MAUREEN CO.

Utabiri Agro

Stabilizing Kenya's Agricultural Economy through Predictive Analytics

Predictive Market Intelligence for Kenyan Farmers & Traders

BUSINESS OVERVIEW

Price Volatility

Kenya's agricultural sector remains constrained by significant price volatility that erodes farmer income predictability.

Fragmented Markets

Market coordination gaps and limited real-time intelligence weaken value chain performance across regions.

Our Solution

An integrated predictive market insights platform that enhances transparency and enables data-driven decisions.

PROBLEM STATEMENT

Kenya's agricultural markets are highly volatile, with prices varying significantly by region and season.

- Seasonal production swings drive price instability
- Shifting demand & supply imbalances by region
- Rising social media influence on market sentiment

📉 *Result: Stakeholders struggle with pricing, distribution, and market timing — limiting profitability and efficiency.*

RESEARCH OBJECTIVES

01 How does price volatility differ across agricultural commodities, regions, and time periods in Kenya?

02 What key determinants—seasonality, market demand, supply variations—drive observed price fluctuations?

03 To what extent can predictive modeling techniques accurately forecast future commodity prices?

04 How does forecasting performance vary across commodities, regions, and market conditions?

DATA UNDERSTANDING

57,010

Structured Market Observations

Data Source

Kenya Agricultural Market Information System (KAMIS)
Developed by the Ministry of Agriculture, Livestock, Fisheries, and Cooperatives

- Maize
- Rice
- Beans
- Beef
- Wheat
- Potato

EXPLORATORY DATA ANALYSIS

We explored commodity supply, prices, and profitability across counties and products.

Supply Concentration

Highly concentrated in a few counties, creating systemic dependency risks across the value chain.

Uneven Profitability

Profitability varies widely across commodities. High price does NOT always mean high profit margin.

Seasonal Patterns

Price trends show clear seasonal patterns for key commodities, directly informing forecast models.

TOP COMMODITIES — PROFIT MARGINS

46.9%

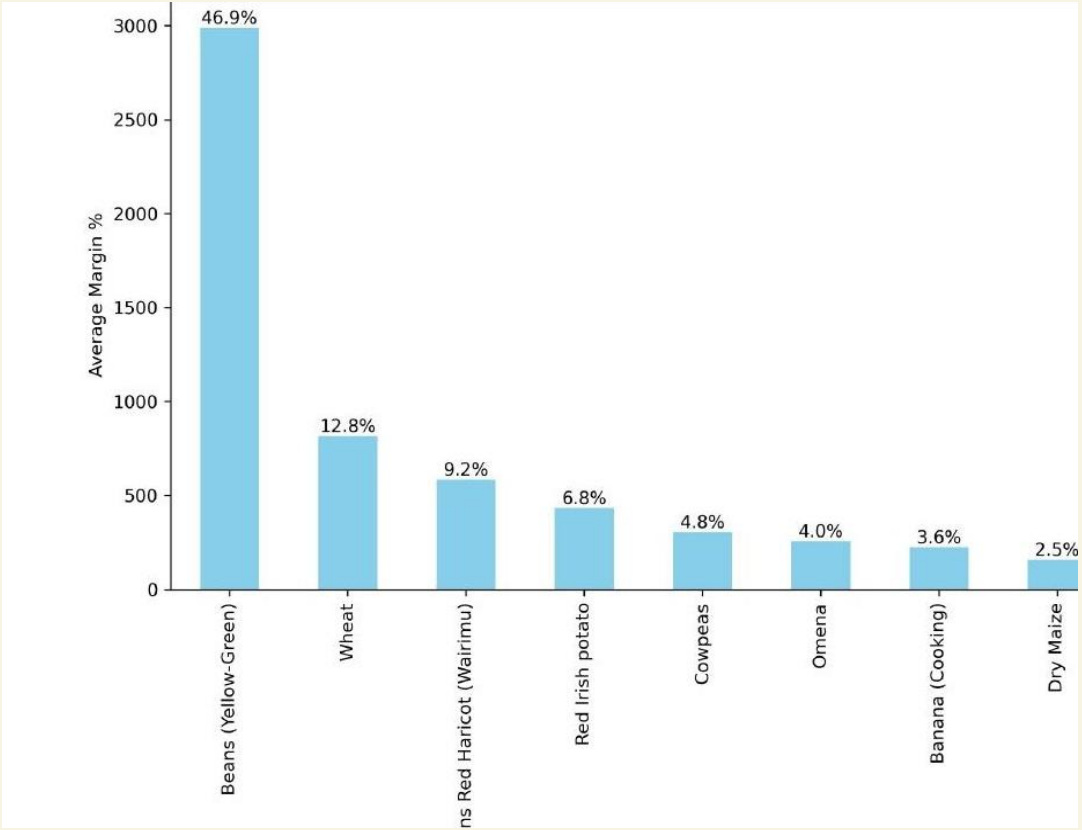
margin

Beans (Yellow-Green) leads all commodities with the highest profit margin.

Other commodities are significantly lower.

⚠ High price ≠ High profit

Profitability is uneven across the commodity landscape.



SUPPLY VOLUME ANALYSIS — BY COUNTY

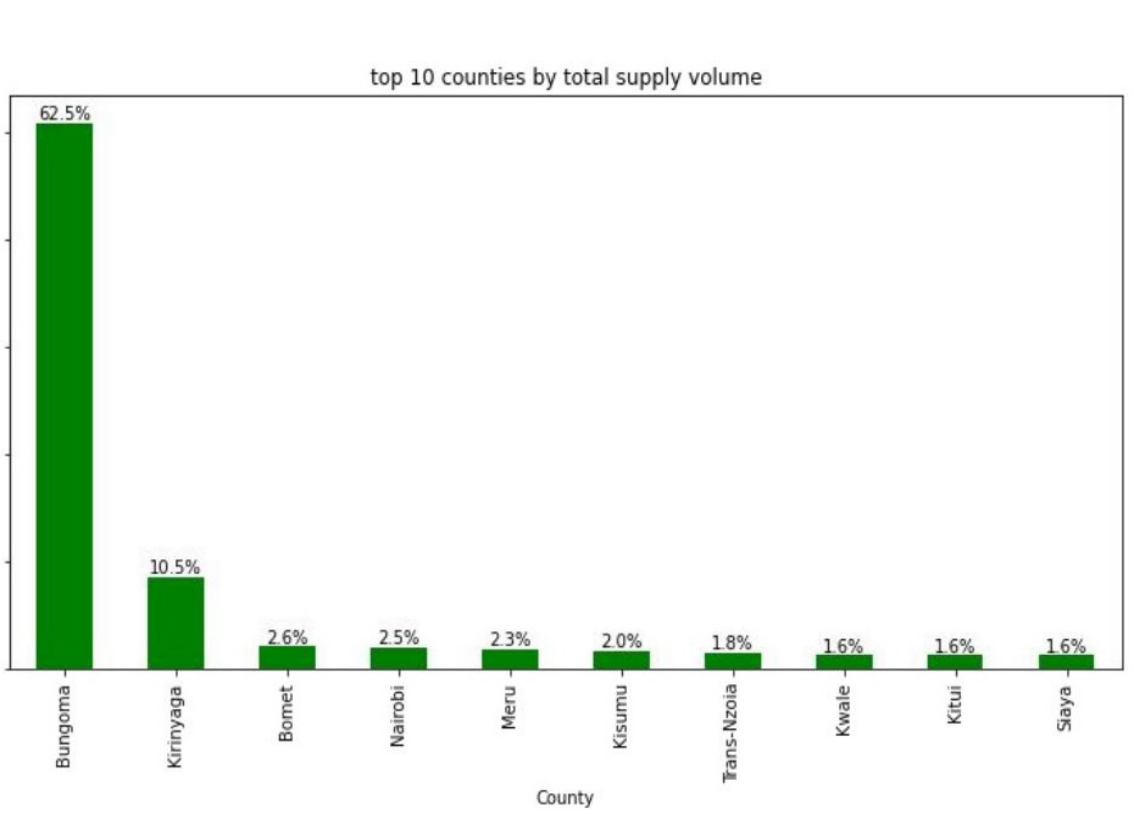
62.5%

Bungoma

Bungoma dominates supply volume — contributing 62.5% of total output.

Other counties contribute very little individually.

⚠ **SYSTEMIC RISK**
Dependency on one county is dangerous.

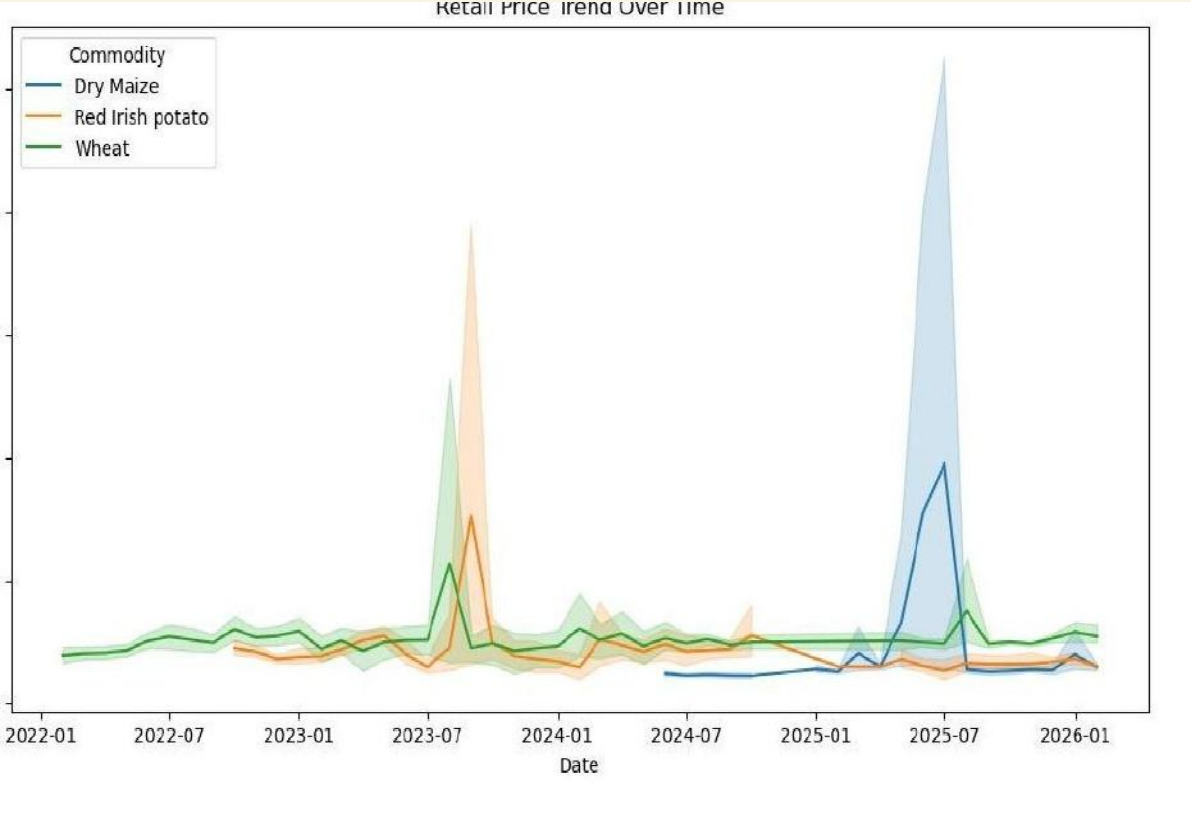


RETAIL PRICE TRENDS OVER TIME

Key Observations

- Prices generally stable 2022 – early 2024
- Sharp spike: Dry Maize in mid-2025
- Sharp spike: Red Irish Potato in late 2023

Commodities: Dry Maize · Red Irish Potato · Wheat
2022 – 2026 time series



CONCLUSION

Forecastable Commodities

Several staple commodities are already forecastable at commercially useful accuracy, enabling immediate deployment of pricing tools.

Volatile Markets Need Hybrids

More volatile commodities reflect genuine market complexity—driven by supply shocks, informal flows, and sentiment—requiring hybrid forecasting.

Supply Concentration Risk

Extreme supply concentration in Bungoma-Chwele exposes a systemic risk, elevating supply diversification to a policy-level priority.

RECOMMENDATIONS — DEPLOYMENT

01

Launch XGBoost Forecasts

Deploy via mobile web app for real-time price predictions accessible by farmers & traders.

02

Rolling 6-Month Forecasts

Updated monthly to ensure forecasts remain current and actionable across market cycles.

03

Pilot Counties

Trans-Nzoia, Kirinyaga, and Nairobi selected as initial deployment regions for maximum impact.

04

Monthly Retraining

Performance monitoring and model retraining to maintain accuracy as market conditions evolve.

05

Fix Data Gaps

Address missing data to improve forecast reliability across all commodity categories.

06

Volatility Risk Index

Add VRI for Omena, Finger Millet, and Red Haricot Beans — the most volatile commodities.

POLICY & GOVERNANCE

01

Ministry Engagement

Present quantitative risk findings to the Ministry of Agriculture and Livestock Development for evidence-based policymaking.

02

Supply Diversification

Drive active policies to redistribute and diversify agricultural supply across more counties, reducing Bungoma dependency risk.

03

Governance Committee

Form a Market Intelligence Governance Committee to oversee data quality, model performance, and stakeholder coordination.

QUESTIONS?

THANK YOU

Maureen Co.