



GHANA STATISTICAL SERVICE



FOOD PRICE VARIABILITY ACROSS REGIONS IN GHANA



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1. INTRODUCTION

Food is a basic human need that should be accessible and affordable to all individuals. However, regional disparities in geographic and financial access to food can contribute to food insecurity and inequality. Food prices vary considerably across regions due to supply-side factors, such as transportation costs, local production cost variations, supply chain disruptions, and seasonality. These regional price differences can have significant implications for individuals' ability to access nutritious and affordable food, particularly for low-income households.

Ensuring access to food is a priority development target which is reflected by the Sustainable Development Goal 2 which aims to end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious, and sufficient food all year round. The ability to access food is mainly influenced by food availability, prices, and household income. This makes poorer households more vulnerable, particularly when food prices are high such as in the current case of Ghana where food inflation has about tripled in the 16 months period between January 2022 and April 2023.

The 2017/2018 Ghana Living Standards Survey 7 indicated that households spent on average 42.9 percent of their expenditure on food. Poorer households spend a relatively larger share of their income on food: the share of household expenditure spent on food ranges from 38.2 per cent for the highest wealth quintile to 49.2 percent for the lowest. Provisional results from the 2022 Annual Household Income and Expenditure Survey first quarter data indicate that households in Ghana spent 62.0 percent of their expenditure on food, indicating that the share of household expenditure spent on food has increased over time and highlighting the importance of analysing levels of and variations in food prices.

This report analyses price variations in food products across the 16 regions and explores trends in food prices between January 2022 and April 2023. It specifically focuses on variations across regions given the regional variations observed in food inflation. The report presents statistics on absolute prices and price differentials for selected food items within and across regions in Ghana. It also compares differences in prices within regions (at various outlets) and differences between regions.

The analysis of price variations in food items across different regions is crucial for understanding the dynamics of food pricing and the impact it has on consumers and the food industry for several reasons. Firstly, it provides critical information on how prices of food differ across different regions and markets, to help consumers, retailers and producers make informed decisions as to which market or region to market or purchase these food items from. Understanding price variations can help consumers make informed purchasing decisions, especially when they are income constrained. It can also help producers and retailers adjust their pricing strategies based on the prevailing market conditions, thereby improving their competitiveness and profitability.

Measurements of price variations can also help identify potential supply chain disruptions, such as adverse weather conditions or transportation bottlenecks, that can affect the availability and affordability of food items in certain regions. By monitoring price variations, policy makers and industry stakeholders can take appropriate measures to mitigate the effects of disruptions, such as by increasing supply chain resilience or by implementing targeted policies to support affected regions.

Finally, measuring variations in food items across regions can help identify disparities in food accessibility and affordability, especially in low-income or marginalized communities. This would guide policy makers to develop targeted policies to improve food accessibility and affordability, thereby reducing food insecurity.

On a monthly basis, the Ghana Statistical Service (GSS) releases inflation statistics based on the Consumer Price Index (CPI) and inflation. Inflation provides information on the relative change over time in the price of a fixed basket of goods but does not provide information on trends and variations in the average price level of individual items in the basket. The statistics on regional price variations on selected food items for April 2023 should not be compared to regional inflation figures for April 2023. This is because the former reflects changes in price at the item level while the regional inflation rate provides information on the change in price for all items in the inflation basket.

The objective of the report is to provide insights into food price variation and trends to help stakeholders in the food value chain make informed decisions about pricing strategies.

2. DEFINITION OF CONCEPTS, DATA SOURCE, AND METHODOLOGY

2.1. Definition of Concepts

2.1.1. Inflation basket

Refers to the group of items for which prices are collected every month for the computation of CPI. Items are ordered in a hierarchy of 13 Divisions, 44 Groups, 98 Classes, 156 Subclasses and 307 Items in the basket.

2.1.2. Outlets

Outlets refers to the various locations (shops) where prices of items in the inflation basket are collected for the computation of monthly CPI.

2.1.3. Price point

This refers to the data point (or unit of observation) representing the price of an item collected at an outlet.

2.1.4. Price per kg/litre

Standardised price for food items. Food items measured in kg and litres were standardised to per units and the prices estimated for units.

2.1.5. Price variation

For the purposes of this report, price variation is defined as the difference in median prices across outlets and regions.

2.2. Data Source

Data for analysing variations in prices were sourced from price data collected for the monthly computation of CPI. The data is collected on 307 items from across all 16 regions in Ghana. Information on 10 food items were used. All values are in Ghana cedis. The data used include prices and quantities on food items collected across all outlets in all 16 regions.

2.3. Justification for the Selection of Food Items

This report presents price variability on 10 selected staple food items. Items in the inflation basket that were considered for the analysis were food items in the inflation

basket on which prices were collected for the month of April 2023. Items with a standardisable unit of measurement, i.e., litres or kg were eligible for inclusion.

The multi-stage selection process is described as follows:

- a. The initial selection criterion was for an item to have at least five standardisable price points in at least 10 regions. Price points measured in non-standardised units such as pans were excluded at this level. The rationale for including the number of price points as a criterion is to ensure that there are enough price points to compute meaningful statistics for each region and to have items available in more than half of the administrative regions.
- b. The second level of selection of items was based on relative weights of these items in the inflation basket which represented their average share of household expenditure in the GLSS 7. Items in the top 50 items ranked by their weights in the inflation basket were included in the final selection i.e. beef, bread, cassava, cooking oil, imported rice, milk, plantain, tomato paste and yam. An exception was made for millet, a staple food in the northern regions of the country (Northern, Savannah, North East, Upper East, Upper West), with weight ranking in the top 50 in these regions but not nationally was included for representation of food items across the country.

Based on the selection criteria, milk was the only item out of the 10 to have the requisite standardisable price points in all 16 regions. Plantain and millet had the fewest regions (10) with the requisite price points.

2.4. Methodology

2.4.1. Unit of measurement

The units of measurements of selected food items were standardised to either kg or litre depending on how they were measured. Observations of standardised prices above GH¢ 1,000 were considered outliers and dropped to avoid their influence on the estimates. Units of measurements that could not be standardised into kg or litres were excluded from the analysis. Unit prices per kg/litre were computed and the median of the unit price was estimated.

2.4.2. Estimation

The median prices for each food item were computed using the standardised units of measurement and dropping extreme price points from the data. The median prices of the 10 selected food items were ranked for each region to determine the top-ranked region for all the selected items. Trend plots are used to show the changes in median prices of the selected food items for each region from January 2022 to April 2023.

The Theil index was then used to estimate the between and within variations in median prices across all regions. To avoid the influence of extreme prices values, median prices instead of mean prices were used since the median is not affected by these extreme prices.

2.4.3. Theil Index

The Theil index is a measure of inequality that provides information on the contribution of within group, and between group inequality to overall inequality. The items that have been used for the within-group and between-group variation computations are the same as those used in the rest of the report. To ensure that extreme unit prices do not affect the estimates of the inequality, outliers were dropped before the Theil indexes were computed.

2.4.4. Computing of interquartile range

The interquartile range (IQR) was used as a measure of deviation because the median is used as a measure of central tendency. The interquartile range represents the difference between the third quartile (also known as the 75th percentile) and the first quartile (or the 25th percentile). The larger the interquartile range, the greater the variation within the region.

The interquartile ranges for each selected item in each region were computed to measure the extent to which unit prices deviate from the median price within the region. The interquartile range measures within-regional variations of unit prices from the various outlets in the region where prices were collected.

3. Results

3.1. Median Prices of Items

The median price per kg of beef in Central (GH¢ 62.00), Ashanti (GH¢60.00) and Bono East (GH¢ 60.00) is at least twice the median price in the Upper East (GH¢ 20.00), Northern (GH¢ 23.30), Eastern (GH¢ 26.40), and Upper West (GH¢ 30.00) regions.

Ahafo Region (GH¢ 36.00) has the highest median price per kg of bread, about three times the median price in the Volta (GH¢ 10.00), Upper East (GH¢ 11.70), and Eastern (GH¢ 12.00) regions.

The median price per litre of cooking oil is highest in the Northern Region (GH¢ 43.00) which is more than twice the median price in the Bono East Region (GH¢ 20.00), the region with the lowest median price.

Ahafo Region (GH¢ 20.00) has the highest median price per kg of imported rice which is about twice that of Upper West (GH¢ 10.70), the region with the lowest median price.

Milk has the least variability in median prices per litre across regions with nine out of the sixteen regions recording the same median price of (GH¢ 43.75).

Seven regions have the same median price per kg of tomato paste (GH¢ 28.60). However, there is about GH¢ 10.00 difference between this median price and the highest recorded (Western North, GH¢ 38.60) and lowest (Central, GH¢ 17.00) median prices.

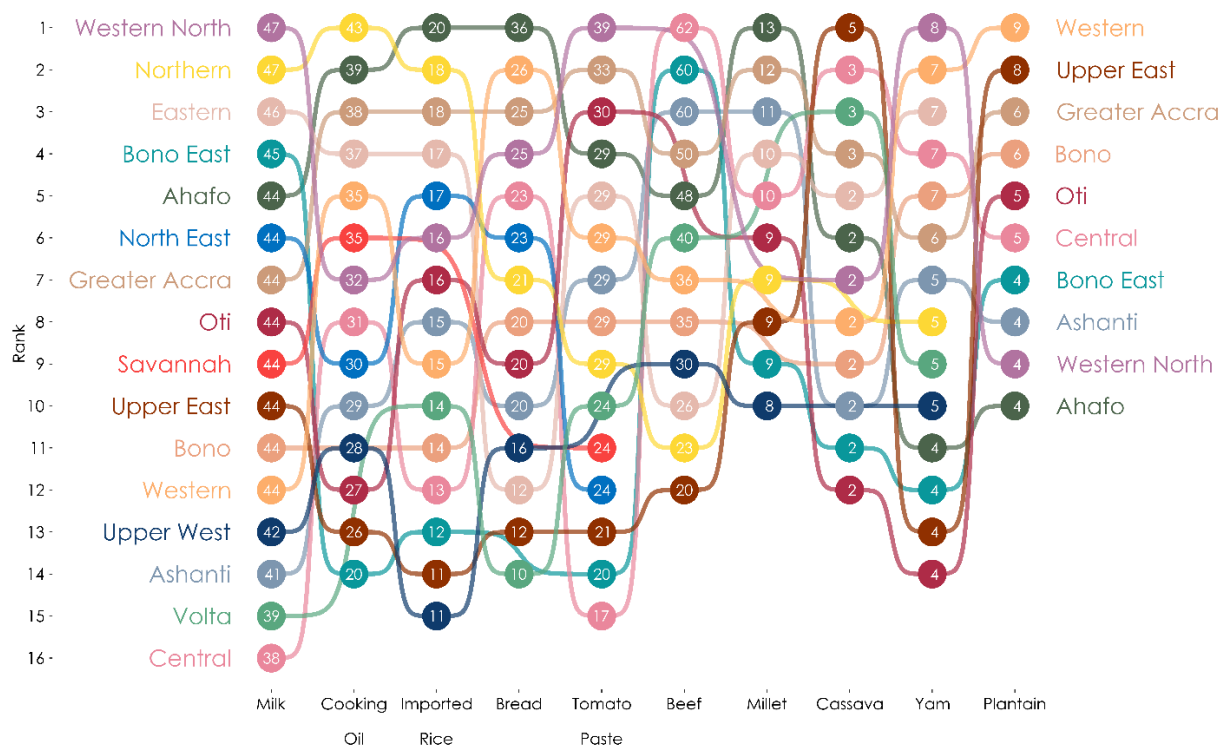
TABLE 1: MEDIAN PRICES OF SELECTED FOOD ITEMS IN GH¢ PER KG/LITRE FOR APRIL 2023 BY REGION

Region	Imported Rice	Millet	Bread	Beef	Milk	Cooking Oil	Cassava	Yam	Plantain	Tomato Paste
<i>National</i>	15.56	10.00	20.00	37.65	43.75	30.35	2.26	5.36	4.60	28.57
Ahafo	20.00	13.37	36.00	48.00	43.75	38.89	2.27	4.31	3.51	28.57
Ashanti	15.00	11.11	20.00	60.00	40.62	28.80	1.96	5.40	3.55	28.57
Bono	14.00	-	20.44	34.72	43.75	-	1.99	7.10	5.73	28.57
Bono East	12.40	8.66	-	60.00	44.66	20.00	1.95	4.17	3.74	20.00
Central	12.75	10.00	23.08	62.00	37.50	31.00	2.72	7.14	4.63	17.14
Eastern	17.33	10.28	11.99	26.40	45.62	36.67	2.41	7.19	-	28.57
Greater Accra	18.00	11.68	24.59	50.00	43.75	38.40	2.52	6.05	6.02	33.33
North East	17.00	-	22.73	-	43.75	30.00	-	-	-	23.81
Northern	18.00	9.14	21.11	23.33	46.88	43.00	-	5.25	-	28.57
Oti	16.00	9.16	20.09	-	43.75	27.00	1.88	3.64	4.99	30.00
Savannah	-	-	-	-	43.75	35.00	-	-	-	23.81
Upper East	11.00	8.82	11.73	20.00	43.75	26.00	4.57	3.81	8.10	21.43
Upper West	10.71	7.86	16.03	30.00	41.88	27.71	-	4.50	-	-
Volta	14.14	-	10.00	40.00	39.06	-	2.53	4.68	-	24.29
Western	14.72	-	25.84	36.00	43.75	35.35	2.16	7.45	8.59	28.57
Western North	16.40	-	24.59	-	46.88	31.76	2.25	7.55	3.53	38.57

Note: Median prices are missing for regions that did not meet the selection criteria stipulated in the methodology

Among the 10 selected food items in April 2023, two regions (Ahafo and Western North) each ranked highest in median prices three times, and Northern, Central, Western, and Upper East ranked first for one item each.

FIGURE 1: RANKING OF MEDIAN PRICES FOR SELECTED FOOD ITEMS BY REGION



The horizontal axis represents the selected food items while the vertical axis represents the regions and the rank of each region. Median prices are compared across regions and the region with the highest median price is ranked highest. For example, Western North region is ranked highest in the median price of milk. Each region's rank can be traced across the various food items by using the colours of each region. The median price of an item in GH¢ per kg/litre is provided for each region.

3.2. Ranking of Regions by Median Prices

Greater Accra Region in April 2023 was the most expensive region for the ten selected food items as the median prices for six items were ranked in the top three, making the region's average rank 3.7.

Upper West Region had the lowest average rank of 11.3 and was the least expensive region for the food items.

TABLE 2: RANKING OF REGIONS ACROSS SELECTED FOOD ITEMS

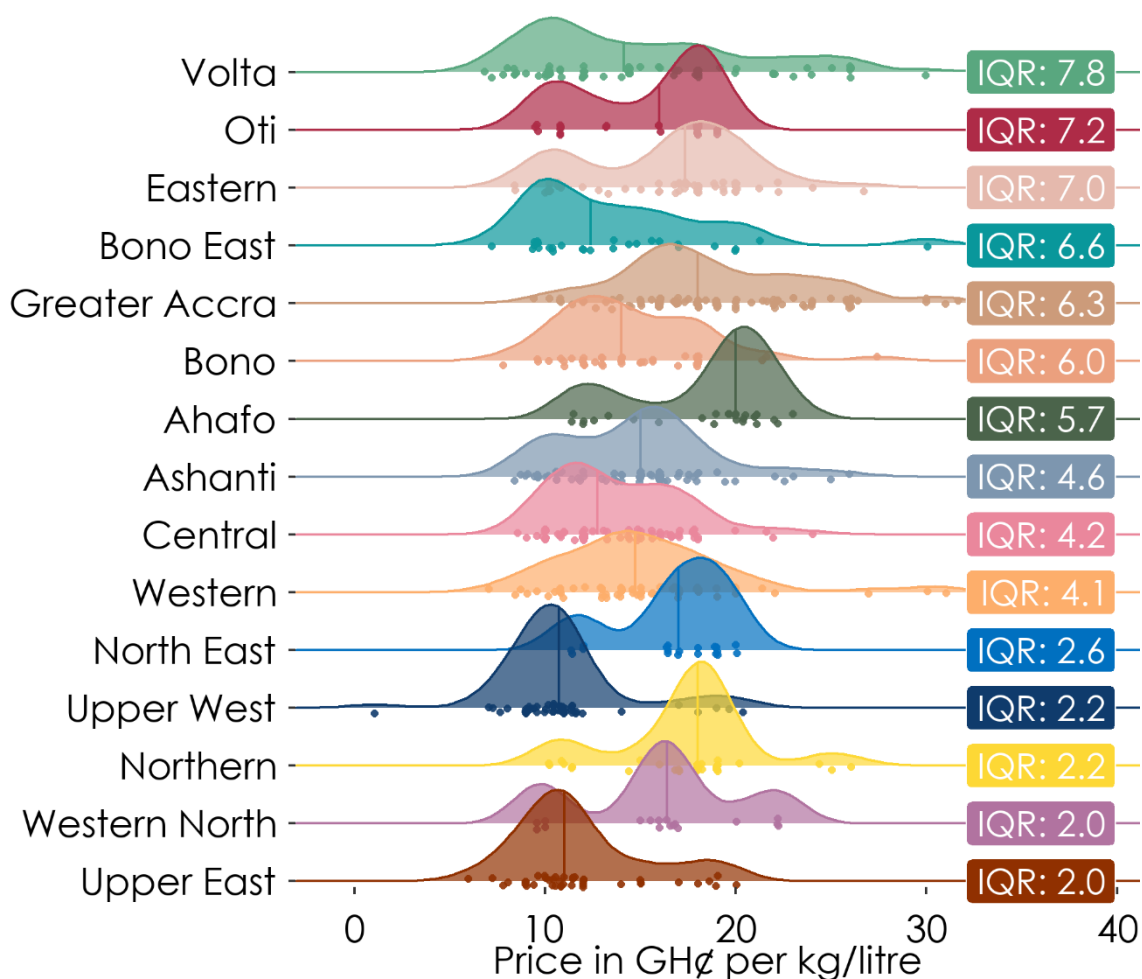
No	Region	Average ranking across food items	Number of times region had the highest median price	Number of times region was ranked in the top 3	Number of items included
1	Greater Accra	3.7	0	6	10
2	Western North	4.5	3	3	8
3	Ahafo	4.6	3	4	10
4	Eastern	5.6	0	2	9
5	Western	5.8	1	3	9
6	Northern	5.9	1	3	8
7	Central	7.4	1	2	10
8	North East	7.6	0	0	5
9	Ashanti	8.0	0	2	10
10	Bono	8.0	0	0	8
11	Oti	8.4	0	1	9
12	Savannah	8.7	0	0	3
13	Bono East	9.6	0	1	9
14	Volta	9.6	0	1	7
15	Upper East	9.9	1	2	10
16	Upper West	11.3	0	0	7

3.3 Comparison of Within Region and Between Region Differences of Prices

The figures in this section present density plots of all prices for each selected food item. The bell-shaped area shows observations clustered around the median price. The peak of the distribution represents the median price with the width of the chart representing the price variability within the region, namely the deviation of prices from the median price in the region.

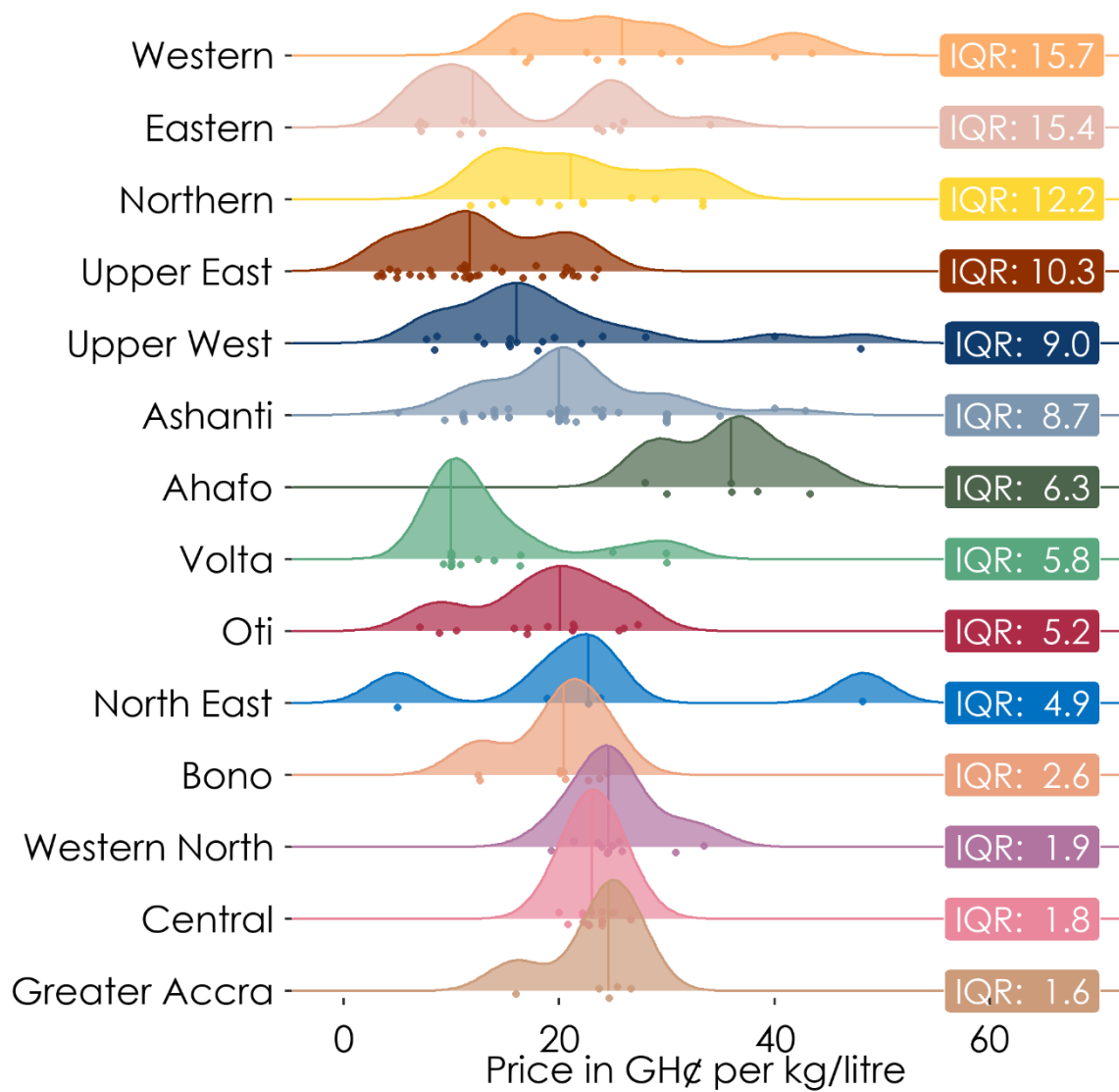
The within region price variability for rice is highest in the Volta Region (7.8), which is more than three times the within region variability in the Upper East Region (2.0) and Western North Region (2.0).

FIGURE 2: PRICE OF IMPORTED RICE WITHIN AND BETWEEN REGIONS IN APRIL 2023



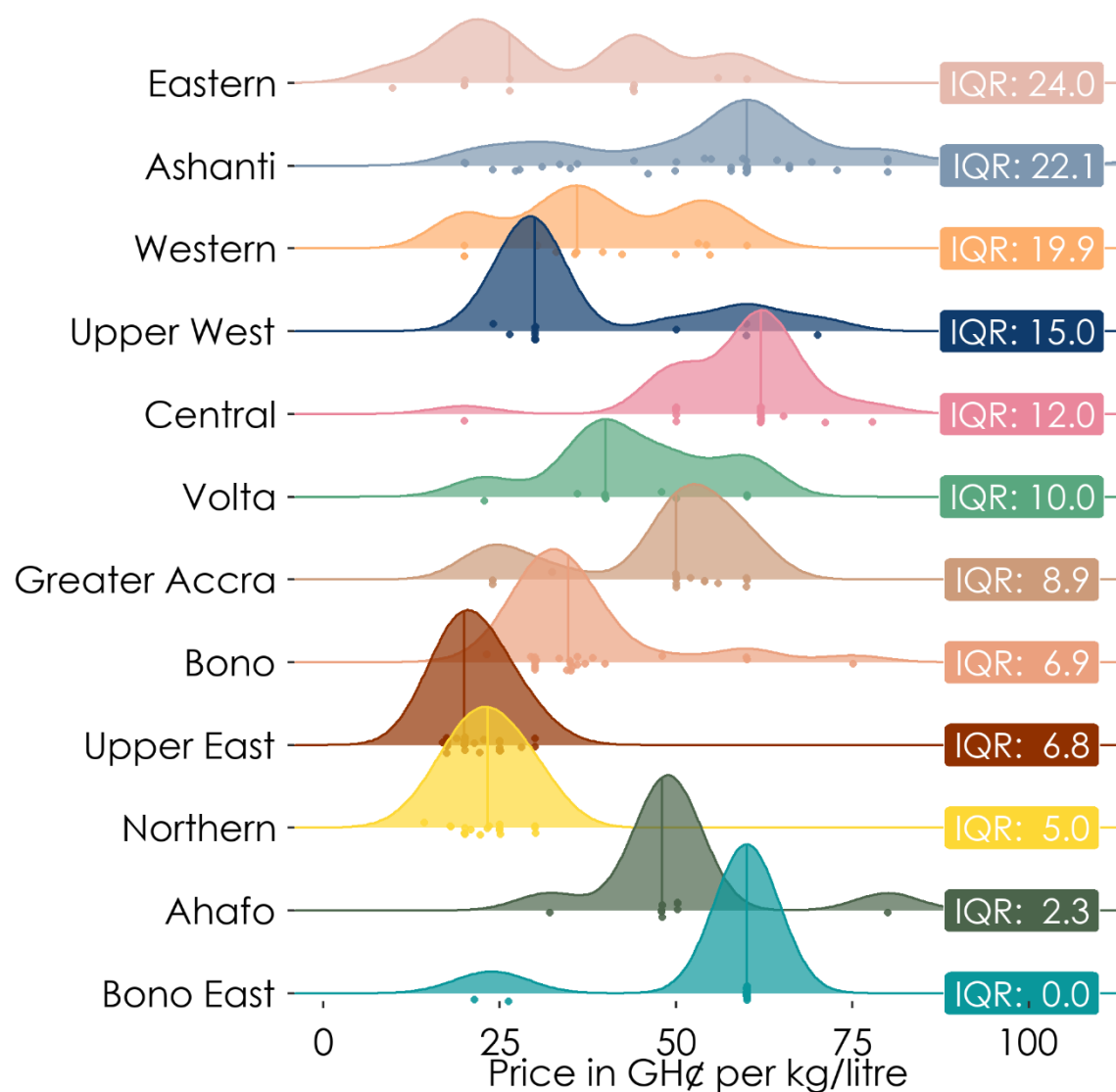
The deviation of prices from the median price per kg of bread is highest in the Western Region (15.7). This deviation is nearly 10 times the deviation in the Greater Accra Region (1.6), the region with the lowest deviation.

FIGURE 3: PRICE OF BREAD WITHIN AND BETWEEN REGIONS IN APRIL 2023



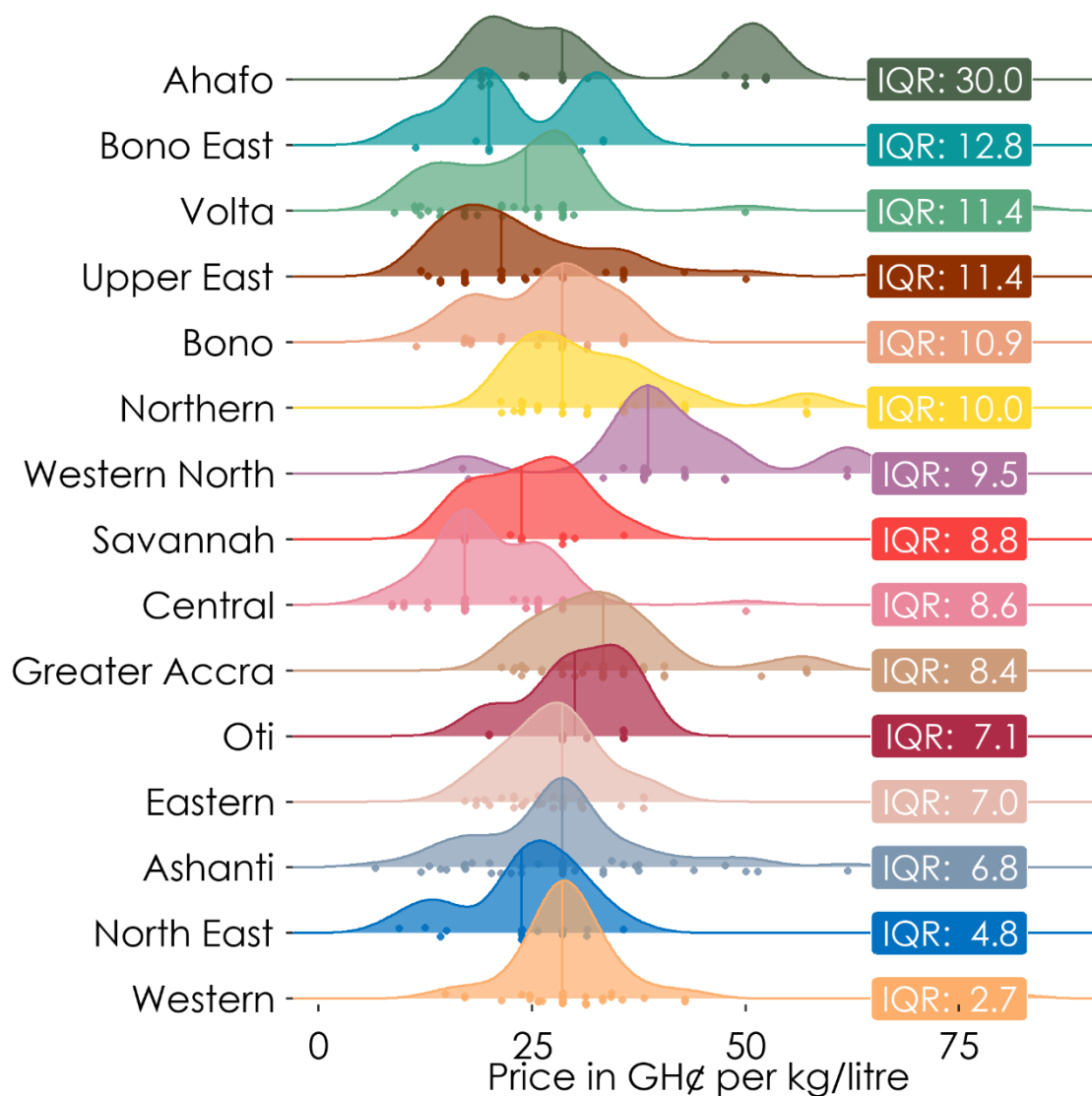
Despite recording the third lowest median price (GH¢26.40) of beef, Eastern Region had the highest within region variation (24.0), which is about 240 times the variation in the Bono East Region, the region with the lowest within region variability.

FIGURE 4: PRICE OF BEEF WITHIN AND ACROSS REGIONS IN APRIL 2023



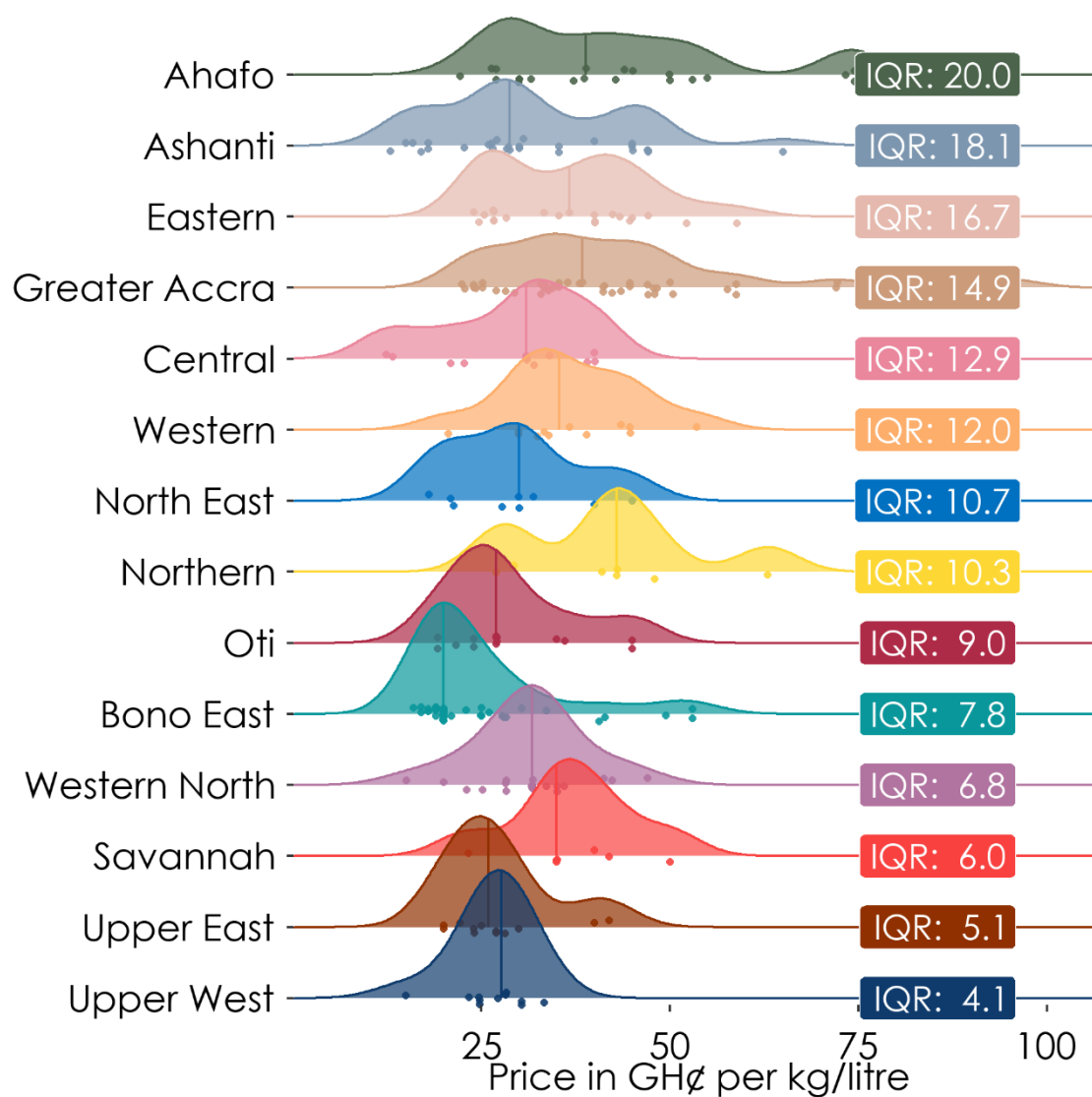
The deviation in prices for tomato paste is highest in the Ahafo Region (30.0) which is about 11 times as high as Western Region (2.7), the region with the lowest price variability.

FIGURE 5: PRICE OF TOMATO PASTE WITHIN AND ACROSS REGIONS IN APRIL 2023



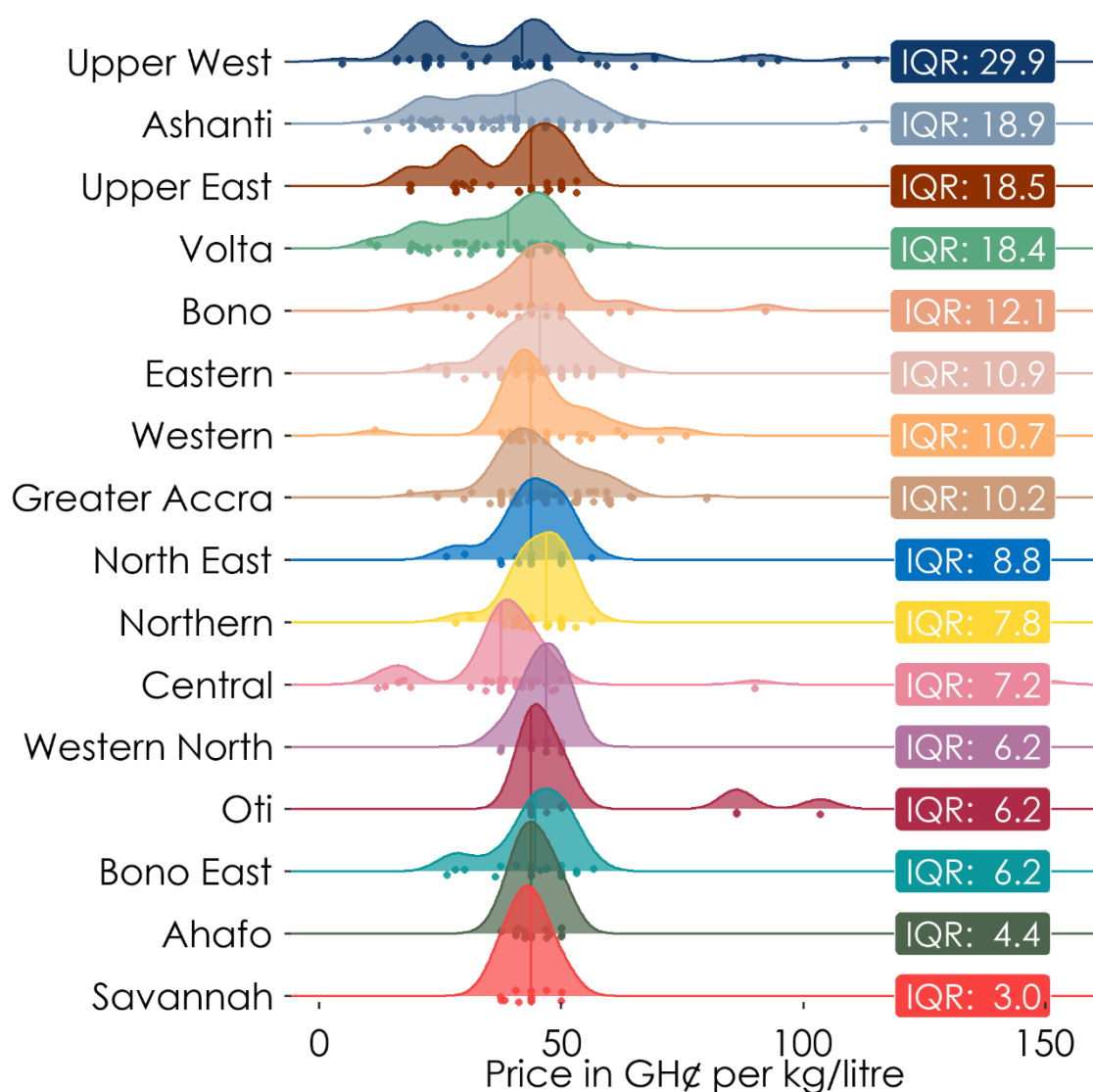
Even though the Northern Region has the highest median price for cooking oil, the within region variation of prices is highest in Ahafo (20.0), which is about twice that of the Northern Region (10.3).

FIGURE 6: PRICE OF COOKING OIL WITHIN AND ACROSS REGIONS IN APRIL 2023



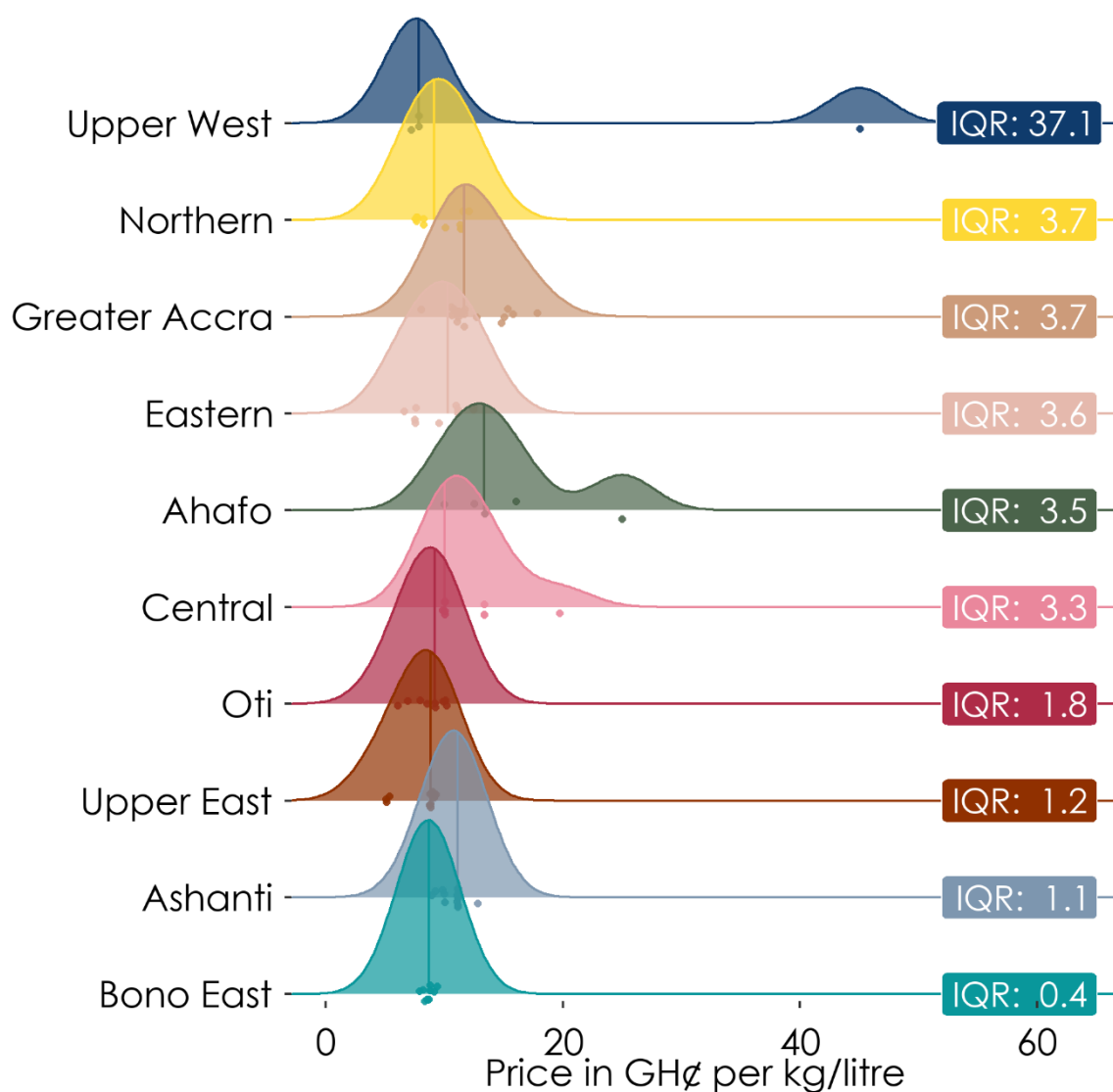
The dispersion in the unit prices of milk, depicting within region variation, is highest in the Upper West Region (29.9) which is about 10 times the dispersion in the Savannah Region (3.0), the region with the lowest price variation.

FIGURE 7: PRICE OF MILK WITHIN AND ACROSS REGIONS IN APRIL 2023



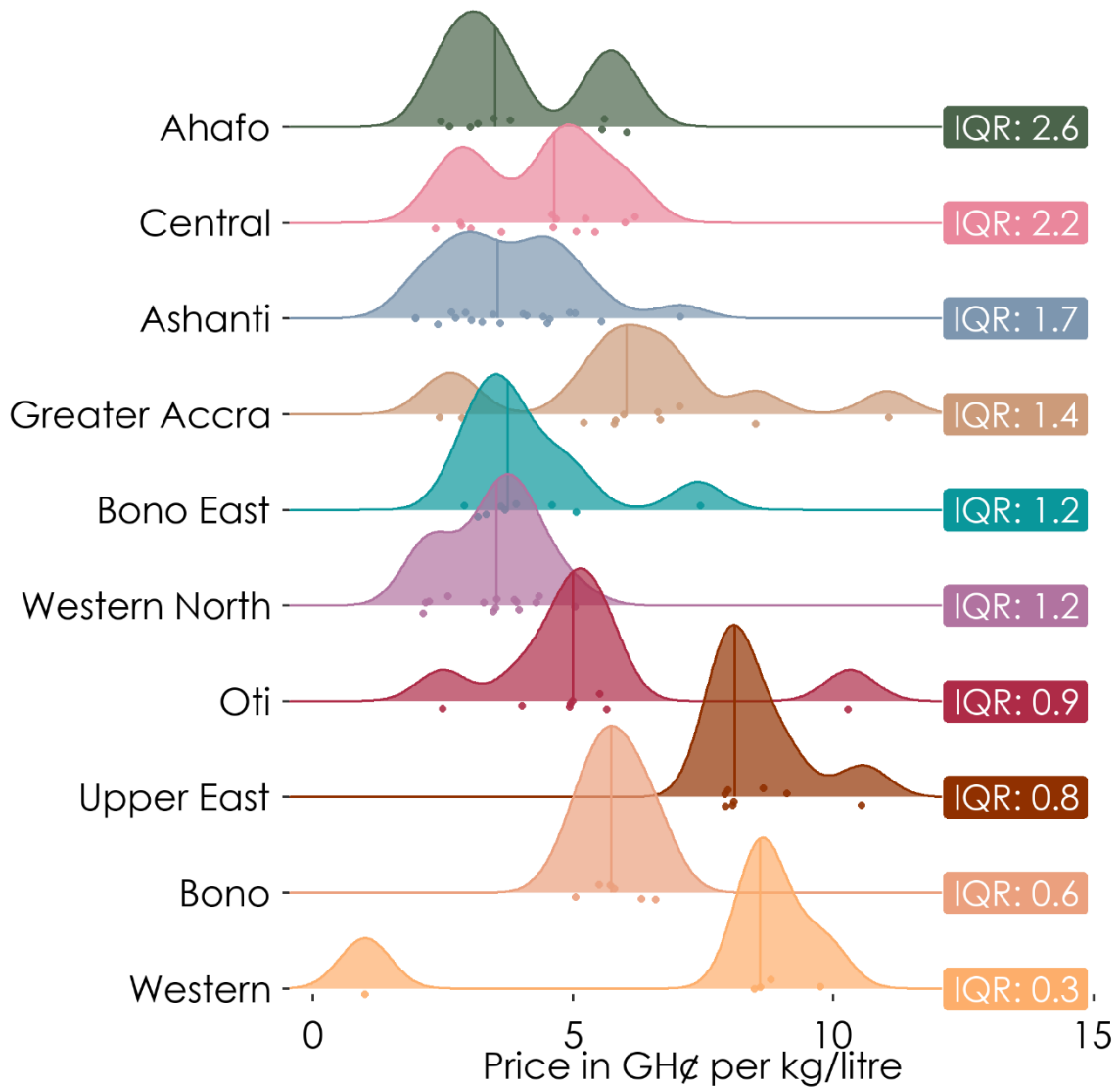
The Upper West Region has the lowest median price of millet (GH¢ 7.9) but has the highest within region variation in prices (37.1), which is more than 10 times the variation in all the other regions.

FIGURE 8: PRICE OF MILLET WITHIN AND ACROSS REGIONS IN APRIL 2023



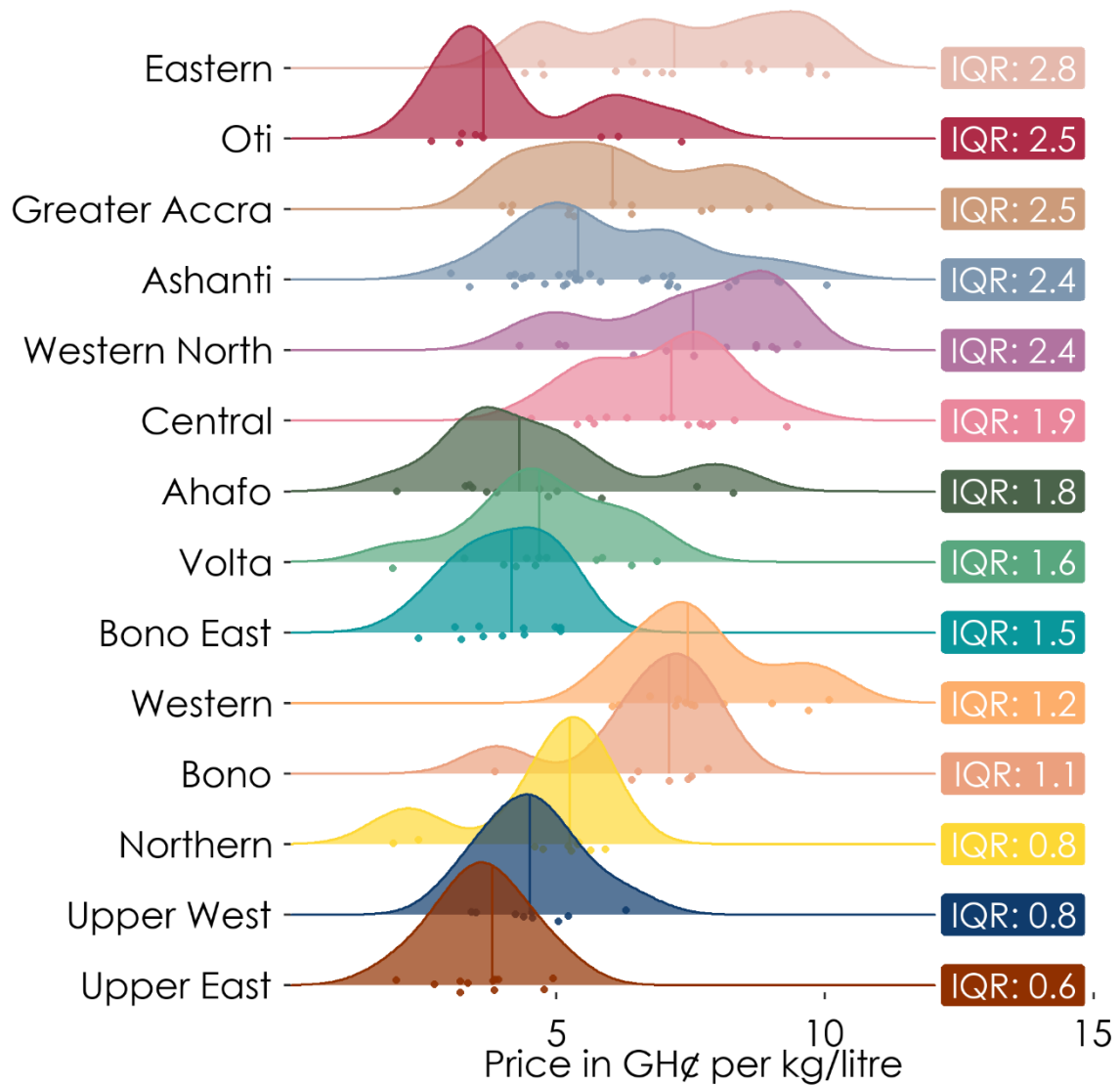
Within region variation in unit prices of plantain is highest in the Ahafo Region (2.6), which is about nine times the variation in the Western Region (0.3), the region with the lowest variation.

FIGURE 9: PRICE OF PLANTAIN WITHIN AND ACROSS REGIONS IN APRIL 2023



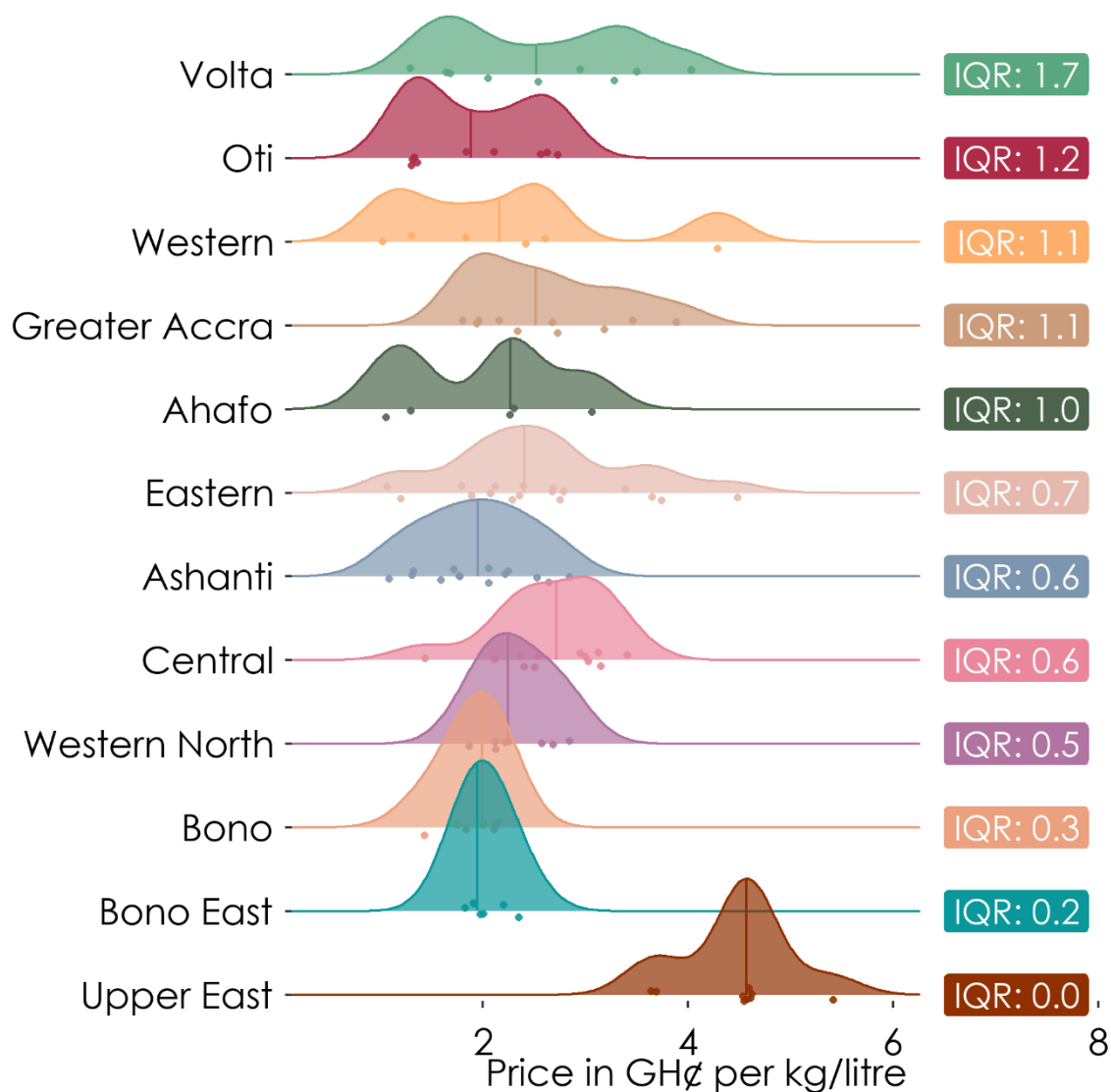
The within region price variation of yam is the second highest in Oti Region (2.5), the region with the lowest median price per kg.

FIGURE 10: PRICE OF YAM WITHIN AND ACROSS REGIONS IN APRIL 2023



The Upper East Region, despite having the lowest within region variation of less than 0.1, recorded the highest median price (GH¢4.60) of cassava while Volta Region, with a lower median price (GH¢2.5) of cassava, had the highest within region variation of 1.7.

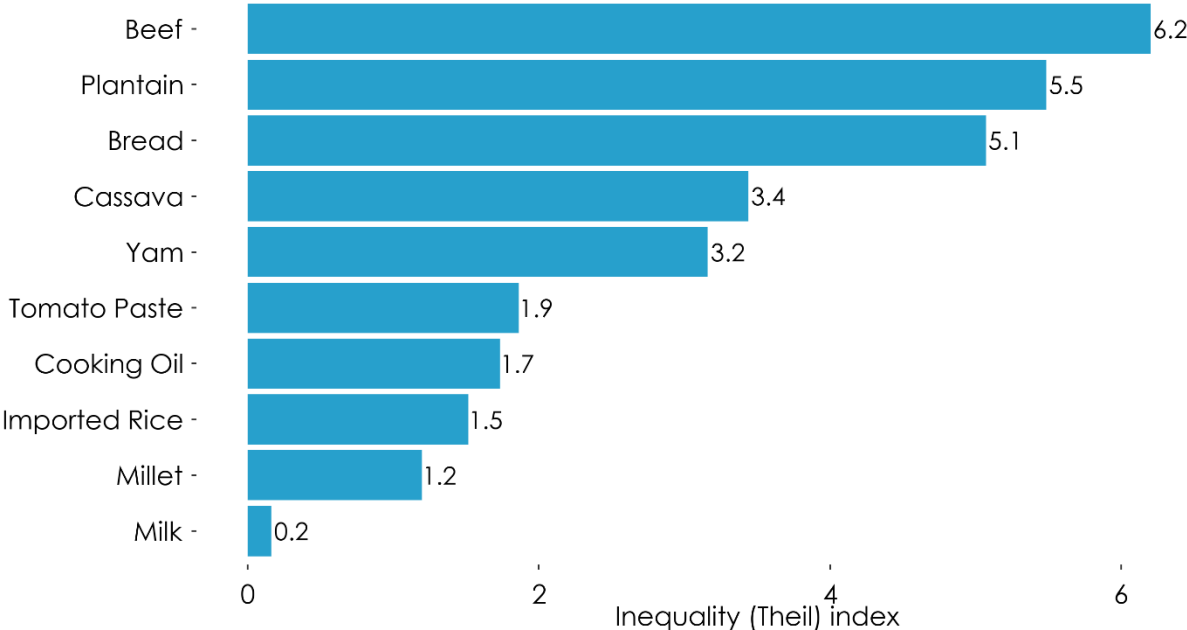
FIGURE 11: PRICE OF CASSAVA WITHIN AND ACROSS REGIONS IN APRIL 2023



3.4 Inequality Index (Theil's Measure) Comparison of Prices

The median price of beef is most unequal between regions, having a Theil index of 6.2 percent which is 31 times the Theil index of milk (0.2%), the item with the least inequality.

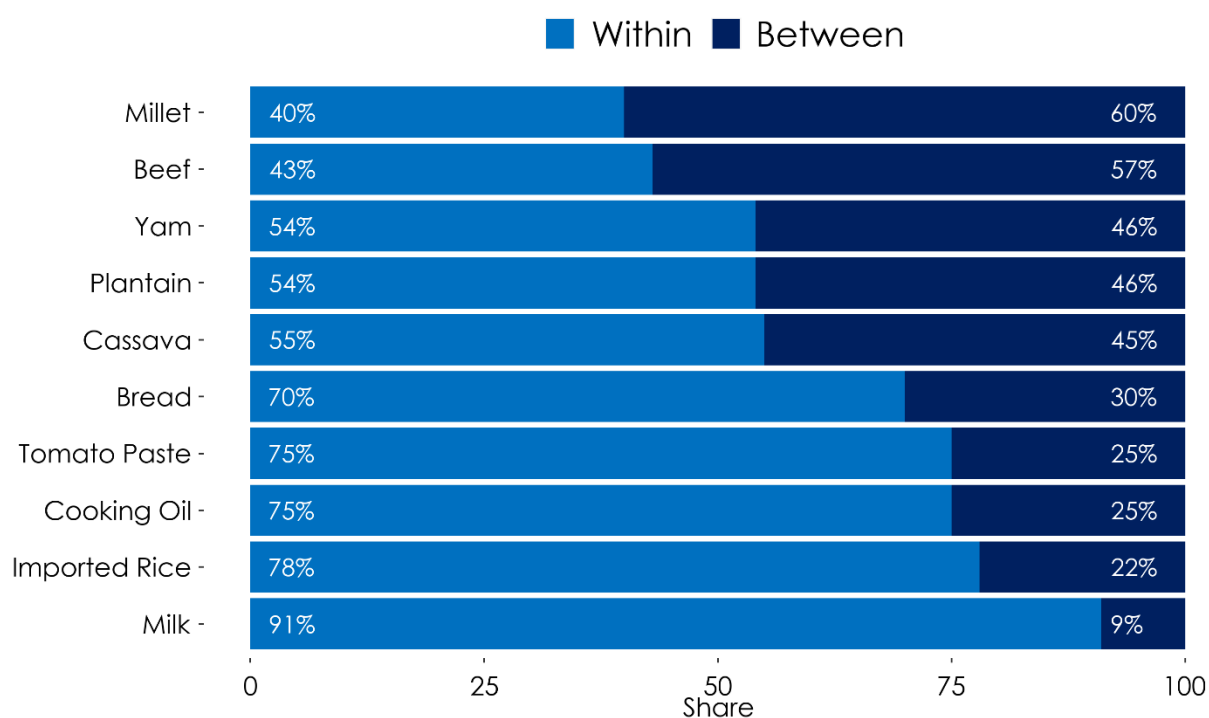
FIGURE 12: THEIL INDEX INEQUALITY IN REGIONAL MEDIAN PRICES OF SELECTED FOOD ITEMS



Eight out of the 10 selected food items (yam, plantain, cassava, bread, tomato paste, cooking oil, imported rice, milk) have within region inequality higher than between region inequality.

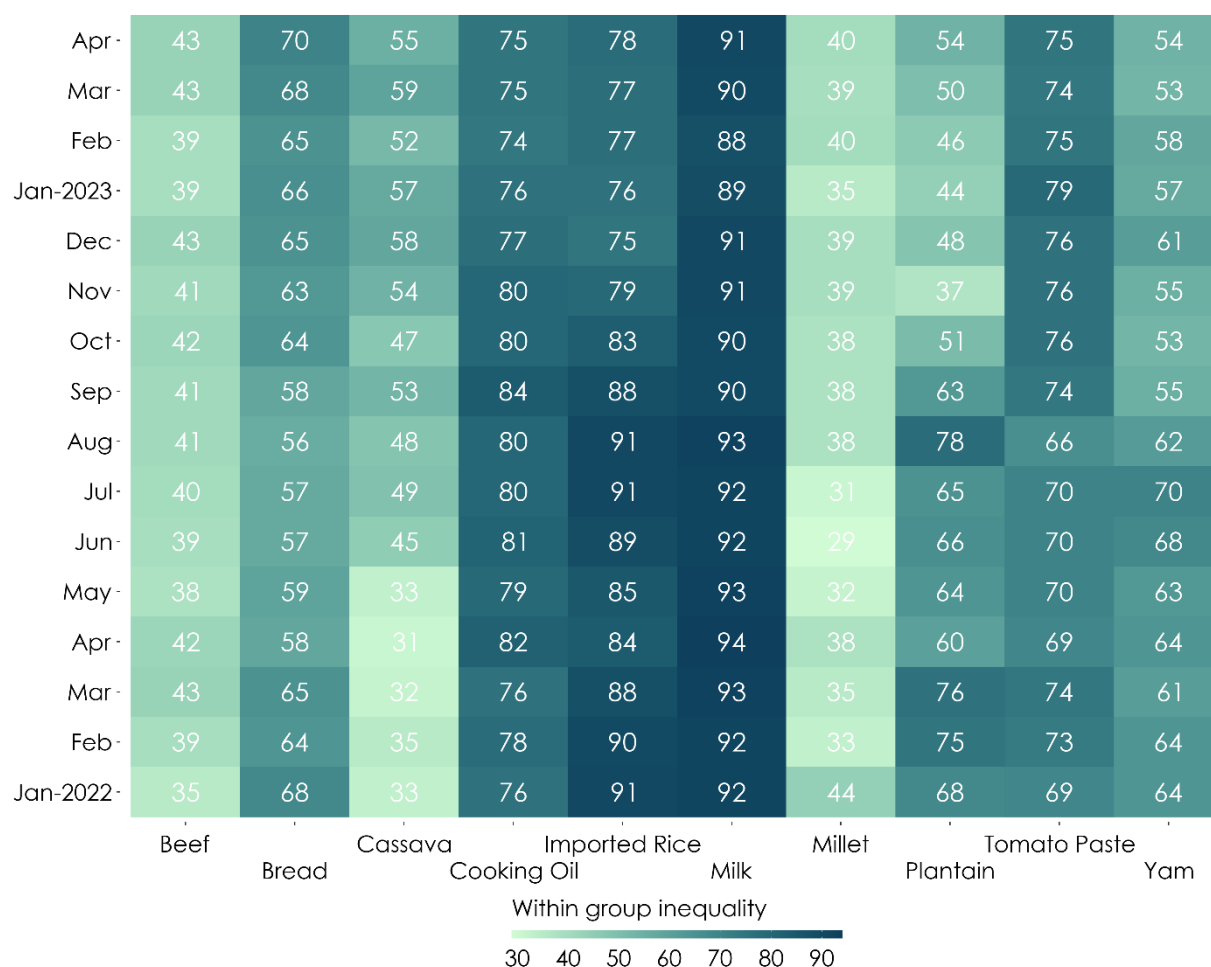
Millet and beef are the only food items having more between region variation in prices than that of within region variation.

FIGURE 13: THE SHARE OF WITHIN AND BETWEEN INEQUALITY (THEIL INDEX) ON MEDIAN PRICES OF SELECTED FOOD ITEMS



Within region variability has moved in different directions over the last 16 months, with some items [beef (35 to 43), bread (68 to 70), cassava (33 to 55), tomato paste (69 to 75)] experiencing an increase in within region inequality. Others [cooking oil (76 to 75), imported rice (91 to 78), milk (92 to 91), millet (44 to 40), plantain (68 to 54), yam (64 to 54)] experienced a decline in within inequality.

FIGURE 14: WITHIN REGION INEQUALITY (THEIL'S MEASURE) OF UNIT PRICES OVER TIME



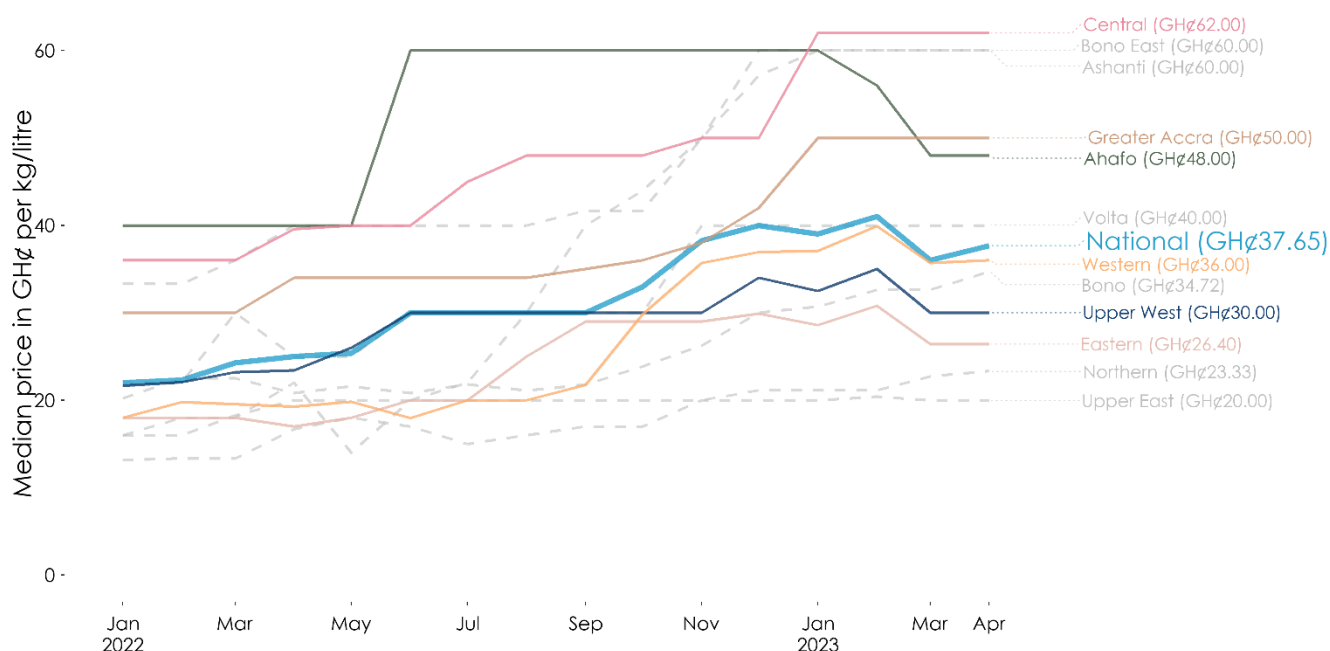
3.5 Prices of Selected Food Items over Time

Nationally, the median price of beef peaked in February 2023 driven by the Greater Accra and Central regions, as their prices peaked earlier.

Prices in three regions (Western, Upper West, and Eastern) peaked at the same time (February) as the national median price for beef.

The median price per kg of beef in the Ahafo Region increased significantly and remained at (GH¢ 60.00) between July 2022 and January 2023 and later declined to (GH¢ 48.00).

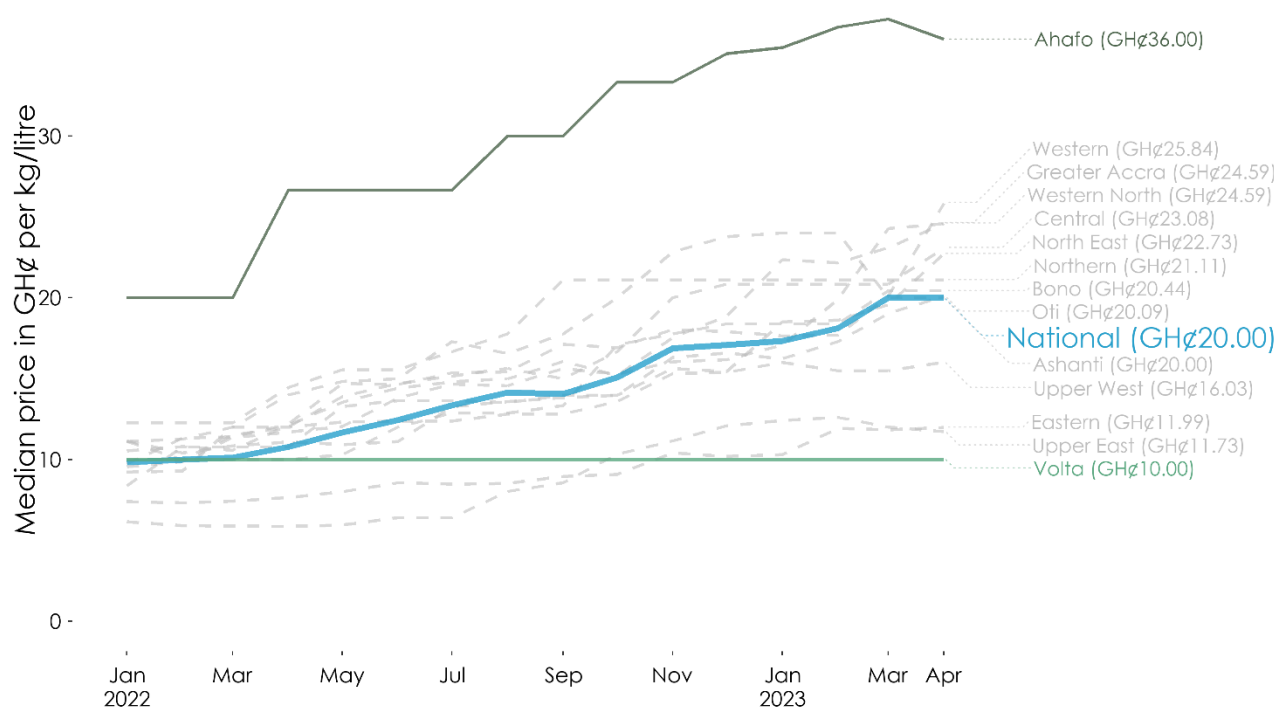
FIGURE 15: PRICE OF BEEF, JANUARY 2022 TO APRIL 2023



In the reference period January 2022 to April 2023, the median price per kg of bread was largely driven by prices in the Ahafo Region. The region's median price (ranging from GH¢20.00 to GH¢36.00) consistently remained about twice the national median price (GH¢10.00 to GH¢20.00) for the 16-month period.

The national median price peaked at the same time (March 2023) as Ahafo and remained stable when there was a marginal decline in Ahafo Region.

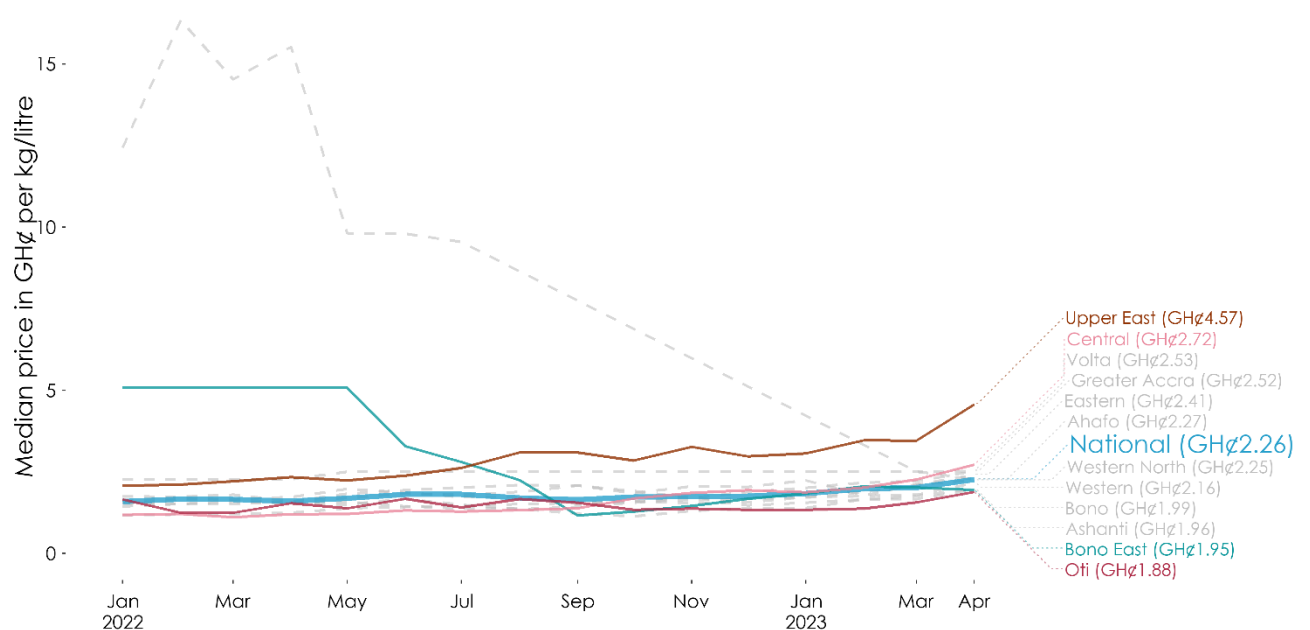
FIGURE 16: PRICE OF BREAD, JANUARY 2022 TO APRIL 2023



The median price per kg of cassava remained fairly stable over the period across most regions with median prices ranging between GH¢ 1.88 (Oti and Bono East regions) and GH¢ 2.72 (Central Region).

Over the reference period, the per kg median price of cassava in Upper East Region (GH¢ 4.57) was twice the national median price (GH¢ 2.26).

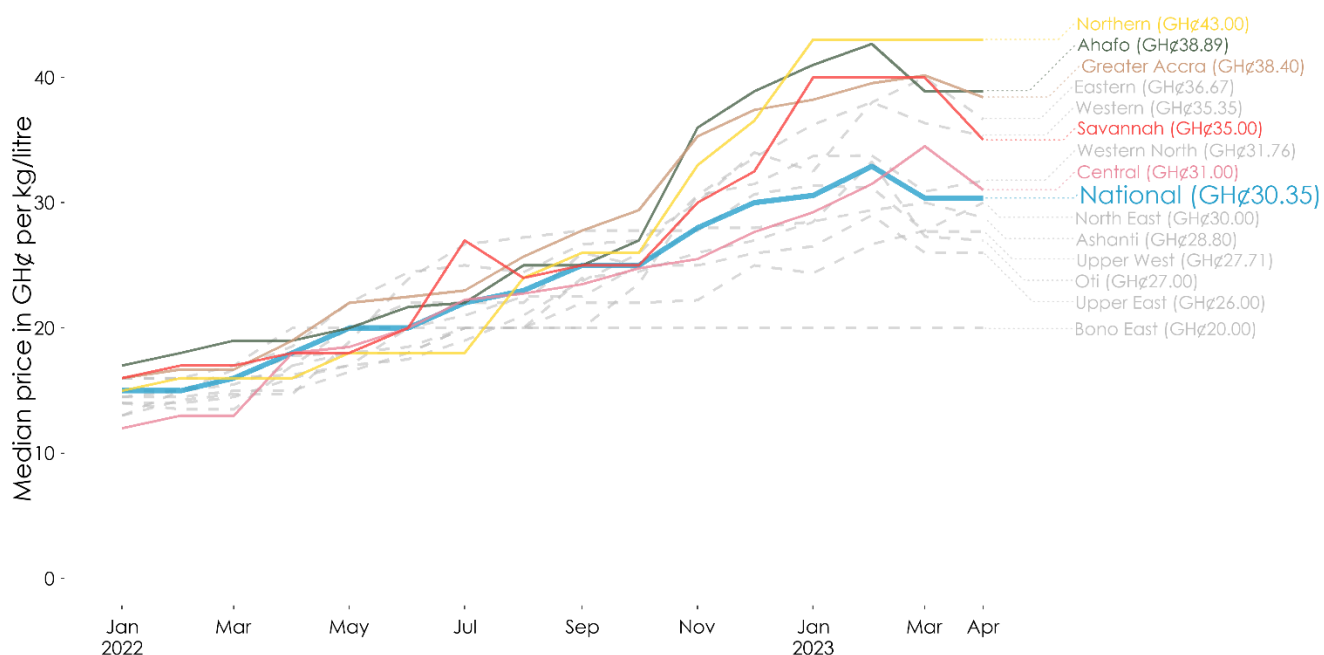
FIGURE 17: PRICE OF CASSAVA, JANUARY 2022 TO APRIL 2023



The national median price per litre of cooking oil peaked in February 2023 and a month on (March 2023), Eastern, Greater Accra and Central regions recorded their highest levels.

Ahead of the national peak in the median price per litre of cooking oil in February 2023, Northern, Western North, Savannah, Upper West regions had recorded their peak in January 2023.

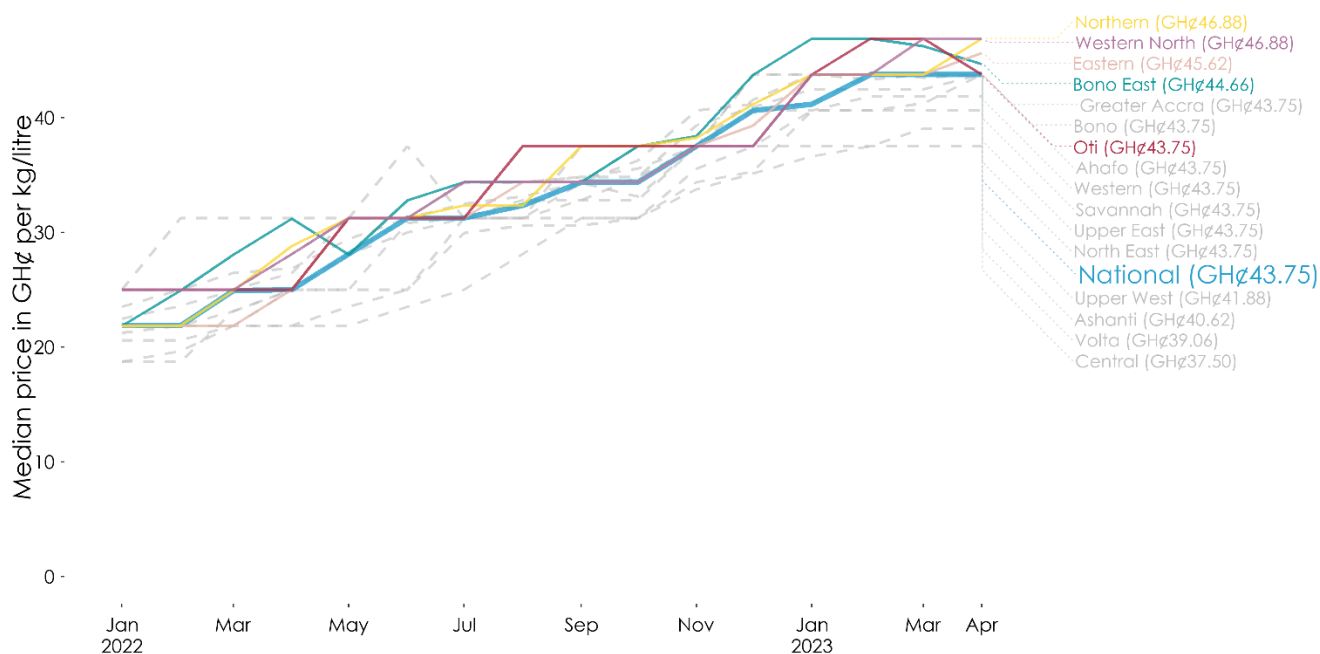
FIGURE 18: PRICE OF COOKING OIL, JANUARY 2022 TO APRIL 2023



The price of milk has remained stable for the last three months (February 2023 to April 2023) with seven regions recording the same median prices as the national median price (GH¢ 43.75).

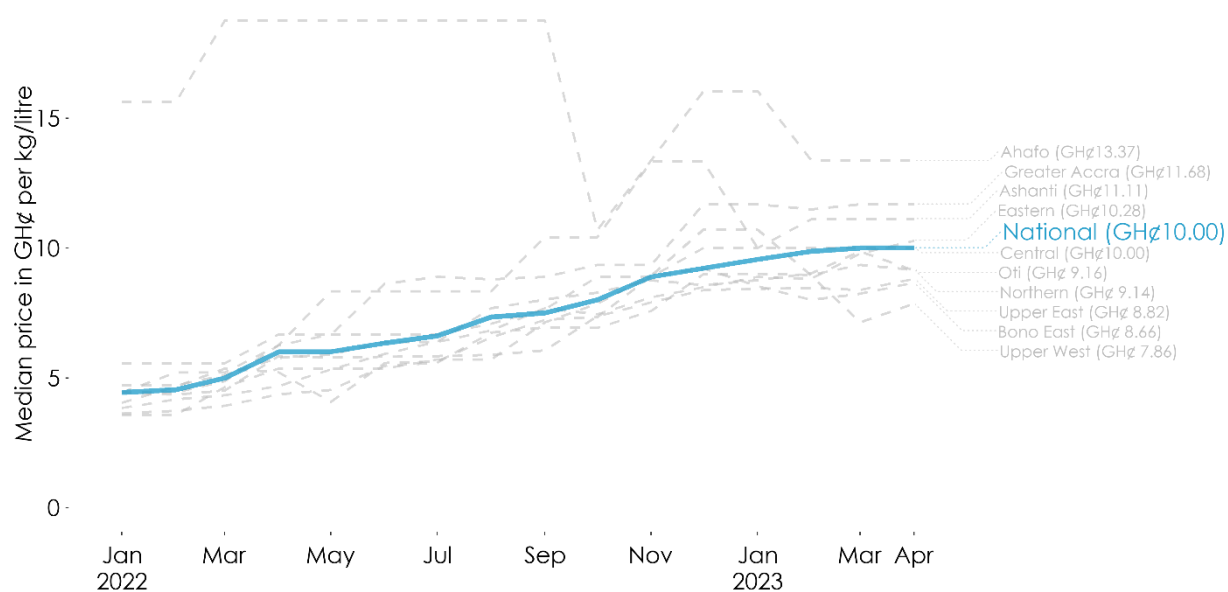
The median price for milk peaked in February 2023 and this associated with prices in Oti, Western North and Bono East regions as prices in these regions were higher than the national median price.

FIGURE 19: PRICE OF MILK, JANUARY 2022 TO APRIL 2023



Ahafo Region over the period has recorded higher median prices per kg of millet, with prices between the month of March and September 2022 being more than three times the national median prices.

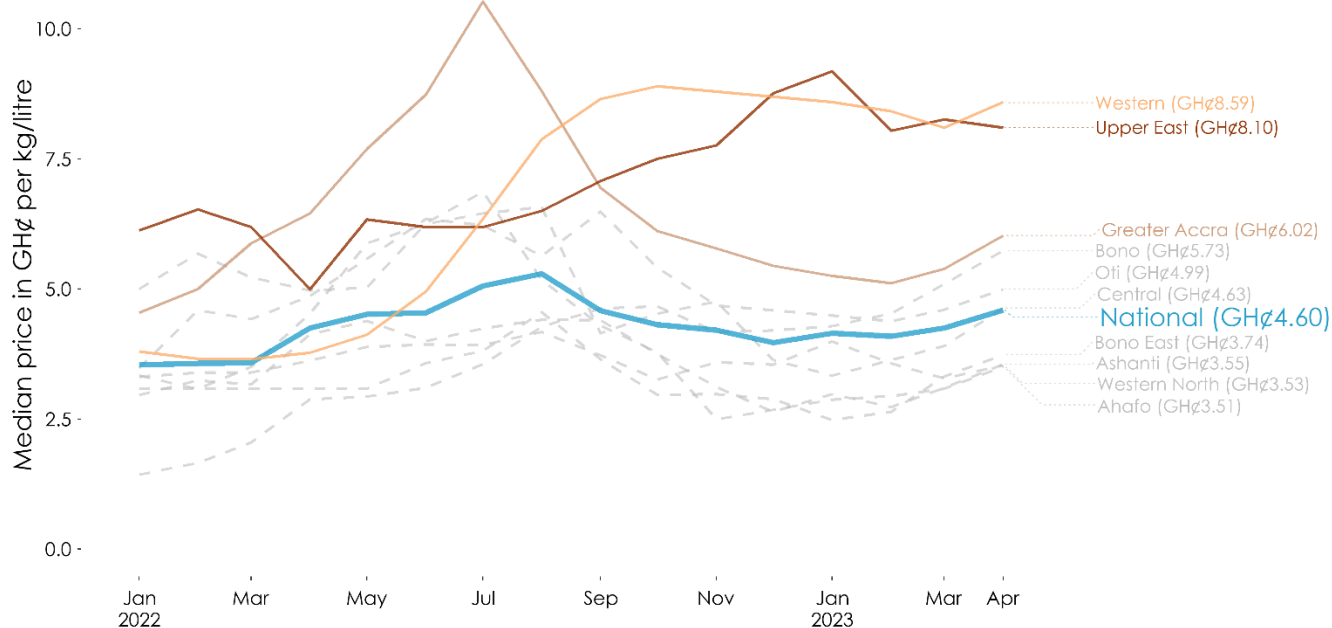
FIGURE 20: PRICE OF MILLET, JANUARY 2022 TO APRIL 2023



Nationally, the median price per kg of plantain started increasing in April 2022, peaked (at GH¢5.00) in August 2022, and this was largely driven by prices in Greater Accra, Western, and Upper East regions.

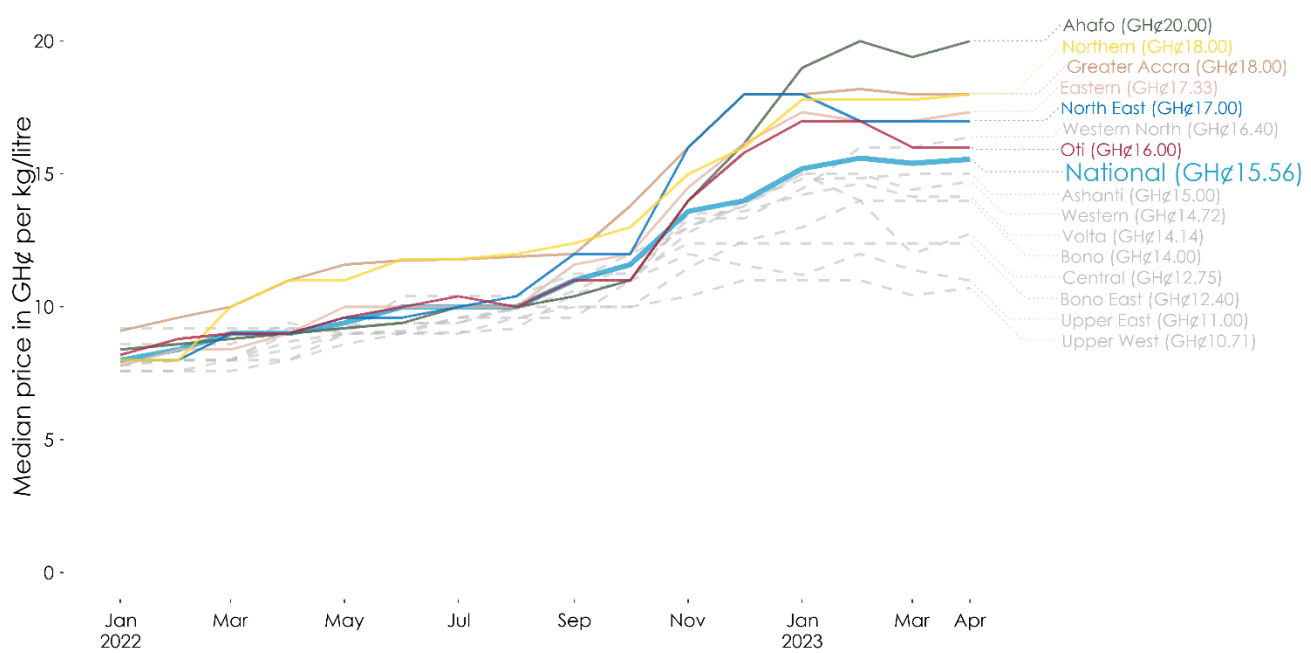
From September 2022, the national median price per kg of plantain declined until December 2022 (GH¢ 5.06 to GH¢ 3.97).

FIGURE 21: PRICE OF PLANTAIN, JANUARY 2022 TO APRIL 2023



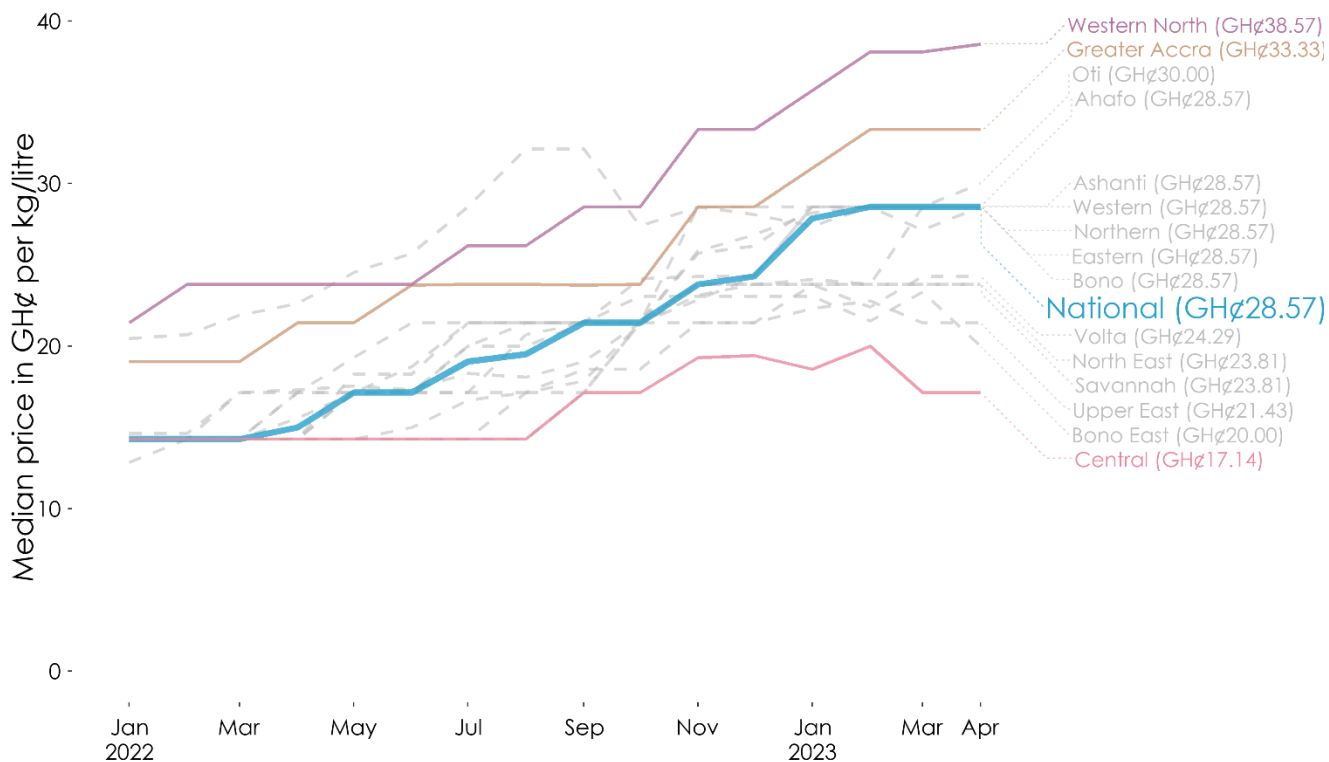
Since September 2022, increases in the national median price per kg of imported rice is associated with upward changes in the Ahafo, Northern, Greater Accra, Eastern, North East, Western North and Oti regions.

FIGURE 22: PRICE OF IMPORTED RICE, JANUARY 2022 TO APRIL 2023



From September 2022 to April 2023, the highest median price of tomato paste was recorded in the Western North Region and this was more than twice the price in the Central Region, which was the lowest.

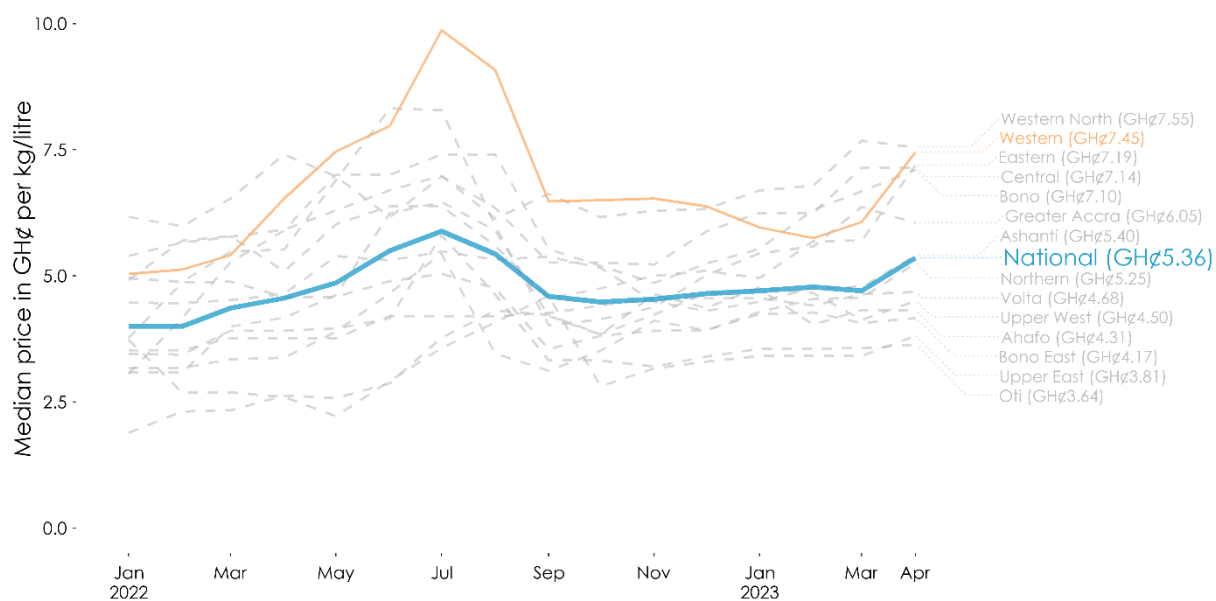
FIGURE 23: PRICE OF TOMATO PASTE, JANUARY 2022 TO APRIL 2023



The median price per kg of yam peaked in July 2022, and declined for the months of August and September 2022.

For the reference period, the trend of the national median price per kg of yam mainly followed the pattern of price changes of yam in the Western Region.

FIGURE 24: PRICE OF YAM, JANUARY 2022 TO APRIL 2023



4. CONCLUSIONS

This report provides information on the price variations of 10 selected food items (beef, bread, cassava, cooking oil, imported rice, milk, millet, plantain, tomato paste, and yam) across regions. The results show that price variations within and across regions are commodity specific as the patterns observed differ for the selected items.

Based on the selected food items, Greater Accra Region recorded the highest prices in April 2023 followed by the Western North then Ahafo regions, Western North and Ahafo were the only regions to have the highest median price for three items each.

Price variation within regions is larger than price variation across regions. Eight out of the ten items had higher within region variation than between regions. Millet and beef were the only items where within region variation was lower than between region variation.

Price of commodities with standard packaging such as milk and tomato paste show less variation across regions with multiple regions recording the same median price. Items without standard packaging e.g., beef and bread show substantial variations across regions.

Findings from this report will provide stakeholders in the food value chain with information to relate the observed variations in unit and median prices to their major pricing decisions. Households can also be guided by the information on the price variation for decision-making. The share of within region inequality in unit prices of selected food items generally being greater than between region inequality provides an avenue for both government and households to reflect in their considerations to drive down and obtain lower food prices all the stages of the value chain of demand and supply of food.

The policy implications of these findings suggest that efforts at driving down inflation may be hastened with the engagement of sub-national governmental agencies. Developing strategies to address regional food price disparities will promote food equity for all will and aid in achieving food security as well as address significantly, macroeconomic variables that are influenced by inflation.

APPENDIX

TABLE 3: INTERQUARTILE RANGE ON PRICES OF SELECTED FOOD ITEMS FOR APRIL 2023 BY REGION

Region	Beef	Bread	Cassava	Cooking Oil	Imported Rice	Milk	Millet	Plantain	Tomato Paste	Yam
Ahafo	2.3	6.3	1.0	20.0	5.7	4.4	3.5	2.6	30.0	1.8
Ashanti	22.1	8.7	0.6	18.1	4.6	18.9	1.1	1.7	6.8	2.4
Bono	6.9	2.6	0.3	-	6.0	12.1	-	0.6	10.9	1.1
Bono East	0.0	-	0.2	7.8	6.6	6.3	0.4	1.2	12.8	1.5
Central	12.0	1.8	0.6	12.9	4.2	7.2	3.3	2.2	8.6	1.9
Eastern	24.0	15.4	0.7	16.7	7.0	10.9	3.6	-	7.0	2.8
Greater Accra	8.9	1.6	1.1	14.9	6.3	10.2	3.7	1.4	8.4	2.5
Northern	5.0	12.2	-	10.3	2.2	7.8	3.7	-	10.0	0.8
Upper East	6.8	10.3	0.0	5.1	2.0	18.5	1.2	0.8	11.4	0.6
Upper West	15.0	9.0	-	4.1	2.2	29.9	37.1	-	-	0.8
Volta	10.0	5.8	1.7	-	7.8	18.4	-	-	11.4	1.6
Western	19.9	15.7	1.1	12.0	4.1	10.7	-	0.3	2.7	1.2
North East	-	4.9	-	10.7	2.6	8.8	-	-	4.8	-
Oti	-	5.2	1.2	9.0	7.2	6.3	1.8	0.9	7.1	2.5
Western North	-	1.9	0.5	6.8	2.0	6.3	-	1.2	9.5	2.4
Savannah	-	-	-	6.0	-	3.0	-	-	8.8	-

Note: Ranges are missing for regions that did not meet the selection criteria for inclusion for the particular item as outlined in the methodology.

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