

Impact of COVID-19 Pandemic on the Poultry Industry of Ghana: Case Study in Kumasi Metropolis

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Abstract:- The recent problem of the COVID-19 pandemic has thwarted every facet of life and the poultry industry is not spared from its ravages. A survey was conducted to ascertain the extent to which the pandemic has affected the poultry industry in the Kumasi Metropolis of Ghana. Open and close-ended questionnaires were administered to poultry farmers, feed millers, traders and consumers of poultry products. The Snowball sampling technique was employed in taking data from the poultry farmers and feed millers. A random sampling method was used in collecting data from traders and consumers. The data were first coded with the procedure of SPSS and descriptive statistics including tables and graphs were generated. The COVID-19 pandemic has impacted the poultry industry in Ghana negatively by crippling the stakeholders in the industry. Poultry farmers are stalling in their various productions because their workers are leaving their jobs because of non-payment of salaries. Farmers are burdened with the reality of a shortage of inputs and so production is not able to go on properly. Feed millers cannot get access to feed ingredients and the few that are available are expensive, making the compounded feed very expensive to farmers. Traders, on the other hand, are not able to source poultry products and so an increase in demand has resulted in the increment in the price of poultry products. Consumers who are at the end of the value chain can no longer afford the cost and so are now looking for alternatives to poultry products.

Keywords: Pandemic, COVID-19, Poultry, Snowball, Stake-holders, Consumers

I. INTRODUCTION

On many occasions, diseases have impacted the course of human history in unexpectedly powerful ways, from influenza, and tuberculosis to yellow fever and so on (Wasiket *et al.*, 2019). Over the years, plagues have resulted in deaths worldwide and eventually changed history. The impact of pandemics, today and in the past is always unequal. For instance, Ebola, which was formerly known as Ebola haemorrhagic fever, is a severe fatal illness which affected humans and other primates. This zoonotic disease transmits from wild animals (such as fruit bats, and porcupines) and spread to the human population through direct contact with blood, secretions, organs, bodily fluids of infected people and contaminated surfaces of materials (WHO, 2019).

The recent pandemic (COVID-19) was reported to have started in Wuhan, China on December 31, 2019, and has spread across the world as of March 2020 (WHO, 2020). Almost every African country has been adversely affected by the pandemic. Continent-wise, 60% of the population is employed in agriculture (Abroquah, 2020). As nations were locked down, bans on public gathering, restricted movements, the number of people in market centres was reduced and borders were closed. Undoubtedly, these measures affect food production and food availability if contingent strategies are not put in place. According to the projections of the United Nations Economic Commission for Africa (ECA, 2020), Africa's GDP growth is set to slow down and is likely to drop from 3.2% to 1.8%. This confirms the likelihood that as a result of the pandemic, there will be a very real and heartbreaking increase in the number of people living in extreme poverty and hunger in Africa (Abroquah, 2020).

The novel Corona virus continues to batter various sectors of the economy of Ghana not sparing the agricultural sector which happens to be the backbone of Ghana's economy. Of all the agricultural sub-sectors in Ghana, the poultry industry is the sub-sector likely to suffer the most from this pandemic, this is because about 85% of inputs into this sector are imported into the country (Obese *et al.*, 2021).

The poultry value chain involves planning, sourcing of birds, housing, production, feeding, vaccination, medication, processing, packaging, quality control, storage and the final transportation to consumers. Any adverse effect on these value chains affects the overall production. The industry has seen a major hurdle with the imposition of lockdowns as a public health measure to reduce the spread of the virus, importation and exportation of day-old chicks, poultry inputs and poultry products are adversely affected (Al-Khalaf *et al.*, 2020).

Studies on the impact of the coronavirus on the poultry industry are limited with little information in Ghana. Hence, there is a need to conduct this research to add to the existing literature in Ghana to ascertain the extent to which the pandemic has affected the poultry industry.

II. METHODOLOGY

A. Study Area

The study was conducted in the Kumasi Metropolis. Kumasi Metropolis is centrally located in the Ashanti Region of Ghana. The Kumasi Metropolis has an approximate land area of 254 square kilometres and is located between latitudes 6°35" and 6°4"N and longitudes 1°30" and 1°35" E. It shares boundaries with the Kwabre District to the north, AtwimaKwanwoma and AtwimaNwabiagya District to the west, Ejisu-Juaben Municipal to the east and Bosomtwe District to the south. This total land area as mentioned above has 15,920 ha being Arable land, and 11,930 ha under cultivation but about 74.9% of the arable land is untapped. The Kumasi Metropolis falls within the sub-equatorial type of climate and is characterised by average temperatures ranging from 21.5°C to 30.7°C. The average annual rainfall is 625 mm. The rainfall pattern is generally good and evenly distributed. The average humidity is about 84.16% at 09.00 GMT and 60% at 15.00 GMT (MOFA, 2016).

B. Research Population

The study population consisted of four stakeholders of the poultry industry. These stakeholders were the poultry farmers, poultry feed millers, poultry input dealers and consumers of poultry products. The population of the poultry farmers involved all medium and large-scale poultry farmers in the Kumasi Metropolis. Those of the input dealers involved all individuals that sell poultry inputs such as poultry prophylaxes, vaccines, additives and disinfectants in the Kumasi Metropolis. The poultry feed millers involved companies that produce and sell poultry feed in the Kumasi Metropolis. Finally, the consumers of poultry products were individuals who were 18 years and above in the Kumasi Metropolis. The population of such individuals according to Ghana Statistical Services (GSS) (2010) was 1,354,699.

C. Research Sample

Accepting 10% error at a 90% confidence level, a total sample size of 170 was estimated using the formula:

$$S = (z/e)^2$$

Where:

S = sample size; Z = degree of confidence (in this case 90% → 1.64) and

e = the accepted error as a proportion of the standard deviation (in this case 10%)

D. Data Collection

Primary data were collected through structured questionnaires which were administered to the poultry farmers, poultry input dealers, feed millers and the consumers of poultry products. The questionnaires were pre-tested to ascertain their validity and the necessary changes made to ensure accurate data collection.

E. Sampling Techniques

The Snowball sampling technique was employed in taking data from 40 poultry farmers and 30 feed millers within the study area. A random sampling method was then used in collecting data from 50 poultry input dealers and 50 poultry consumers within the study area.

F. Questionnaire Design

The questionnaire comprised of two sections; the first section included questions on the socio-economic characteristics of respondents such as age, gender, household size, marital status and educational background. The second section included questions on the effect of COVID-19 on the operations of poultry feed millers, poultry farmers, traders and consumers of poultry products. A well-structured questionnaire consisting of both open-ended and closed-ended questions was used. The open-ended questions gave the respondents the chance to express their views about the subject matter. The closed-ended questions on the other hand gave the respondents a pre-coded response in which the respondents selected the option which is most representative of their cases.

G. Data Analysis

The data were analysed with the help of SPSS software version 22. The data were first coded with the help of the software. Later, descriptive statistics, such as tables and graphs, were generated. Tukey test was used to detect statistical significance among treatment groups. Significant differences were accepted if $P < 0.05$.

III. RESULTS AND DISCUSSION

The results capture four sections consisting of the four stakeholders of the poultry industry considered in this study.

A. Section one: Response of poultry farmer

From Table 1, the gender distribution of the survey showed that 80% of the farmers were males with females constituting only 20%. The result obtained may be because the activities in the poultry business tend to be vigorous and strenuous and involves a lot of lifting heavy loads such as feedstock, mixing feed and equipment. The finding is consistent with the finding of (Amoaben, 2011) who had the majority of his respondents being male when he carried out a study to ascertain the correlation between the demographic characteristics of poultry farmers and the success of their farming activities in the Dormaa Municipality. The author made similar inferences that the agricultural sector in Ghana is labour intensive, so women do not usually have the strength to carry out this hard work as compared the men.

The distribution of the various religion revealed that almost all the farmers were Christians (93%) with only 7% of them being Muslims (Table 1). The dominant religion in Ghana and for that matter in the Kumasi Metropolis according to Ghana Statistical Service, (2010) is the Christian religion, so this finding is a true reflection of the situation on the ground as far as religion is concerned.

The majority of the respondent (80%) were married whilst 13% of the farmers were single and 7% of them were divorced. The high percentage of married farmers is likely an indication that perhaps their spouses and children may be serving as a source of free available labour for the farm.

With the educational background, all the farmers had some form of education. Forty percent (40%) of the farmers had Tertiary education, 33% of them studied up to SHS/Technical level and 27% of farmers had basic

education (Table 1). The fact that the majority of the farmers received some form of education may mean that they have at least the technical knowledge to carry out the various activities on their respective poultry farms or will be in a better position to receive in-service training. Since the poultry industry involved modern and innovative ways of carrying out activities, so one needs to be abreast with how all these activities are carried out (Amoaben, 2011). Also, the validity of their responses to the questions is assured.

Variables	Frequencies	Percentages (%)
Gender		
Male	24	80
Female	6	20
Religious background		
Christian	28	93
Muslim	2	7
Marital status		
Single	4	13
Married	24	80
Divorced	2	7
Education		
Basic school	8	27
SHS	10	33
Tertiary	12	40

Table 1: Demographic characteristics of poultry farmers

Almost all the farmers (97%) rear chickens with 3% rearing both chicken and turkey (Table 2). The dominant poultry species in the world is chicken, they are the most popular worldwide irrespective of culture and region or religion (Al-Nasser *et al.*, 2007), and the finding confirms this reality. Nevertheless, there are other species of poultry in Ghana like quails, ducks, guinea fowls, turkey, ostriches etc but the commercialization of some of them is not yet done.

Eighty-three percent (83%) of the farmers keep only layers on their farms, 10% keep only broilers and the remaining 7% of the farmers keep both broilers and layers (Table 2). Farmers that produce broiler birds usually find it difficult to sell the birds when they are ready for slaughter, probably because of the influx of cheaper broiler meat from other countries and also the fact that farmers do not have storage places for their slaughtered birds to sell them later (Otsyina *et al.*, 2003). These challenges discourage farmers from embarking on broiler production and rather, they prefer to go into layer production which somehow has a ready market for the eggs.

Most of the farmers (58.6%) indicated that they were into the poultry business to make money, 27.6% of the respondent inherited the poultry business from their family and 13.8% of the respondent had a sheer passion for the poultry business (Table 2). The majority stating that they are in the business to make money confirms the finding of Marzukiet *al.* (2016) who concluded in their study that monetary consideration is the main factor that motivates entrepreneurs to start a business.

Majority (52%) of the farmers indicated that they compound their feed, 31% of them source their feed from feed suppliers and the remaining 7% source their feed from the retail seller on the market (Table 2). Every enterprise does a cost-benefit analysis to see how best to cut down cost and maximizes profit. Ghana poultry farmers are not exceptional in this fact, so most of the farmers have realized that compounding their feed will cut down feed costs, which will go a long way to reducing production costs.

Fifty-nine percent (59%) of the farmers made it known that the pandemic has resulted in feed shortage, and the remaining 41% said it has resulted in an increment in feed prices (Table 2). The farmers revealed that income tax and unavailability of feed were responsible for the increase in feed prices. The pandemic came with the lockdown of nations and most of the poultry feed ingredients are imported into the country for feed formulation and compounding, so it will not be surprising if there is a feed shortage because the ingredients will not be available for formulating and compounding. According to Vorotnikov (2020), most African countries are import-dependent on the supply of feed ingredients and breeding materials. Hence, supply disruption as a result of the decline in airline traffic globally, caused by the COVID-19 pandemic significantly diminished the steady production.

The farmers were again asked to tell whether the pandemic has resulted in the prices increase of vaccines and medication and the majority (70%) of them indicated that there has been a slight increase since the onset of the pandemic, the remaining 30% indicated that the prices had remained the same (Table 2). The increase in medication costs reported by the majority of the farmers confirms the

findings of Uyanga *et al.* (2021) that logistics challenges such as limited access to farm supplies due to the pandemic are contributors to the increase in the prices of these supplies.

Sixty-six percent (66%) of the farmers indicated that the pandemic has increased production costs. The remaining 34% revealed that the pandemic has resulted in them having

a low-profit margin (Table 2). This finding confirms the findings of Obese *et al.*, (2021) who realised from their study that most agricultural inputs are now more expensive to import due to the closure of the borders and restrictions on commercial flights, thus increasing production costs and reducing profit margins of farmers.

Variables		Frequencies	Percentages (%)
Species of birds raised	Chicken	29	97
	Chicken and Turkey	1	3
Type of chicken raised	Egg layers	25	83
	Broilers	3	10
	Layers and broilers	2	7
Reason for farming poultry	Family inheritance	8	27.6
	Passion	4	13.8
	Money	17	58.6
Source of feed for the farm	Feed suppliers	9	31
	Own feed	15	52
	Market	5	17
Ingredients used to compound feed	Maize, WB, SBM	5	33
	Maize, WB, SBM, RB, OS & C	10	67
Effect of COVID-19 on sourcing of feed	Increase in price	12	41
	Feed shortage	17	59
What accounted for the increase	Importation tax	10	37
	Unavailability of feed	17	63
Cost of vaccine before and after COVID -19	Slightly increased	21	70
	No change	9	30
How has the increase affected your enterprise?	Increase cost of production	19	66
	Reduce profit margin	10	34

Table 2: Information on poultry farmers and their views on the impact of COVID-19 on the poultry industry

WB= wheat bran, SBM= soybean meal, RB= rice bran, OS= oysters shells, C= concentrate

Majority of the farmers (37%) had less than 5 workers, 37% of them had between 5-10 workers and 27% of them have more than 10 workers (Figure 1). Most of the farms had few workers probably because they have other available

cheap labour like their families. This confirms the report of Holness (1991) who noticed in his study that most farmers in Africa rely more on family labour than external labour. Probably to cut down production costs and maximize profit.

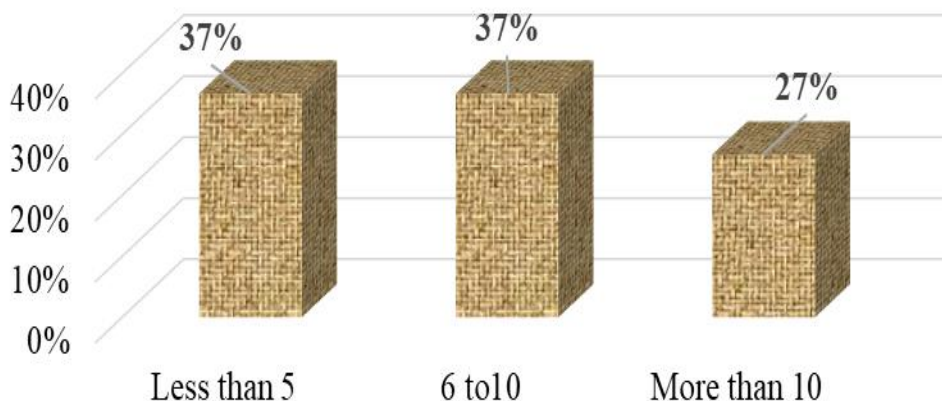


Fig. 1: Information on poultry farmers’ labour force

From Figure 2, 63% of the farmers indicated that the pandemic has negatively affected their farming activities. Feeding and watering, environmental hygiene, waste disposal and health care are the key practices that result in healthy birds and for that matter excellent productivity. So, a situation that will prevent farmers from carrying out these practices will result in low productivity. Notwithstanding, this finding is consistent with the findings of Hussain *et al.* (2020) who carried out a study to ascertain the economic and social impacts of COVID-19 on animal welfare and dairy husbandry in central Punjab, Pakistan. They concluded that there was a significant negative impact of COVID-19 on the surveyed farms on animal health, milk production, and animal welfare.

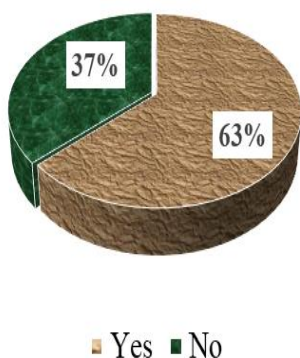


Fig. 2: Responds on whether COVID-19 has affected poultry farmer’s activities

Majority (73%) of the farmers intimated that the pandemic has caused them to be unable to pay their workers and for that matter, most of their workers have left due to non-payment of salaries (Figure 3). Twenty-seven percent (27%) of the farmers also revealed that an inadequate number of workers has stalled their farming activities. This situation reported by the farmers may mean that their birds would be facing welfare and management challenges. Given that poultry is live animals, the requirement for daily care and routine management (feeding and watering, environmental hygiene, waste disposal and health care) is inevitable. Inconsistencies in these routine management practices may lead to a reduction in body weights, feed

intake, egg production, and overall health and welfare of poultry resulting in production losses and shortages in poultry products (Butterworth, 2018).

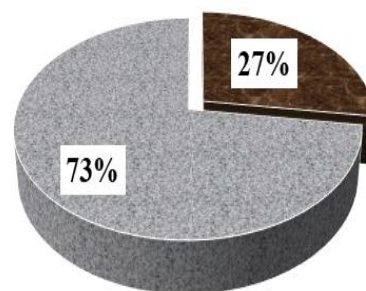


Fig. 3: Effect of COVID-19 on the labour force of poultry farmers

B. Section two: Response of feed millers

From Table 3, feed millers were asked to indicate where they source their feed ingredients for formulating the various feed they sell. About Sixty-three percent (63.2%) of them indicated that they source their feed ingredients from various markets in the metropolis. The remaining 36.8% revealed that they source their ingredients directly from farmers that produce those ingredients. This finding confirms the finding of Menget *et al.* (2014), who realised that the traditional retail market dominates the commodity marketing system in Ghana.

Majority (63.3%) of the feed millers affirmed that the pandemic has affected the availability of the ingredients that they use in formulating their various feed (Table 3). The rest of the feed millers (36.7%) indicated that the pandemic did not affect the availability of feed ingredients (Table 3). Most poultry inputs are imported into the country, and the pandemic has resulted in border closure in a number of countries. Thus, it is only natural that their availability is affected. Notwithstanding, this finding agrees with the finding of Obese *et al.* (2021) who had similar responses when they investigated the impact of COVID-19 on animal

production in Ghana. Obese *et al.* (2021) also realised in their study that all poultry inputs are of low supply since the onset of the pandemic.

The feed millers were again asked whether the pandemic has affected the pricing of this feed ingredient and all of them (100%) unanimously affirmed that COVID-19 has affected the prices of the ingredients they use in compounding their respective feeds (Table 3). They were further asked to indicate how the pandemic has affected the pricing of the feed ingredients and all of them indicated that the pandemic has resulted in the price hike of these ingredients. This finding is consistent with the finding of FAO (2020) who noted after a series of research conducted since the onset of COVID-19 that prices of animal production inputs have increased. All the respondents (100%) noted that there has been an increase in the prices of

ingredients since the onset of the COVID-19 pandemic as compared to how it was before the pandemic. On this ground of price increment, the majority (73.3%) of the respondents intimated that there has been a percentage increase in the feed ingredient within a range of 5%-10% since the onset of the pandemic (Table 3).

Feed millers were further asked what accounted for this increase in the prices of feed ingredients in this era of the pandemic and the majority (66.7%) of them made it known that it was the scarcity of the ingredients that resulted in this increment (Table 3). The remaining (33.3%) indicated that the hike in importation tax is responsible for the increase in the prices of the ingredients. This finding aligns with the finding of AU-IBAR, (2020) and Obese *et al.* (2021) whose respondents shared the sentiment of a scarcity of poultry inputs.

Variables		Frequency	Percentages (%)
Source of feed ingredients	Market	19	63.3
	Farmgate	11	36.7
COVID-19 and availability of ingredients	Yes	19	63.3
	No	11	36.7
Effect of COVID-19 on price of ingredients	Yes	30	100
	No	0	0
Ways COVID-19 has affected price of ingredients	Increased price	30	100
Increase of ingredients price compared to price before COVID-19	Yes	30	100
	No	0	0
Percentage increment of price of feed	5%-10%	22	73.3
	11%-16	8	26.7
What accounted for the price increment	High importation tax	10	33.3
	Scarcity of ingredients	20	66.7

Table 3: Feed miller’s view on the impact of Covid-19 on the feed milling industry

Thirty-seven percent (37%) of the feed millers responded to the question of what they think the government should do to mitigate the problems of the pandemic in the poultry industry and said that, the government should provide poultry farmers with soft loans (Figure 4). Thirty-two percent (32%) of them suggested that government

should decrease importation tax, especially on agricultural-related goods. The remaining 26% and 5% of the respondents also indicated that government should invest in the poultry industry and provide subsidies on vaccines and poultry drugs, feed and feed ingredients respectively.

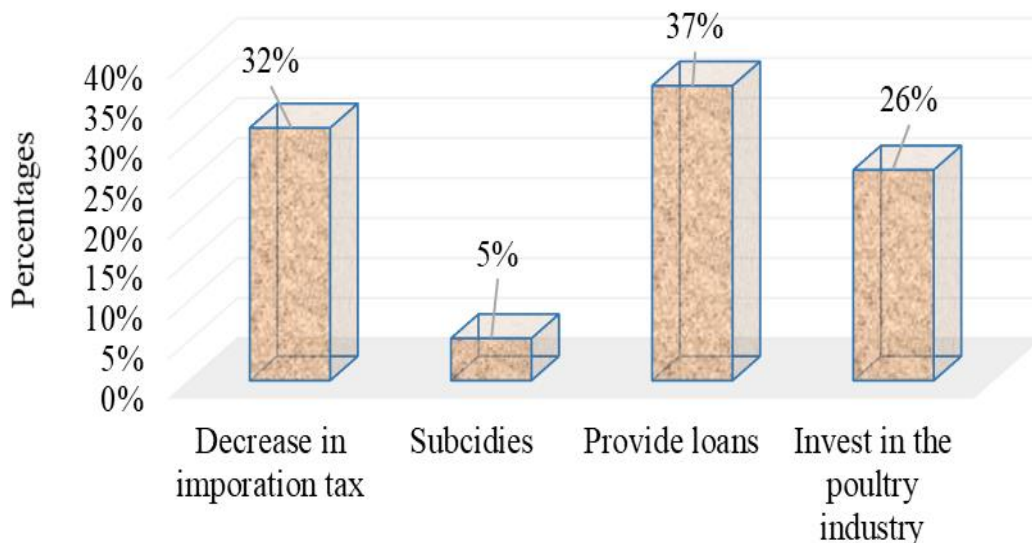


Fig. 4: Feed miller opinion on what should be done to mitigate or reduce the impact of COVID-19 pandemic on feed mill operators

C. Section three: Response of traders of poultry products

Response on the gender indicated that 76% of the traders were female with only 24% being male (Table 4). This finding is consistent with the findings of Oltmans (2013) who recorded females’ dominance in a case study on food retail. The author asserted that women have the determination and the patience to sit in one place for several hours to do their trading activities as compared to

men. Majority (62%) of the traders were married with 24% of them being single (Table 4). This also agrees with the findings of Oltmans (2013) who did a case study on the food retail environment of Accra, Ghana. With regards to responses on the educational background of the traders, 56% of them attended secondary school education, 38% of them had basic education with 4% and 2% of them have no formal education and Tertiary education respectively.

Variable	Frequencies	Percentages (%)
Gender		
Male	12	24
Female	38	76
Religious background		
Christian	33	66
Muslim	17	34
Marital status		
Single	12	24
Married	31	62
Divorced	2	4
Widowed	5	10
Education background		
Basic school	19	38
SHS	26	56
Tertiary	3	2
No formal education	2	4

Table 4: Demographic characteristics of traders of poultry products

The traders were asked to tell whether they were finding it difficult to source poultry eggs before the pandemic and almost all of them (95%) answered that they were not finding it difficult sourcing poultry eggs (Figure 5).

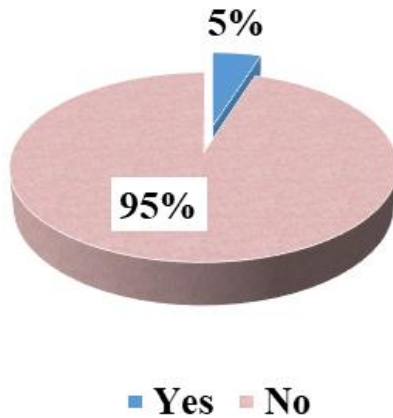


Fig. 5: Responds of respondents on the difficulty in sourcing chicken eggs before the pandemic

The traders were again asked to tell whether they have started finding it difficult to source chicken eggs since the onset of the pandemic and about 61% of them made it clear that the pandemic has resulted in them struggling to get the eggs (Figure 6). Notwithstanding, the remaining 39% of the traders asserted that there have not been any changes since the onset of the pandemic. The finding is consistent with that of Obese *et al.* (2021) who realised in their study that the stoppage of all activities has resulted in the unavailability of most food commodities when they carried out a study to ascertain the impact of COVID-19 on animal production in Ghana.

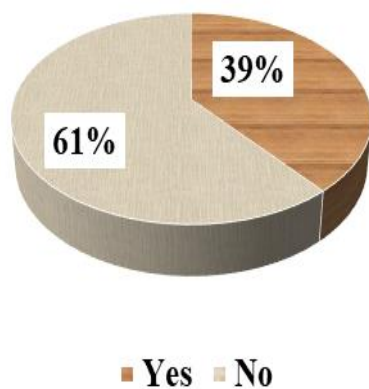


Fig. 6: Responds of respondents on the difficulty in sourcing chicken eggs since the onset of the pandemic

A similar question posed to traders of chicken eggs was asked to traders in chicken meat and 56% indicated that they were already finding it difficult to source chicken meat even before the pandemic, while the remaining 44% contradicted that assertion (Figure 7). There was a ban on the importation of frozen chicken in 2018 to revamp the local poultry industry, which could be responsible for the unavailability of chicken meat before the COVID-19 outbreak as reported by the respondents. According to Nurah (2018), the ban brought about a shortage of chicken meat during that period, because local farmers' output was

not enough to meet the entire chicken meat demand of the country.

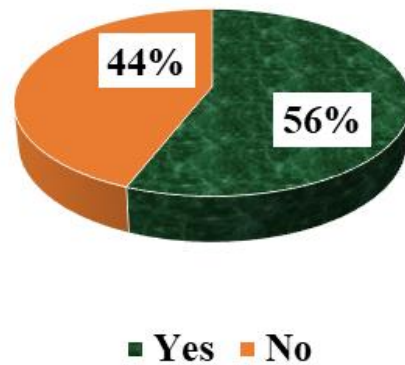


Fig. 7: Responds of respondents on the difficulty in sourcing chicken meat before the pandemic

The meat traders were again asked to tell what the situation is as far as sourcing of chicken meat is concerned since the onset of the pandemic and interestingly, 82% of them revealed that they are now really finding it difficult sourcing poultry meat (Figure 8). This confirms the findings of Obese *et al.* (2021) when they conducted a study to ascertain the impact of COVID-19 on animal production in Ghana. The authors concluded that the COVID-19 pandemic has impacted livestock production in Ghana negatively via demand and supply of food, input supply and veterinary services, animal breeding and husbandry, as well as human and institutional capacity building.

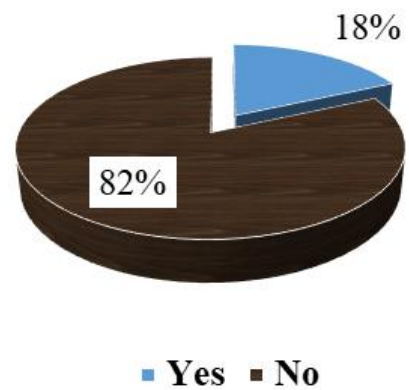


Fig. 8: Responds of respondents on the difficulty in sourcing chicken meat since the onset of the pandemic

Seventy-four percent (74%) of the egg traders intimated that COVID-19 has resulted in an increment in the cost of the eggs they buy from the farmers. The remaining 26% of the traders have the opinion that the pandemic has resulted in a shortage of eggs and so they do not even get some to buy from the farmers (Figure 9). The supply of these poultry commodities is usually done by farmers, so the lockdown hampered their availability by so doing reduce their usual supply capacity.



Fig. 9: Responds of respondents on how COVID-19 has affected the chicken eggs market

On the side of chicken meat traders, 67% of them share the same sentiment as the egg traders that the cost has increased (Figure 10). Twenty-two percent (22%) of them are of the view that the pandemic has resulted in reduced patronage by consumers of chicken, notwithstanding, 11%

of them believe that the pandemic has resulted in reduced importation of frozen chicken. This finding is in line with the findings of Tasiameet *al.* (2020) who had similar responses in a survey to ascertain the patronage of consumers at Kumasi Abattoir.

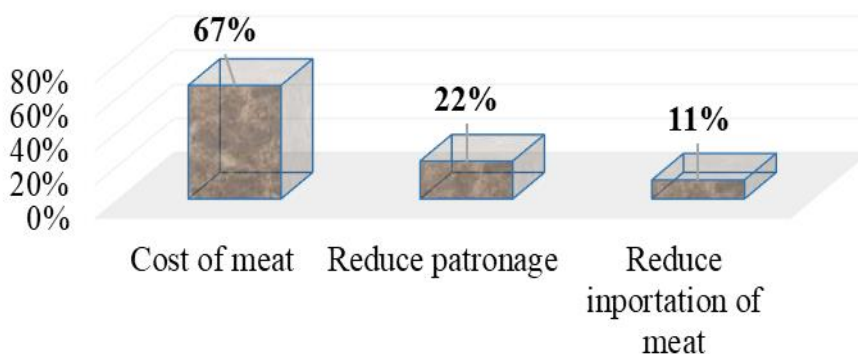


Fig. 10: Responds of respondent on how COVID-19 has affected the meat market

The data obtained from traders of poultry products revealed that the current average cost of a tray of eggs is significantly ($P < 0.05$) higher than the cost before the COVID-19 pandemic (Table 5). Also, the price at which they sell this tray of eggs currently has increased significantly ($P < 0.05$) as compared to how it was sold before the COVID-19 pandemic. In the same vein, the current cost of a kilogram of chicken as provided by the traders of poultry products is also significantly ($P < 0.05$)

higher than the cost at which they bought a kilogram of chicken, before the COVID-19 pandemic. A similar trend was observed in how they now sell a kilogram of chicken. According to Asante and Mills (2020) and Gakpo (2020), the closure of market centres and all activities to enforce social distancing has resulted in the reduction of food commodities leading to a hike in prices of those food commodities in most urban markets across the country.

Variables	Period		P-value
	Before COVID-19	Current situation	
Average cost of a tray of eggs (GH¢)	13 ^b	16 ^a	0.001
Selling price of a tray of eggs (GH¢)	17 ^b	20 ^a	0.001
Average cost of a kg chicken (GH¢)	7 ^b	9 ^a	0.004
Selling price of kg chicken (GH¢)	11 ^b	14 ^a	0.001

Table 5: The previous cost and the current cost of poultry products

^{ab}: Means bearing different letters in the same row are significantly different at $P < 0.05$.

D. Section four: Response of poultry products consumer

From Table 6, 64% of the respondents were females with only 33% being males. The high female percentage is consistent with the findings of IDS and GSS, (2016) who had in their survey out of 4,995 respondents recorded, 59.8% of the respondents were females. They attributed the

higher female percentage to the fact that men are much more often away from the household than women. Majority (58%) of the consumers of poultry products were married, with 30% of them being single (Table 6). Single individuals don't engage in food preparation as frequent as married individuals will do, they usually rely on fast food, so getting

food ingredients of which poultry products are paramount usually is not their priority as far as cooking-related issues are concerned. Forty-six percent (46%) of the respondents had basic school education, 38% of them had Secondary School education, 8% of the respondents had tertiary education and finally, 8% did not have any formal education

(Table 6). Basic education as the highest percentage aligns with the results of IDS and GSS (2016) who had junior high school scoring the highest percentage (37.7%) out of the 4,964 respondents and tertiary education scoring the lowest (12.4%).

Variable	Frequencies	Percentages (%)
Gender		
Male	18	36
Female	32	64
Religious background		
Christian	37	74
Muslim	12	24
Traditionalist	1	2
Marital status		
Single	15	30
Married	29	58
Divorced	2	4
Widowed	4	8
Education background		
Basic school	23	46
SHS	19	38
Tertiary	4	8
No formal education	4	8

Table 6: Demographic characteristics of consumers of poultry products

From Table 7, 98% of the consumers of poultry egg indicated that since the onset of the pandemic prices of eggs has gone up and they attributed this price increment to the shortage of eggs at the various markets in the metropolis. This finding agrees with the finding of Asante and Mills (2020) and Gakpo (2020) who noted that the closure of borders and the lockdown have resulted in a price hike in food commodities in Ghana.

Seventy-one percent (71%) of the egg consumers indicated that the price increment has resulted in them reducing the number of eggs they usually patronise before the onset of COVID-19, 18% and 11% of them noted that

the price hike has resulted in them not buying the eggs at all and making use of substitutes respectively (Table7).Poultry meat consumers also confirmed that the pandemic has resulted in a price hike (67%). They also noted that the price increase was a result of the shortage of poultry meat on the market and high importation tax, 67% and 33% respectively. Eighty-two percent (82%) of the meat consumers also stated that the price increase has resulted in the reduction of the amount of poultry meat they usually patronise and 18% of them noted that they now use substitutes in place of the poultry meat.

Variable	Frequencies	Percentages (%)
Pandemic onset effect and price of eggs		
Yes	48	98
No	1	2
In what way has the increased price affected your patronage		
Reduce patronage	20	71
Stop patronising	5	18
Now using substitutes	3	11
Pandemic onset effect and price of meat		
Yes	33	67
No	16	33
How has COVID-19 increased the prices of meat		
High importation tax	6	33
Shortage of meat	12	67
In what way has the increased price affected your patronage of meat		
Reduce patronage	9	82
Now using substitutes	2	18

Table 7: Consumers' response on whether the pandemic has affected their patronage of poultry products

IV. CONCLUSION AND RECOMMENDATION

It is concluded that the COVID-19 pandemic has impacted negatively the poultry industry in Ghana by crippling the stakeholders in the industry. Poultry farmers are stalling in production because their workers are leaving their jobs because of non-payment of their salaries. Farmers are again burdened with the reality of a shortage of input and so production is not able to go on properly. Feed millers cannot get access to feed ingredients and the few that are available are expensive, making the compounded feed very expensive to farmers. Traders, on the other hand, are not able to source poultry products and so an increase in demand has resulted in the increment of prices of the few that are available at the farms. Consumers who are at the end of the value chain can no longer afford the cost and thus, are looking for alternatives to poultry products. This case study should be replicated in other parts of the country, especially places where poultry production is dominant to ascertain the nationwide effect of the pandemic on the poultry industry. Also, since this research is only a snapshot in time, it would be interesting to return and complete a similar study in the future to see if any changes have taken place.

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CONFLICT OF INTEREST

The authors declare there is no conflict of interest.

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