FARMSMART: A DATA-DRIVEN SOLUTION TO REDUCE POST-HARVEST LOSSES IN NIGERIA

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INTRODUCTION

- Post-harvest loss(PHL) remains a major challenge in Nigeria's agricultural sector, with up to 40% loss annually due to inadequate storage and inefficient logistics, particularly in states with high production capacities.
- This issue discourages youth from engaging in agriculture, limiting productivity and food security.
- Our project, FARMSMART, leverages data analytics and simple digital tools to predict, prevent, and reduce post-harvest losses.
- We analyzed crop loss data to identify high-risk regions, crops, and seasons.
- Using Excel and Pixellab, we developed a prototype mobile app simulation to assist farmers and stakeholders in making informed decisions.
- FARMSMART empowers young agri-preneurs and stakeholders to proactively reduce waste, increase profitability, and stimulate youth-led agri-businesses in Nigeria.

PROBLEM STATEMENT

- Nigeria experiences 30%-50% post-harvest losses due to poor storage and logistics, costing the economy $9 billion annually. The FMARD highlights that this waste discourages young people from engaging in agriculture. (FMARD, 2022)
- These losses occur due to inadequate storage and inefficient logistics, particularly in states with high production capacities.

OBJECTIVES

- To identify and visualize areas and crops with high risk for post-harvest losses in Nigeria.
- To understand how different factors like transport type, storage method and, spoilage contribute to losses.
- To propose a digital solution that can help farmers and stakeholders reduce post-harvest loss and improve profits.

DATA STRATEGY

- **Data Source**:
  - A mock dataset was generated to reflect what actual post-harvest loss might look like, drawing insights from research works and agricultural sites.
  - The data included various crop types, regions, storage and transport methods, and potential spoilage reasons.
- **Data Cleaning**:
  - Handled missing values by deleting and inputting where necessary.
  - Removed duplicates.
- **Tools Used**:
  - Microsoft Excel to clean, analyze, and visualize the data.
  - Pixellab for mobile app mockup.

DATA STRATEGY CONT.D

- Key features in our dataset includes:
- **Crops**: Cassava, Maize, Onion, Pepper, Tomato, Yam.
- **States**: Oyo, Benue, Kaduna, Enugu, Kano, etc.
- **Spoilage Reason**: Delay, Heat, Humidity, and Mechanical damage.
- **Transport**: Motorcycle, truck and cart.
- **Storage**: Open-air, cold storage, and silos.

The data covered a two-month period March and April to observe short- term trends.

DATA ANALYSIS & INSIGHTS

- The total post-harvest loss recorded was approximately 51,355.2kg.
- Maize (22.6%), Tomatoes (21.97%) and Onions (17.37%) experienced the highest losses.
- Oyo, Benue, and Plateau topped the list of states with the highest recorded losses. This could be linked to poor storage facilities or transport challenges to those regions.
- Transport contributed heavily to post-harvest loss with trucks accounting for **49%.**
- Among the storage methods, open-air storage caused over **37%** of the total loss, pointing to the need for better alternatives like cold storage.
- Our analysis also showed that maize and tomato losses were higher in April than in March. This could be due to rising temperatures or increased market delays as harvest.

VISUALIZATION

- Bar charts, column charts and pie-charts were included to show the loss distribution by crop-type, transport, storage, spoilage reason and state.
- The highest losses by crop-type was found to be maize, with Oyo recording the highest total losses across the states.

PROPOSED SOLUTION

- **Concept Name:** FARMSMART
- **What It Does:**
  - Uses real-time and historical data to map high-risk areas.
  - Offers smart alerts and recommendations based on crop and season.
  - Provides a planning tool for logistics, storage, and market timing.
- **Components:**
  - Excel-based dashboard with interactive filters for crop, state, and season.
  - Mobile app mockup (Pixellab) with key features such as notifications and educational tips.
- **Bonus Features:**
  - Farmer education module with tips on reducing post-harvest loss.
  - Linkage suggestions to cold storage providers and transporters.

PROTOTYPE DEMO

- Link to Mobile App prototype
- https://www.figma.com/proto/QG7PQAZee0hH7sXVmM1F2G/Untitled?node-id=1-17&p=f&t=YRZwN4RgM5s4cYBQ-1&scaling=scale-down&content-scaling=fixed&page-id=0%3A1&starting-point-node-id=1%3A13

CONCLUSION

- From our analysis, its clear that post-harvest losses are driven by poor infrastructure, inefficient logistics, and exposure to spoilage conditions.
- Crops like maize and tomatoes are particularly vulnerable, and states like Oyo and Benue are heavily affected.
- While our data was simulated, the trends we observed align with what we've seen documented by agricultural bodies.
- Tackling post-harvest loss requires a coordinated effort to improve storage, transport and handling process.