

Small-Scale Poultry Farmer's Perception on the Emerging Impact of Covid-19 Pandemic in Zambia

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Abstract

The Covid-19 pandemic has been reported to have disrupted the food systems globally, thereby, negatively affecting production of agricultural commodities. This study was carried out to examine the emerging impact of the pandemic on small-scale poultry farmers in Lusaka Province, Zambia. Questionnaires were administered to 100 farmers in Chongwe rural area (Lusaka city sub-hub) and the data collected were subjected to descriptive and correlation analysis. The research findings revealed that the pandemic has a significant negative impact on the small-scale poultry farmer access to feed availability, vaccines and day old chicks. Similarly, the pandemic had a significant impact on market availability, accessibility and the purchasing power of the consumers. The research also indicated that a significant positive correlation exist between difficulties in accessing essential inputs for poultry productivity and the coping strategy that the poultry farmer adopted. While the government provided financial incentives to some industrial and commercial entities, most small-

scale farmers in this study did not benefit from the scheme. This shows that the government is more focused on industrial entities rather than small-scale farmers and producers. The study concluded that farmers experienced a great effect of the pandemic on their poultry business due to the restriction imposed by the government, which caused inaccessibility of input supplies and market for the sale of birds. Mitigating strategies such as facilitating access to production inputs, market linkages and financial assistance (soft loans, grants, relief etc.) for small-scale poultry producers to build a resilient poultry system and cope with the emerging challenges Covid-19 imposed on the poultry industry, are recommended.

Keywords: Poultry, Covid-19, Small-scale, Farmers, Marketing System, Demand, Supply

Introduction

The outbreak of the Covid-19 pandemic in the late 2019, and the

several precautionary measures such as lockdown, movement restriction and social distancing taken by governments to curb the spread of the virus, had significant consequences and impacts on the poultry farming systems and supply chains in some developing nations [1,2]. According to Hobbs et al., [3], these containment efforts have had a significant impact on the movement of agricultural commodities from farmers to consumers, putting food supply networks at risk of disruption. Hafez and Attia [4] found that the pandemic has disrupted numerous operations in poultry supply chains, posing unprecedented hurdles to small poultry farmers, especially in marginalised farming communities.

The impact of the pandemic on poultry and other livestock supply chains, threatens to impair the livelihoods and food security of poor and rural people in developing nations [5, 6]. This is in part due to the fact that poultry production is the most rapidly expanding agricultural sub-sector, particularly, in developing countries [7]. In Zambia alone, poultry business remains a vital part of the country's economy, accounting for 4.8% of agricultural GDP and 48% of the livestock sector [8]. It generates a considerable amount of revenue from selling eggs, broiler meat, and culled chickens.

While it is true that the Covid-19 pandemic had no direct impact on the poultry supply chain's production stages [9], interruptions in downstream stages, such as transportation and logistics, as well as demand and consumption, have a knock-on effect on producers [10, 11].

The World Food Programme(WFP)[12] discovered that Covid-19 restrictions hampered poultry producers' access to feed, water, and other production inputs in Eastern and Southern African countries and that exporters in these countries faced significant drops in demand for livestock-sourced foods in major importing markets.

Small-scale poultry farming systems in sub-Sahara Africa, which are usually practiced by rural households in extensive or semi-extensive systems, account for over 80% of the total chicken population and significantly contribute to yearly egg and meat output [13]. Small-scale poultry farmers, in particular, faced many Covid-19 related challenges, including supply chain disruptions, labour shortages, demand disruption, animal market malfunctions, as well as price volatility, and changes in consumer purchasing behaviour [14, 15]. Hatab et al., [16] found three primary reasons for the pandemic's detrimental impact on small-scale chicken producers namely; over reliance on humans for operations, limited logistical and financial resources and the fact that most were not eligible for the government's stimulus programmes.

There is, however, very little empirical information on the impact of the pandemic on poultry supply networks and small-scale poultry farmers [4]. A careful examination of the few available literature exposed three main flaws. Firstly, the majority of the literature concentrated on intensive production systems of developed nations, while there were few studies based on the experiences of small-scale poultry farmers in underdeveloped countries [11]. Similarly, most of

the evidence were aggregated by continental, regional and sector-level analyses [17, 18]. This approach is contrary to the diversity of the poultry systems in developing nations and offers a one-size-fits-all solution, ignoring the fact that the challenges faced differ with location, institutional frameworks, and socioeconomic situations. Lastly, rather than measuring the extent of these effects using quantitative methods, most of these studies adopted qualitative research methods [19], which tend to explore and describe the dynamics of Covid-19 and its effects on livestock value chains.

Smallholder poultry farmers mainly sell their chickens and poultry by-products in peri-urban and urban centres at informal markets and other formal markets [20]. However, due to the pandemic, access to markets and trading of live birds along highways were restricted [21] and thus, impacted farmers' income and livelihood. In addition, access to quality poultry inputs, day-old chicks, and vet and extension services were interrupted. These emerging challenges impacts and threaten on small-scale poultry value chain activities from input supplies to consumption. Therefore, the objective of the study was to examine the emerging impact of the Covid-19 pandemic on small-scale poultry farmers in Chongwe, a rural district in Zambia's Lusaka province as well as impact of containment measures and coping strategy adopted.

Materials and Methods

Study Area

The study was conducted in Chongwe, a rural district in Zambia's Lusaka

province. Chongwe is located at 15° 21' 0" S and 28° 42' 0" E. According to [22], agriculture is the mainstay of the economy of the district and the proximity to Lusaka city is an advantage in terms of ready market. Agricultural activities include crop production, horticultural production and livestock production are common in Chongwe district. This study area plays a vital role in supplying food items to urban areas like the Lusaka city, which depends on agricultural products (crop and livestock) from the rural communities of Chongwe district to meet the food and nutrition needs of consumers in Lusaka city.

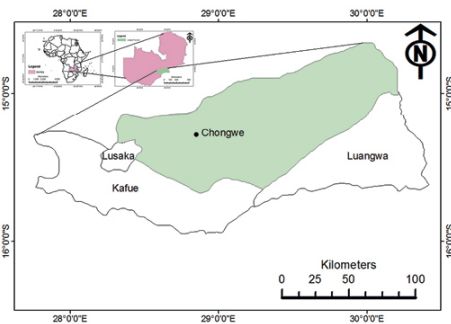


Figure 1: Map of Zambia showing Chongwe district and a few constituent districts in Lusaka Province. Source: [23]

Methodology

The research design was a case study which allowed for quantitative and qualitative research methods to collect adequate information for the study. Primary data were collected for the study using a structured questionnaire. The questionnaire was pre-tested to ascertain the validity of the questions and research objectives. A total of 100 respondents were selected using two stage sampling technique. In the first

stage, four wards out of nineteen were selected for the study based on farmers' population and high percentage of poultry farming in the areas. For the second stage, farmers were selected randomly from each area on the basis of their poultry size, and knowledge of the poultry farming. Twenty-five (25) small-scale poultry farmers were selected in Mwalumina, Palabana, Kanakantapa and Lukoshi wards.

Data were collected on the following: farmers' demographic characteristics-age, education, gender, marital status, household size, and employment status; farmers' poultry production and operation capacity -number of birds, poultry farm status, and variety of birds raised; farmers' perception of the impact of Covid-19 and lockdown measures on the poultry industry, business, and supply chains; farmers' price changes on poultry inputs and products; and farmers coping mechanisms against the pandemic and suggestions to help the small-scale poultry business.

The data collected was analysed using the SPSS software package (SPSS 27.0). Descriptive (frequency and percentage distribution) carried out together with Pearson correlation statistics were used for data analysis. Pearson correlation analysis were carried out for these factors - required support and information from the government and private sector (financial assistance and provision of incentives and palliatives); coping strategy, and lastly, factors affecting small-scale poultry productivity (such as inaccessibility of essential poultry production inputs and market) in Chongwe area during the pandemic.

Results and Discussion

Farmers' Socio-demographics

Table 1 shows the socio-demographics of the farmers in the study area. There was gender balance in the study (54.3% male and 45.7% female). This indicated that poultry farming in the study area is largely practiced by both male and female and thus, there is no gender discrimination to poultry farming. This agreed with findings from Ngongolo et al., [24] that chicken production is a vital economic enterprise for both male and female genders because of the benefits and the speedier manner to earn income by converting input resources within a short period. Age bracket between 18 and 30 years had the highest number of farmers involved in poultry farming in the study areas. This result indicated that young people are now more involved and interested in exploring business opportunities in poultry farming and other farming activities in the study area as opposed to the popular opinion that agriculture is mostly practiced by the older people. The youth involvement in poultry farming can be as a result of the perception around the profitability and less back-breaking activities involved in poultry farming compared to crop farming. This finding agreed with Mulema et al.,[25] that showed that the majority of youth (69%) in Zambia were engaged in the agribusiness as their primary source of livelihood. Aside from crop production, the study reported that poultry was the most popular animal enterprise in Zambia, with 54% of the youth sample population engaging in this enterprise [25]. Similarly, a study conducted in Tanzania and Zambia found that women

and youth are actively involved in chicken production and are the primary beneficiaries [26].

The average households size of the study area was found to be between 1 to 5 people. The survey findings were consistent with the [27] results, which stated that the average household size in Zambia, is 5.0 people [Table 1]. In terms of education, 40.2% had completed high school while the majority (66.3%) were married and 45.7% engaged in full-time farm employment [Table 1]. It is thought that age, education, full-time farm-employment and marital status could have an implication on their production capacity of the farmers and how they managed their poultry farming business. Regarding the educational level, 40.2% have high school education, while 38% have informal education [Table 1]. This

study established that farmers with higher education levels are expected to experience less impact of the Covid-19 on their poultry operations due to their informed knowledge and adoption of best practices on production and coping mechanism. This is in agreement with the study in Tanzania [24] that most chicken keepers have just an elementary education and rely on their poultry ventures for cash and protein. As a result of the fairly level of literacy of the poultry farmers, this study expected that the level of education will have influence on the level of knowledge and information adopted by the farmers to enhance their accessibility to financial loans, market linkages and essential poultry inputs, although the Government of Zambia's [8] incomplete data were left out of this study analysis.

Table 1: Socio-demographic Characteristics

Socio-Demographic Characteristics	Frequency	Percentage (%)
Gender		
Male	50	54.3
Female	42	45.7
Age		
18-30years	31	33.7
31-40years	26	28.3
41-50years	22	23.9
Above 50years	13	14.1
Level of Education		
Informal education	35	38.0
Trade school	16	17.4
High school	37	40.2
Tertiary education	4	4.4
Marital Status		
Single	18	19.6
Married	61	66.3
Divorced/separated	2	2.2
Widow	11	12.0
Household Size		
1-5 people	47	51.1
More than 5 people	45	48.9
Farm Employment		
Full time farmer	42	45.7
Part time farmer	26	28.3
Seasonal farmer	24	26.1

Farmer's Poultry Production and Operation Capacity

Table 2 shows farmers' poultry operation capacity. This study observed that the majority of the households within the Chongwe district owned at least, a small poultry shelters (such as cages, baskets, mud poultry house) to rear chickens either for sales or family consumption. The result also aligned with the report of [28] that the Lusaka Province has Zambia's highest broiler production concentration due to small-scale and big poultry farms clusters. In addition, half (50.0%) of poultry farms are family-owned [Table 2]. This affirmed that livestock family farms are common practices in many African countries as indicated by Gueye [29] that the poultry family farms in Africa remain an appropriate system to supply the fast-growing human population with high-quality protein.

According to Table 2, many of the farmers (44.6%) are known for rearing village chickens as a source of income, while a few (28.3%) were engaged

in rearing both hybrid and village chickens and nearly half (43.5%) of the farmers had less than 50 birds size. This agreed with a study by Gunya [30] which indicated the important contribution of local chickens towards income generation for farmers.

The result in Table 2 shows that many of the poultry farmers in the region are mainly small-scale with less than 50 birds and potentially having little capacity to increase their poultry production. Similarly, the study noticed that farmers are often limited on the number of birds they can raise due to availability of income, the size of the poultry houses to rear the chickens as well as the knowledge on poultry management. This is in agreement with the study in Nigeria [31] that most small-scale poultry farmers lack the financial resources and management skills to raise larger flocks. In addition, the study observed that the small flock size will determined their input requirements, output supplies to the market and cost and revenue implications.

Table 2: Poultry Production and Operation Capacity

Operational Capacity Status	Frequency	Percentage (%)
Type of Poultry Farm Ownership		
Solely owned	40	43.5
Family ownership	46	50.0
Partnership venture	4	4.3
Out-grower for private company	2	2.2
Poultry Varieties		
Primary local/village chickens	41	44.6
Primary hybrid chickens	25	27.1
Combined hybrid and local/village chickens	26	28.3
Number of Birds		
Less than 50 birds	40	43.5
Between 50-100birds	20	21.7
Between 101-300 birds	16	17.4
Between 301-500 birds	16	17.4

Covid-19 Impact on the Performance of the Small-scale Poultry Farms

Table 3 shows the impact of the pandemic on the performance of the respondents' poultry operations. The majority (95.7%) of the small-scale poultry farmers experienced a significant negative impact of the pandemic. In terms of risk assessment, 85.9% of the farmers had a reduction in income as a result of the pandemic's impact. Similarly, a large percentage (79.3%) of the farmers recorded an increase in mortality rate due to limited access to veterinary professionals and stocking of veterinary drugs as a result of Covid-19 containment measures. In addition, nearly half (47.8%) of the farmers noted that the pandemic posed a high risk to their poultry farming business [Table 3].

These findings agreed with Adesina et al., [32] who demonstrated that poultry farmers suffered from Covid-19 restrictions and were faced with egg glut due to lockdown. Similarly, Chrispin and Munguzwe [33] also showed that business activity of poultry farmers and revenues were negatively impacted by the Covid-19 measures while ability of households to sell various commodities in different types of markets generally decreased due to the pandemic. Also, the present study corroborated findings from [34] showed that the Covid-19 pandemic created massive disruptions in meat supply chains including the poultry industry. Detrimental impacts to chicken demand due to restaurant closures led to supply adjustments affecting broiler small-scale poultry farmers and business.

Table 4 elaborated on the impact of the pandemic on access to inputs, financial services, gluts in selling chicken and chicken by-products, increase in price of poultry inputs,

decline in consumption of healthy and nutrition food of small-scale poultry operations. Majority of the farmers (62%) lacked access to inputs during the lockdown period, while fewer (10.9%) had access to financial services during the pandemic. Almost all the farmers (98.9%) indicated that prices of poultry inputs increased during the pandemic [Table 4].

Nearly half (47.8%) of the farmers experienced gluts due to failure to sell chicken and chicken by-products during the lockdown. Many of the farmers (80.4%) indicated that the pandemic led to a decrease in the number of consumers and traders who buy from them [Table 4]. This study showed that the covid-19 pandemic had a major impact on the informal markets and the purchasing power of the vulnerable households in the study area. Similarly, majority (76.1%) of the farmers ate less healthful and nutritious food (in terms of frequency, amount, and quality) during the pandemic. This study recommends the need for government and private sector to facilitate market linkage and support systems, access to logistic support (such as transportation, cold storage and processing plant), and training programs (access to training on-farm management, business skill, feed formulation, and comprehensive best practices).

This present research findings were supported by [35] study which indicated that covid-19 affected small-scale broiler farming differently based on their management and production systems and resource endowment. [36] have also indicated that the pandemic increased food insecurity caused by significant declines in purchasing power and food demand among low-income households due to loss of income and livelihood sources coupled with closures of informal markets.

Table 3: Impact of the Pandemic on the Performance of the Small-scale Poultry Industry

Impact of covid-19 on farmers productivity	Frequency	Percentage (%)
Negatively impacted poultry business		
Yes	88	95.7
No	4	4.3
Declined in sales of chicken and poultry products		
Yes	85	92.4
No	7	7.6
Experienced actual risk on the poultry business		
Very High	44	47.8
Very Low	16	17.4
Medium	32	34.8
The pandemic affected the income of farmers		
Loss/decrease in income	79	85.9
Increase in income	6	6.5
Not affected at all	7	7.6
Mortality rates increase due to covid and lack of access to veterinary staff		
Yes	73	79.3
No	19	20.7

Table 4: Limitations Faced by Small-scale Poultry Industry During the Pandemic

Factors	Yes	No
Access to inputs (feeds, vaccines and day-old chicks, veterinary support)	35 38%	57 62%
Access to financial services	10 10.9%	82 89.1%
Gluts in selling chicken and chicken by-products	44 47.8%	48 52.2%
Declined in the number of buyers or traders	74 80.4%	18 19.6%
Declined in consumption of healthy and nutritious food (frequency, quantity, and quality)	70 76.1%	22 23.9%
Increase in prices of poultry inputs	91 98.9%	1 1.1%

Price Changes in Poultry Inputs and Products During the Covid-19

Table 5 shows how prices of poultry product inputs and by-products changed pre and during the Covid-19 pandemic. As a result of the pandemic's compounding effect, the price per unit of poultry feed and other poultry inputs climbed up dramatically. Farmers experienced a sharp increase in the price of a doc rose by 40% from its pre-pandemic level [Table 5]. The explanation for the rapid rise in doc prices may be linked to a study by Samboko et al., [37], which found that 97% of day-old chick sales in Zambia are for the domestic market, with exports representing barely 3% of annual production. Similarly, the study noted that protectionist policies by the government also impacted on the price of poultry, whereby broiler imports are not allowed into the country and only mechanically deboned chickens are presently allowed to be imported into Zambia. It was observed from the study that the increase in population and urbanisation and the depreciation of the Zambia currency (ZMW) against

the dollar were other major factors contributing to the high and competitive prices of the doc and other poultry production inputs.

In addition, the price of a whole chicken (both local chicken and broiler) has risen by 33% due to factors such as the production costs, consumer's change of tastes and preferences and the fluctuating exchange rates. This finding aligned with the study of Matenga and Hichaambwa [38], which stated that prices of farm inputs reportedly increased with the on-set of Covid-19, most, especially the livestock farming. This mainly due to restriction of movements, high cost of transportation during the on-set of the pandemic and exchange rate fluctuation.

It is recommended that the government must establish and implement policy interventions such as introducing subsidies on poultry production inputs to reduce the cost of these inputs to support small-scale poultry farmers and ensure adequate supports to facilitate and strengthen the formation of farmers' cooperatives.

Table 5: Price Changes in Poultry Inputs and Products Before and During Pandemic

Inputs/products	Unit	Before	During	Changes in Price
<u>Poultry Feeds:</u>				
Starter		230	410	78%
Grower	50kg	290	352	21%
Finisher		280	348	24%
Day Old Chicks	1 DOC	6	10	67%
Whole chicken (local chicken)	1 chicken	60	90	50%
Whole chicken (Broiler)	1 chicken	50	75	50%
<u>Poultry Vaccines:</u> Gumboro				
vaccine	100 doses	15	30	100%
New castle vaccine	100 doses	10	25	150%
<u>Equipment:</u>				
Feeders	1 unit	30	78	160%
Drinkers	1 unit/5litres	35	70	100%
Litter (sawdust)	50kg	10	15	50%
Charcoal	50kg	70	100	43%

** (Prices were computed in Zambia Kwacha. 1 USD = 17.6 ZMK)

The above percentage change in price was computed (between March 2020 and February 2021) as the price of a commodity before the pandemic and the price of the same commodity during the pandemic. Mathematically, percentage change in price is represented as $(d-b)/b*100$ where d – prices during the pandemic and b – prices before the pandemic.

Covid-19 Implications on Productivity, Coping Strategy and Support Mechanisms

The results of the Pearson Correlation analysis in Table 6 examines the relationship between farmer's productivity, coping strategy and support mechanism against the pandemic. This section considers some of the factors already highlighted in Table [4] which were correlated against the farmers' coping strategy and the required support mechanisms from the government. The result indicated that the most significant strong positive correlation of 0.641 exist among factors affecting poultry productivity during the pandemic and the coping strategy that

the poultry farmer adopted to provide solution to the factors such as the lack or inaccessibility of market for farm produce due to closed of informal market places, inaccessibility of extension and veterinary personnel to attend to the birds, high cost of inputs due to the lockdown which led to difficulties in accessing essential inputs (vaccines, animal feeds and doc). This analysis supported the findings from [39] which noted that how households cope with the shocks created by the Covid-19 pandemic will shape its long-term impacts on household welfare and food systems.

It can also be deduced from the analysis that there exists a relationship between the support that the poultry

farmer needed from the government and private sector in relation to the factors affecting the poultry productivity among small-scale farmers in the study area because of the correlation value of 0.591 [Table 6]. The result also ascertained that there exists a relationship between the coping strategy that the poultry farmer adopted during the pandemic and the support they needed from the government and private sector because of the correlation value of 0.532.

This study recommends scaling-up farmer-focused or tailored interventions such as financial assistance (soft loans, grants and relief funds), incentives and palliatives (inputs such as doc, feeds and vaccines) to help farmers curb risks and shocks from the pandemic and improve their income.

Table 6: Correlation Matrix between Support Mechanism, Coping Strategy and Factors Affecting Small-scale Poultry Productivity During the Pandemic

Correlation Matrix		Support and information needed from government and private sector	Coping strategy adopted	Factor affecting small-scale poultry productivity during the pandemic
Support and information needed from government and private sector	Pearson Correlation			
Coping strategy adopted	Pearson Correlation	.532**		
Factor affecting small-scale poultry productivity during the pandemic	Pearson Correlation	.591**	.641**	

Note: **. Correlation is significant at the P-value 0.01 level (2-tailed). $p < 0.01$.

Conclusion

In this study, it is suggested that the Covid-19 pandemic affected many small-scale poultry farmers in Chongwe District. This study observed that the price changes for poultry inputs has resulted in a negative effect on the input supplies (doc, vaccines, poultry feeds)

while small-scale farmers that were able to sell their poultry-by products (whole chicken) benefited slightly from the higher prices on poultry by-products.

To ensure market stability, we concluded that price and market regulations must be put in place to

ensure that farmers can access and afford essential farm inputs for their farm activities. In addition, to ensure that farmers build better resilience to global shocks such as the pandemic, this study concluded that governments must establish and strengthen farmer cooperatives and farmers must be encouraged to join the cooperatives as a means to facilitate provision of farm inputs, market linkages for farm produce and share useful information with farmers.

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Consent to participate: Informed verbal consent was obtained from all individual participants included in the study.

Consent for publication: Not applicable.

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Availability of data: The datasets generated during and/or analysed during the current study are not publicly available but are available from the corresponding author on reasonable request.

Code availability: Not applicable.

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