

#### Who Am I

- Professor of Software Engineering
- Co-Lead, <u>EU Project on Digitization</u>, <u>Sustainable</u> 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

O1 Agricultural Landscape in Ogun State

O4 Green Agriculture Practices

O2 Challenges in Traditional Agriculture

**O5** Research Findings

O3 The Digital Revolution

Of The EU-Project Impact



Agriculture plays a <u>major economic role</u> 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



### 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.



Continued use of traditional and less efficient farming methods.





#### **Resource Inefficiency**

Wastage of resources like water, fertilizers, and energy.



Practices contributing to soil degradation and water pollution.

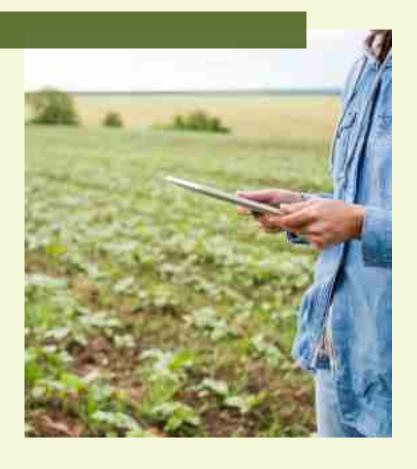




#### **Income Instability**

Unpredictable income due to yield fluctuations.





### The Digital Revolution

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

Organisation for Economic Cooperation 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.



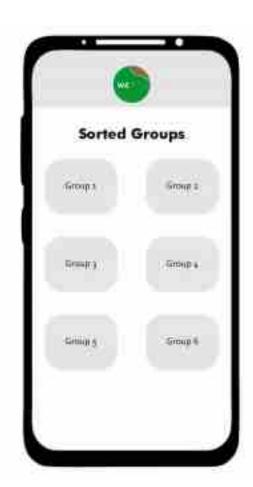
### **Intelligent Market Space**

- 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

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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

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.



#### Sustainable Agriculture

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



#### Reduced Environmental Impact

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



