



## Cereals and grain legumes supply chain: implications for food and feed availability in Nigeria

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### Abstract

Cereals and grain legume are of benefits for human consumption and the feed industry. Grain merchants and market speculators are involved in their distribution across the country. Their low production outputs with imports restriction made their supply grossly inadequate to meet the demand. This paper examined selected grains output in Nigeria from 2010 to 2022, analysed grain supply chain and examined the implications of the activities of grains merchants on grains hoarding. The study used secondary data on output of maize, millet, sorghum, soybean, groundnut and cowpea. Data was presented using table and graph with the aid of Stata software. Conceptual analysis was adopted for the demonstration of grains supply flow. In 1,000 metric tonnes, output of millet reduced from 5,170 in 2010 to 2,000 in 2022. That of maize increased from 7,677 in 2010 to 12,745 in 2021; sorghum's output reduced from 7,141 to 7,000 while that of soybean increased from 142 in 2010 to 680 in 2022. Outputs of millet and sorghum dipped between 2011 and 2013. Grain merchants and speculators hoard grains and sell at higher prices to households and feeds industry due to yearly excess demand over supply. Households buy grains and livestock products at higher prices, households in turn makes labour available to farmers at higher prices with concurrent general price increases. This affects food and feed availability. The paper recommended that Government should purchase grains directly from farmers. Industrial users should also be encouraged to be off-takers of grains through contract farming.

**Keywords:** Grains supply, hoarding, food, feed availability, Nigeria

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### Introduction

The economic importance of cereals and grain legumes cannot be over-emphasised in Nigerian. Grains such as maize, millet, sorghum and soybean provide the largest constituents of human food and feed formulations in livestock production. One reason for this is that they provide energy and protein for human and livestock (Ikem et al., 2023). Thus, their ready availability partly determines the food security level of the country. Of importance, is that the production of the grain crops mostly takes place in the northern and

middle belts of Nigeria. The production pattern implies that the grains are moved across the country to urban areas and other towns for sales. However, due to increasing population that aggravates the demand for the grains, middlemen, grain merchants, speculators and agents are involved in the storage and distribution of the products through the wholesalers to the retailers and consumers.

Nevertheless, there is relatively low production of the grains due to number of reasons including rural-urban migration, banditry and insurgency in the northern parts

of the country that drive farmers from their farms and abandonment of farming for quick money-making ventures like transport service and menial jobs by youths. Government import restriction on food and feed items is also affecting grain supply. These situations adversely affect the nation's quest for food security as enough foods are not produced and available for the growing population, resulting into scarcity and increase in the prices of available food and livestock feed commodities. This paper examined the national outputs of maize, millet, sorghum and soybean from 2010 to 2022 in Nigeria. Also, it analysed grain supply chain in the country and examined the implications of the activities of grains merchants and speculators through grains hoarding. Suggestions were then proffered towards improving grains availability and supply.

There is avalanche of literature on grains output and supply in Nigeria. Some of the reports are Ikem et. al. (2023), Government of Alberta (2023), USDA (2023), Kabir (2021), FAO (2015) and Ndukwu et al. (2015). These studies expounded on the production output, distribution pattern and dietary importance of the grains as well as the challenges confronting the agricultural industry. Moreso, other studies that relates to grains outputs and supply in Nigeria are Badu-Apraku et al. (2013), Tawo (2019), Adamgbe et al. (2020), Odume (2022), Olasehinde, Qiao and Mao (2023) and Wossen et al. (2023). This study examines outputs and conceptualised grains supplies with a reflection of the activity of grain merchants, middlemen and speculators.

### **Methodology**

The study used secondary data of the agricultural sector in Nigeria obtained from

Statista, an online source of statistics and facts on Nigerian Agriculture. Data on grains output for maize, millet, sorghum and soybean from 2010 to 2022 were acquired from the stated source. The data were described using table and graph with the aid of STATA analytical software. Conceptual analysis was also adopted for the supply flow demonstration of the grains from the farm gate to household and industry; and the flow of labour factor from household to the farm. The conceptualisation was backed-up with quantitative and qualitative literature.

### **Results and Discussion**

Major grains outputs in Nigeria: 2010 – 2022. Table 1 and figure 1 show the outputs of maize, millet, sorghum and soybean in Nigeria from 2010 to 2022. Table 1 and Figure 1 are presented for complementary and supplementary purposes to aid discussion. The Table 1 shows the specific numeric outputs while the figure 1 depicts the trends of the grains' outputs. In metric tonnes, millet output was 5,170 in 2010, decreased to 1,271 in 2011 further nosedived to 910 in 2013 it increased in 2014 to 1,399, 1,879 in 2018 and 2,000 in 2020. One major reason for the downward trend in the output of millet was the insurgency and banditry experiences in the north especially between 2011 and 2014 as well as the flood in 2011 and 2012 (the Guardian.com, 2011; Odume, 2022). Maize output increased throughout the period between 2010 and 2021. It was 7,677 in 2010 and increased to 11,548 and 12,745 in 2016 and 2021, respectively. This is line with Wossen et al. (2023) that reported increased in Nigeria Maize out from 2000 to 2022 due to the positive derived effects of maize yield and increase in area cultivated. According to Wossen et al. (2023), these two effects are due to certain factors that are group-able into two sets,

namely maize yield promoting drivers and increase in maize demand for animal feeds, man food and industrial usage. Over the years governments at all levels have introduced and implemented maize production enhancing policies and institutional supports. According to Badu-Apraku et al., 2013; Olasehinde et al. (2023), early maturing, stress resistant and high

yielding varieties had been introduced and adopted over the years. The country is witnessing growth in the number of grain seeds entrepreneurs (Ojoye, 2018), provision of inputs supports to farmers (Tawo, 2019; Adamgbe et al., 2020) and increasing maize demand for human, livestock and industrial consumption (Wossen et al., 2023).

**Table 1: Outputs of selected grains in Nigeria (Metric Tonnes): 2010 -2022**

| Year | Millet | Maize  | sorghum | soybean |
|------|--------|--------|---------|---------|
| 2010 | 5,170  | 7,677  | 7,141   | 142     |
| 2011 | 1,271  | 8,878  | 5,690   | 177     |
| 2012 | 1,281  | 8,695  | 5,837   | 205     |
| 2013 | 910    | 8,423  | 5,300   | 220     |
| 2014 | 1,399  | 10,059 | 6,883   | 240     |
| 2015 | 1,485  | 10,562 | 7,005   | 350     |
| 2016 | 1,553  | 11,548 | 7,556   | 405     |
| 2017 | 1,510  | 10,420 | 6,939   | 450     |
| 2018 | 1,879  | 11,000 | 6,721   | 520     |
| 2019 | 1,939  | 12,700 | 6,665   | 600     |
| 2020 | 1,905  | 12,400 | 6,590   | 647     |
| 2021 | 1,922  | 12,745 | 6,725   | 641     |
| 2022 | 2,000  | NA     | 7,000   | 680     |

NA = Not available

Source: Statista (2023)

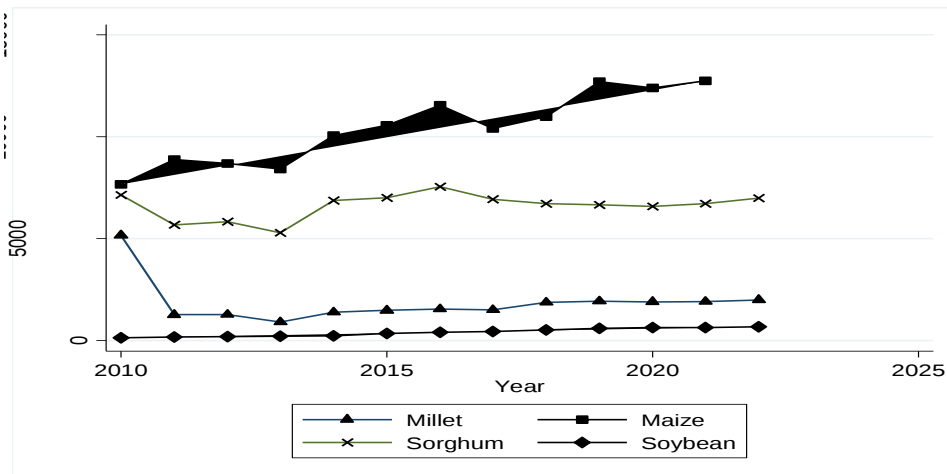
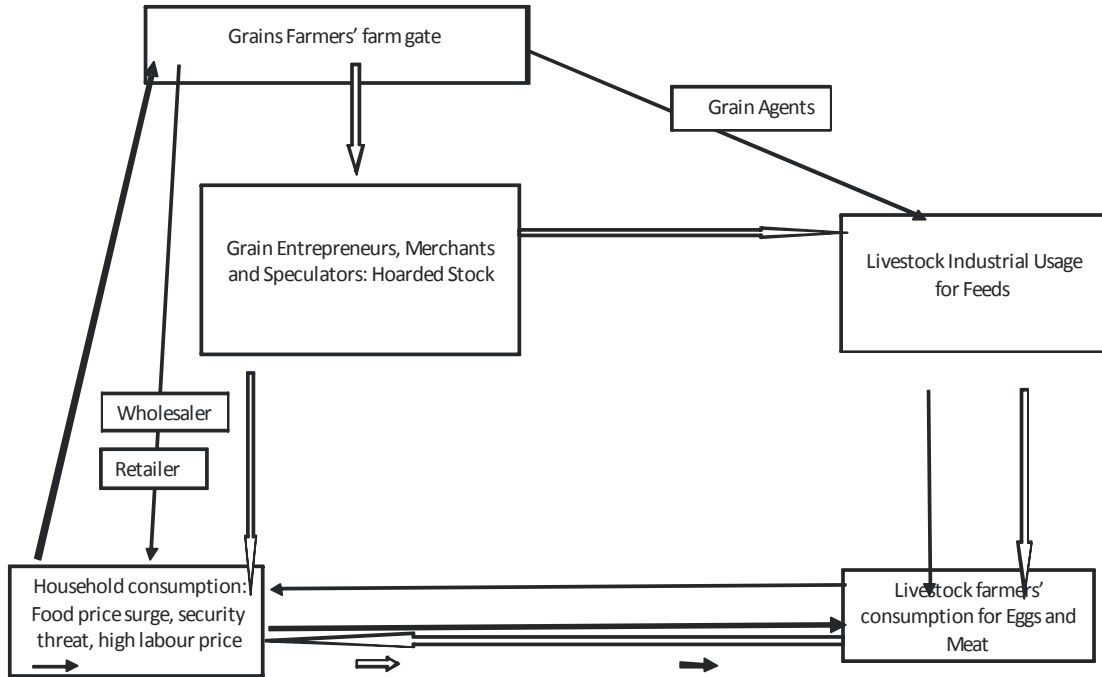


Figure 1: Outputs of selected grains in Nigeria: 2010 -2022  
Source: Statista (2023)



Key: Grain supply at low price; Grain supply at high price; Labour supply at high price  
Figure 2: Grain and labour input supplies chart between farm gate and households

For sorghum, output was 7,141 in 2010 and increased to 7,556 in 2016 but reduced in 2017 to 6,939 and continued the decline to 6,590 in 2020; it however increased in 2021 to 6,725. Major grains outputs pummelled from between 2011 and 2013. This can be attributed to the sudden increased in insurgency and terrorism in the northern part of the country during the period (Mamman, 2020); supporting Adebisi et al. (2016) that insurgency and terrorism reduced agricultural output in Nigeria between 2004 and 2013. Soybean output increased throughout the referenced period; it increased in metric tonnes, from 142 to 240 and 680 in 2010, 2014 and 2022 respectively. Overall, the outputs of the four grains would have been better but for natural disasters such as floods, conflicts and

insecurity in the country (FAO, 2018; Abbas et al., 2018).

### Supply of grain from the farm gate

Figure 2 is a conceptual chart that shows the flow of grain from the farm to household and industry with the underlying realistic assumption that farmers sell grains to households for food and industries for manufactured products and livestock feeds. PWC (2021) reported that of total maize produced in Nigeria, 10-15 per cent is consumed by households, 19.5 per cent is used by manufacturing industries such as breweries, flour, cereals and sweets producers, etc, and approximately 45.5 per cent is used for the production of livestock feeds. The diagram shows that the household and industry, however, get lean volume of their grain requirements from the

farmers. NTA, 2019 mentioned that industries buy the thin volume through grain agents. Grain merchant, speculators and middlemen buy the bulk of the grains from the farm at higher price than that offered by households and industry and create artificial shortage (Oguoma et al., 2010). The bulk purchase by middlemen makes grain to be less available, if other causes of decrease in grains supply such as shortage of factors of production, natural disasters and industrial dispute are isolated (Government of Alberta, 2023 and FAO, 2015). Since household and industry must survive, they ended up buying from the hoarded stock of the grain by merchant/speculators/middlemen at high prices. This is connected to the report in 2020/21 that middlemen were responsible for high food prices (Oguoma et al., 2010; Kabir, 2021).

#### **Implications for food and feed availability**

Though grains output increased over the years 2010 to 2022, the actual outputs and availability are lower than the expected due to insurgency, terrorism and natural disasters like flood (FAO, 2018; Abbas et al., 2018). In relation to this, USDA (2022) reported the output of Nigeria's major grain, maize, to be 10.0, 11.6 and 12.5 million metric tons (MMT) in 2020/2021, 2021/2022 and 2022/2023 respectively. But maize demand was estimated to be 12 to 15 MMT and the annual demand for local maize is approximately 14 MMT with local maize supply versus demand gap estimated to be 2 to 4 MMT per annum (PWC, 2022). Consequently, middlemen, as grains entrepreneurs, take advantage of the restricted grains supply through mopping up the lean available quantities by buying at attractive prices from farmers and markets, thereby causing artificial scarcity. Subsequently, the middlemen sell back to the markets at dictated prices under one or few

sellers-many buyers conditions. Ejorha (2020) reported that on 0.1 ton of paddy rice, middlemen received 39.31 per cent of consumers' spending as net profit while producers received gross margin of 60.69 per cent. Also, the activity of middlemen on price advantage is such that their price is 368% of farm gate price for a crop like njama njama vegetable in Cameroon (Piabuo et al., 2020).

Notwithstanding the yearly fluctuations in the market prices of grains, the higher price offered by middlemen, makes the industry produce livestock feeds at higher price and sell to farmers. Animal farmers produce at higher cost and sell livestock products at higher price to households. Households in turn offer their labour to the farms at higher wage value. The higher prices of livestock products such as meat and eggs constitute food security threat to households. The overall resultant effects of grain hoarding include surge in animal food prices and food accessibility threat, a component of food security. The reduction of activities of the grain merchant/speculators /middlemen is therefore desirous towards food security promotion. Diverse farmers have requested for provision of transportation facilities for cheap movement of grains, insurance and storage facilities to curb the activities of middlemen in the agricultural sector (NTA, 2019)

#### **Conclusion and Recommendations**

The excess grain demand over supply as commonly experienced in Nigeria yearly with attendant high prices for households and industry will continue except urgent steps are taken to stem the activities of middlemen, speculators and merchants. It is necessary for policies to be put into action for efficient supply of grain to keep grain

prices reasonably low for the users of grains as direct consumption or industrial inputs. The study therefore recommends that Government should start direct purchase from farmers and farmers should be linked directly to industrial buyers of grains through guaranteed purchase arrangement. Also, industrial users should be encouraged to becoming off-takers of grains through contract farming. This will check the activities of the economic actors that hoard and cause artificial shortage of grains that leads to high grains prices for households and industrial users and there will be dynamic smooth flow of grain in the country.

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