

**OCCURRENCES OF CHLOROPHYLL-A AND
PHYTOPLANKTON BLOOMS IN DIFFERENT
MARITIME ZONES AROUND SRI LANKA WITH
RESPECT TO MONSOON PATTERNS AND SEA
SURFACE TEMPERATURE USING REMOTE SENSING
TECHNIQUES**



A dissertation submitted to the
Faculty of Animal Science and Export Agriculture
Uva Wellassa University
in partial fulfillment of the requirement of
the degree of
Bachelor of Science in Aquatic Resources Technology
by

GALWADU ACHARIGE JEEWANI SANDAMALI

**Department of Animal Science
Faculty of Animal Science and Export Agriculture
Uva Wellassa University
2020/2021 Declaration**

ABSTRACT

Marine phytoplankton plays a vital role as a primary producer, oxygen producer, and carbon absorber; however, their spatiotemporal distribution is little known within the Sri Lankan Ocean. Therefore, this study was conducted to assess the anomalies of chlorophyll-a (CHL-a) concentration which represent phytoplankton biomass in sea margins around Sri Lanka concerning different monsoon patterns and different maritime zones and Sea Surface Temperature (SST) over the past six-year period (2015–2020) by remote sensing analysis. Moderate Resolution Imaging Spectroradiometer (MODIS) aqua daily images of SST and CHL-a were analyzed by SeaDAS 7.5.3 and then ArcGIS 10.8 was used to clip reprojected raster layers as per different isobath zones (continental shelf, 1000 m & 2000 m) which were demarcated by Google earth pro 7.3.3 and legalized zones (Territorial Sea & EEZ) around Sri Lanka. According to two-way ANOVA, there were significantly different ($p < 0.05$) mean CHL-a and SST concentrations concerning the various Isobath zones, Legalized Zones as well as Monsoon patterns. The highest mean CHL-a value 3.878 mg m^{-3} meanwhile the lowest SST 22.74°C was observed in the Southwest Monsoon period in continental shelf ($< 100 \text{ m}$) in the part of southwest sea margin of Sri Lanka, the lowest CHL-a 0.12 mg m^{-3} was found within the EEZ in the First Inter Monsoon. By concerning the past six-year period the highest mean CHL-a values were recorded during the South West Monsoon followed by Second Inter Monsoon, North East Monsoon, and First Inter Monsoon respectively. Mean chlorophyll-a values were reduced towards the open ocean as the continental shelf, territorial sea, 1000 m isobath, 2000 m isobath, and EEZ consecutively. The reason for the resulting differences is strongly suggested due to the uplifting of nutrients drained from terrestrial runoff during the activated monsoons and activation of upwelling systems as revealed by previous studies. However, further studies are needed on nutrient loading with terrestrial runoffs and the level of required trace elements for the growth of phytoplankton.

Keywords: Remote Sensing for Chlorophyll-a; MODIS; South West Monsoon; North West Monsoon; Phytoplankton Biomass