



# Remote Sensing in North Africa: Applications for Crop Monitoring

Chinedu Kalu<sup>1,2</sup>, Nwakwe Nnamdi<sup>1,3</sup>, Obiora Ezeqma<sup>2,4</sup>

<sup>1</sup> Covenant University, Ota

<sup>2</sup> Nigerian Institute of Social and Economic Research (NISER)

<sup>3</sup> Department of Crop Sciences, University of Benin

<sup>4</sup> Department of Crop Sciences, Covenant University, Ota

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**Correspondence:** [ckalu@hotmail.com](mailto:ckalu@hotmail.com)

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## Author notes

*Chinedu Kalu is affiliated with Covenant University, Ota and focuses on Agriculture research in Africa.*

*Nwakwe Nnamdi is affiliated with Covenant University, Ota and focuses on Agriculture research in Africa.*

*Obiora Ezeqma is affiliated with Nigerian Institute of Social and Economic Research (NISER) and focuses on Agriculture research in Africa.*

## Abstract

Remote sensing technologies have been increasingly applied in various agricultural sectors to monitor crop health and productivity. In North Africa, particularly Nigeria, these techniques offer a promising tool for improving resource efficiency and yield stability. A comprehensive search strategy was employed across multiple databases including Web of Science, Scopus, and Google Scholar. Studies published from to present were included if they focused on remote sensing applications in crop monitoring within Nigeria's agricultural context. A thematic analysis approach was used for data synthesis. Remote sensing techniques have shown significant potential in detecting early signs of stress in crops such as water scarcity and nutrient deficiencies, with detection rates exceeding 80% in some studies. These findings indicate a clear need for further validation and integration into operational agricultural practices. The reviewed literature underscores the importance of remote sensing technologies in enhancing crop monitoring capabilities, particularly in resource-limited environments like Nigeria. However, challenges such as data quality and cost remain significant barriers to widespread adoption. Investment should be directed towards improving satellite imagery resolution and developing robust algorithms for real-time analysis. Additionally, training programmes for farmers on the use of remote sensing tools are essential for maximising benefits from these technologies. The empirical specification follows  $Y = \beta_{0+\beta} p X + \text{varepsilon}$ , and inference is reported with uncertainty-aware statistical criteria.

**Keywords:** *Sub-Saharan, GIS, Landsat, Sentinel, remote sensing, precision agriculture, vegetation index*

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