

Promoting Digital Solutions and Green Agriculture in Ogun State

Prof. O. T. Arogundade

Who Am I

- Professor of Software Engineering
- Co-Lead, EU Project on Digitization, Sustainable Agriculture and Rural Farmers 2023-2025.
- Co-PI, A Mobile based supporting Tool for weight determination and equalization in animal Experiment. Institutional-based Research Grant, by TETFund,
- PI, Deployment of Intelligent Animal Tracking System for Pasture and Range Management sponsored by AlumNode Research Grant, Germany 2019.
- PI, A mobile Intelligent Animal Tracking System funded by IBR TETFund Research Grant 2016.



Outline

01 Agricultural
Landscape in Ogun
State

02 Challenges in
Traditional
Agriculture

03 The Digital
Revolution

04 Green Agriculture
Practices

05 Research Findings

06 The EU-Project
Impact

A person wearing a blue and white checkered shirt is shown from the chest down, gesturing with their right hand. They are standing in a field of tall green grass. A semi-transparent green rectangular box is overlaid on the right side of the image, containing the title text.

Agricultural Landscape in Ogun State

Agriculture plays a major economic role in Ogun State and provides income and employment for about 70% of the labour force while contributing 30% of the State's GDP.

IITA, 2022

Significance of Agriculture in Ogun State

- Economic Backbone
- Employment
- Contribution to GDP
- Rural Development
- Supply Chain
- Food Security
- Cultural Heritage
- Export Potential:

Major food crops grown

- rice,
- maize,
- cassava,
- yam
- banana.



Challenges in Traditional Agriculture

Limited Access to Information

Lack of access to modern agricultural information and practices.



Yield Variability

Inconsistent yields due to unpredictable weather and lack of precision.

Outdated Techniques

Continued use of traditional and less efficient farming methods.



Resource Inefficiency

Wastage of resources like water, fertilizers, and energy.

Environmental Concerns

Practices contributing to soil degradation and water pollution.



Income Instability

Unpredictable income due to yield fluctuations.

A woman with short brown hair, wearing a light blue button-down shirt and a matching bucket hat, is smiling at the camera. She is holding a clipboard and a pen. The background is a lush green field with trees and foliage, suggesting an agricultural or outdoor setting. A semi-transparent green rectangular box is overlaid on the lower half of the image, containing white text.

How Do We Address These Challenges?

These challenges necessitate innovative approaches to ensure sustainable and productive agricultural systems.

The Digital Revolution

Technology has evolved agriculture from a manual endeavour to a precise science, empowering farmers with data-driven insights and tools for sustainable growth

*Organisation for Economic Co-operation and Development
(OECD)*





NIMTrack

...shaping the future of cattle security...



- LoRaWAN wireless network-based system
- Mobile-enabled technology for real-time location tracking
- Geofencing

Mobile Organic Courseware

- A video-based mobile courseware to train farmers remotely on organic agricultural practices.
- It is a responsive web application but mobile responsive that provides access to video library through an easy-to-navigate interface for low-literate farmers and extension workers on any device.
- The navigational layer uses graphics, audio, and touch interaction to make simple choices in crop, crop phase and activity to reach the desired video.



Intelligent Market Space

- To improve income gains from production gains, smallholder farmers need to sell their produce as efficiently as possible, for the best possible price, without having to take time away from farming or their families and without the influence of the middleman.
- A mobile based sale and logistics management system.



WE Tool

- Weight Equalisation (WE) is the technique of grouping experimental subjects with the aim of reducing the variability in the starting weight among experiment treatment groups.
- WETOOL is a mobile based application that will automatically assign animals to experimental units of different sizes using Android mobile application



Precision Farming

A large-scale farm where precision farming technologies are in use. Sensors embedded in the soil continuously monitor moisture levels, while GPS-guided tractors plant seeds and apply fertilizer with pinpoint accuracy.



Drone Technology

Drones equipped with irritating sound that drive away birds from rice plantation.



Data-Driven Decisions

A smallholder farmer in a developing country who receives weather forecasts and soil analysis reports on their smartphone. Using this data, they make informed decisions about when to plant, irrigate, and harvest their crops, optimizing resource use.



Smart Monitoring

A greenhouse equipped with smart monitoring systems. If the temperature or humidity levels deviate from the ideal range, the system automatically adjusts the climate control and sends alerts to the farmer's mobile device.



Digital Mapping

- Think about a farm that uses digital mapping and GPS technology to precisely map fields and determine soil types.
- With this data, the farmer can apply the right amount of nutrients to each section of their land, avoiding over-fertilization or under-fertilization.





Market Access

“Market Access

To improve income gains from production gains, smallholder farmers need to sell their produce as efficiently as possible, for the best possible price, without having to take time away from farming or their families and without the influence of the middleman.

A mobile based sale and logistics management system



Sustainability



Think about a farm that has adopted sustainable farming practices, such as no-till farming and the use of cover crops.

These practices improve soil health, reduce erosion, and minimize the need for chemical pesticides.



Green Agriculture Practices

Green Agriculture

Green agriculture is a holistic approach that prioritizes sustainability and environmental stewardship in farming practices.

Focus on Sustainability: Strives to meet present needs without compromising future generations' ability to meet their needs.

Environmental Stewardship: Aims to protect and enhance natural resources while minimizing negative impacts.



Examples of Green Practices

- **Organic Farming:** Avoids synthetic inputs like pesticides and fertilizers, focusing on natural methods to enhance soil health and promote biodiversity.
- **Agroforestry:** Combines trees with crops, offering shade, soil enrichment, and diversified income sources.



How Ogun State can Benefit from These

Increased Yield and Efficiency

Digital tools streamline processes, minimizing resource wastage and operational inefficiencies.



Reduced Environmental Impact

Data-driven decisions prevent overuse of chemicals and water, reducing negative environmental effects.



Sustainable Agriculture

The synergy supports environmentally friendly practices that safeguard land and resources for the future.

A close-up photograph of several small green seedlings growing in dark brown soil. The seedlings are arranged in a diagonal line from the bottom left towards the top right. The background is blurred, showing more soil and distant seedlings.

Thank You

arogundadeot@funaab.edu.ng