Karamoja Food Security Analysis

File created on: 8/31/2025 2:00pm

Overview

Karamoja is the most food-insecure region of Uganda. Several NGOs provide technical support as well as farm inputs to the farmers experiencing extremely low yield. Dalberg Data Insights(DDI) has been requested to develop a new food security monitoring tool to support the decision making of one of the NGOs active in Karamoja region of Uganda.

Our goal was to develop an interactive visualization tool of the results for this first crop season. This visualization tool that we will develop will be used as a first mockup of the Food Security Monitoring tool that DDI will develop for the NGO.

Data and Analysis Methods

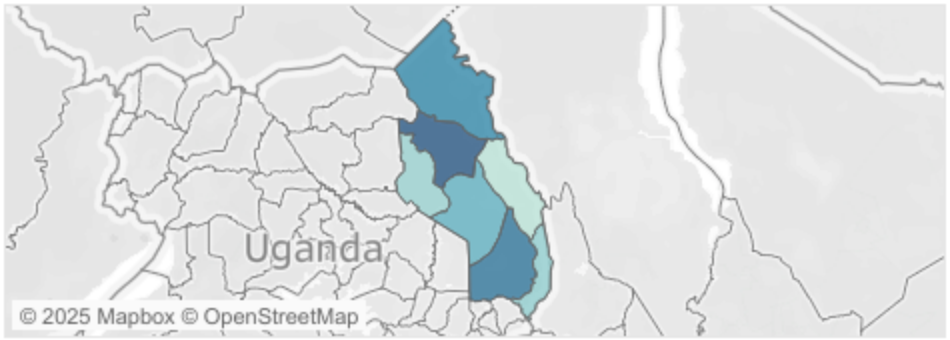
- Dalberg Data Insights provided us with different datasets to facilitate this project.
- A list of data files given for analysis:

1. Uganda_Karamoja_District_Crop_Yield_Population.csv
2. Uganda_Karamoja_Subcounty_Crop_Yield_Population.csv
3. Crop_Type_Map_Maize.shp
4. Crop_Type_Map_Maize.shp
5. Uganda_Districts.shp
6. Uganda_Districts.shp

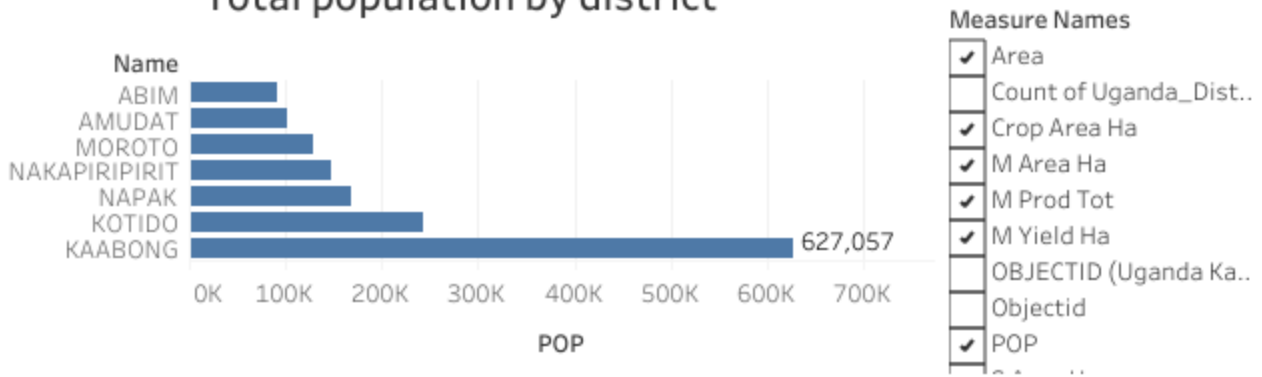
We performed data cleaning and preparation on a Jupyter notebook and proceeded to visualize the data on tableau. Our findings are shown below:

District Analysis

Map of Total Crop Production by District



Total population by district



District summary Table

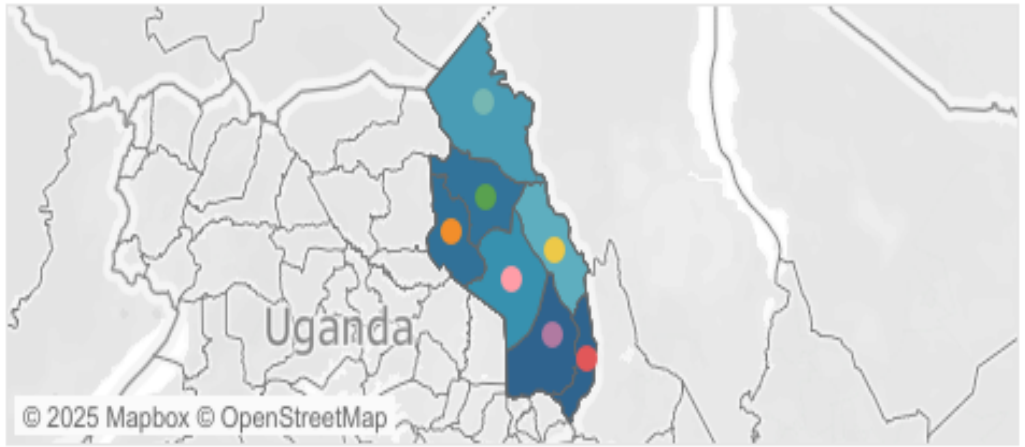
Name	Area	Crop Area Ha	M Area Ha	M Prod Tot	M Yield Ha	POP	S Area Ha	S Prod Tot	S Yield Ha
ABIM	2,771,977,106	5,470	1,849	1,922,567	1,040	90,385	3,277	1,471,506	449
AMUDAT	1,643,582,836	5,765	2,734	3,545,558	1,297	101,790	2,973	609,552	205
KAABONG	7,373,606,003	28,122	7,394	6,987,723	945	627,057	20,544	5,731,830	279
KOTIDO	3,641,539,808	53,033	1,751	2,010,575	1,148	243,157	50,247	16,631,904	331
MOROTO	3,570,160,948	5,955	1,190	422,468	355	127,811	4,742	606,944	128
NAKAPIRIPIRIT	4,216,323,900	26,373	6,426	8,122,197	1,264	146,780	19,237	6,848,491	356
NAPAK	4,508,782,023	22,944	6,544	5,588,336	854	167,625	16,142	2,211,456	137

Subcounty Analysis

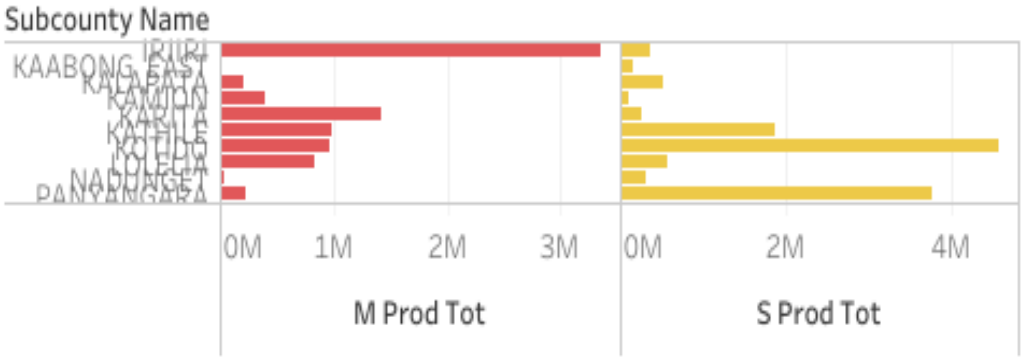
M Yield Ha
0 1,397

Measure Names
POP
Total Crop Yield

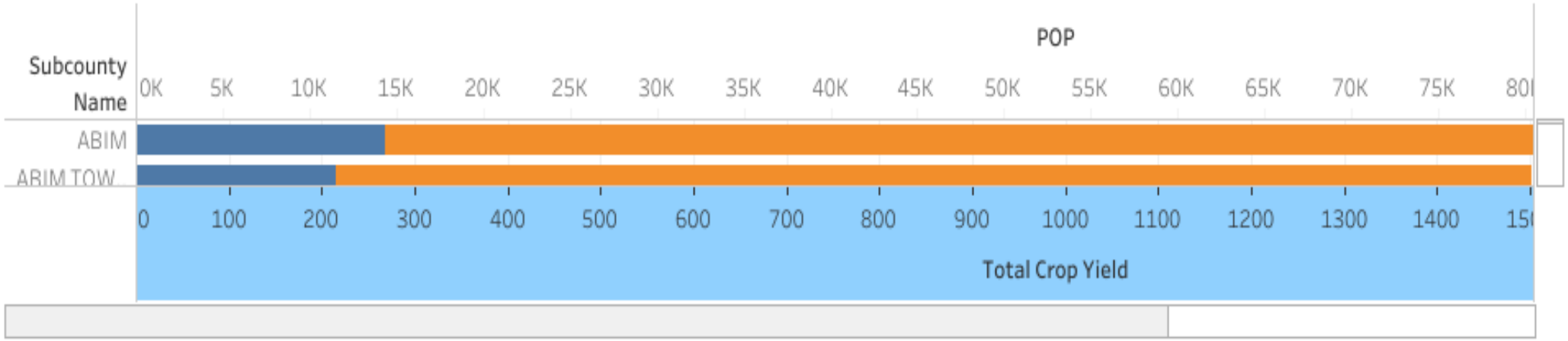
Map of Crop Yield by Subcounty



Total Sorghum and Maize Production in top 10 most populated Subcounties

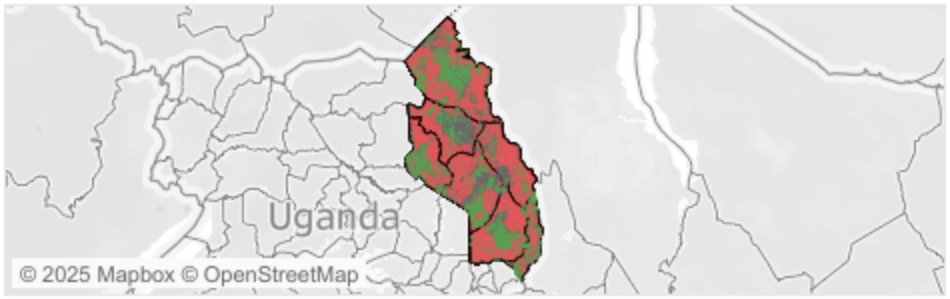


Comparison of Population of Each Subcounty by Total Crop Yield

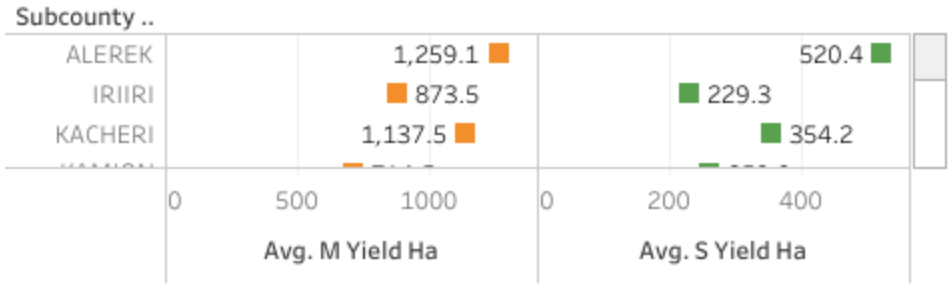


Crop Analysis

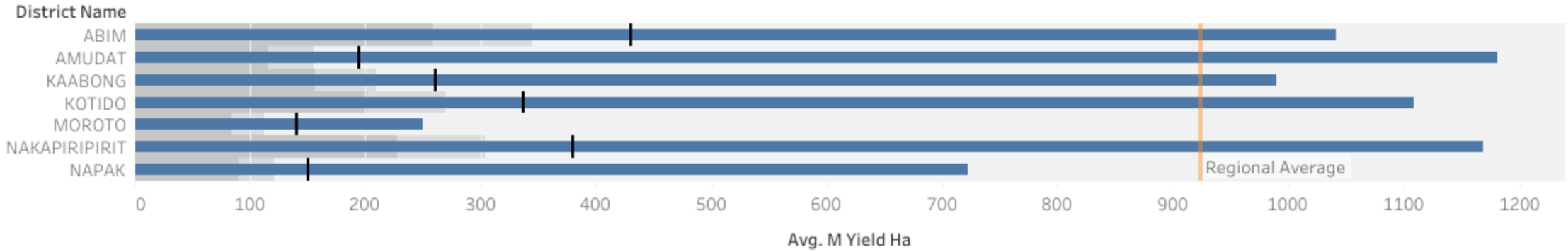
Map of Cultivation Areas in Subcounties



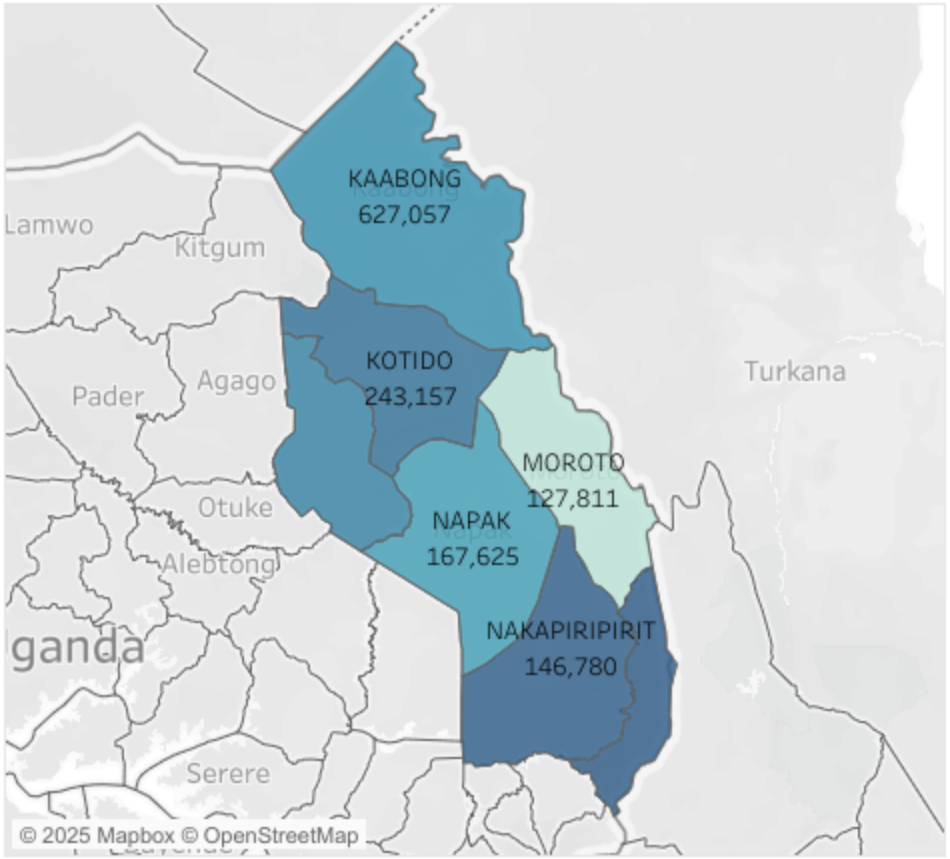
Average Crop Yield by Subcounty



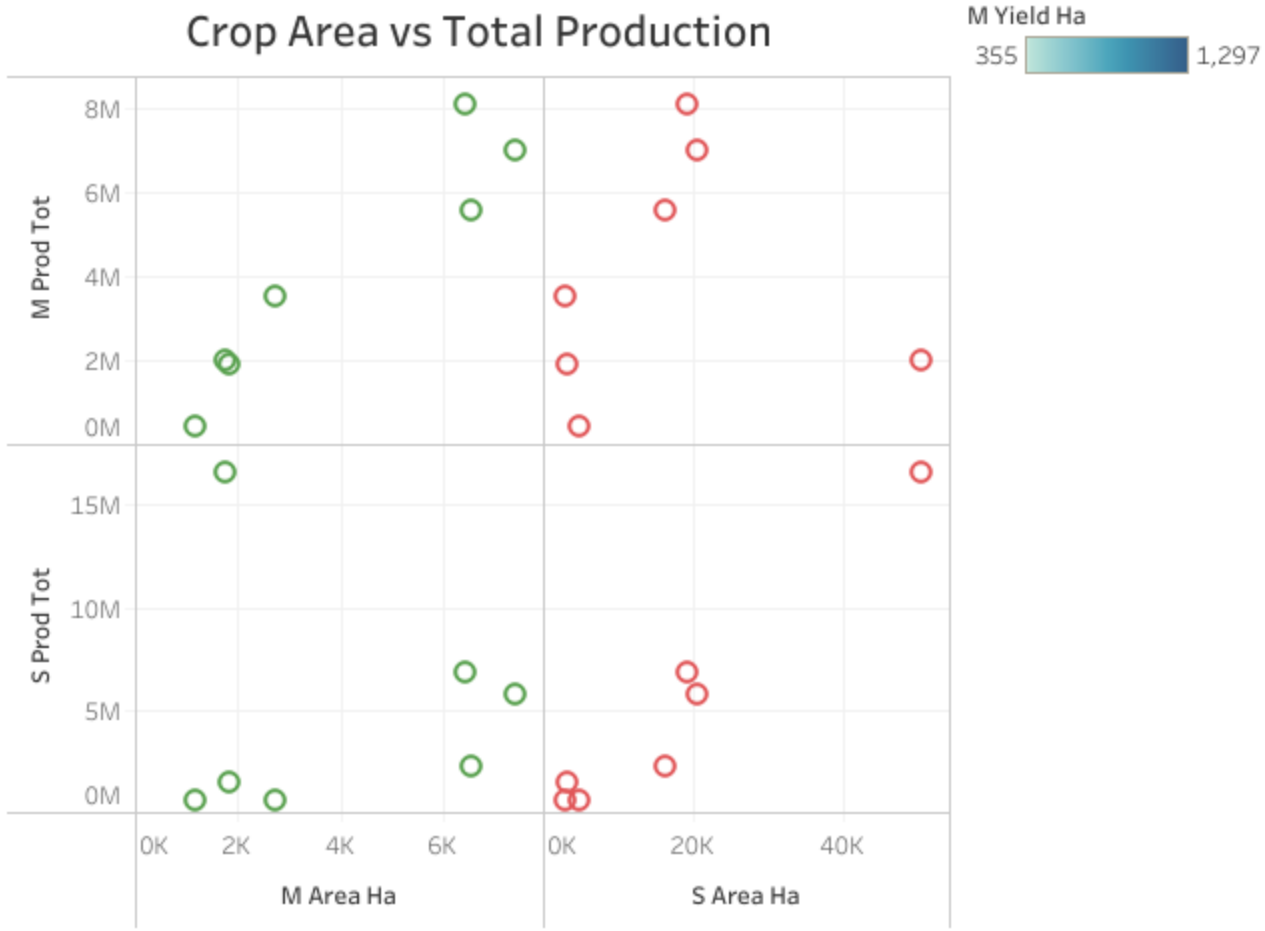
Average yield vs Regional Average



Map of Population vs Maize Yield per District



Crop Area vs Total Production



Conclusion

- District Analysis: The map provides a high level overview of total crop productivity across Karamoja districts. The color intensity shows total sorghum and maize production, helping us identify the most productive areas at a glance. These areas are Kotido, Nakarapiripirit and Kaabong districts.

- Sub county Analysis: The bar graphs show the relationship between individual crop production, total crop yield and population. We can conclude that the majority of the sub counties have a population higher than their crop yield or production with the exception of Nakarapiripirit Town Council.

- Crop Analysis: The map visualizes the cultivated areas, for both maize and sorghum, revealing which crop is the more dominant in specific sub counties of Karamoja.

- The map of population vs maize yield per district: It shows high populations in the districts and low maize yields. These areas are prone to facing significant food deficits and should be prioritized for food aid, agricultural support programs and market interventions.

RECOMMENDATIONS

- DDI should work on gaining access to more data sources for further analysis . This is because there are numerous other factors not displayed in the data like weather changes and market prices that may affect crop production in certain areas.

- Establish a Food Security Hotspot Index: This index could combine metrics like crop yield per capita, population density, and past food aid data to create a ranked list of the most vulnerable sub counties. This would provide a clear, data-driven way to prioritize resources.

- Implement a localized agricultural support program: Recommend tailored agricultural interventions such as drought resistant maize seeds, soil health maintenance, or introducing small scale irrigation techniques, to the specific needs of each sub county based on the crop dominance.

Future Work and Next Steps

- Incorporate New Data Sources: Expand the analysis by including important aspects such as:

1. Market price data for staple crops to track food affordability and accessibility.
2. Live weather data such as rainfall and temperature, used to predict drought risk.
3. Health data within the region, to identify vulnerable populations for proper planning and better resource allocation.

- Enable predictive modeling: Use data provided to predict food security crises before they happen. This allows for ample time to put measures in place so as to minimize the effects of the crises.

- Analyzing additional staple crops will provide a broader view of agricultural production and a more accurate analysis of the condition of the habitants of Karamoja Region.

Contributors

Group 10

- Shirley Muiruri
- Ashley Simiyu
- Kyle Ongera
- Rodney Onsongo
- James Kongere

Github Link

https://github.com/shirley-muiruri/Karamoja-Crop-Yield-Analysis-.git

THANK YOU!