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**Spatiotemporal Analysis of Commodity
Price Dynamics Across Kenyan Counties:
Influencing Factors and Economic
Implications**

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"Leveraging data to unveil patterns and inform strategic decision-making."

Acknowledgment

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A Beautiful Mind

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1 INTRODUCTION

An in-depth understanding of commodity price dynamics is paramount for addressing economic inequalities and ensuring the resilience of market systems. This report offers a rigorous analysis of commodity price fluctuations across Kenyan counties, utilizing extensive historical data to discern emerging trends and patterns. Through the exploration of regional disparities, market structures, and temporal shifts, this study aims to provide valuable insights that can guide evidence-based policymaking, optimize market operations, and promote sustainable economic development throughout Kenya.

1.1 Research Question

How do the prices of various commodities, categorized by region, market type, and temporal factors, evolve over time, and what are the underlying determinants influencing these price fluctuations across different Kenyan counties?

1.2 Purpose and Scope

This study seeks to:

- Undertake a comprehensive analysis of the temporal fluctuations in commodity prices across diverse regions, encompassing both administrative subdivisions (Regions and Counties) and market classifications.
- Examine and elucidate regional price disparities, identifying the critical factors such as market conditions, currency exchange rates, and commodity-specific attributes that drive these variations.
- Generate actionable, evidence-based insights to inform the strategic decision-making processes of policymakers, industry stakeholders, and market participants, with the ultimate goal of enhancing market efficiency and fostering sustainable economic development.

1.3 Dataset Description

The dataset constitutes a comprehensive collection of variables that facilitate an in-depth analysis of commodity price dynamics across Kenyan counties. It encompasses:

- A rigorous spatiotemporal examination of commodity prices, disaggregated by regional identifiers (Regions and Counties), market categories (e.g., rural versus urban), and geographic coordinates (latitude and longitude), providing a nuanced understanding of price variability across different locales.
- A classification of market types and their influence on price disparities, accounting for factors such as pricing categories (e.g., retail, wholesale) and the role of market positioning in shaping price fluctuations.
- A longitudinal analysis of historical price trends for a diverse range of commodities, allowing for the identification of temporal price patterns and fluctuations over time in noted areas.
- A detailed exploration of pricing mechanisms through key variables, including price flags, price types, and currency considerations, offering insights into the sources of price variation and enabling cross-market comparisons.
- The conversion of local pricing data into standardized USD values (usdprice and usdvalue), facilitating meaningful cross-border and inter-market price comparisons, thereby enhancing the dataset's analytical utility.

2 ROBUSTNESS AND STRATEGIC IMPORTANCE OF THE DATA

The robustness and integrity of the dataset are crucial in ensuring the accuracy and relevance of analytical outcomes. This section critically examines the strength of the data, emphasizing its systematic organization through regional delineations, commodity classifications, and market dynamics. A thorough understanding of these factors is essential for generating credible economic insights that can meaningfully inform both policy formulation and strategic decision-making.

The regional stratification of commodity prices, as defined by administrative divisions (Regions and Counties), enables a detailed exploration of geographic disparities in pricing across Kenya. This regional granularity, coupled with market categorizations (e.g., rural versus urban), provides critical context for identifying emerging trends and spatial variations in commodity pricing. Furthermore, the inclusion of temporal data (date) allows for the identification of longitudinal price patterns, facilitating a deeper understanding of seasonal and cyclical pricing dynamics.

By leveraging this multidimensional dataset, it becomes possible to generate actionable insights that can guide evidence-based policymaking, promote economic stability, and enhance food security. The detailed and comprehensive nature of the data—spanning commodity types, market structures, and regional economic conditions—enhances analytical capabilities, enabling the formulation of tailored strategies that address the unique challenges and opportunities within specific regional and commodity markets.

2.1 Observed Counties and Markets

This section provides an overview of the 22 counties observed in the analysis, which represent a diverse range of regions across Kenya. These counties, selected from a total of 47, capture various geographic and economic characteristics, offering valuable insights into regional market dynamics.

Geographical Distribution of Observed and Unobserved Counties

Highlighted counties (gold) indicate active monitoring

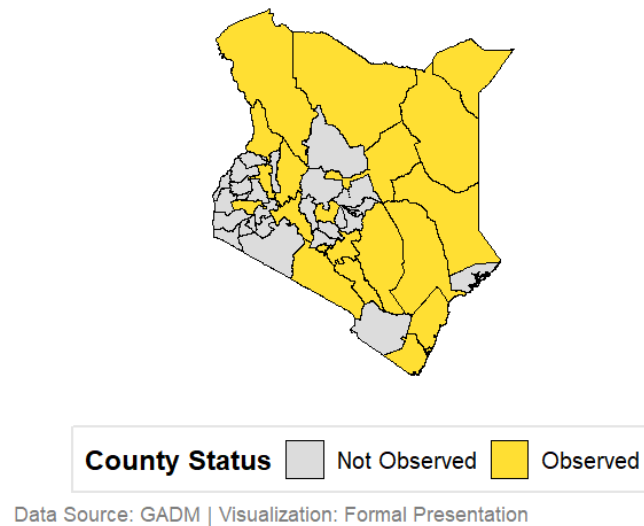
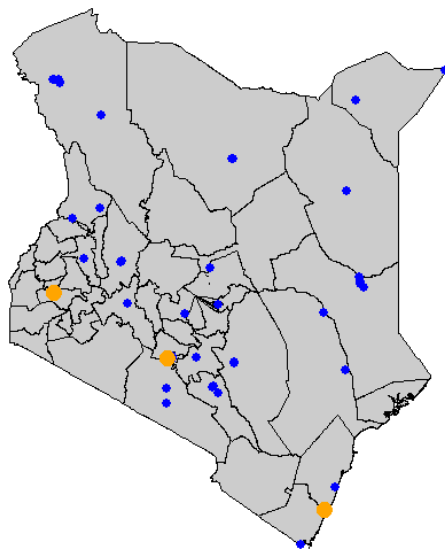


Figure 1: Map of Observed Counties

In addition to the county-level observations, this analysis highlights several key markets within these counties. It examines how both rural and urban market dynamics contribute to commodity price fluctuations across the country, providing a nuanced understanding of the factors that drive price variability.

Distribution of Markets and Major Cities Across Kenya

Markets: Blue, Major Cities: Orange



Source: GADM and Market Data

Figure 2: Markets Observed in the Analysis

These insights into market conditions—ranging from urban centers to rural hubs—are critical for understanding the broader economic patterns and challenges in Kenya’s commodity markets.

Current Population Distribution by County in Kenya

Darker colors indicate higher populations

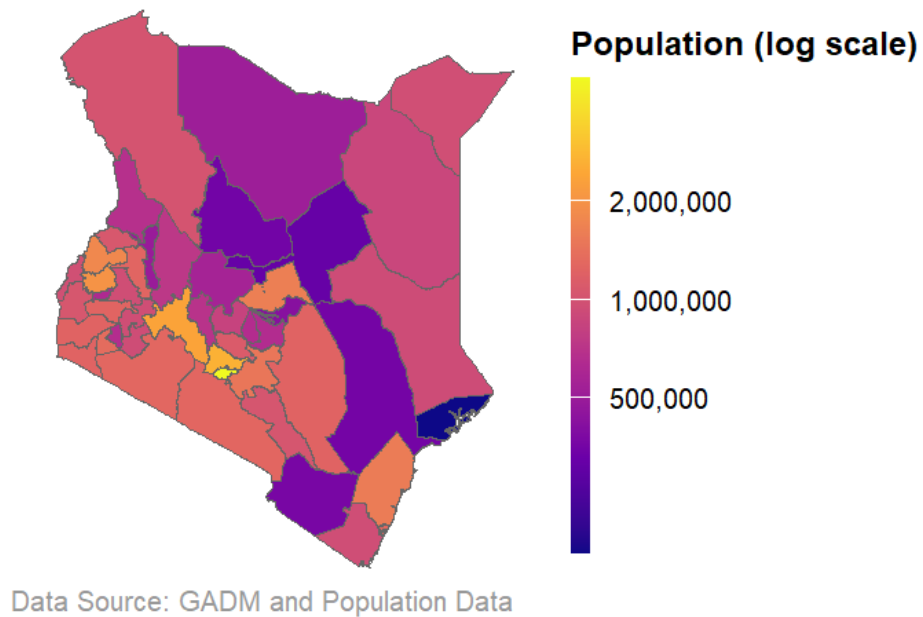


Figure 3: Current Population

- The majority of the unobserved counties exhibit average population levels, indicating that the dataset primarily focuses on more populous regions.
- However, the data has successfully captured a representative sample of both prominent towns and lesser-known areas, ensuring a broad geographic and economic scope.
- This balance suggests that the dataset is not biased, but rather provides a comprehensive representation of the country's commodity markets.
- The observed counties, in particular, exert considerable influence over the national economy, reflecting their significant role in shaping pricing trends and market behavior.
- This underscores the robustness and representativeness of the data, highlighting its capacity to offer valuable insights into Kenya's economic landscape.

2.2 Regions Growth Rate

Kenyan Regional Growth Rate (1999-2009)
Regions by Average Growth Rate

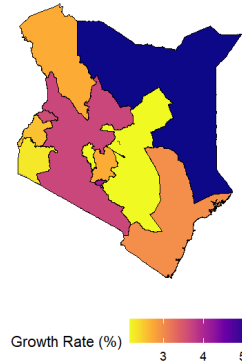


Figure 4: Kenyan Regional Growth Rate (1999-2009)

Kenyan Regional Growth Rate (2009-2019)
Regions by Average Growth Rate

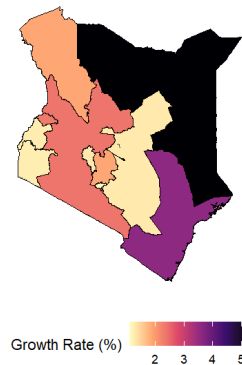


Figure 5: Kenyan Regional Growth Rate (2009-2019)

- The color balance across regions in the dataset appears to be consistently distributed, suggesting that these areas either play a significant role in influencing commodity prices or are themselves impacted by price fluctuations.
- This pattern underscores the potential correlation between regional population dynamics and commodity consumption, as population size directly affects demand—either increasing or decreasing it—thereby influencing price trends.
- Such consistency in the data further emphasizes the importance of these regions in shaping the broader economic landscape and commodity market behavior.

2.3 Regional Population Trend

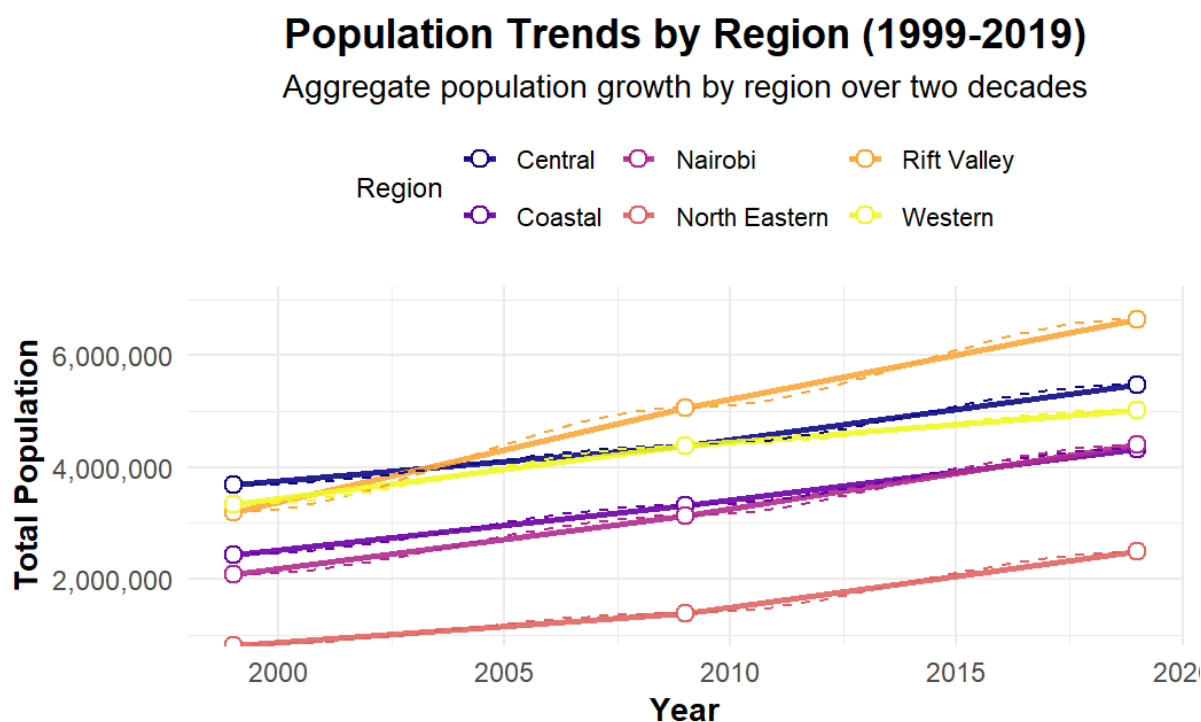


Figure 6: Regional Population Trend

- The regional trend analysis reveals that no single region outpaces the others, indicating that each area is growing at a consistent, independent pace, thereby reflecting a balanced economic development across the country.
- This pattern provides valuable insights that can be integrated into the analysis of commodity price fluctuations, enhancing our understanding of regional dynamics.
- Additionally, the data suggests that certain regions exhibit higher growth rates than others, pointing to potential variations in economic development.
- Further investigation will be crucial to determine whether these disparities are driven by commodity price distribution or other regional factors, offering a clearer understanding of the underlying causes of growth and price dynamics.

2.4 Counties Growth Rates

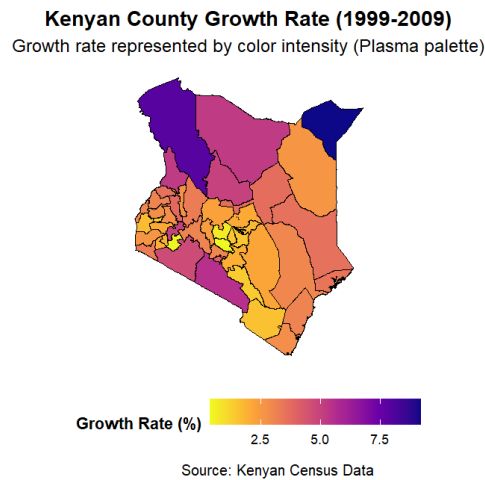


Figure 7: Kenyan Counties Growth Rate (1999-2009)

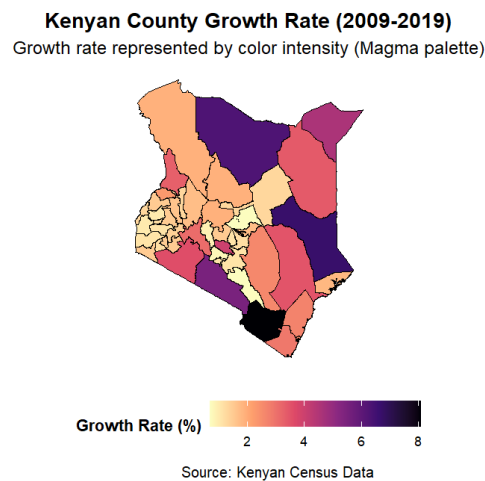


Figure 8: Kenyan Counties Growth Rate (2009-2019)

- The distribution patterns observed for regions mirror those of the counties, maintaining a consistent balance across both levels.
- This alignment reinforces the idea that the distribution is not arbitrary, but rather reflects underlying economic or demographic factors.
- With this consistency in place, further analysis is now needed to investigate the reasons behind this balance, providing deeper insights into the factors contributing to regional and county-level commodity price dynamics.

2.5 Top 10 Counties by Population Growth Rate

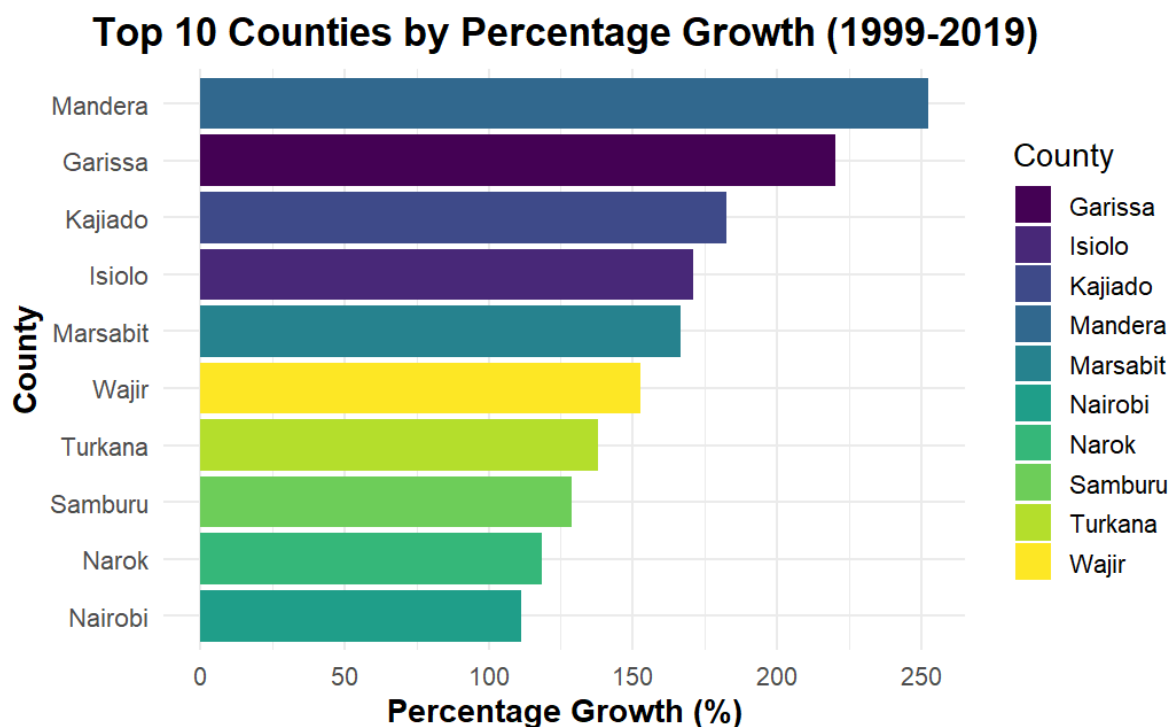


Figure 9: Top 10 Counties by Population Growth Rate

- Understanding counties with the highest and lowest population growth rates is crucial for analyzing their potential relationship with the price growth rates of various commodity categories.
- This analysis suggests that population growth significantly influences commodity prices, particularly in specific regions and for particular categories.
- If a clear relationship between population growth and price fluctuations is established, it would imply that controlling population growth could be an effective strategy for managing price stability.

2.6 Bottom 10 Counties by Population Growth Rate

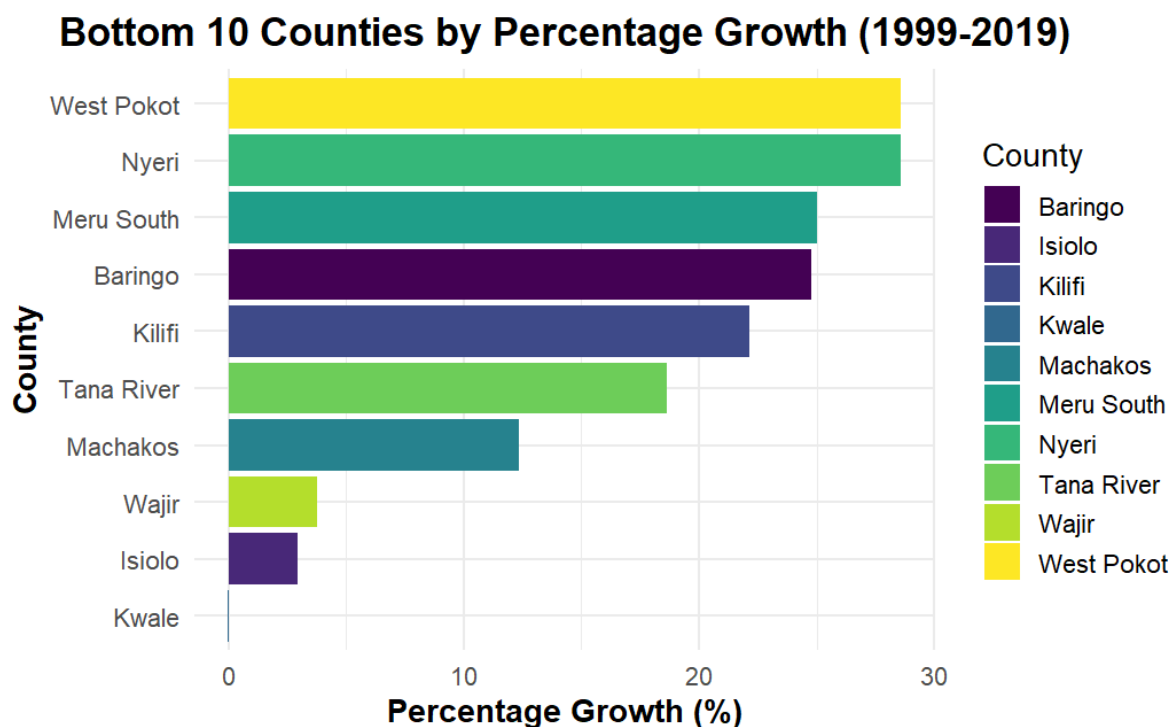
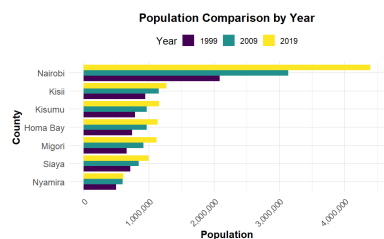
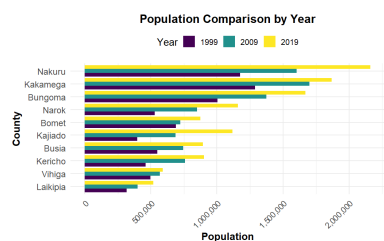
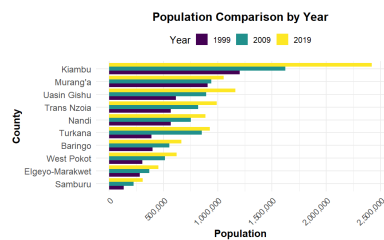
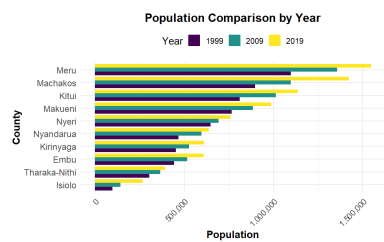
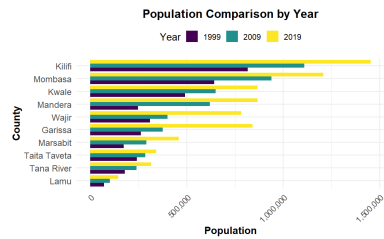


Figure 10: Bottom 10 Counties by Population Growth Rate

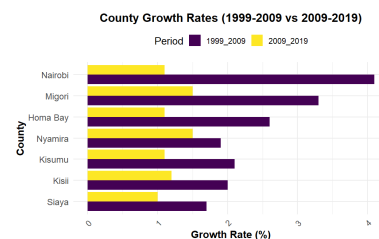
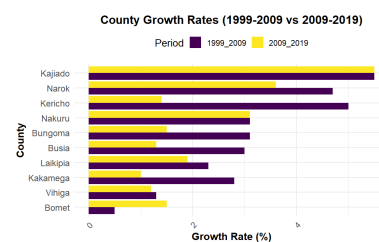
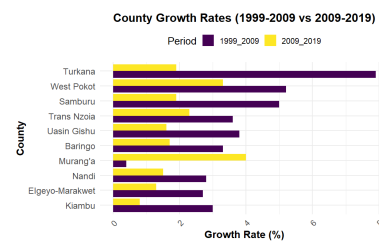
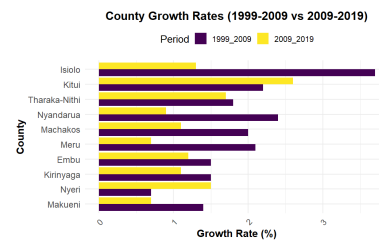
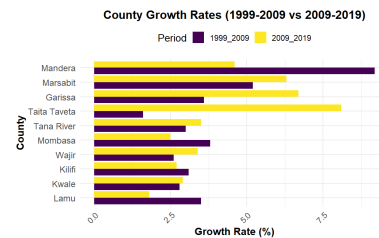
- Moreover, if such a pattern is observed over time, it could provide valuable insights for government agencies to anticipate future price trends and demand based on population projections.
- This information would be invaluable for investors and businesses, as it allows them to identify high-growth areas and commodities poised for investment.
- Additionally, it would aid in regulating the production and distribution of commodities across the country, as price and value growth rates may vary significantly by region, driven by population dynamics and regional preferences.

2.7 All Counties at a Glance

Population Comparison by Year



County Growth Rates (1999-2009 vs 2009-2019)



- At a preliminary glance, there appears to be a general decline in population across several counties.
- Further analysis is required to determine whether this demographic trend has any significant impact on the local economy, as such shifts may influence commodity prices in specific regions.
- Understanding the relationship between population changes and economic performance will be essential for assessing how these factors could affect pricing trends in certain areas.

2.8 Strength Index of Data

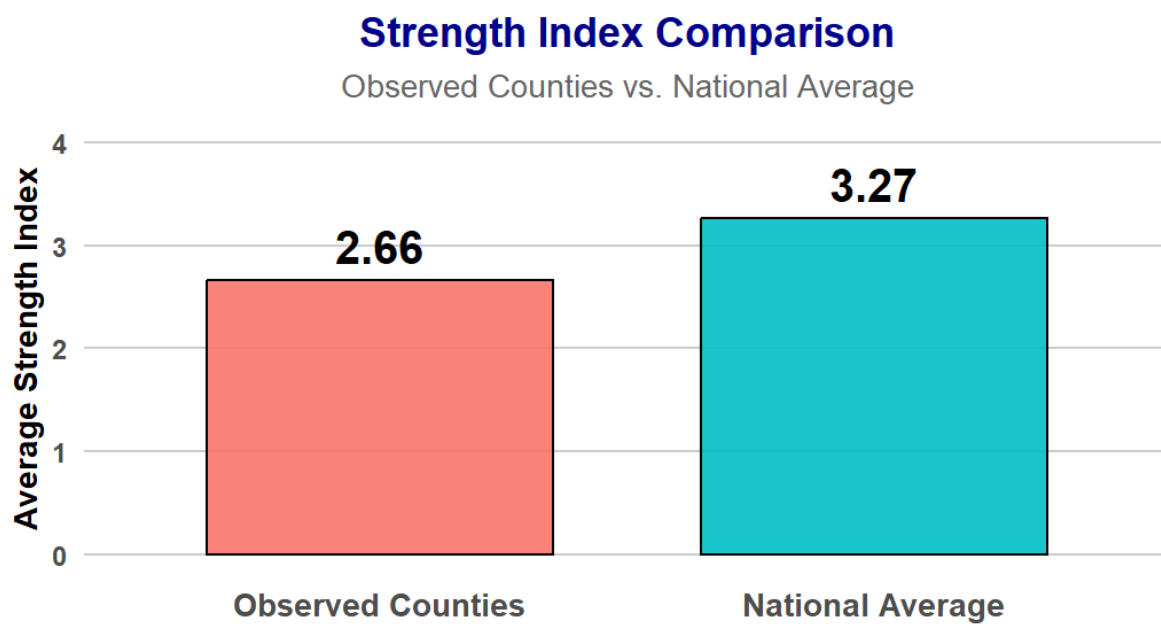


Figure 11: Strength Index Out of 10

- The counties perform at 81.3% of the national average, indicating significant room for improvement but also strength of observed counties.
- The disparity suggests potential under representation of economically strong areas or over representation of low-population regions.
- Despite the gap, the observed counties hold notable economic influence (81.3%) , reflecting their importance in national metrics.

2.9 Analysis of Weighted Growth Rates and Observed Counties

2.9.1 Key

Findings

- **Population Representation:** Observed markets account for 27.57% of the total population, contributing 28.43% to the overall weighted growth rate, highlighting proportional alignment.
- **Weighted Growth Rates:** Observed markets exhibit a lower weighted growth rate (0.69%) compared to non-observed markets (2.44%), indicating slower growth dynamics.
- **Variance in Growth Rates:** Observed markets display a higher variance (2.03) compared to the overall dataset (1.86), suggesting regional growth heterogeneity.
- **Bootstrap Confidence Interval:** The 95% BCa interval for weighted growth (1.495%, 3.084%) confirms reliability of any insights that will be drawn from our study, but instability warnings require further validation.

2.10 Growth

Weight

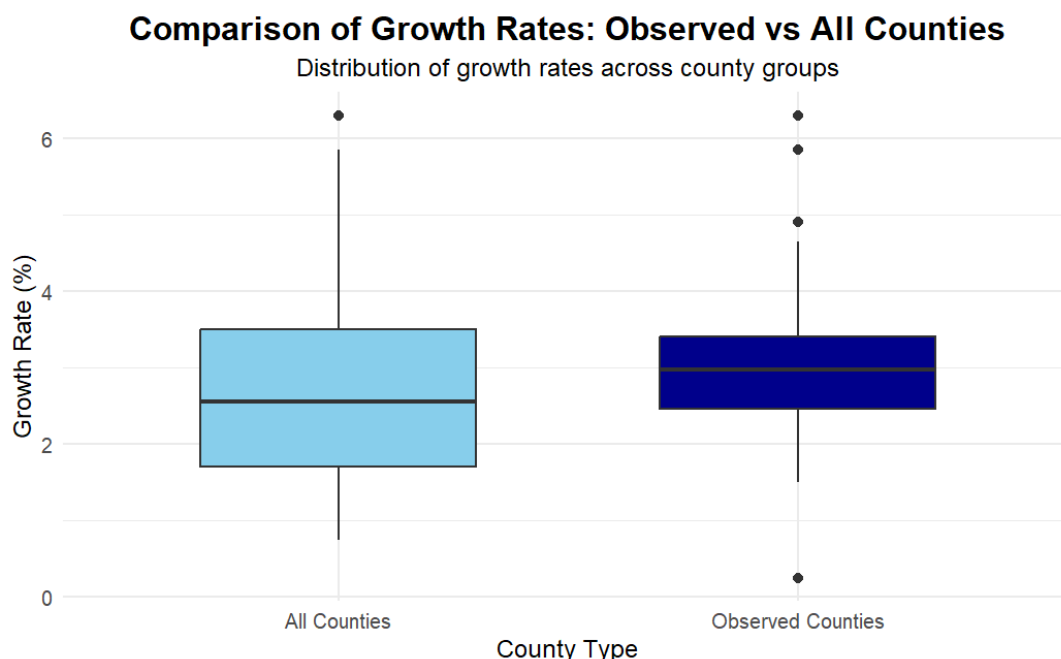


Figure 12: Distribution of growth rates across county groups

2.10.1 Boxplot

Insights

- **Wider Variability in All Counties:** The box plot highlights significantly broader variability in growth rates for all counties, reflecting diverse growth dynamics across the dataset.
- **Consistency in Observed Counties:** Observed counties demonstrate greater consistency in growth rates, with a narrower interquartile range and fewer extreme values, possibly due to focused development or socio-economic homogeneity.
- **Exceptional Outliers in Both Groups:** Outliers in both datasets represent unique cases with significantly different growth rates, potentially driven by rapid economic changes, policy interventions, or geographic factors.

2.11 Combined Insights and Implications

- **Distinct Characteristics of Observed Counties:** Observed counties exhibit unique growth rate characteristics compared to all counties, potentially due to specific economic, geographic, or policy-related factors.

2.12 Growth

Rates

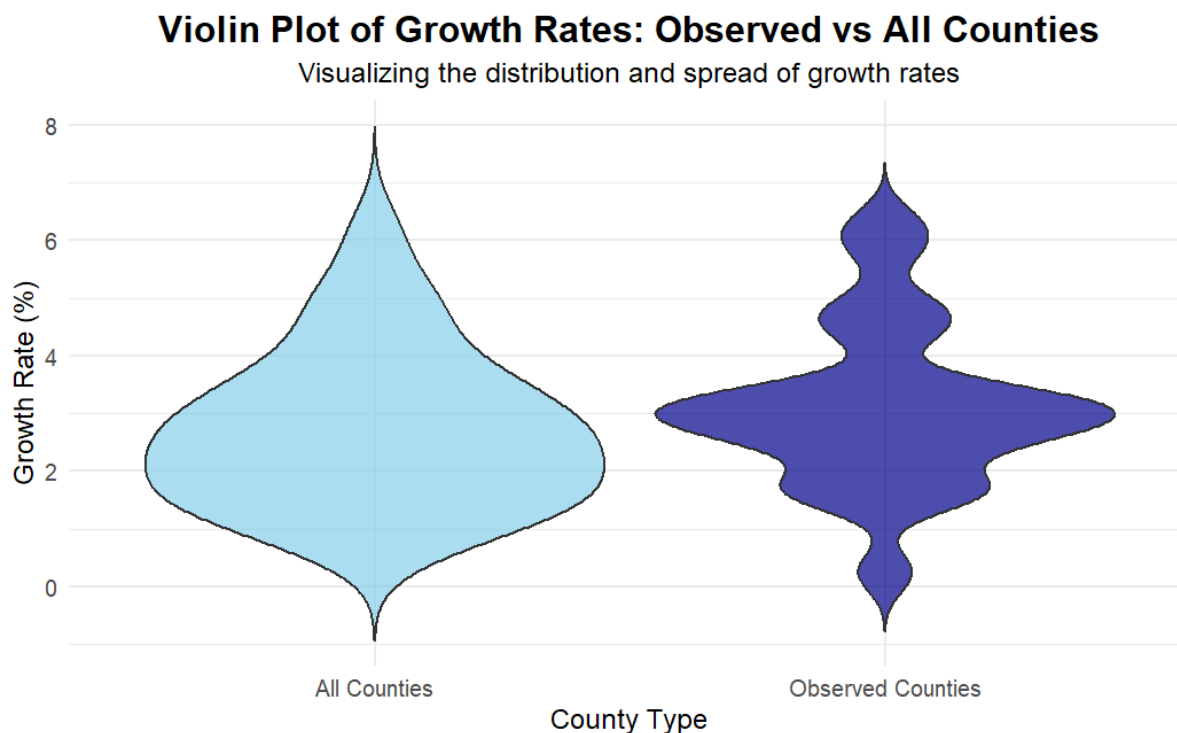


Figure 13: Violin Plot of Growth Rates: Observed vs All Counties

2.12.1 Violin Plot: Growth Rates

- **All Counties:** The growth rate distribution is broad and symmetrical, indicating diverse patterns across the dataset.
- **Observed Counties:** The narrower distribution with distinct peaks reflects uniform and focused growth trends.

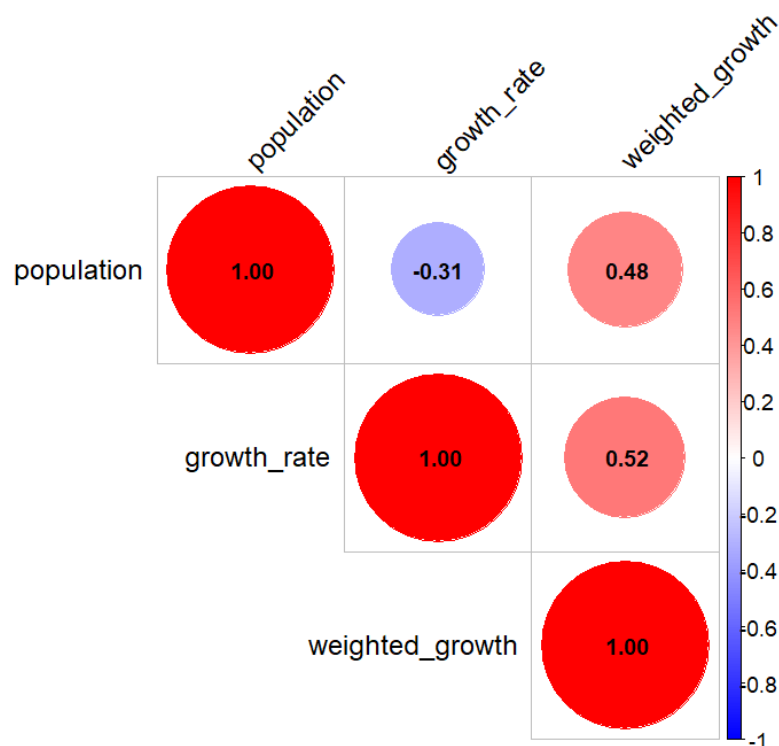


Figure 14: Spread of growth rates

2.12.2 Correlation

Analysis

- **Population vs. Growth Rate:** Moderate negative correlation (-0.31), suggesting slight influence of growth rates on population.
- **Population vs. Weighted Growth:** Stronger correlation (0.48), indicating that population size significantly impacts growth metrics.
- **Growth Rate vs. Weighted Growth:** Moderate-to-strong correlation (0.52), emphasizing the role of growth rates in overall development outcomes.

2.12.3 Implications

- The uniform growth in observed counties suggests the presence of replicable development strategies.
- Population size is a key driver for prioritizing resource allocation in populous areas.
- Further research is essential to understand outliers and variability in growth rates for equitable and sustainable development.

2.13 Growth Rate Analysis

2.13.1 Summary Table of Metrics

Table 1: Key Metrics and Their Values

Metric	Description	Value
1	Overall Weighted Growth Rate for All Markets	2.439521
2	Overall Weighted Growth Rate for Observed Markets	2.515286
3	Population Contribution of Observed Markets (%)	27.571329
4	Growth Rate Contribution of Observed Markets (%)	28.427617
5	Variance (Observed)	2.028187
6	Variance (Non-Observed)	1.857049
7	Bootstrap CI Lower	1.495006
8	Bootstrap CI Upper	3.084123

2.13.2 Key Insights

- **Overall Growth Rates:** The overall weighted growth rate is 2.44% for all Markets and 2.52% for observed Markets.
- **Population and Growth Contribution:** Observed Markets contribute 27.57% to the total population and 28.43% to the total growth rate.
- **Variance Analysis:** Growth rate variance for observed counties is higher (2.03) compared to non-observed counties (1.86), indicating greater variability within observed regions.
- **Confidence Interval:** The 95% bootstrap confidence interval for the overall growth rate ranges between 1.50% and 3.08%.

3 COMMODITIES AND CATEGORIES

3.1 Category Analysis Growth Rates by Time and Values

Table 2: Time-wise Analysis of Categories and Values

Category	Value
Milk and Dairy	10.869538
Oil and Fats	9.670680
Meat, Fish, and Eggs	7.261247
Non-Food	6.378031
Miscellaneous Food	4.992026
Pulses and Nuts	2.620770
Vegetables and Fruits	1.941230
Cereals and Tubers	1.081993

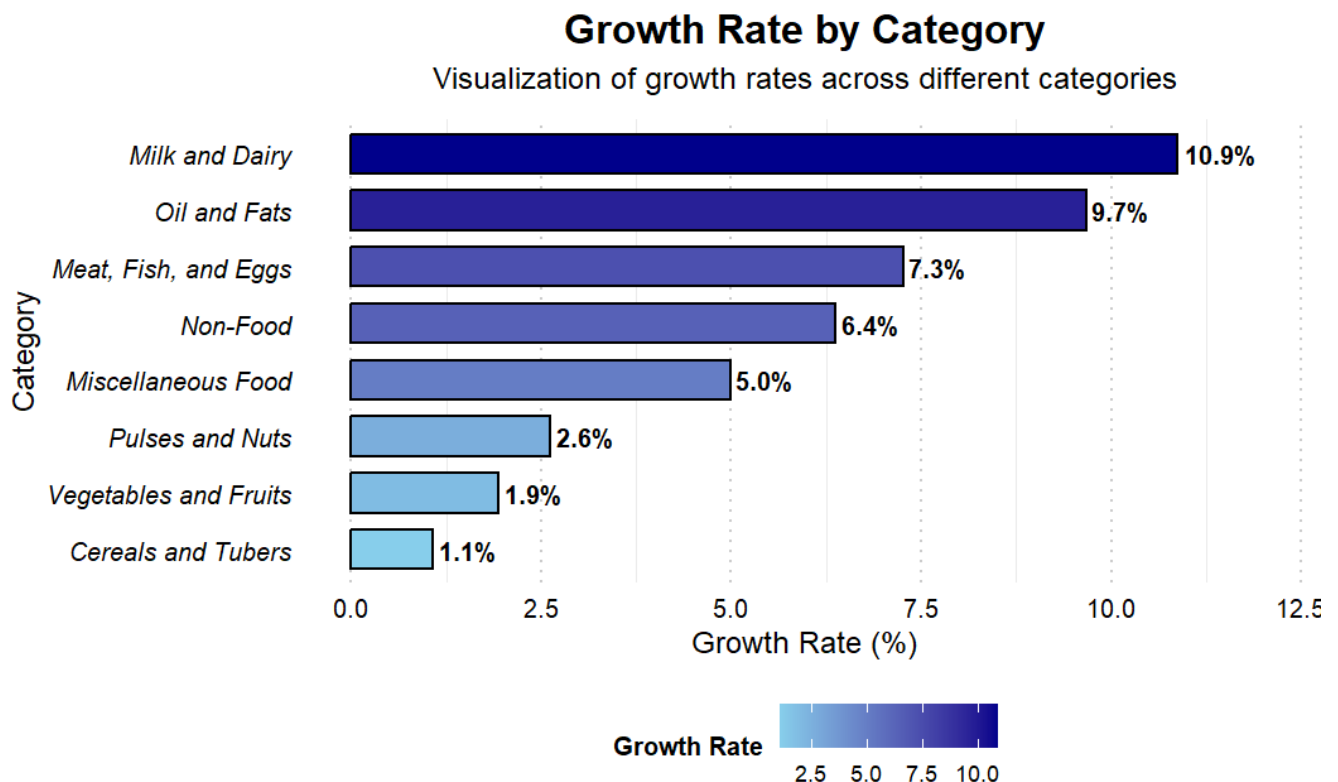


Figure 15: Category Growth Rates

3.1.1 Actionable

Insights

- **High-Growth Categories:** - Milk and Dairy (10.87%) and Oil and Fats (9.67%) exhibit strong growth. Prioritize investments and optimize supply chains for these categories.
- **Moderate Growth:** - Meat, Fish, and Eggs (7.26%) and Non-Food (6.38%) show stable growth. Allocate moderate resources to maintain performance.
- **Low-Growth Categories:** - Vegetables and Fruits (1.94%) and Cereals and Tubers (1.08%) need targeted interventions, such as subsidies or improved market access, to enhance growth.
- **Diversification Opportunities:** - Miscellaneous Food (4.99%) and Pulses and Nuts (2.69%) present opportunities for diversification and market development.
- **Strategic Resource Allocation:** - Sustain high-growth sectors while addressing challenges in low-performing categories to ensure balanced growth.
- **Policy Recommendations:** - Develop category-specific strategies to promote high-growth industries and support lagging sectors through innovative programs.

3.2 Commodities Analysis Growth Rates by Time and Values

Table 3: Time-wise Analysis of Commodities' Growth Rates (Part 1)

Commodity	Growth Rate
Milk cow fresh	193.26
Bread	43.39
Milk cow pasteurized	39.67
Meat camel	37.69
Sorghum white	36.53
Milk camel fresh	31.50
Potatoes Irish red	25.62
Fuel kerosene	23.09
Fuel petrol gasoline	22.58
Meat goat	22.30
Beans dolichos	18.60
Cowpeas	17.58
Rice aromatic	15.30
Beans rosecoco	13.92
Meat beef	13.47
Oil vegetable	13.27
Maize white dry	13.13
Fuel diesel	12.87
Bananas	12.07
Cooking fat	12.04
Potatoes Irish white	11.56
Milk UHT	11.12

High-Performing Commodities

- Milk cow (fresh) exhibits the highest growth rate, driven by strong consumer demand and a focus on fresh dairy products.
- Bread, pasteurized milk, and meat (camel) follow as significant contributors, indicating their critical role in household staples.

- Focus on enhancing the supply chain for high-growth commodities to maximize value and expand market reach.
- Develop targeted strategies for underperforming commodities to address inefficiencies and explore new opportunities for market growth.
- Encourage diversification of agricultural products to reduce dependence on declining sectors.

Table 4: Time-wise Analysis of Commodities and Values (Part 2)

Commodity	Value
Maize flour	10.55
Rice	10.34
Wheat flour	10.25
Sugar	10.13
Cabbage	9.93
Onions dry	9.83
Onions red	9.83
Salt	9.83
Tomatoes	9.81
Kale	9.80
Beans yellow	9.78
Beans	9.74
Sorghum	9.70
Beans kidney	9.43
Potatoes Irish	8.76
Beans dry	5.89
Maize	5.68
Sorghum red	5.50
Millet finger	4.27
Maize white	3.84
Beans mung	-0.03
Spinach	-4.09
Cowpea leaves	-10.63
Fish omena dry	-11.01
Rice imported Pakistan	-22.68

Underperforming**Commodities**

- Commodities such as maize white, spinach, and cowpea leaves demonstrate negative growth rates, highlighting potential oversupply, reduced consumer preference, or inefficiencies in their value chains.

Critical**Declines**

- Imported rice from Pakistan and fresh onions (dry) face significant value losses, suggesting challenges such as competition, changing import policies, or local market dynamics.

Recommendations

- Prioritize investments and innovation in high-performing sectors to maintain momentum.
- Address inefficiencies in lagging commodities through targeted interventions, including supply chain optimization and market access strategies.
- Explore diversification opportunities to mitigate risks in underperforming categories.

3.3 Commodities Growth Rates by Category

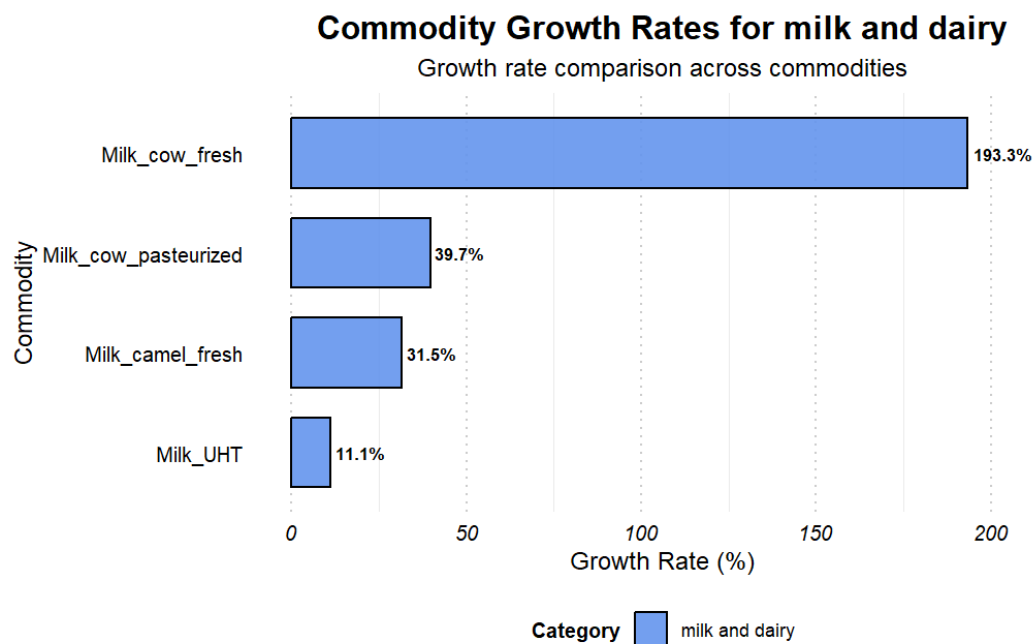


Figure 16: Milk and Dairy

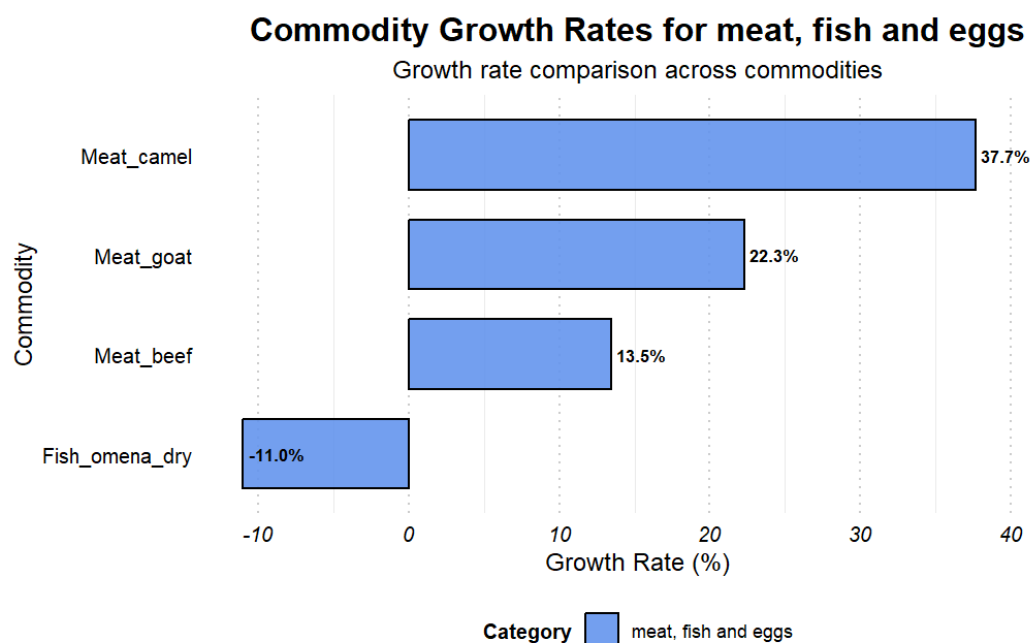


Figure 17: Meat, Fish and Eggs

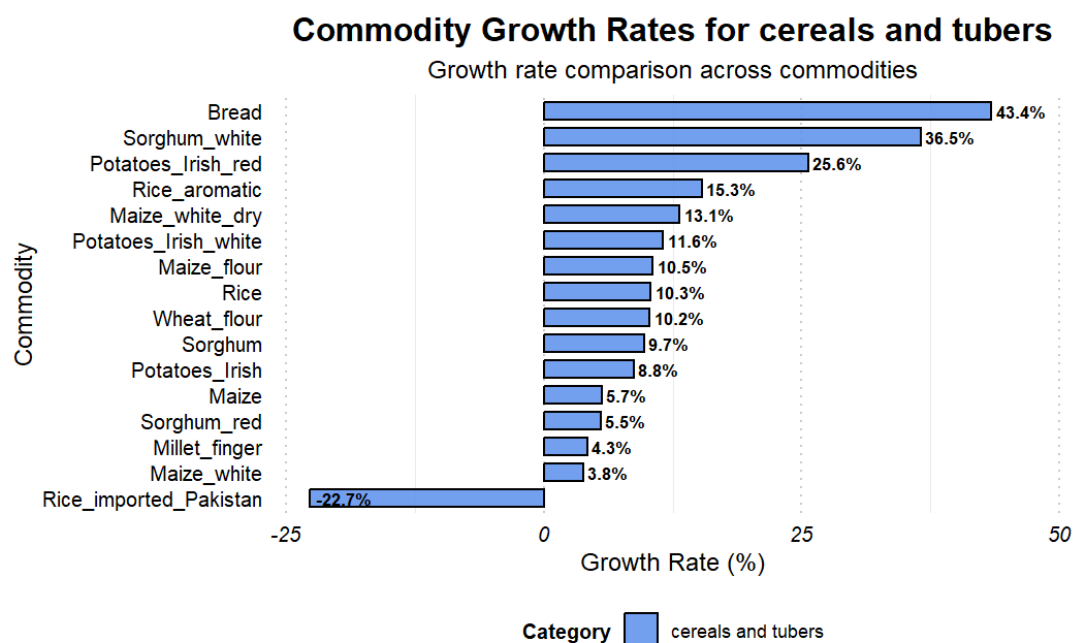


Figure 18: Cereals and Tubers

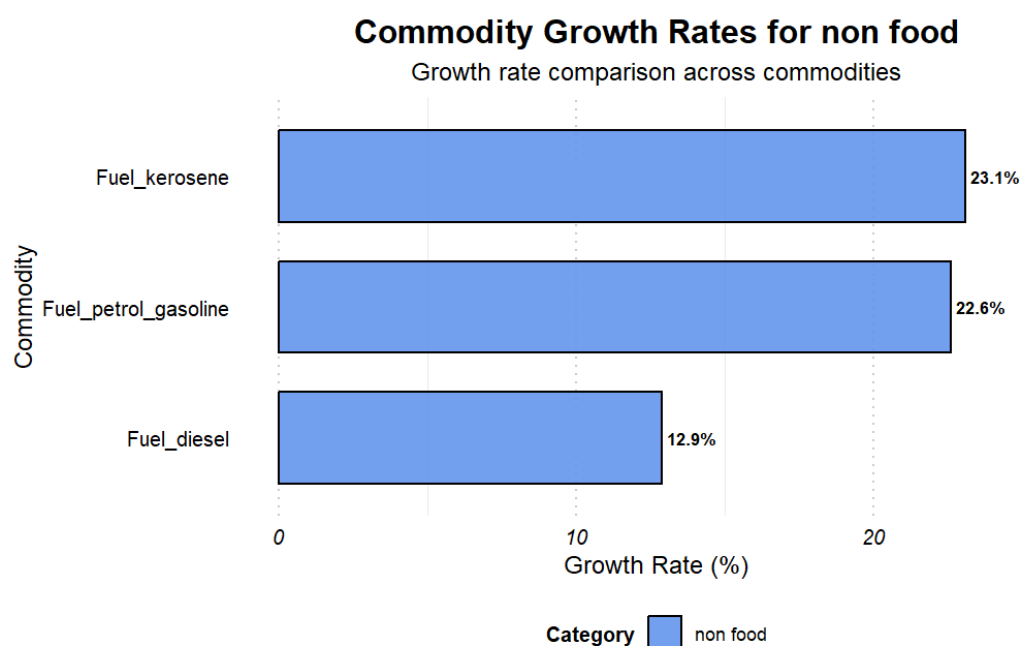


Figure 19: Non Food

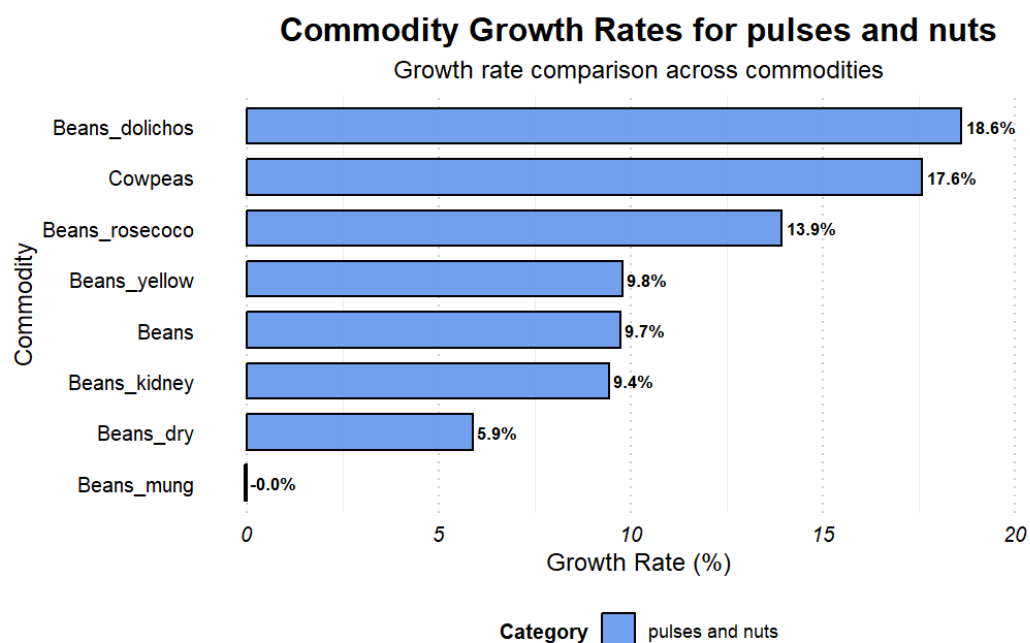


Figure 20: Pulses and Nuts

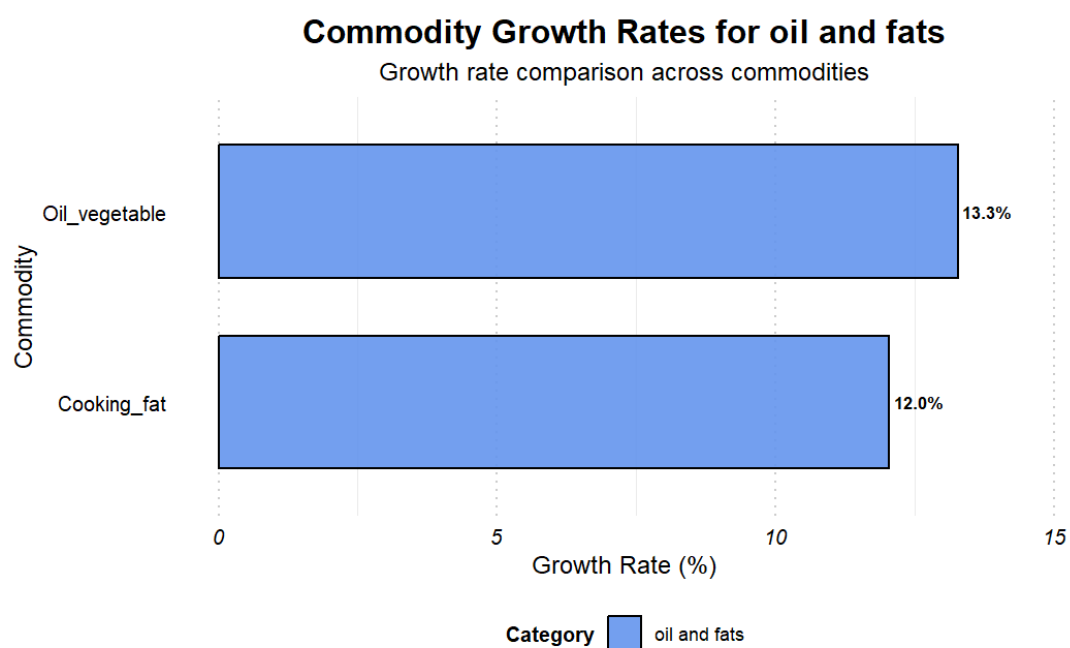


Figure 21: Oil and Fats

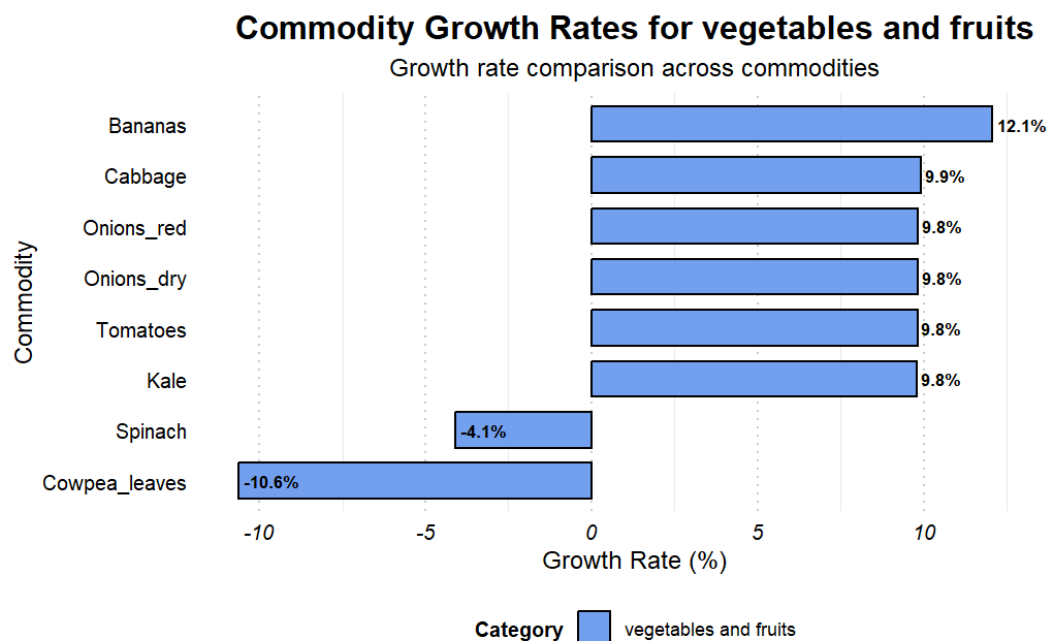


Figure 22: Vegetables and Fruits

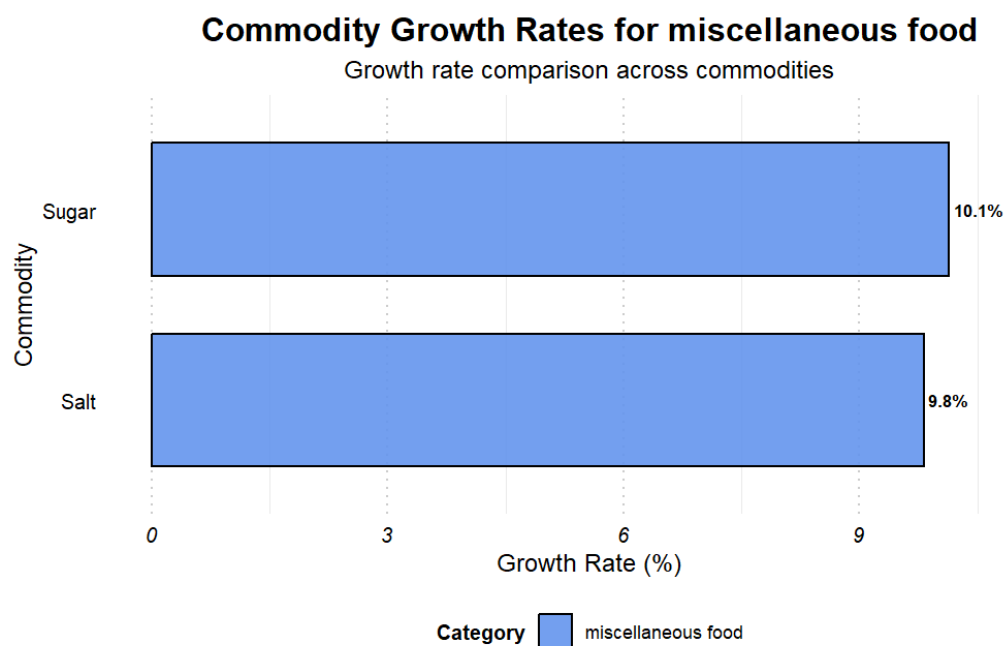


Figure 23: Miscellaneous Food

3.4 Category Growth Rates for Major Cities and Towns

Analysis of Counties Based on Population Data

- It is important to note that the top three and bottom three counties analyzed in this study are selected based on population data.
- This approach aims to explore whether population knowledge can provide additional insights into the dataset, offering a deeper understanding of the trends and patterns within the counties.

3.5 Major

Cities

3.5.1 Mombasa

Table 5: Mombasa Time-wise Analysis of Commodities by Category and Growth Rate

Category	Growth Rate (%)
Vegetables and Fruits	124.93
Meat, Fish and Eggs	54.24
Pulses and Nuts	35.46
Cereals and Tubers	31.69
Oil and Fats	27.04
Milk and Dairy	26.05
Miscellaneous Food	16.66

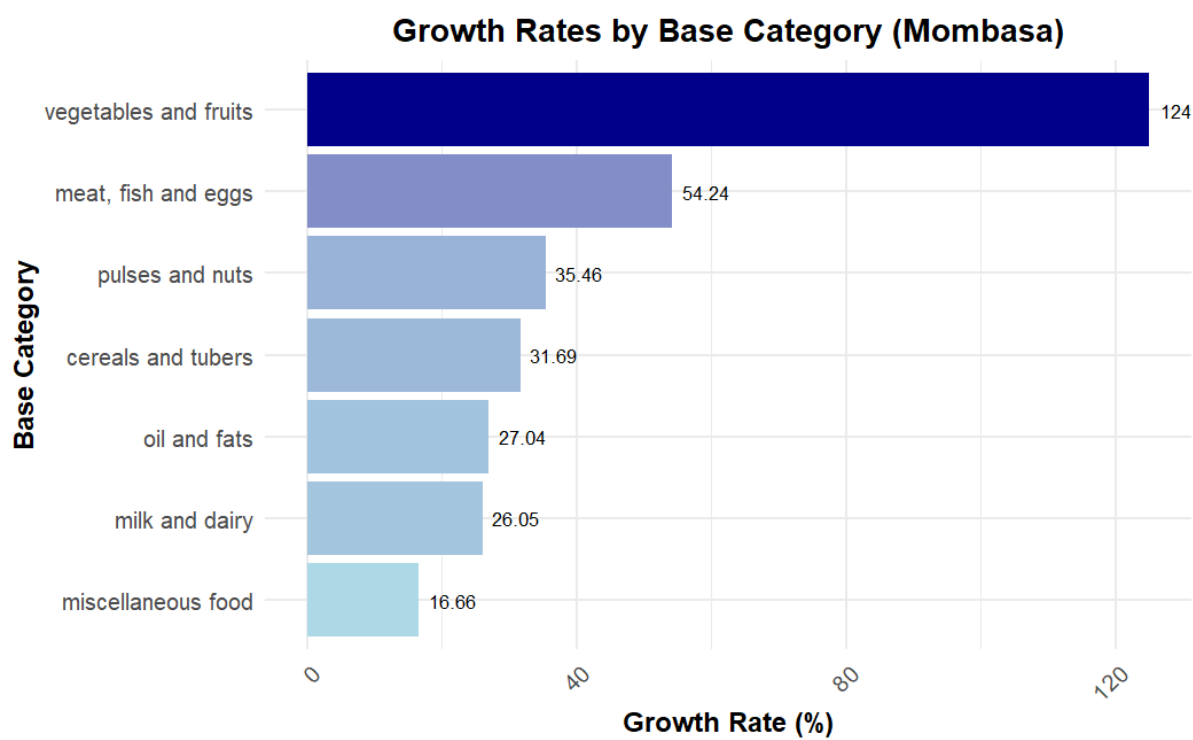


Figure 24: Growth Rates by Base Category (Mombasa)

3.5.2 Kisumu

Table 6: Time-wise Analysis of Commodities by Category and Growth Rate

Category	Growth Rate (%)
Vegetables and Fruits	110.72
Pulses and Nuts	33.02
Cereals and Tubers	30.33
Meat, Fish and Eggs	-75.47

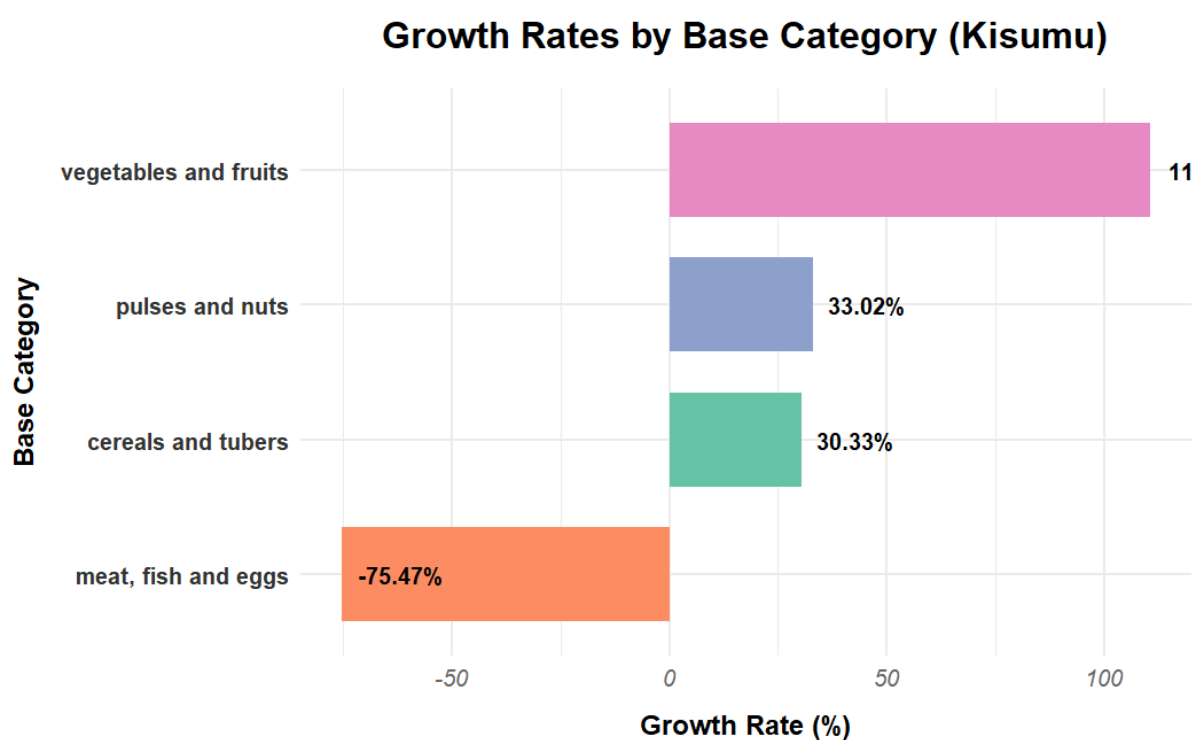


Figure 25: Growth Rates by Base Category (Kisumu)

3.5.3 Nairobi

Table 7: Time-wise Analysis of Commodities by Category and Growth Rate

Category	Growth Rate (%)
Vegetables and Fruits	101.52
Oil and Fats	41.47
Milk and Dairy	37.88
Pulses and Nuts	35.49
Meat, Fish and Eggs	29.71
Cereals and Tubers	29.40
Miscellaneous Food	17.89
Non-Food	11.88

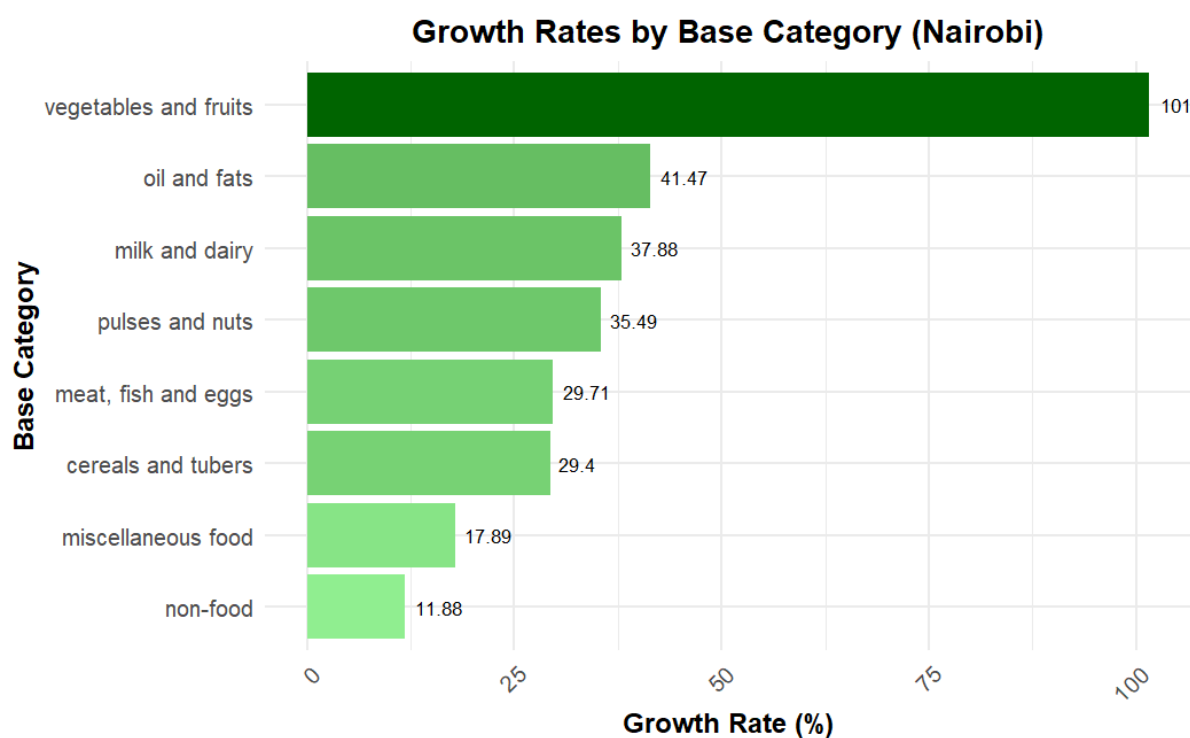


Figure 26: Growth Rates by Base Category (Nairobi)

3.6 Top 3 Counties by Category Growth Rate

3.6.1 Mandera - Top County

Table 8: Time-wise Analysis of Commodities by Category and Growth Rate

Category	Growth Rate (%)
Vegetables and Fruits	129.15
Pulses and Nuts	105.93
Cereals and Tubers	39.88

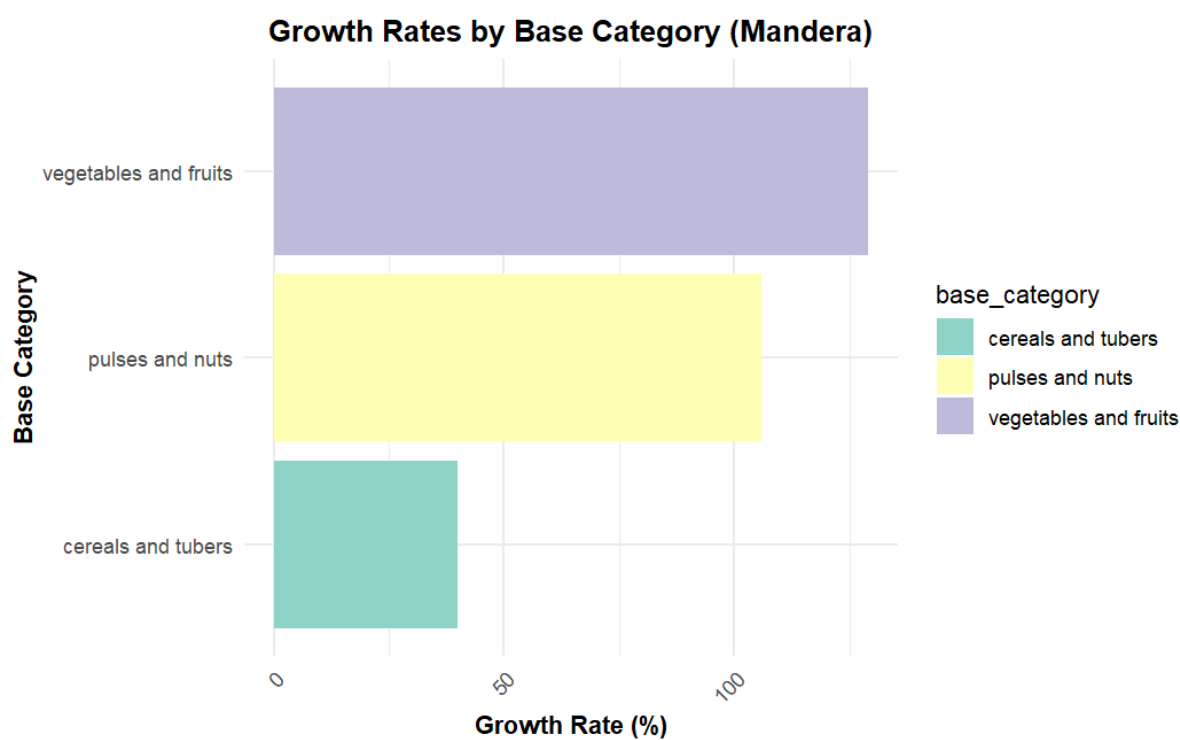


Figure 27: Growth Rates by Base Category (Mandera)

3.6.2 Garissa

-

Second

Best

Table 9: Time-wise Analysis of Commodities by Category and Growth Rate

Category	Growth Rate (%)
Milk and Dairy	148.51
Meat, Fish and Eggs	137.27
Oil and Fats	127.35
Miscellaneous Food	114.45
Pulses and Nuts	88.47
Vegetables and Fruits	83.95
Cereals and Tubers	45.02

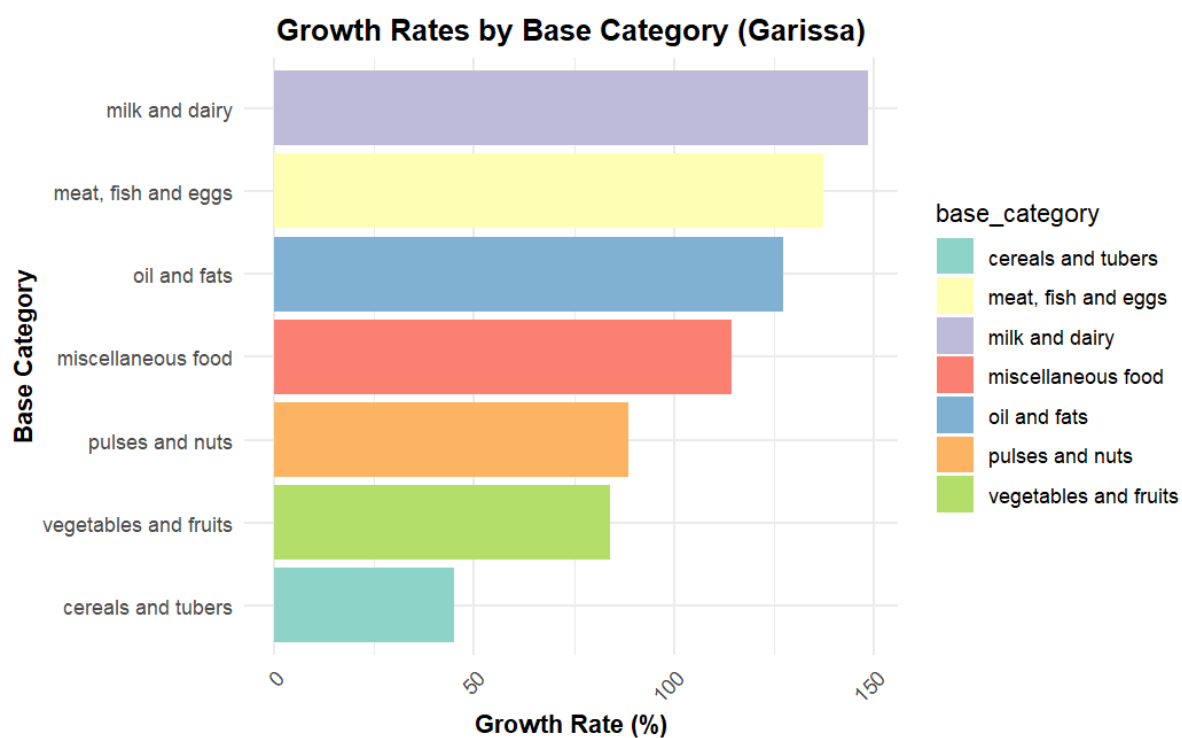


Figure 28: Growth Rates by Base Category (Garissa)

3.6.3 Kajiado**-****Third****Best**

Table 10: Time-wise Analysis of Commodities by Category and Growth Rate

Time	Category	Growth Rate (%)
Vegetables and Fruits	132.27	
Pulses and Nuts	39.05	
Cereals and Tubers	29.13	

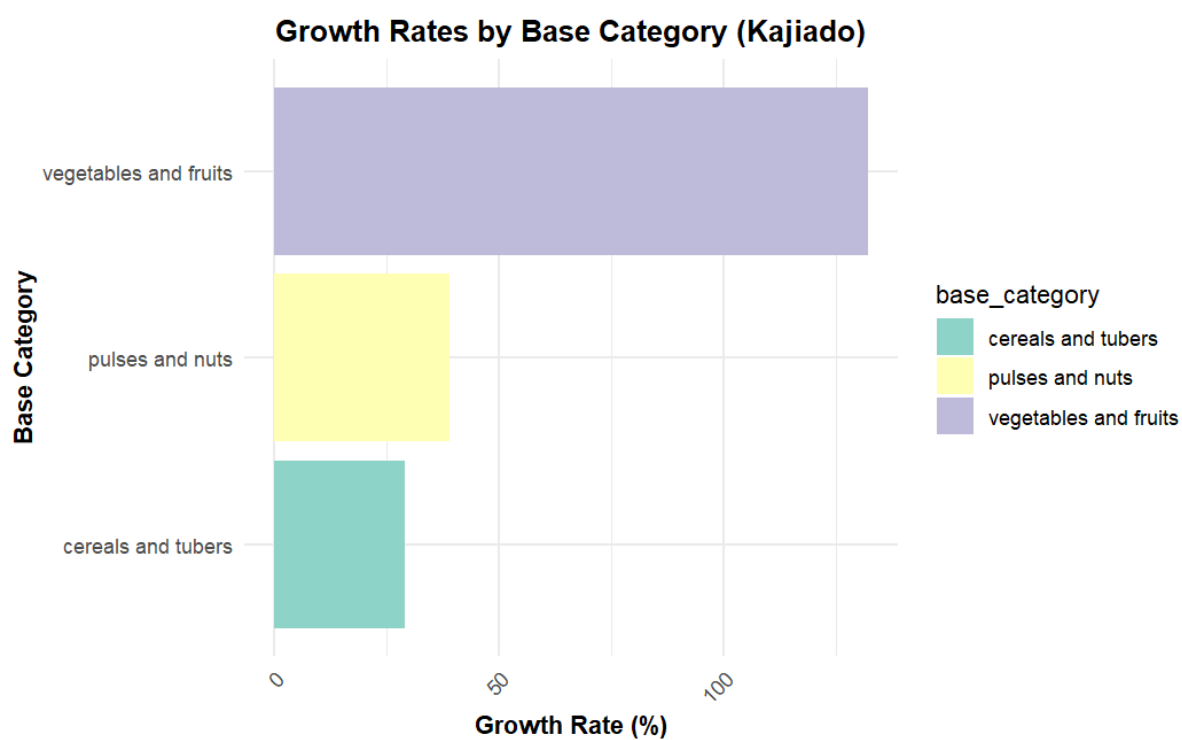


Figure 29: Growth Rates by Base Category (Kajiado)

3.7 Bottom 3 Counties by Category Growth Rate

3.7.1 Wajir Worst County

Table 11: Time-wise Analysis of Commodities by Growth Rate

Category	Growth Rate (%)
Pulses and Nuts	135.47
Milk and Dairy	71.19
Oil and Fats	59.71
Meat, Fish and Eggs	51.74
Cereals and Tubers	45.64
Miscellaneous Food	28.69
Vegetables and Fruits	-100.52

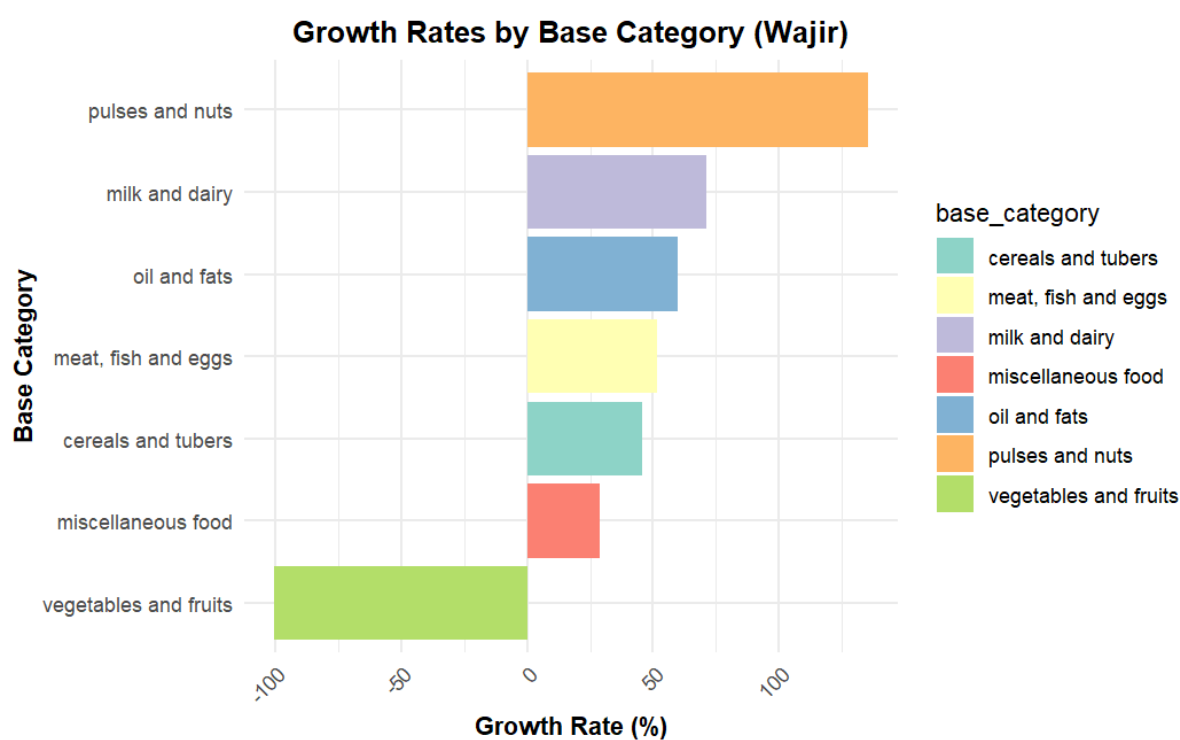


Figure 30: Growth Rates by Base Category (Wajir)

3.7.2 Isiolo

-

Second

Worst

Table 12: Time-wise Analysis of Commodities by Category and Growth Rate

Category	Growth Rate (%)
Meat, Fish and Eggs	201.34228
Pulses and Nuts	81.96051
Milk and Dairy	37.99043
Oil and Fats	37.75357
Cereals and Tubers	30.15489
Miscellaneous Food	17.99208
Vegetables and Fruits	-654.09049

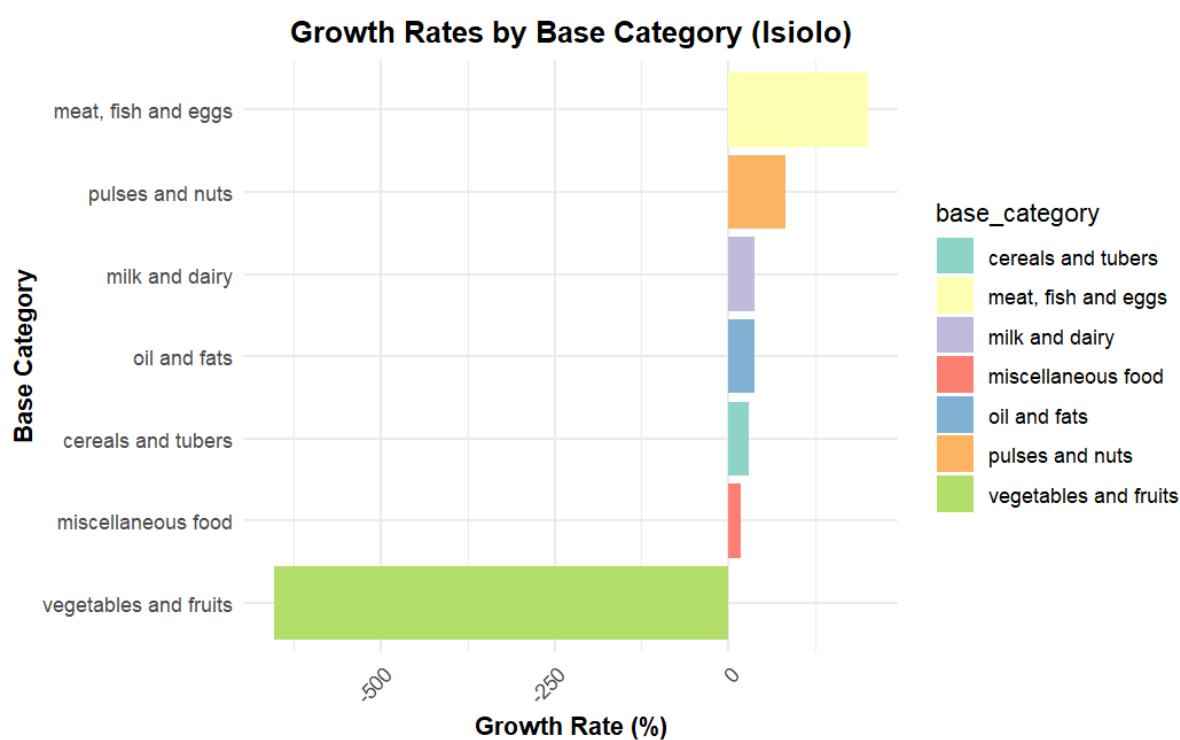


Figure 31: Growth Rates by Base Category (Isiolo)

3.7.3 Kwale

-

Third

Worst

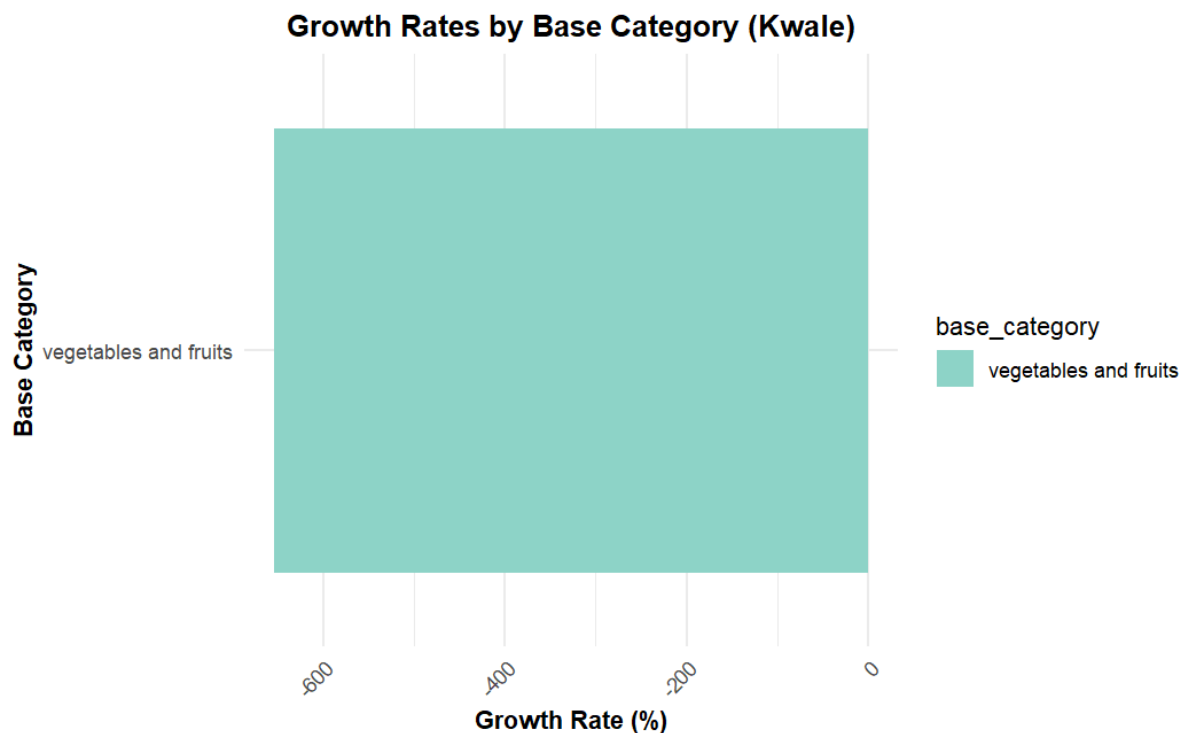


Figure 32: Growth Rates by Base Category (Kwale)

- **Data Collection:** Limited data was collected from Kwale County. Despite this, the available information reveals significant insights into market performance.
- **Market Trends:** A substantial decline in the fruit market was observed, with a recorded drop of up to 600 units. This sharp decline necessitates immediate assessment and intervention to stabilize the market.
- **Population Growth Impact:** Kwale County has the lowest population growth rate among counties analyzed. This observation highlights a potential correlation between population growth and market performance, emphasizing the need for further investigation into demographic and economic factors affecting the region.

4 ECONOMIC CORRELATION TO PRICE OF COMMODITIES

Correlation of Commodity Prices and Per Capita

- The table below illustrates the correlation between the USD value of various commodities and the per capita USD of economic growth.
- This analysis sheds light on the commodities that have a direct and significant relationship with the economy. Such insights are invaluable for predicting market price trends, facilitating informed government planning, and providing critical data for investors seeking opportunities in key sectors.
- The commodities are ranked in descending order of correlation, offering a clear perspective on their relative influence on economic dynamics.

The correlation value between USD value and per capita USD indicates the strength and direction of their relationship:

- **Positive Correlation (0 to 1):** As the USD value increases, the per capita USD also tends to rise, with stronger correlations closer to 1 indicating a more direct and consistent relationship.
- **Negative Correlation (-1 to 0):** A decrease in per capita USD accompanies an increase in USD value, with values closer to -1 showing a stronger inverse relationship.
- **Near Zero Correlation (around 0):** Minimal or no relationship exists between USD value and per capita USD, suggesting that changes in one do not predict changes in the other.

Table 13: Time-wise Analysis of Commodities' Growth Rates (Part 1)

Commodity	Start Year	End Year	Correlation Value
Milk Cow Fresh	2021	2024	1.00000000
Bread	2006	2020	0.94328139
Beans	2006	2021	0.93669493
Maize White	2006	2020	0.93469958
Milk Cow Pasteurized	2006	2020	0.92999478
Oil Vegetable	2006	2024	0.88663803
Beans Dry	2006	2024	0.88552307
Maize	2006	2024	0.88211342
Sorghum	2006	2024	0.88068873
Potatoes Irish	2006	2024	0.87547086
Fuel Kerosene	2014	2020	0.71399736
Fuel Petrol Gasoline	2014	2020	0.62787606
Fuel Diesel	2014	2020	0.55484323
Bananas	2018	2024	0.11936065
Sugar	2018	2024	0.11051784
Wheat Flour	2018	2024	0.09841991
Rice	2018	2024	0.09548183
Maize Flour	2018	2024	0.09094893
Salt	2018	2024	0.08012306
Kale	2020	2024	-0.04969923
Tomatoes	2020	2023	-0.25401309

Table 14: Time-wise Analysis of Commodities and Values (Part 2)

Commodity	Start Year	End Year	Correlation Value
Meat Goat	2020	2024	-0.40555142
Meat Beef	2020	2024	-0.40943856
Beans Yellow	2021	2023	-0.85960147
Cowpeas	2021	2024	-0.86200450
Potatoes Irish White	2021	2024	-0.86265561
Potatoes Irish Red	2021	2024	-0.86321275
Cabbage	2021	2024	-0.87089550
Maize White Dry	2021	2024	-0.87336958
Onions Dry	2021	2024	-0.87340909
Onions Red	2021	2024	-0.87340909
Beans Dolichos	2021	2024	-0.87416782
Rice Aromatic	2021	2023	-0.88322021
Beans Rosecoco	2021	2024	-0.88804849
Sorghum White	2021	2024	-0.89086584
Milk Camel Fresh	2021	2024	-0.94715359
Milk UHT	2021	2024	-0.94914187
Cooking Fat	2021	2024	-0.95195901
Meat Camel	2021	2024	-0.95205446
Beans Kidney	2021	2023	-1.00000000

5 INFLATION RELATION TO PRICE OF COMMODITIES

- The line graphs presented below provide a visual comparison of the country's inflation trends alongside the average USD value of commodities.
- This data serves as a valuable tool for policymakers and investors in understanding broader economic movements and planning strategic interventions.
- These graphs highlight patterns and fluctuations within the economy, offering a broad perspective on how inflation interacts with commodity values over time.
- While they showcase independent trends, further analysis may be required to draw actionable conclusions regarding their interplay or influence on market dynamics.

5.1 Current Inflation Trend

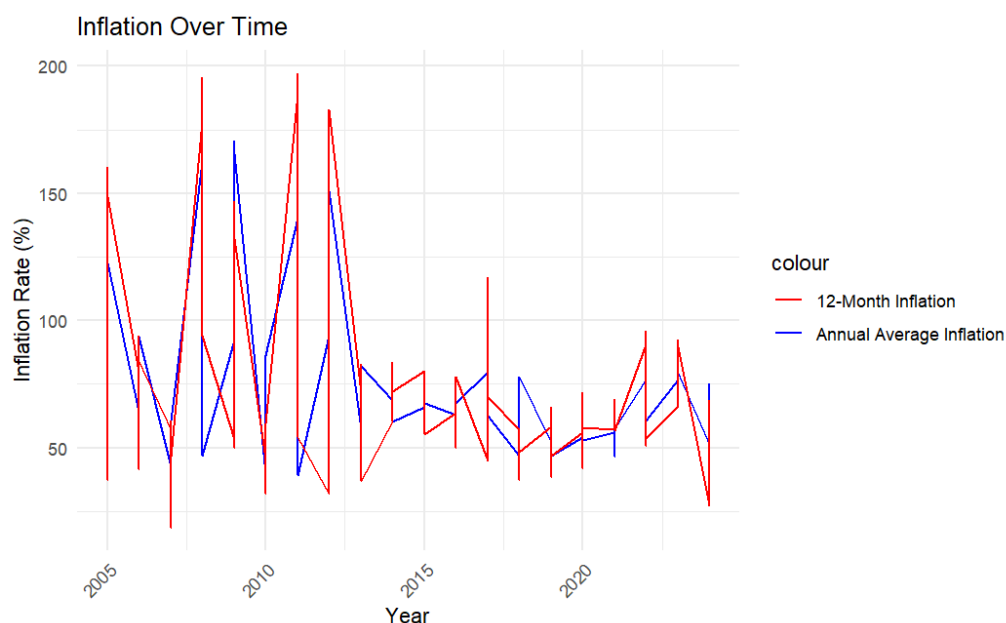


Figure 33: Inflation Over Time

5.2 Average Commodities USD Value Over Times

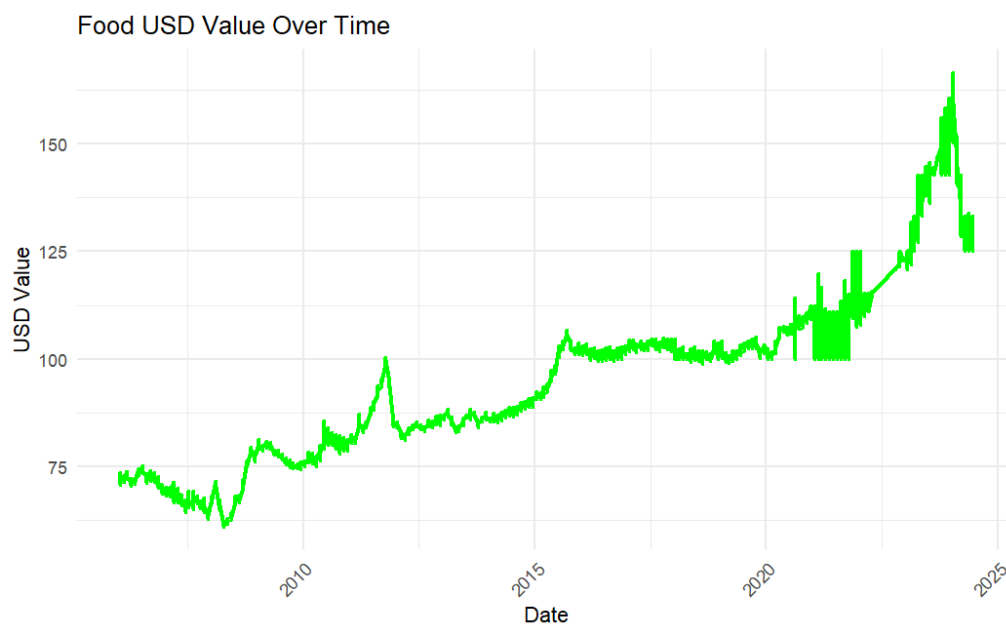


Figure 34: Commodities USD Value Over Time

5.3 Commodity against Inflation

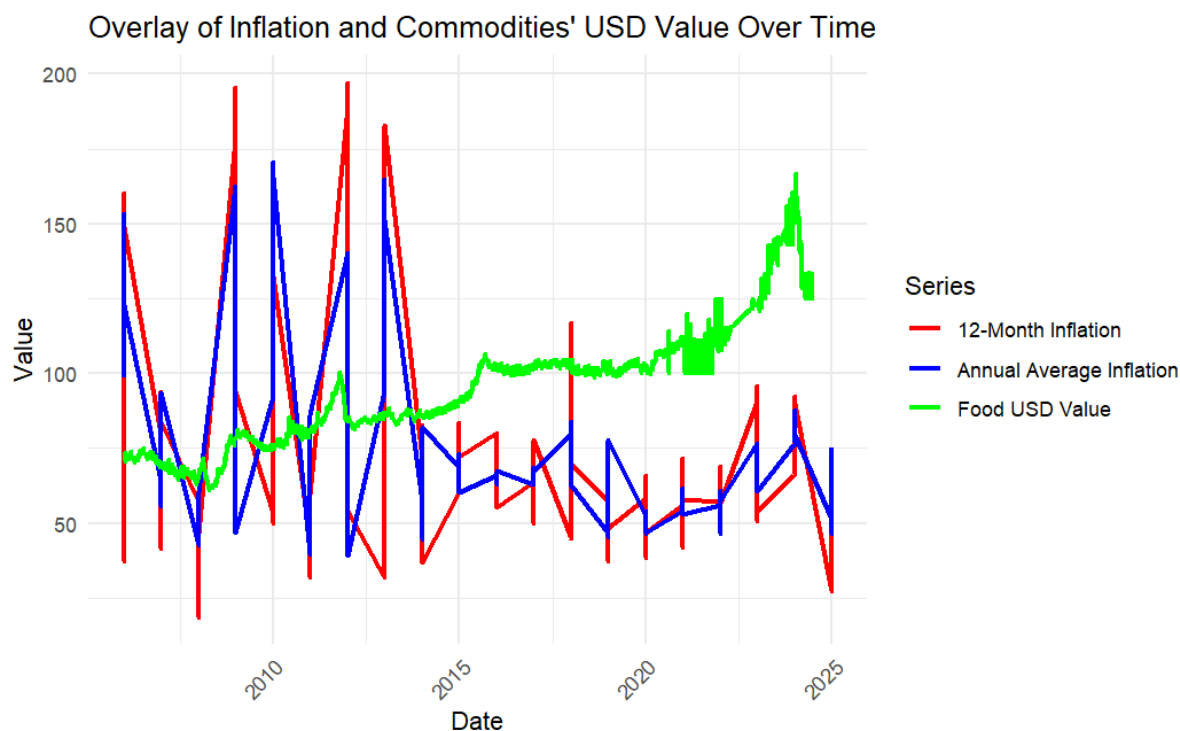


Figure 35: Commodities against Inflation

Analysis of Inflation Trends and Commodity Values

- The following images provide a comprehensive visual representation of three key aspects: the inflation rate trends in our country, the USD value of various commodities, and a combined line graph illustrating both metrics. This analysis aims to assess whether a direct relationship exists between inflation rates and commodity values.
- From the visual data, it is evident that there is no significant correlation between inflation rates and commodity values. **While inflation might influence the price of a product, the lack of a measurable relationship implies that these variables cannot reliably predict future trends or inform actionable strategies.** This insight underscores the need for alternative analytical approaches when addressing market behavior and economic planning.

5.4 Correlation of Food Prices vs Inflation

Below is the correlation value of food prices versus inflation for various commodities.

Table 15: Correlation of Food Prices vs Inflation

Commodity	Correlation
Food Data	0.207953144453382

- **Weak Positive Correlation (0.208):** While food prices appear to have **some** connection with inflation, this relationship is weak, suggesting that **other factors** likely play a more prominent role in influencing inflation levels.

6 PRICE FLAGS AND PRICE TYPE

6.1 Actual & Aggregate for the best and worst Categories(Growth Rate)

Best Category - Milk and Dairy

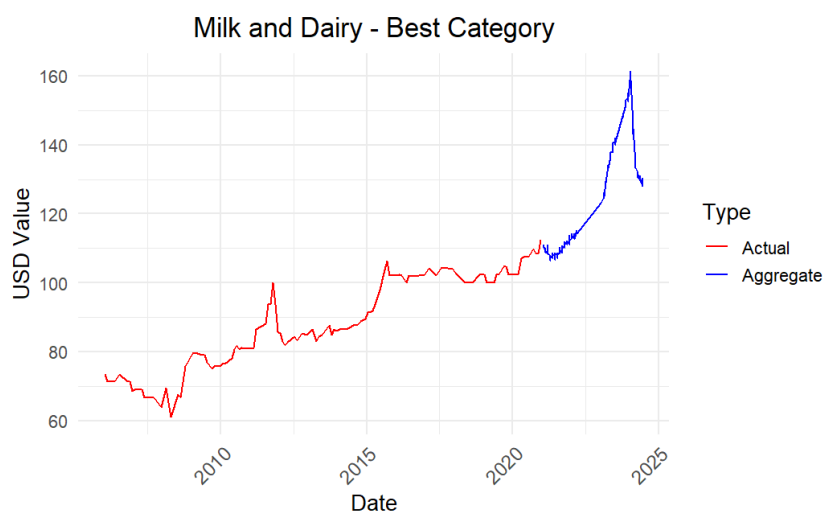


Figure 36: Best Category - Milk and Dairy

Second best Category - Oil and Fats

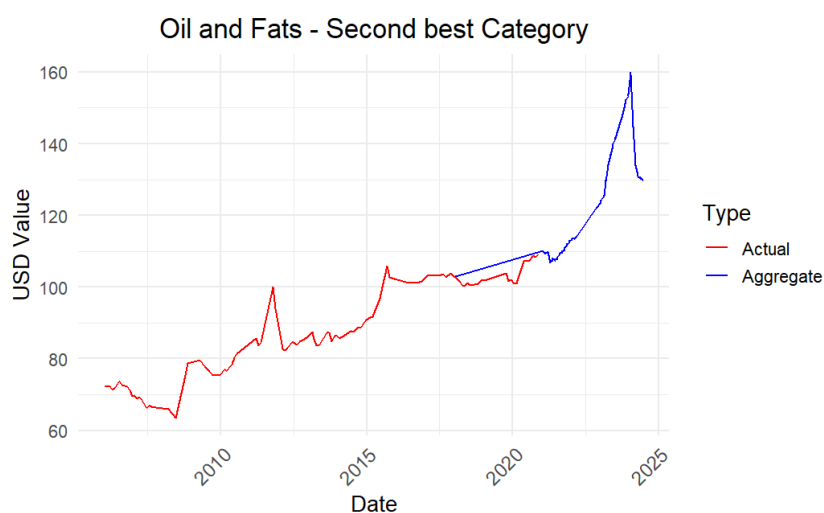


Figure 37: Second Best - Oil and Fats

6.1.1 Worst Category - Cereals and Tubers

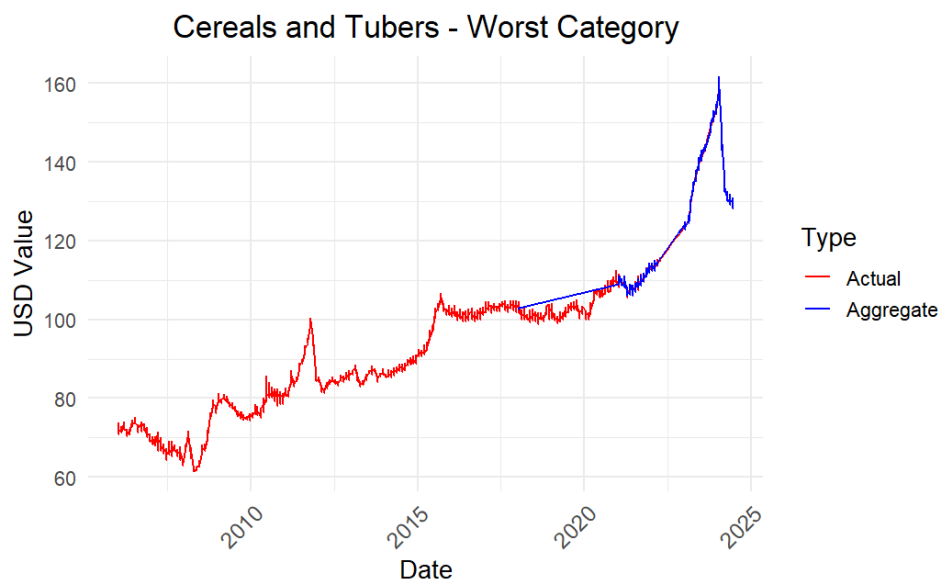


Figure 38: Worst Category - Cereals and Tubers

Price Divergence and Market Conditions

Mid-2017 to 2019

- Actual market price consistently below aggregate price.
- Signaled subdued demand, oversupply, or unfavorable conditions.
- Market uncertainty with prices lower than anticipated.

COVID-19 Pandemic and Market Disruption

- Sharp dip observed at the start of 2020.
- Significant divergence between actual and aggregate prices.
- COVID-19 pandemic caused severe market disruption.
- Market conditions were volatile, altering typical price dynamics.

Post-Pandemic

Stabilization

- Stabilization after about a year of market turbulence.
- Prices have since remained within expected ranges.
- Reflects a return to economic stability.
- Market adjustment to post-pandemic environment.

6.1.2 Second Worst Category - Vegetables and Fruits

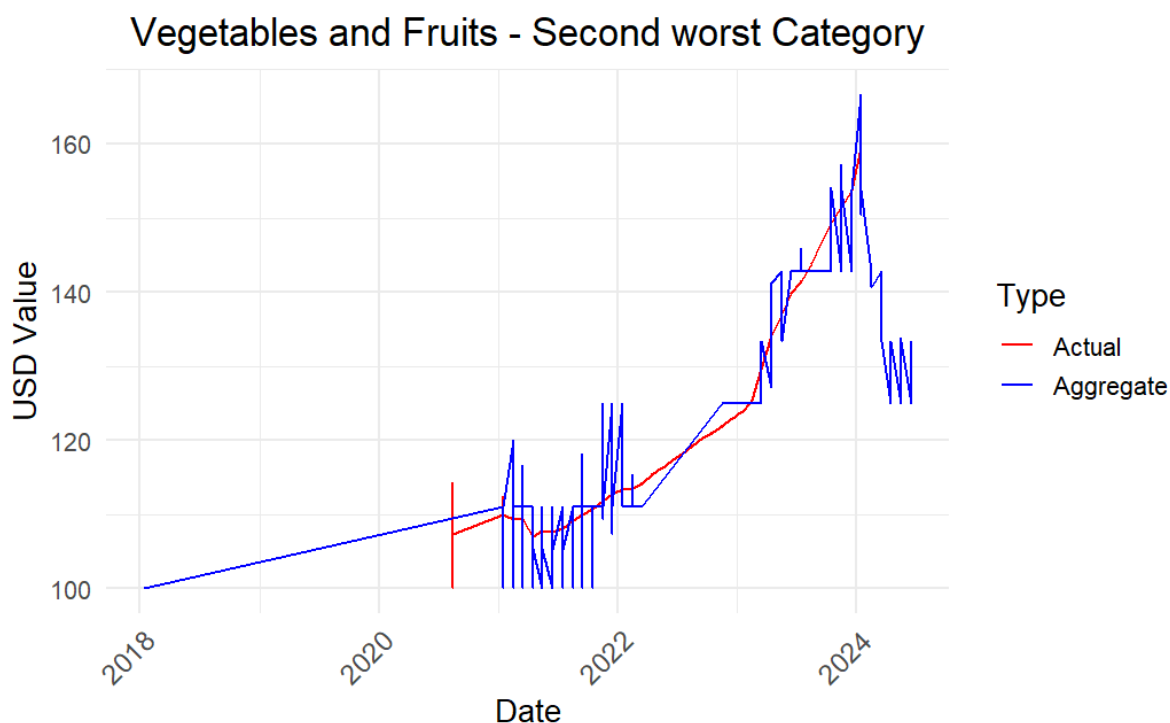


Figure 39: Second Worst Category - Vegetables and Fruits

- The same price trend is observed in consequent plots
- Analysis of market price trends, focusing on actual vs aggregate prices.
- Highlights impact of COVID-19 pandemic on market conditions.
- Examines current market conditions in relation to expected prices.

Conclusion

- Market experienced disruptions due to COVID-19, but signs of stabilization have emerged.
- Absence of recent price data does not hinder conclusions on market direction.
- Future analysis will provide clearer picture once data becomes available.

6.2 Actual and Aggregate for the best and worst Commodities(Growth Rate)

6.2.1 Best Commodity - Milk

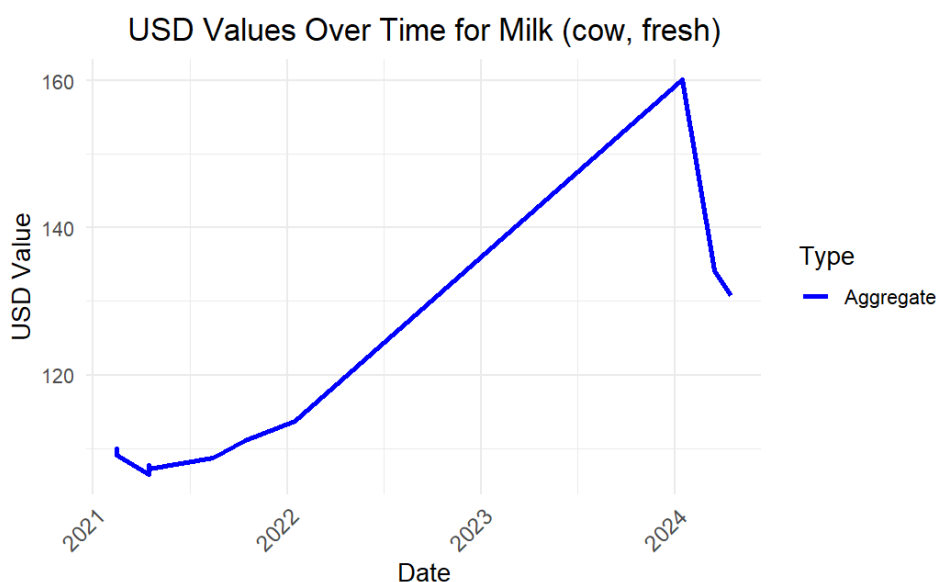


Figure 40: Aggregate for Milk

• Market Analysis of Milk Prices

The milk market has experienced a consistent upward trend in prices over recent years. This steady increase highlights the importance of acknowledging market data, which has created opportunities for investors to enter the market. **However, the sudden and unexpected fall in prices demonstrates the inherent volatility and unpredictability of the milk market.** This fluctuation serves as a reminder that, despite seemingly stable trends, market conditions can shift rapidly, impacting investment strategies and consumer behavior.

6.2.2 Second Best Commodity - Bread

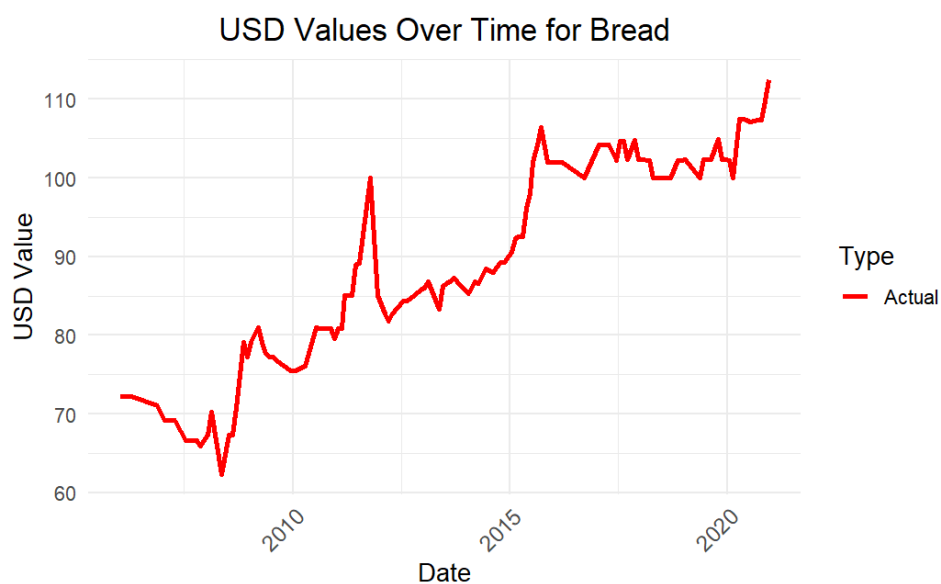


Figure 41: Actual for Bread

6.2.3 Worst Commodity - Rice (Imported Pakistan)

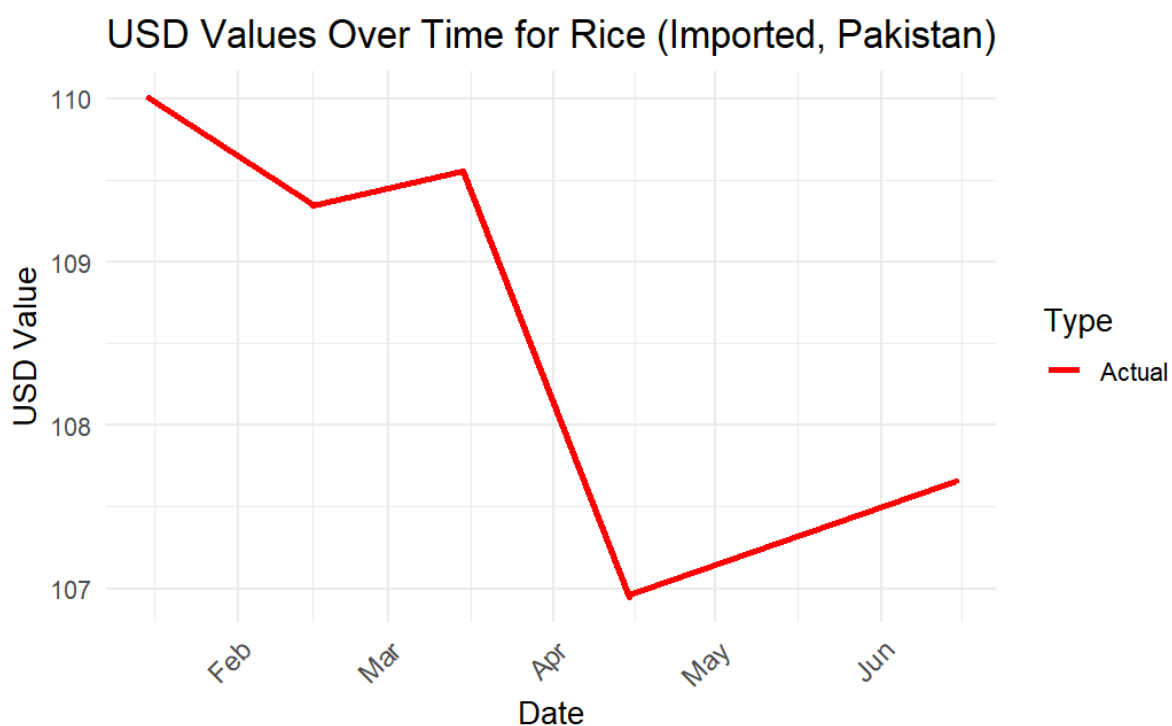


Figure 42: Actual for Rice, Pakistan

6.2.4 Second

Worst

Commodity

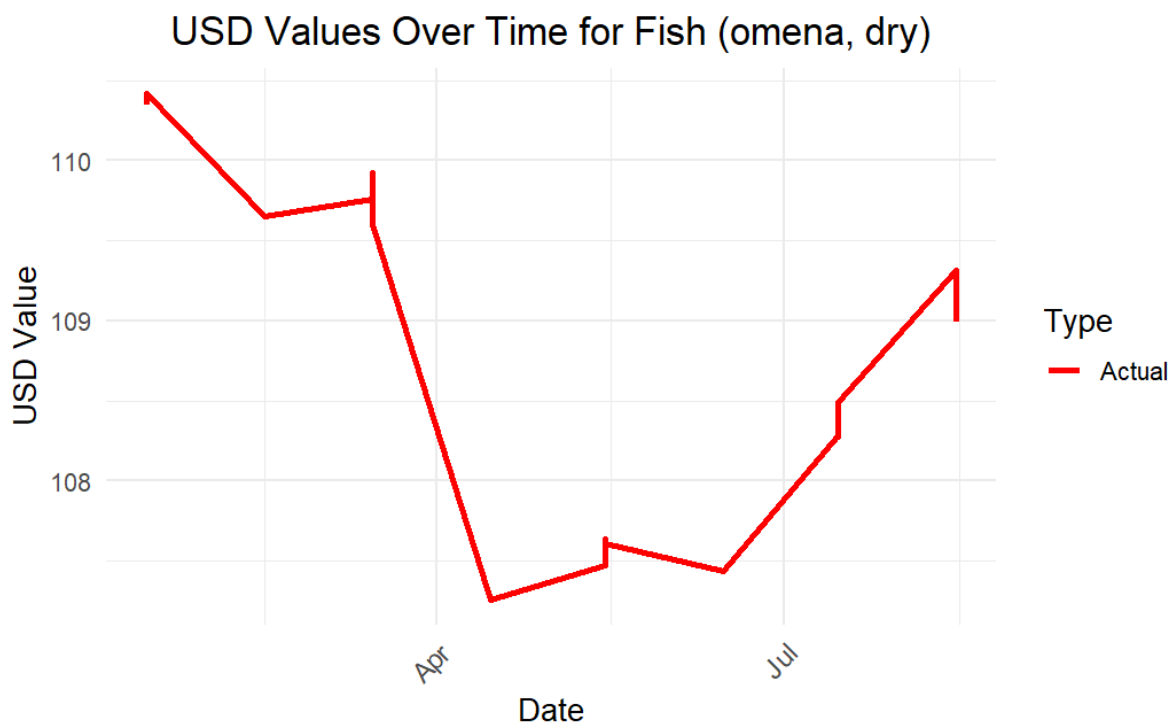


Figure 43: Actual for Fish(Omena, Dry)

Market Analysis of Fish and Imported Pakistani Rice

- The value of both fish and imported Pakistani rice has recently seen a notable decline, indicating that these products may not currently represent strong investment opportunities.
- Despite this, there is a clear need for government intervention. A thorough study should be conducted to promote local fish and support the livelihoods of fishermen, which could help enhance the value of these products and boost the local economy.
- Additionally, the decline in the value of imported rice suggests a growing stability in the country's reliance on local farmers.
- This shift may indicate changing consumer preferences or a strengthening of the domestic agricultural sector, underscoring the importance of fostering local production to meet national demand.

6.3 Retail

Vs

Wholesale

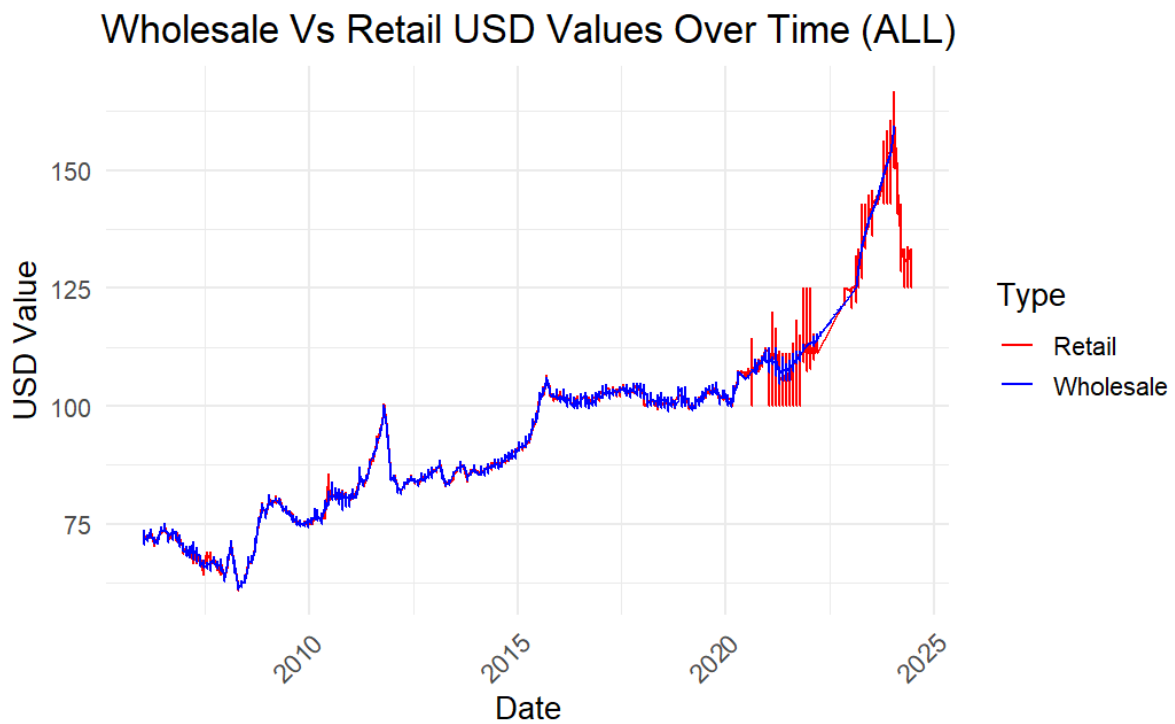


Figure 44: Retail vs Wholesale

Analysis of Wholesale and Retail Price Trends

- An examination of the wholesale and retail prices reveals a close correlation between the two until late 2020.
- This shift suggests a potential conflict in consumer preferences between retail and wholesale purchasing, which may have been influenced by the disparity observed between aggregate and actual prices.
- The data indicates that price type—whether wholesale or retail—has an immediate effect on consumer behavior, with fluctuations in price flags directly impacting market dynamics.

Conclusion

In conclusion, this report offers an in-depth analysis of the evolving trends in commodity pricing across Kenya, elucidating the key determinants driving price volatility. The findings underscore the necessity for targeted policy interventions aimed at mitigating regional price discrepancies, enhancing market access, and promoting sustainable agricultural practices. By cultivating a more resilient and efficient commodity system, stakeholders can better address the complexities of pricing dynamics, thereby contributing to long-term economic stability and food security in Kenya.

"I've always believed that if you set your goals and work hard, you can achieve almost anything. John Nash"