

The COVID – 19 Pandemic effect on Agriculture and Food Security in Uganda

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Abstract

Agriculture is one of the drivers of economic development since Uganda is predominately an agricultural economy and being less developed, its key to transform agriculture in order to achieve economic growth. The growth in COVID-19 cases led to limited movement from one place to another due to the stringent measures put in place to deter the further spread of the virus and this in turn could have affected agricultural activities and food security in the country due to high costs of food distribution and access to inputs. The purpose of the study was to investigate how COVID-19 pandemic has affected agriculture and food security in Uganda. The study used a descriptive design with only quantitative approaches and the data used in this study was extracted from Uganda Bureau of Statistics (UBOS). The analysis involved running Analysis of Variance (ANOVA), pairwise correlation matrix and descriptive analysis. Results indicated that there was a significant mean difference between prices of rice, sugar, milk and eggs from March to June during the COVID-19 (P -value < 0.05), the actual percentage mean difference between prices of agricultural products during COVID period at 5% level, it also discovered that between March and June, price of rice recorded the highest increase with an average of 4.8%, followed by that of eggs (3.5%), Sugar (3.4%) while price of milk recorded an average decline of negative 6.1% during COVID period. Results further exposed that transportation costs had a negative and insignificant relationship with the prices of agricultural products during the COVID period ($r = -0.734$, P -value > 0.05). It is observed that after the outbreak of COVID-19, the transportation cost declined exponentially to negative 0.6%, 0.7%, and 0.4 in March, April, and May respectively which was far below the transportation costs recorded in 2019 and the price of rice persistently increased from 0.3% to 8% respectively due to its increased household demand during the lockdown. Therefore, it is concluded that since the prices of core agricultural food stuffs increased during the COVID-19 period, this affected the availability of food in homes, thus reduced on food security.

Key words; COVID-19, Agriculture, Food Security and Uganda

1.0 Background of the study

The entire globe was challenged with extraordinary catastrophe since December 2019, COVID-19 has affected the entire biosphere triggering incredible human disaster of historic magnitudes. COVID19 doesn't recognize any boundaries, saves no nation, and attacks widely. Mishra and Rampal (2020) close to 83 million people probably 132 million might go hungry by 2020 due to the pandemic COVID-19 economic recession and over 690 people are currently going hungry, 135 are presently at risk of food insecurity and need food assistance. Conferring to World Bank 100 million people are assumed to be pushed to life-threatening poverty. According to WHO (2020) globally 23,518,343 are confirmed cases with 810,492 deaths; In Uganda as of 26th August, 2020

the country had registered 2,362 cases, 1,165 recovered and 22 deaths and the country was in a total incremental lockdown from March to May, 2020. The virus has interrupted humanity and disbanded the international economy which has reflective long-lasting social and economic penalties in every angle of the globe. Technology adoption in African agriculture is very low, constraining productivity and rural income.

Agricultural products earned Uganda money during the lockdown i.e., coffee \$45.87 billion - \$36.928 million, tea \$5.15 million - \$6.145 million, fish \$14.98 million - \$6.831 million and Maize \$10.23 - \$6.256 million in March and April respectively making it important for Uganda's economy (ERRC, 2020). According to Uganda National Farmers' Federation (UNFFE) food production was estimated to fall between 15%-40% due to twisting effects and disturbances during COVID-19 lockdown. The production of food depends on amalgamation of influences i.e., practices, pesticides, seeds and fertilizers. However, the control to movements and banning public and private transport-controlled farm inputs affected agricultural production hence food shortage in post-Covid-19. Farmers clearly rely on public transportation and planting wasn't at its best and needed government's support with agricultural inputs, post-harvest handling practices, monitor pests and diseases (caterpillars in Luwero and Kayunga) and crop protection. The food surplus in March -June was a result of lockdown for major consumers such as school closure which won't be the case throughout the year and puts both livelihoods and lives at a high risk because food strengthens the immune system (Hillier, Newton-Lewis, Nair, & Larsen, 2020).

Agriculture is one of the drivers of economic development since Uganda is predominately an agricultural economy and being less developed, its key to transform agriculture in order to achieve economic growth. The sector employs a tune of about 60% and subsidizes 22% to the GDP of the country. Regrettably the sector is subjugated low technology, under funded by government, poor farming methods and production for home consumption (Trotter et al., 2020). The pandemic COVID-19 that affected the entire world didn't spear Uganda as a country and farmers in particular because some claimed that they counted losses since the food produced like matooke (bananas) ripened in the gardens. The price reduced from 20,000Ugx (\$5) to 5000Ugx (\$1.25) the transportation trucks rarely collected food from the villages hence ripening and rotting of bananas. Ugandans stocked a lot of dry foods and had little money left for fresh foods ahead of restrictions. Some farmers returned the fresh foods as meals for animals although it wasn't lucrative. So, the

closure of farmers' markets, takeaways, food stores, ban of mass gathering and drink manufacturing facilities affected food supply chain. The Minister for Relief, Disaster Preparedness and Refugees warned that more districts are at risk of food shortage including Wakiso, Kampala Kikuube and Hoima.

The growth in COVID-19 cases led to limited movement from one place to another due to the stringent measures put in place to deter the further spread of the virus and this in turn could have affected agricultural activities and food security in the country due to high costs of food distribution and access to inputs. Hence, this justified the need for this study was to investigate how COVID-19 pandemic has affected agriculture and food security in Uganda.

1.1 Objectives

1.1.1 Study purpose

The study goal was to examine the COVID-19 pandemic effect on agriculture and food security in Uganda.

1.1.2 Hypotheses

The study was guided by the alternative hypotheses below;

Ha1: There is a significant mean difference in the prices of different agricultural products during the outbreak of COVID-19 in Uganda

Ha2: There is a significant relationship between transportation costs and prices of agricultural products during the outbreak of COVID-19 in Uganda

2.0 Methodology

The study used a descriptive design with only quantitative approaches to investigate the effect of COVID-19 pandemic effect on agriculture and food security in Uganda. The data used in this study was extracted from Uganda Bureau of Statistics (UBOS).¹ The analysis involved running Analysis of Variance (ANOVA) to investigate whether mean difference existed between the prices of

¹ UBOS (2020). Uganda consumer price index, June 2020 report. <https://www.ubos.org/publications/statistical/30/>

different agricultural products in COVID-19 period. In addition, pairwise correlation matrix was performed to establish the association between transportation costs and prices of agricultural products during the outbreak of COVID-19 in Uganda. Lastly, descriptive analysis was performed to get a descriptive view of how transportation costs and prices of agricultural products were affected in times of COVID-19.

3.1 Challenges faced by farmers

- a) Transport and market access blockages as a result of COVID-19
- b) Ban of weekly markets caused impendent to farmers to access inputs and failure to access points of sale.
- c) Ban of public and private transport affected movement of agricultural produce and affected sales of agricultural inputs since they are sold in Kampala and the users are deep in the villages (Mbarara, Masaka, Mubende).
- d) Inadequate supply of medicine and livestock feeds hence disruption
- e) Weather patterns coupled with floods are a threat to sustainable agriculture and access to food. Floods damage homes, roads and displace people in Karamoja, Bugishu, Kigezi and Rwenzori regions
- f) Agribusinesses are unable to pay functional costs, maintain the existing wage structure, rent, field operations and utility bills.
- g) Reduction in agro of agro chemicals due to failure to access financial support.
- h) Low demand for agro-chemical products due to restricted movements resulted into demand for credit thus unhappy business operations
- i) Delayed clearance, approval, field inspections, and registration of new agro-chemical products affected business operations.
- j) Fluctuation and disparities in food prices i.e., matooke, tomatoes, eggs, sweet potatoes, fruits and vegetables, bananas while the fall is good for consumers but its bad for food system. The principle of demand stresses that when supply increases prices reduce yet the purchasing power is low due to loss of jobs leading drop of prices.
- k) Locusts in Karamoja region demolish crops coupled with restricted movements during COVID-19 also frustrated the efforts to deal with them.
- l) Government failure to regulate food prices

- m) Lack of funding to enable government provide emergency food relief across the country
- n) Lack of grants to small agricultural enterprises lead by women in villages, provide training and tools, and agricultural seeds will reduce empowerment to agriculture
- o) Food scarcity emerges as lockdown hits growers
- p) The 498,000 kilograms of maize distributed in various districts as agricultural input were not enough for all farmers in Uganda to enable them increase productivity and improve household incomes.
- q) Losses of livestock due to failure to access farms during the lockdown and limited means left to access drugs and seeds which impacted on the production.
- r) Limited transport means to Kampala from the village affected productivity i.e, the president banned empty double cabins and pick-ups yet those were the ones farmers used to collect their produce.
- s) The cost of business operation increased during the lockdown until restrictions were relaxed for farmers to benefit
- t) Drop in prices of commodities i.e., eggs, bananas etc
- u) Disruptions in food movements affected food chain the movement affected the production process from farm to mouth hence shortages of some food stuffs i.e., grains like cereals hence prices increased
- v) Farmers will walk out of the value chain because of low prices for food stuffs hence cheating farmers
- w) Need for technological investment in the agricultural sector
- x) The system of agriculture is in a mess yet the business remained open during the lockdown
- y) The turnover for farmers reduced sharply as a result of the decrease in the supply because of transport difficulty, some likely market closures i.e., schools, and other businesses lessened productivity by targeted farmers, order turn arounds.
- z) Difficulties in clearances from responsible authorities (district COVID-19 taskforce) for permission to operate during COVID-19 Lockdown enable Ugandans put food on the table.

3.2 Strategies for coping during lockdown

- a) Lay off some staff- work with skeleton staff
- b) Reduce operational costs through salary cuts

- c) Work from home
- d) Suspend some activities and resume when the situation normalizes
- e) Communication channels necessitated changes i.e., use of social media platforms, mobile phone calls, text messages and using acceptable transportation means by government to sale agricultural products.
- f) Need for loans to buy Agricultural inputs because of reduced savings yet recovery is uncertain.
- g) Digitalizing payment methods, market and delivery to the door step
- h) Capitalize storage amenities and add value to agricultural products
- i) Investment in affordable means of transport such as bicycles and motorcycles
- j) Online advertisement of agricultural products
- k) Value additional covert milk to cow ghee.
- l) Strengthening regulatory, quality control systems to enable business sustainability especially in the agro-chemical and provide subsidies on loans
- m) Strengthen linkages with dealers, middle men, suppliers, farmers, stockists, importers, hub agro-dealers in line with agriculture extension services
- n) Decentralise power to deal with the fight for counterfeits.
- o) Districts to support the purchase and input distribution to farmers across the country

4.0 Findings

The study presents findings on the COVID-19 pandemic effect on agriculture and food security in Uganda. The study mainly relies on how COVID-19 pandemic has affected; the transportation costs and the prices of agricultural products in Uganda. The study findings are presented in the preceding sections below;

4.1 Examining the mean difference in prices of different agricultural products during the time of COVID-19 in Uganda (March-June 2020)

The study made an attempt to establish whether prices of rice, sugar, milk and eggs were experiencing the same average change during the COVID-19 period. ANOVA was used to examine whether there existed a mean difference between prices of rice, sugar, milk and eggs during the COVID-19 period. The study findings are detailed in table 1 below;

Table i: ANOVA results examining the mean difference between prices of different agricultural products during COVID-19 (March-June)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	303.367	3	101.122	5.103	0.017
Within Groups	237.783	12	19.815		
Total	541.149	15			

Source: Own Computation based on UBOS (2020)

From table i above, it is observed that there was a significant mean difference between prices of rice, sugar, milk and eggs from March to June during the COVID-19 (P-value < 0.05). The study findings indicate that the average change (increase or decrease) in prices of rice, sugar, milk and eggs was different during COVID-19 times. This implies that the increase or decrease in price of one commodity was independent of the increase or decrease in price of another commodity during the lockdown in Uganda. The average change in prices of different commodities differed because of the difference in demand and purchasing power from the households and sub sectors like restaurants and hotels. The movement of food stuffs across borders took a long period of time due to cross border testing of drivers to ensure that they don't have COVID-19 yet agricultural products are perishables and this disrupted the agriculture business.

Table ii: Bonferroni test showing multiple comparisons between mean prices of different agricultural products at 5% level

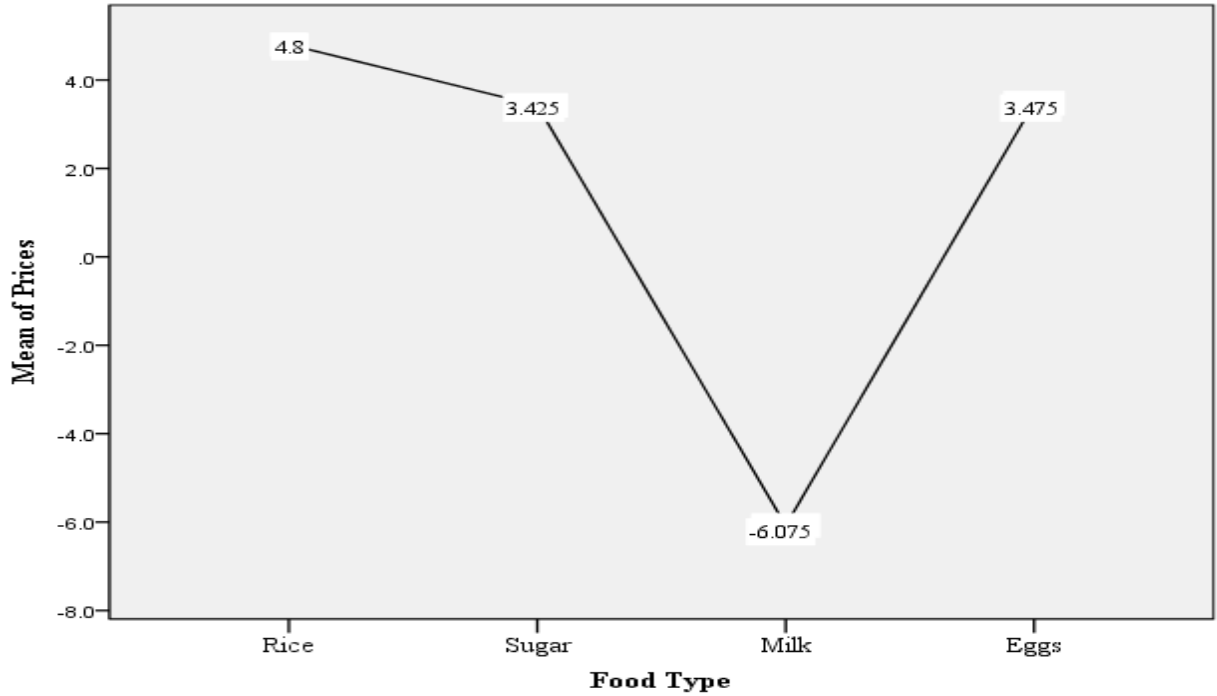
(I) Food Type	(J) Food Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Rice	Sugar	1.3750	3.1476	1.000	-8.548	11.298
	Milk	10.8750*	3.1476	.029	.952	20.798

	Eggs	1.3250	3.1476	1.000	-8.598	11.248
Sugar	Rice	-1.3750	3.1476	1.000	-11.298	8.548
	Milk	9.5000	3.1476	.064	-.423	19.423
	Eggs	-.0500	3.1476	1.000	-9.973	9.873
Milk	Rice	-10.8750*	3.1476	.029	-20.798	-.952
	Sugar	-9.5000	3.1476	.064	-19.423	.423
	Eggs	-9.5500	3.1476	.062	-19.473	.373
Eggs	Rice	-1.3250	3.1476	1.000	-11.248	8.598
	Sugar	.0500	3.1476	1.000	-9.873	9.973
	Milk	9.5500	3.1476	.062	-.373	19.473
*. The mean difference is significant at the 0.05 level.						

Source: Own Computation based on UBOS (2020)

Since the ANOVA test results in table i above exhibited a significant difference in the means of prices of different agricultural products, the study went ahead to establish the actual mean difference that existed between different products.

The results in table ii show the actual percentage mean difference between prices of agricultural products during COVID period at 5% level. It was revealed that the percentage average price of rice was above that of sugar, milk, and eggs between March and June 2020. The proportion of average price of sugar was above that of milk and below that of eggs while that of milk was below that of eggs between March and June.



Source: Own Computation based on UBOS (2020)

Figure i: Average change in prices of different agricultural products in Uganda between March and June 2020

The study findings above in figure i indicate that between March and June, price of rice recorded the highest increase with an average of 4.8%, followed by that of eggs (3.5%), Sugar (3.4%) while price of milk recorded an average decline of negative 6.1% during COVID period. The increase in prices of rice, sugar and eggs was attributed to the increased household demand since they are essential food stuffs while the decrease in price of milk was due to excess supply amidst limited demand. A reasonable number of Ugandans could hardly access supermarkets in the city center and its suburb due to lockdown since they were advised as a presidential directive to purchase the necessary items in local mini shops and supermarkets.

4.2 The relationship between transportation costs and prices of agricultural products during the outbreak of COVID-19 in Uganda

The study investigation sought to find out whether there was a significant association between transportation costs and prices of agricultural products during COVID pandemic in Uganda. The findings are presented in table iii below;

Table iii: Pairwise correlation matrix showing the relationship between transportation costs and prices of agricultural products between March and June 2020

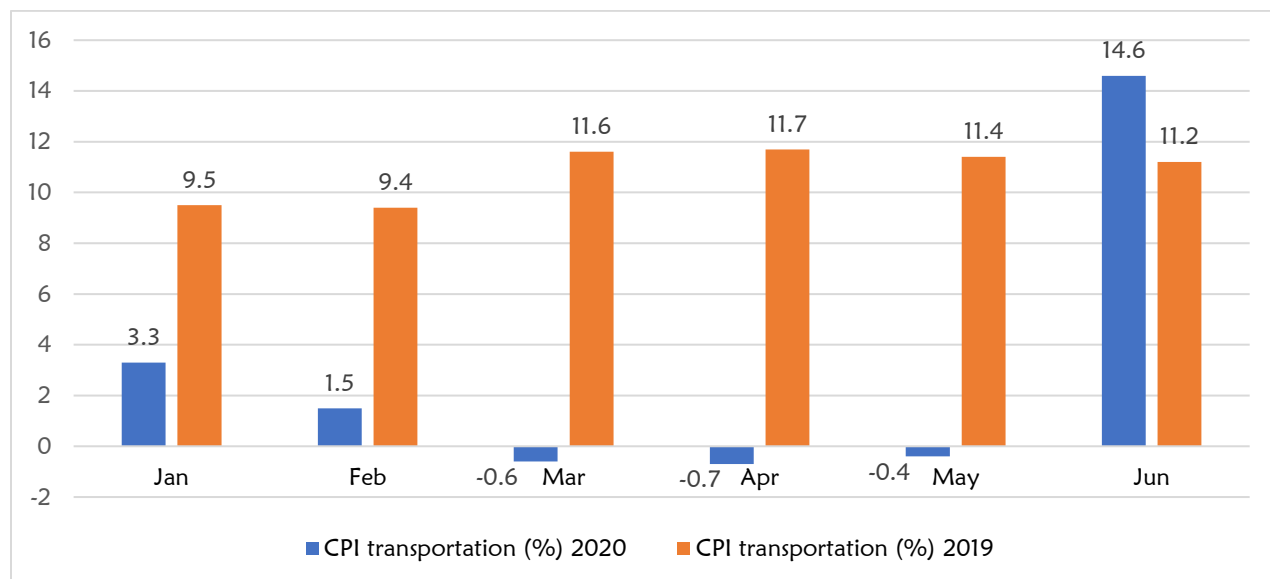
		Prices of agricultural products	Transportation costs
Prices of agricultural products	Correlation Value	1	
	P-value		
	N	6	
Transportation costs	Correlation Value	-0.734	1
	P-value	0.097	
	N	6	6

Source: Own Computation based on UBOS (2020)

The findings in table iii revealed that transportation costs had a negative and insignificant relationship with the prices of agricultural products during the COVID period ($r=-0.734$, $P\text{-value}>0.05$). This may imply that the fall in prices of agricultural products was not determined by the increase in cost of transport during the lockdown. The findings may also imply that the fall in prices of some agricultural products was as a result of limited demand from sub sectors like restaurants and hotels which were closed during the COVID lockdown but not transportation costs. The lose of jobs reduced demand for some food stuffs i.e., ilk could have been a luxury than maize flour. Due to lockdown the airport was closed hence no tourists who used to boost this industry by demanding for food stuffs hence increased prices.

4.3 The effect of COVID-19 pandemic on transportation costs in Uganda

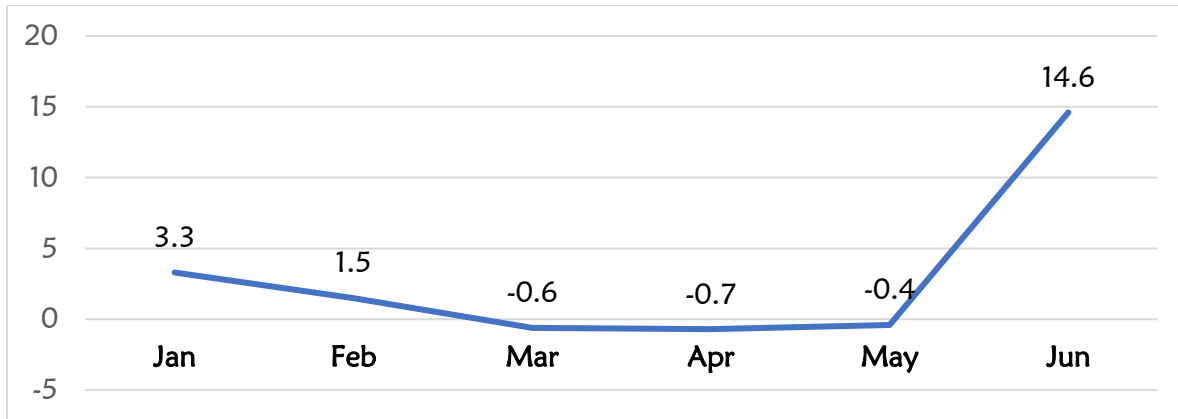
The outbreak of COVID-19 led to limited movement of vehicles from one area to another and this might have affected the distribution of food in the country thus affecting food security. To assess how COVID affected food distribution and food security, comparisons between transportation costs in 2019 were made with those of 2020 as indicated in figure ii below;



Source: Own Computation based on TradingEconomics.com and UBOS (2020)

Figure ii: Comparison between the transportation cost (%) in 2019 and 2020 from January to June

The results in figure ii above indicate that after the outbreak of COVID-19 in March 2020, there was continuous decline in transportation costs up to May 2020. It is observed that after the outbreak of COVID-19, the transportation cost declined exponentially to negative 0.6%, 0.7%, and 0.4 in March, April, and May respectively which was far below the transportation costs recorded in 2019 in similar months. After some lockdown measures were removed in June 2020, the cost of transport increased to 14.6% and this was above that was recorded in 2019 in the same month. The decrease in cost of transport between March and May 2020 was attributed to limited demand for transport from the public and therefore few movements were left to cargo trucks. The decrease in transport costs fostered movement of agricultural products to market thus an indicator of increased food security during COVID-19 period.



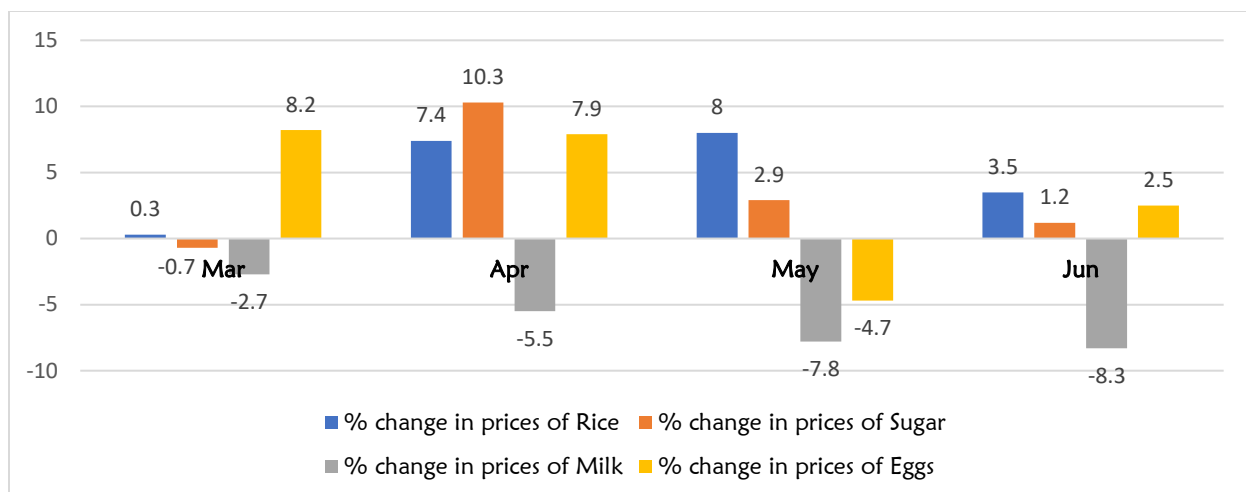
Source: Own Computation based on TradingEconomics.com and UBOS (2020)

Figure iii: Variation (%) in transportation costs from January to June 2020 in Uganda

Figure iii above shows that before the outbreak of COVID-19 in January and February, the cost of transport was slightly above while after the outbreak in March, the transportation cost declined exponentially due to reduced movement and demand for public transport. However, after the government lifted some measures in June where some private vehicles and other means of transport resumed operation, the cost of transport increased to 14.6% indicating increased demand for public transport.

4.4 The effect of COVID-19 pandemic on the prices of agricultural products in Uganda

The increase or decrease in prices of agricultural products predict the level of food security in Uganda, for instance when prices are high, the demand for agricultural products might be affected thus hindering the availability of food to fight hunger, malnutrition, and famine in homes. Thus, it was imperative for the current study to assess how COVID-19 pandemic affected the prices of agricultural products in Uganda. The results are presented in subsequent sections below;



Source: Own Computation based on UBOS (2020)

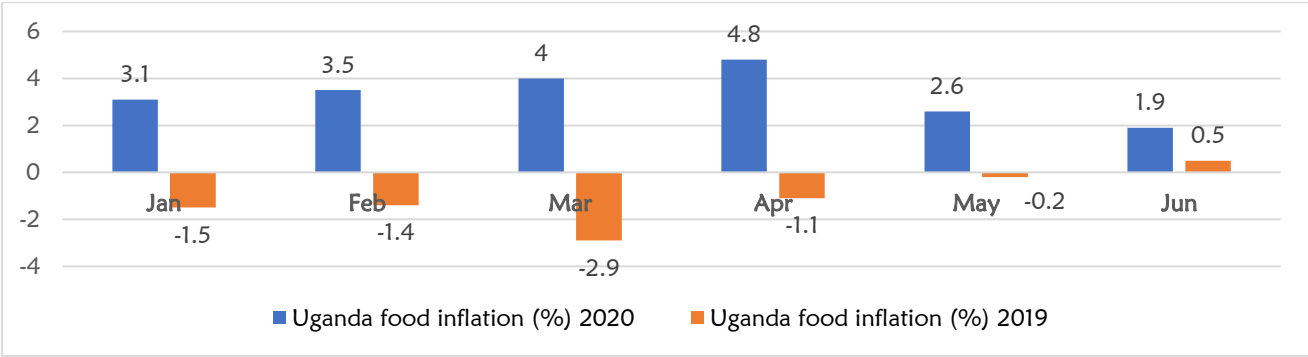
Figure iv: Change (%) in prices of different agricultural products during the COVID-19 period (March to June 2020)

The findings in figure iv show that from March to May 2020, the price of rice persistently increased from 0.3% to 8% respectively due to its increased household demand during the lockdown. Meanwhile, from May to June the price of rice recorded a slight decrease from 8% to 3.5% because of decreased demand from the households since many were purchasing food stuffs like maize flour, cassava flour and other given goods due to fall in their incomes. Secondly many retail shops were permitted to operate between May-June 2020 which increased competition hence reduced prices because the local shops were taking advantage of the lockdown between March-May, 2020.

During the outbreak of COVID-19 in March 2020, the price of Sugar had decreased to negative 0.7% and after the escalation of COVID-19 cases and stringent measures in April, the price of sugar increased abruptly by 10.3%. This increase was brought up by traders who were taking advantage of the situation on allegations that Ugandan market operates under market forces of demand and supply. However, from April to June, the price of sugar recorded a persistent decline from 10.3% to 1.2% because of government intervention. For instance, the president ordered the arrest of traders who were increasing prices of goods beyond their normal prices and this witnessed the reduction in price of sugar.

The price of milk recorded a decline throughout the COVID-19 period since there was increased supply amidst the limited available demand. In addition, subsectors like restaurants and hotels were closed during the lockdown yet they are potential buyers of milk.

The price of eggs recorded gradual decline from March to May from 8.2% to negative 4.7% respectively during the COVID-19 period. The fall in price of eggs was due to closure of hotels and restaurants which led to over flooding of eggs in the market due to limited demand. The observation during the lockdown indicated that one would acquire 4 eggs at 1000 UG shillings (0.3 USD) which was a sign of excess supply visa-vis the limited demand. However, after the restaurants and hotels resumed operation in June, the price of eggs started increasing due to increased demand.



Source: Own Computation based on UBOS (2020)

Figure v: Comparison between the prices (%) of food stuffs in 2019 and 2020 (January to June)

The findings from figure v show that prices of food stuffs increased during the COVID-19 lockdown in Uganda as compared to in 2019 in the same months. The increase in price of food stuffs during lockdown was attributed to several factors such as increased household demand, limited movements of vehicles, and intentional increase in prices by traders to take advantage of the lockdown situation.

5.0 Conclusions

5.1 Examining mean difference in prices of the different agricultural products during the time of COVID-19 in Uganda

The study concludes that there existed a significant mean difference in the average change in prices of different agricultural commodities during the COVID-19 period. This indicated that an increase in price of one commodity would not influence the increase or decrease in price of another commodity during the lockdown.

5.2 The relationship between transportation costs and prices of agricultural products during the outbreak of COVID-19 in Uganda

The study revealed that transportation costs had no significant association with the price of agricultural products during the COVID-19 period. The increase or decrease in the cost of transport during the lockdown would not interfere with the prices of agricultural products in Uganda. Thus, it is concluded that the change in prices of agricultural commodities during the lockdown was determined by other factors arising from stringent COVID-19 preventive measures put in place by the government such as Transport and market access blockages as a result of COVID-19 such as the ban of weekly markets caused impendent to farmers to access inputs and failure to access points of sale. The ban of public and private transport affected movement of agricultural produce and this affected sale of agricultural inputs since they are sold in Kampala and the users are deep in the villages (Mbarara, Masaka, Mubende).

5.3 The effect of COVID-19 pandemic on transportation costs in Uganda

The study concludes that during the lockdown in 2020, the cost of transport reduced significantly as compared to the cost of transport in 2019. This indicates that the distribution of food was not affected during the lockdown hence increased food security.

5.4 The effect of COVID-19 pandemic on the prices of agricultural products in Uganda

The findings revealed that the price of food stuffs increased during the outbreak of COVID-19 in 2020 when compared with prices of food stuffs in 2019. The study also found out that on average the price of rice was the highest during the lockdown, followed by that of eggs, sugar while price milk was below (in negatives). Therefore, it is concluded that since the prices of core agricultural food stuffs increased during the COVID-19 period, this affected the availability of food in homes,

thus reduced on food security. The government should consider opening up borders so as to improve on the inflow of food stuffs from other countries since this may enable reduction in prices thus improving on accessibility to food. The government should support farmers with financial aid to enable them sustain their operation this will provide food for the country in the short and long run. The farmers need government support in provision of transportation equipment to facilitate their business and the dare need for digitalization of agriculture businesses inline with delivery on the door step, online payments, government to invest in value chains and marketing their businesses and the need to discover and exploit regional markets as a solution to agricultural related challenges.

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