between SST and Chl-a ( $r^2 = 0.4$ ,  $p < 0.03$ ). Furthermore, there was positive significant correlation between catch rates of Kawakawa tuna and Chl-a ( $r^2 = 0.6$ ,  $p < 0.001$ ) which was insignificant with SST ( $r^2 = 0.001$ ,  $p > 0.05$ ). The potential fishing ground of Kawakawa tuna was found in Pemba channel (at accuracy of 80%).

### **Conclusion**

This study indicated that, with the integration of remote sensing technology, statistical modeling and geographic information (GIS) technique were able to determine the relationship between SST and Chl-a and thus able to forecasting aggregation of Kawakawa tuna. This may contribute in fishers decision making and reducing hunting time and cost in fishing activity as well as in management of Kawakawa fishery.

**Keywords:** Catch rate, Remote sensing, Sea surface temperature, Chlorophyll-a, GLM, GAM, Kawakawa tuna.