Development of potential fishing ground forecast for Skipjack tuna gillnet fishery of Sri Lanka

S.S. Gunasekara*

National Aquatic Resources Research and Development Agency (NARA), Crow Island, Colombo 15, Sri Lanka

Skipjack tuna (*Katsuwonus pelamis*) is one of the most important fish species in the Sri Lankan gillnet fishery. Skipjack tuna inhabits the epipelagic zone (shallower than ~100 m) and is associated with warm water (>28–29 °C). Understanding the oceanographic factors that affect fish distribution is essential to find out the possible fishing grounds. It is possible to use near-real-time oceanographic information from satellite remote sensing to predict potential fishing grounds of Skipjack tuna. The objectives of this study were to investigate the connection of Skipjack tuna fishing grounds with environmental factors in the Northern Indian ocean using fishery logbook data and oceanographic parameters. Skipjack tuna catches from the gillnet fishery of Sri Lanka (-2 S to 12 N, 75 E to 90 E) from the 2016-2019 period were matched with Sea Surface Temperature (SST), Sea Surface Salinity (SSS), Chlorophyll-*a* and other relevant oceanographic parameters from satellites and in-situ data from Copernicus Marine Environment Monitoring Service (CMEMS) during the study period using statistical modelling (Generalized Additive Model). The one-variable model using SSS and SST had the highest explained deviance (6.08% and 4.9%). A multi-criteria model was developed to predict potential fishing grounds using SST and SSS data from the product GLOBAL ANALYSIS FORECAST PHY 001 024 provided by the CMEMS. The model provides a 5-day fishing ground forecast. Models were developed using the R statistical program language (version 4.0.3) and ArcGIS Pro 2.9.3. The prediction model results were validated with fishermen's feedback, logbook and vessel monitoring system data. Experimental potential fishing ground advisories for skipjack tuna are produced three times a week and disseminated to fishers via WhatsApp.

Keywords: forecast, Generalized Additive Model, gillnet fishery, R, Skipjack tuna

*Corresponding Author – email: sudheera@nara.ac.lk