



# **MONITORING VEGETATION COVER CHANGE IN EASTERN NILE BASIN USING REMOTE SENSING**

By  
**Mohammed Salah Yousef Marzouk**

A Thesis Submitted to the  
Faculty of Engineering at Cairo University  
in Partial Fulfillment of the  
Requirements for the Degree of

**MASTER OF SCIENCE**  
In  
**IRRIGATION AND HYDRAULICS ENGINEERING**

FACULTY OF ENGINEERING, CAIRO UNIVERSITY  
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Under the Supervision of

**Prof. Dr. Ahmad Wagdy  
Abdeldayem**

**Prof. Dr. Nadia Mohamed  
Eshra**

.....  
Professor of Hydrology  
Irrigation and Hydraulics Department  
Faculty of Engineering, Cairo University

.....  
Associate Professor of Hydropower  
National Water Research Center  
Ministry of Water Resources and Irrigation,  
Cairo, Egypt

**Dr. Mohamed Aly Elkordy**

.....  
Assistant Professor  
Irrigation and Hydraulics Department  
Faculty of Engineering, Cairo University

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Approved by the  
Examining Committee

---

**Prof. Dr. Ahmad Wagdy Abdeldayem, Thesis Main Advisor**

Professor of Hydrology  
Faculty of Engineering, Cairo University

---

**Prof. Dr. Alaa El-Din Mohamed El Zawahry, Internal Examiner**

Professor of Water Resources  
Faculty of Engineering, Cairo University

---

**Prof. Ashraf Mohamed Elmoustafa, External Examiner**

Professor of Engineering Hydrology  
Faculty of Engineering, Ain Shams University

FACULTY OF ENGINEERING, CAIRO UNIVERSITY  
GIZA, EGYPT  
2020

**Engineer's Name:** Mohammed Salah Yousef Marzouk  
**Date of Birth:** 13/10/1990  
**Nationality:** Egyptian  
**E-mail:** [mohammedsalahyousef@gmail.com](mailto:mohammedsalahyousef@gmail.com)  
**Phone:** 01004855836  
**Address:** 22 a.b.c Gameaa El Ismaili, khayrat,  
Lazoughly, Cairo, Egypt  
**Registration Date:** 01 / 03 / 2014  
**Awarding Date:** ... / ... / 2020  
**Degree:** Master of Science  
**Department:** Irrigation and Hydraulics Engineering



**Supervisors:**

Prof. Ahmad Wagdy Abdeldayem  
Associate Prof. Nadia Mohamed Abdelsalam Eshra  
Dr. Mohamed Aly Elkordy

**Examiners:**

Prof. Dr. Ahmad Wagdy, (Thesis main advisor)  
Prof. Dr. Alaa Elzawahry, (Internal Examiner)  
Prof. Ashraf Mohamed Elmoustafa, (External Examiner)  
- Professor of Engineering Hydrology,  
Faculty of Engineering, Ain Shams University

**Title of Thesis:**

Monitoring vegetation cover change in the Eastern Nile using remote sensing

**Key Words:**

Eastern Nile; Vegetation Cover Change Detection; Evapotranspiration; GERD Dam;  
Remote Sensing

**Summary:**

As a result of this research, a technique is now made available to continuously monitor the dynamic changes in the green cover within the Eastern Nile basin. The monitored irrigated land areas in dry and wet seasons are used to calculate the water consumption based on provided actual evapotranspiration and interception data. The technique aims at producing consistent spatial and temporal maps for green cover in the Eastern Nile in both seasons (wet and dry) using available remote sensing data. Several remote sensing indices (water and vegetation) are tested to determine their applicability in detecting the green cover changes. Among these indices, the Normalized Difference Vegetation Index is chosen to map the green cover and giving a unique pattern for every land use upon analyzing the time series results. The method has been applied on Sudan main irrigation schemes (Gezeira- Rahad – Kenana) and the time series vegetation cover maps are generated for the study areas over the period from 2000 till 2016. The resulted classification maps were compared to the FAO classification maps generated at the Wapor project, and the results prove to be consistent and water consumption is calculated accordingly.

## **Disclaimer**

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

Name: Mohammed Salah Yousef Marzouk

Date:

Signature

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Mohammed Salah Yousef, 2020

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