A Report on Uganda's Karamoja District

NOTE: ***THE PROJECT WAS WHOLLY DONE BY THE GROUP EVERYONE LISTED PARTICIPATED IN THE WORK. EVERY SECTION WAS DISCUSSED AS A GROUP WITH EACH HAVING A PART IN IT.***

INTRODUCTION

This report presents an overview of maize and sorghum farming in the Karamoja region, drawing upon data collected during the first crop season. The analysis forms part of an initiative commissioned by [insert NGO name], in collaboration with the Data-Driven Innovations (DDI) team, to better understand food security dynamics in one of Uganda's most vulnerable regions.

The investigation was made possible through the participation of local farming communities across multiple subcounties in Karamoja, whose agricultural practices, yields, and production data form the basis of this study. Their contributions were complemented by insights and support from:

1. David Ndung'u
2. Ivy Muchangi
3. Marcus Kaula
4. Winfred Mwangi
5. Steve Mburu

These participants were essential in providing a clear picture of how staple crops such as maize and sorghum sustain household livelihoods and shape local economies.

This work was deemed necessary because Karamoja faces persistent challenges of food insecurity, driven by erratic rainfall, land degradation, limited access to improved inputs, and post-harvest losses. Understanding how maize and sorghum contribute to food security is critical in designing strategies that strengthen resilience and ensure sustainable food supplies.

The present report is not only an assessment of current crop performance but also serves as a foundation for future monitoring efforts. The Agri-tech team has requested the development of an interactive visualization tool for the results of this first crop season. This tool will serve as a mockup of the Food Security Monitoring system that DDI will develop for the NGO. The mockup will demonstrate how food security data can be visualized, explored, and communicated effectively to stakeholders, thereby enabling data-driven decision-making at community, regional, and policy levels.

TERMS OF REFERENCE

SOFTWARES/PROGRAMMES USED:

- google colab - Used for primary understanding of the data and analysis.
- Canva - Used in the creation of the presentation document
- Canva -Used in creation of text document(Report)
- Tableau - Used in the creation of basic and complex visualizations.

IMAGES SOURCE

- All images used in the notebook we obtained online and other generated by Canva AI

DATA SOURCE

- Data used for analysis was obtained from dataset with karamoja district and karamoja subcounty data

PROCEDURE

To get the full understanding of the data we were working with, analysis of dataset had to be done. The following processes were followed:

Data Collection

- Crop yield and population data were obtained from the Uganda Karamoja Subcounty dataset.
- Additional context and challenges facing maize and sorghum farming were sourced from secondary literature and relevant online resources.

Data Cleaning and Preparation

- The dataset was reviewed to check for errors, missing values, and inconsistencies.
- The data was structured into usable formats for analysis, ensuring accuracy and reliability.

Data Analysis

- Quantitative analysis was carried out to establish crop yields, distribution across subcounties, and relative contribution of maize and sorghum.
- Economic and food security implications of production levels were assessed.

Validation and Interpretation

- Findings from the data analysis and visualization were interpreted to identify key challenges, trends, and opportunities in maize and sorghum farming.
- Stakeholders were engaged to validate the results and provide feedback.

Reporting and Recommendations

- A comprehensive report was drafted to present the findings, conclusions, and recommendations for strengthening food security monitoring.
- The report also provides actionable advice on farming practices, innovations, and future trends.

BACKGROUND

Karamoja is a region in Uganda . It covers an area of 27,528Km and comprises of ten districts. The region is projected to have a population of 1.4 million people. Karamoja has a semi-arid climate characterized by a single rainy season from approximately March to November, with rainfall peaking in the month of April and May. Maize and Sorghum grow in Karamoja with sorghum being the more widely cultivated staple crop, though both face challenges due to short, erratic rains and food security risks. Land suitability varies, with some areas being moderate to highly suitable for maize and sorghum, but productivity is low due to limited technology and poor market access.

OBJECTIVES

The main objectives of this task are:

- To create a functional prototype dashboard within 3 working days.
- To integrate spatial and analytical visualization elements to support decision-making.
- To ensure that the mockup reflects the client's minimum expectations, namely:
  - Inclusion of an **interactive map**.
  - Ability to visualize results at both the **district** and **sub-county** administrative levels.

FINDINGS

1. **Crop Dominance**

- **Sorghum is the dominant crop** in Karamoja. It occupies much larger areas (thousands of hectares) compared to maize (hundreds of hectares).
- This confirms sorghum's central role in local food security.

2. **Productivity Differences**

- This means maize is more productive on smaller plots, but less widely planted.

3. **Total Production Contribution**

- Despite lower yields, sorghum's **massive cultivated area** results in much higher total production (millions of kilograms per subcounty).
- Maize contributes less in volume, but has high potential value per hectare.

4. **Geographical Patterns**

- Areas with higher populations tend to have larger crop areas for both maize and sorghum.
- Farming intensity is strongly tied to household food needs and labor availability.

5. **Economic Importance**

- **Sorghum provides greater overall economic value** to communities due to its scale, demand (households, breweries, aid), and drought resilience.
- **Maize is important for market integration**, especially in cross-border trade and local markets.

6. **Food Security Implications**

- **Sorghum ensures household stability** by being reliable in semi-arid conditions.
- **Maize adds dietary diversity and cash income**, but is more vulnerable to climate stress and pests.

CONCLUSIONS

1. **Sorghum is the dominant crop**

The dataset shows that sorghum occupies **far larger cultivated areas (thousands of hectares)** compared to maize (mostly in the hundreds). This confirms that sorghum is the backbone of food production in Karamoja.

2. **Maize has higher yields per hectare**

Even though sorghum covers more land, the average maize yield per hectare is **2–3 times higher** (around 850–1,200 kg/ha for maize vs 280–370 kg/ha for sorghum). This means maize is more productive on small plots, but less widespread.

3. **Sorghum contributes more to total production**

Because of its vast cultivated area, sorghum's **total production runs into millions of kilograms per subcounty**, far surpassing maize. This makes it the key cereal for both household consumption and market trade.

4. **Crop distribution follows population patterns**

Subcounty with higher populations tend to have larger areas of both sorghum and maize, showing that farming is strongly tied to household food needs and labor availability.

5. **Food security relies more on sorghum than maize**

The combination of **larger area, higher total output, and drought resilience** makes sorghum the **main food security crop**, while maize plays a complementary role, adding dietary diversity and cash income where water availability is better.

RECOMMENDATIONS

1. **Prioritise Sorghum as the Food Security Crop**

- Sorghum should remain the backbone of household food supply since it covers the most land and contributes the highest total production.
- NGOs should support improved sorghum seed access, community seed banks, and farmer training on Striga-resistant and drought-tolerant varieties.

2. **Promote Maize in High-Potential Areas**

- Since maize has higher yields per hectare, NGOs can target irrigation schemes and relatively wetter subcounty for maize expansion.
- Also it will diversify diets and improve market opportunities for farmers where water stress is lower.

3. **Invest in Soil and Water Conservation**

- Promote simple techniques like mulching, contour farming, and zai pits to improve water retention and soil fertility.
- Educate the farmers on the importance of drip farming which helps in saving water and also feeding the crop with water fully without waste.

4. **Support Post-Harvest Management and Storage**

- Provide hermetic storage bags and community silos to reduce losses from pests and mold.
- Training farmers in proper drying and storage can increase household food reserves and prevent lean-season hunger.

5. **Develop Market Linkages and Value Addition**

- Facilitate farmer cooperatives to aggregate sorghum and maize for better bargaining power.
- Support small-scale processing (sorghum flour, porridge mixes, animal feed) to increase income opportunities.

6. **Leverage Data and Visualizations for Decision-Making**

- This will help NGOs', government, and local leaders track crop performance, identify vulnerable subcounty, and design targeted interventions.