



Hungarian University of Agriculture and Life Science

Gödöllő Campus

Environmental Engineering

Environmental Change Monitoring

with GIS in the Four Thousand Islands region, Laos

Supervisor: Dr. Zoltán Vekerdy

Professor

Institute of Environmental Sciences

Department Of Water Management and

Climate Adaptation

Author: Kingkham Paseutsakoun

CZ69EF

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SUMMARY

Four Thousand islands are one of the most valuable islands in the southern part of Laos, it's containing Waterfalls, Wetland, water channels and settlements for humans and biodiversity. This study focused on changes in environment such as: water, bare land, and vegetation cover area in wet/dry seasons because of climate change and human activities. This study aimed to determine the impact of the changes in water levels in dry and wet seasons in different years. The study also aimed at determining if there were changes in vegetation cover during different dry and wet seasons in different years and determining if the size of the islands changes as due to changes in water levels. To be able to achieve the above objectives the following methods were applied. QGIS software version 3.30 was used to analysis NDVI images, used NDVI images to create and classification water, barren land, and vegetation cover map areas. To be able to determine area of water, Land, and vegetation cover between year 2010 – 2020 at Four Thousand Islands and determine water area change, bare surface and vegetation change by rapid water flow and climate change, the Raster Calculation function was used for the Calculation of pixels on NDVI maps. Results from this study showed that barren land increased in the dry season while vegetation and water areas decreased. Additionally, water cover areas are decreasing related to reduction of water level at Mekong River based on Seasonal shifting caused by climate change because of long drought period and short period of monsoon. A significant effect associated with climate change was noted in the month of November that showed increased vegetation cover area of 43% with a decrease in island size (52.23%), the possible cause for this could be due to increase of water level and end of monsoon season. NDVI maps and water occurrence maps showed that in the year 2020 there was extreme drought and lack of water due to climate change and human activities. The GIS technique is a precise and convenient tool to get calculated pixels data on NDVI maps. The result of this study can be used by the government of Laos to determine change in water level and vegetation cover in other ecological area of interest in assessing the impact of climate change in the environment and inform policy maker in decision making on issues affected by climate change, for the purpose of detecting and analyzing the impact of drought in the future NDVI is easy technique and effective tool that can be linked to other environmental monitoring. The findings of this study can be used to decide before implementing the conservation measures of the Four Thousand Islands.