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# Assessment of the Impact of COVID-19 Pandemic on Livestock Production in Koinadugu District, Sierra Leone

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**Abstract:- The emergence of coronavirus disease 2019 (COVID-19) has significantly impacted various industries worldwide, particularly livestock. The study aims to assess the impact of the COVID-19 pandemic on livestock production in Sierra Leone's Koinadugu area. The data was gathered from 162 livestock farmers in six chiefdoms of the Koinadugu District. Quantitative data were collected using semi-structured questionnaires, while qualitative data was collected via personal observations, desk research, and interviews. The questionnaires were administered between February 6 and March 25, 2021. The data were analyzed using Microsoft Excel version 2010 software. According to the findings, pandemics have had a detrimental influence on livestock production due to government-imposed measures such as lockdown, stay-at-home, and social distance. It impacted livestock productivity by limiting farmers' capacity to sell livestock products in the market (91.3%), limiting access to livestock input supplies (84.0%), deterring access to pasture (80.9%), and selling livestock become challenging because dealers are scarce (96.3%). It also impacts animals' health as there was a shortage of veterinary medicines (87.6%) and a lack of veterinarians (80.2%). Therefore, it is suggested that the government and other responsible authorities should prepare and execute policies to reduce COVID-19's pandemic impact on livestock production and marketing chains.**

**Keywords:** Animal health, COVID-19 impact, Economic losses, Livestock market, Livestock production.

## I. INTRODUCTION

The novel coronavirus disease 2019 (COVID-19) pandemic, caused by the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), is likely to have originated in December 2019 in Wuhan, Hubei Province, China, and has since spread to practically every country on the planet, including Sierra Leone [1]. The World Health Organization (WHO) designated COVID-19 a worldwide emergency on March 11, 2020, posing a threat to various industries, including health, agriculture, and manufacturing [2,3]. COVID-19 pandemic, in particular, has had a profound influence on perceptions of the contemporary world, raising genuine issues about the underpinnings of everyday life due to its large-scale death and morbidity rates [4,5]. Both the disease and the threat of transmission have prompted strict restrictions worldwide, restricting freedom of travel and commerce, quarantining billions of people, causing a significant decline in economic activity, and disrupting food and manufactured goods supply chains [6].

COVID-19 pandemic is harming several agriculture sectors, including crop production and livestock, and it is estimated that 60% of the world's population relies on agriculture for survival [7,8]. Agriculture contributes to over one-third of the global GDP [9]. COVID-19 shocks to agriculture cause disruptions on both the demand and supply sides due to production-related issues such as disruptions in input supply, labor availability, food losses, and a slow shift in transportation [10]. The Organization for Economic Cooperation and Development (OECD) forecasts a drop in economic growth from 2.9 to 2.4 percent in 2020, with the possibility of a decline to 1.5 percent if the pandemic continues [11].

The first COVID-19 case in Sierra Leone was reported on March 31, 2020, with 7682 cases and 125 deaths as of May 8, 2022 [12]. The government has taken significant action from the outset, enacting preventative measures such as the President's announcement of a 12-month national state of emergency [13]. Lock-downs, mobility restrictions, social distancing, and market closures were among the government's limitations. Furthermore, fear of getting the virus prompted more than 60% of the population to stay at home and minimize their market visits, resulting in a broad economic slowdown and revenue losses for many [14]. Agriculture markets and supply chains have been significantly disrupted in Sierra Leone, with agriculture markets likely taking the brunt of the damage because they rely primarily on timely access and transportation to markets from rural and peri-urban settings and demand from metropolitan cities and towns [15]. In 2015, the livestock industry generated around 5.7 percent of the agricultural GDP. Despite its modest GDP contribution, livestock farming is a significant agricultural sector, with almost 74 percent of families participating. Mixed crop-livestock systems are used by 85 percent of rural households [16]. The closure of government and non-government industries, mobility restrictions, social isolation, and a drop in economic development limit the demand for livestock products [17]. The movement restrictions also reduced the availability and timely distribution of veterinary supplies like medications and feed and a workforce scarcity for intensive farm activities [18].

Even though the COVID-19 pandemic has had enormous consequences, scientific documents on the disease's effects on the livestock industry in the Koinadugu area are

still lacking. The overall objective of this research was to assess the principal impact of the COVID-19 pandemic on livestock production, marketing, and animal health practices in the Koinadugu area. It is critical to measure the pandemic's impact on the livestock industry to develop practical solutions for mitigating such effects.

## II. METHODOLOGY

### *A. Study Area*

The research was carried out in Sierra Leone's Northern Province's Koinadugu area. Koinadugu district is surrounded by Bombali district to the west, Tonkolili district to the southwest, Kono district to the south, and the Republic of Guinea to the north. It is the country's largest district in terms of geographical size, yet it has the lowest population density. Like the rest of the country, the area has two different seasons: wet and dry. The dry season lasts from November to April, while the rainy season lasts from May to October, with 147 wet days and an average of 208 cm of rainfall. Approximately 91 percent of the district's population lives in rural regions, with an average family size of six. Agriculture is the primary source of income for about 84 percent of the district's residents [16]. The district boasts the country's largest livestock population, which provides animal protein sources.

### *B. Sampling procedure*

The data was collected in six chiefdoms of the Koinadugu district such as Kasunko, Mongo, sengbe, wara-wara yagala, Dembelia Sinkunia, and Folsaba Dembelia. The livestock farmers in the six chiefdoms were surveyed. With the cooperation of the heads and chiefs of several villages in the research regions, a simple random sample was employed. Following that, 162 livestock farmers were chosen for the study. The data was collected from two distinct sources. Quantitative data were collected using semi-structured questionnaires, while qualitative data was collected via personal observations, desk research, and interviews. The questionnaires were administered to 162 livestock farmers between February 6 and March 25, 2021.

### *C. Data analysis*

The data were analyzed using Microsoft Excel version 2010 software. Tables and graphs were used to display the frequency and percentage distribution of the data. For a comprehensive presentation of findings, personal conversations and observations were presented in a narrative context.

## III. RESULT

### *A.Socioeconomic characteristics of livestock farmers*

Most livestock farmers (88.9%) were men, while 11.1% were women (Table 1). Most of the farmers (60.5%) are between 46 and 55 years old, and the majority (63.0%) have no formal education. Most farmers (65.5%) have a household size of 5 to 8 individuals, with most farmers (74.1%) married. The livestock farmers have much experience since most (62.7%) have been doing it for 21 to 30 years. The majority (60.5%) are small-scale livestock farmers with 21-50 animals. The findings are consistent with [19], who stated that most rural people in West Africa rely on small-scale livestock farming for their livelihood.

**Table 1:** Socioeconomic characteristics of livestock farmers (N=162**)**

| Variables | Frequency | Percentages |
|---|---|---|
| **Gender** | | |
| Male | 144 | 88.9 |
| Female | 18 | 11.1 |
| **Age** | | |
| Below 26 | 5 | 3.1 |
| 26-35 | 8 | 4.9 |
| 36-45 | 21 | 13.0 |
| 46-55 | 98 | 60.5 |
| Above 56 | 30 | 18.5 |
| **Household size** | | |
| Less than 5 | 12 | 7.4 |
| 5-8 | 106 | 65.5 |
| 9-12 | 18 | 11.1 |
| Above 13 | 26 | 16.0 |
| **Educational level** | | |
| No formal education | 102 | 63.0 |
| Primary school | 31 | 19.1 |
| Secondary school | 16 | 9.9 |
| Tertiary education | 13 | 8.0 |
| **Marital Status** | | |
| Single | 14 | 8.6 |
| Married | 120 | 74.1 |
| Others | 28 | 17.3 |
| **Years of keeping livestock** | | |

| | | |
|---|---|---|
| 1-10 | 14 | 7.9 |
| 11-20 | 12 | 6.4 |
| 21-30 | 98 | 62.7 |
| 31-40 | 28 | 17.3 |
| 41 and above | 10 | 6.2 |
| **Hard size** | | |
| <21 | 20 | 12.3 |
| 21-50 | 98 | 60.5 |
| 51-80 | 10 | 6.2 |
| 81-110 | 15 | 9.3 |
| 111-140 | 11 | 6.8 |
| >140 | 8 | 4.9 |

**Source:** Field survey, 2021

*B. The primary livestock species owned by the farmers*

The respondents in the survey are primarily livestock farmers owning various livestock species, as seen in Figure 1. Poultry (42.0%), cattle (29.0%), goats/sheep (19.8%), and other animals (9.3%) are the most prevalent livestock raised by the respondent. The findings align with the 2015 population and housing census report that 90 percent of Sierra Leone's population rears poultry [16].

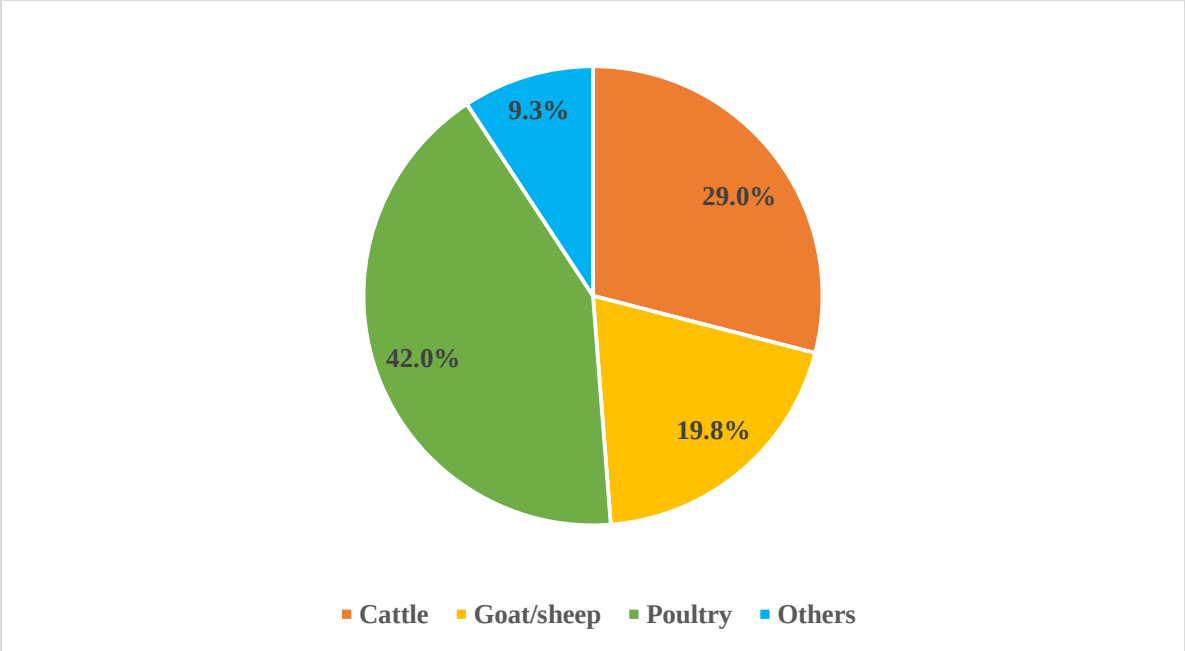


**Fig 1:** Primary livestock owned by farmers

*C. Management of the livestock herd*

Figure 2 shows that the entire family (54.3%) was in charge of the animals, followed by the laborer, the husband, the children, and the wife. The findings are similar to [20], who said that the entire family is involved in the animals' management in pastoral communities. The spouse is in charge of different management activities, such as taking livestock for grazing and leading them to water sources. Men also provide shelter, decide when and how much to sell, and manage the money generated from animal transactions. Women and children also do most management tasks such as providing feed and feeding, watering, confinement, treatment, breeding stock selection and counting the number of animals [21,22]. Even though it might be costly, some families engage outside workers to help them manage their animals [23].

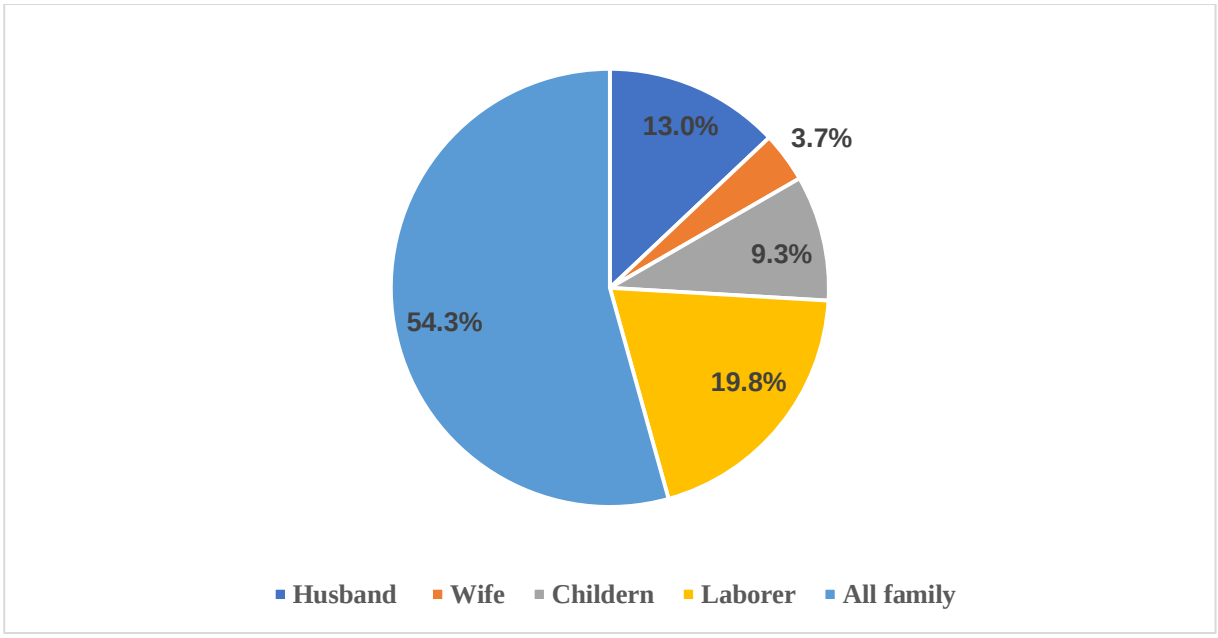


**Fig 2:** The management of the livestock herd

*D. The purpose of keeping livestock by the farmers*

Farmers' primary motivation for raising livestock was to generate cash (63.6%), followed by household consumption, religious or cultural rituals, traction power, and manure (Figure 3). Livestock farmers sell live animals and their products to generate money to purchased food and household goods especially during the rainy season when farmers face a food crisis. Farmers also have to pay for medical costs, school fees, clothing, planting materials, and agricultural labor. The results are consistent with [24], who report that livestock was sold to buy food, pay school fees, and hire labor.Farmers also retain livestock to create high-quality manure employed in vegetable cultivation or sold to vegetable producers [25].

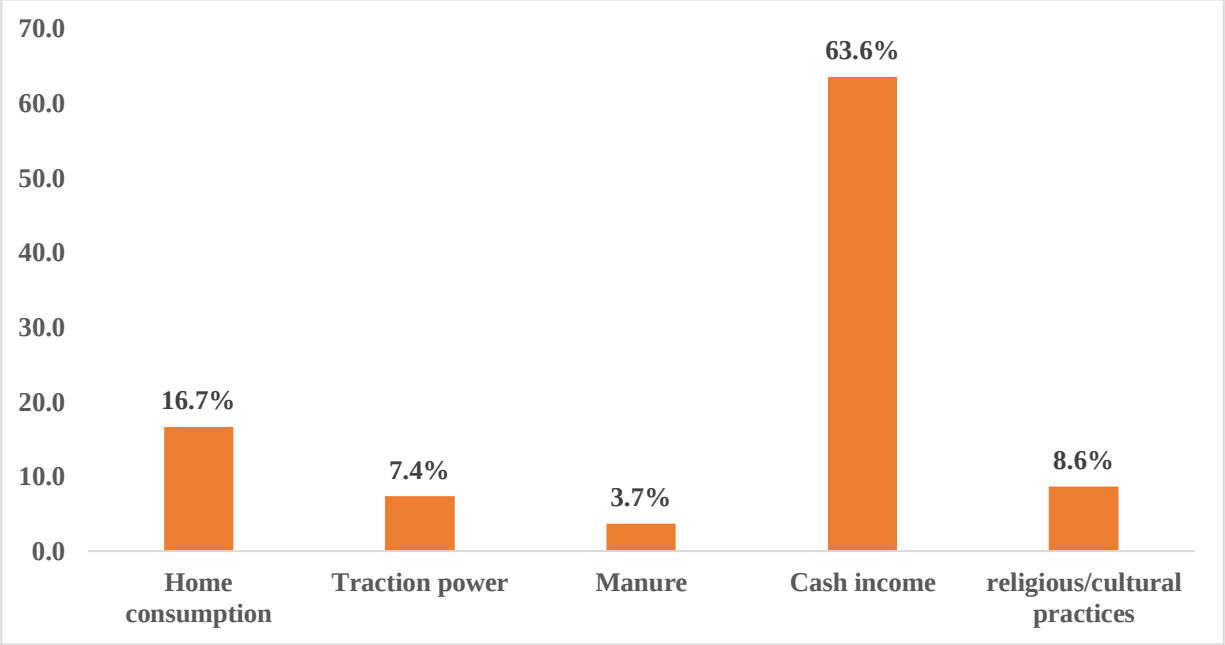


**Fig 3:** The purpose of keeping livestock

*E. The marketing of live animal and livestock products*

The livestock farmers were asked where they sell their live animals and product (Figure 4). Most farmers (57.4%) sell their products to a local market, followed by a local butcher, local consumption, nearby hotels or restaurants, and government institutions. Because the local market is convenient, most farmers prefer to sell their livestock or livestock products there. The findings align with those of [26], who stated that livestock producers sell their products directly to local markets, bypassing the "middlemen" in the food supply chain, which has several potential benefits.

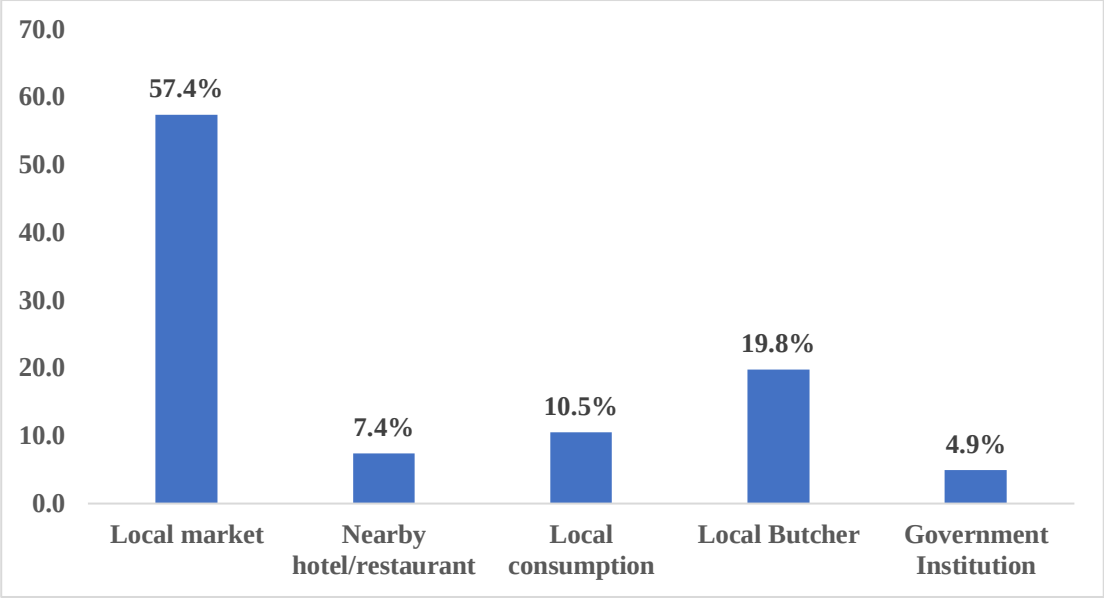


**Fig 4:** Marketing of livestock/ livestock products

*F. Livestock farmers' sources of information about COVID-19*

Figure 5 reveals that (55.6%) of livestock farmers learned about COVID-19 via their local radio station, followed by community administration, extension services, fellow farmers, the telephone, and the internet. The local radio station has nationwide coverage, making it the most convenient to disseminate information. The farmers can comprehend them since they are transmitted in their local tongue. The findings are consistent with [27], who indicated that during COVID-19, the older people depended on radio and newspapers for information while the younger generation relied predominantly on internet searching and social media networking sites.

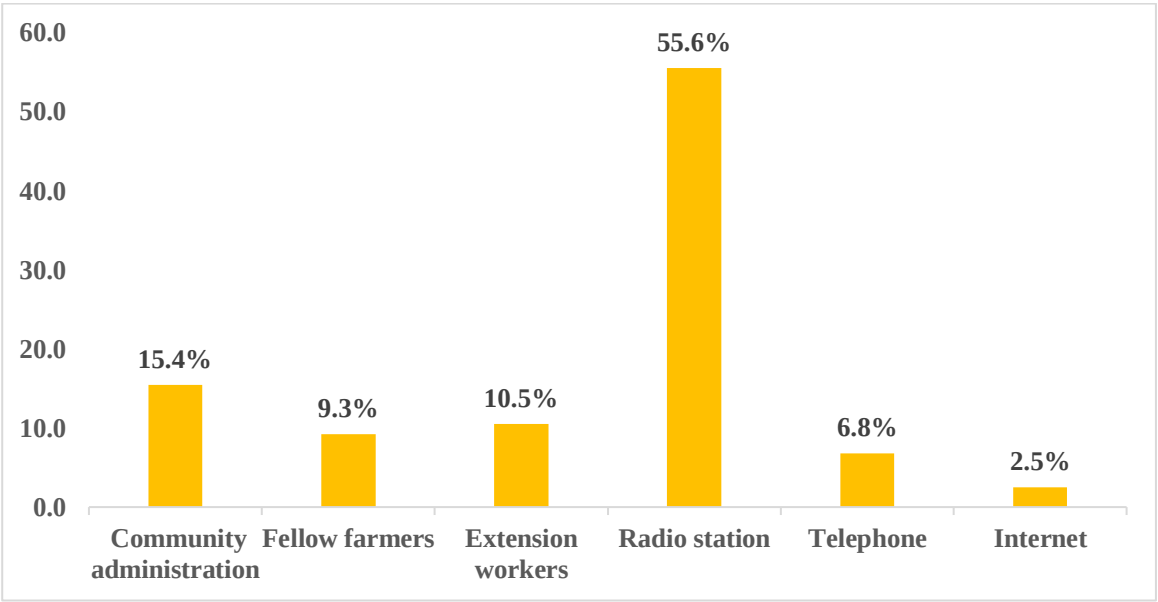


**Fig 5:** Sources of information about covid-19

*G. The impact of COVID-19 on livestock production*

Table 2 shows COVID-19's pandemic impact on livestock production systems. The farmers reported that the COVID-19 pandemic crisis restricted their ability to sell cattle in the market (91.3%), access to livestock inputs (84.0%), and reduced access to pasture (80.9%). The findings are comparable to those reported by [10] that livestock producers in Senegal face challenges marketing their products. The results are consistent with [15], who stated that access to livestock input was one of the top challenges in keeping livestock during the COVID-19 pandemic.

**Table 2:**The impact of COVID-19 on livestock production (n=162)

| Constrained in livestock production | Proportion | Percentage | Ranking |
|---|---|---|---|
| Reduce access to livestock inputs | 136 | 84.0 | 2 |
| Reduce access to pasture. | 131 | 80.9 | 3 |
| Reduce access to sell livestock and livestock products in the local market. | 148 | 91.3 | 1 |
| Reduce access to veterinary services | 120 | 74.1 | 4 |
| Increase in mortality of livestock | 94 | 58.0 | 6 |
| Reduce labor availability | 112 | 69.0 | 5 |

* Responses are not 100% due to multiple responses of the respondents.
**Source:** Field survey, 2021

*H. The impact of COVID-19 on livestock health management*

Table 3 reveals that most farmers (94.4%) can't afford or pay for veterinary services because their sales revenue from livestock and livestock product is declining. They reported a shortage of veterinary medicines (87.6%) and a lack of veterinarians (80.2%). Most of the farmers (67.9%) couldn't practice routine treatment of vaccination and deworming of animals. The majority of livestock farmers in the Koinadugu district say they have trouble accessing medicine and vitamins. Since the onset of COVID-19, some farmers claim that veterinary professionals have not visited them. The findings are consistent with [28], who indicated that livestock farmers have difficulty receiving medication during the COVID-19 lockout since animal health center employees are no longer visiting them. Animal health products and services are becoming scarce in the COVID-19 lockdown, which will impact livestock productivity [29].

**Table 3:**The impact of COVID-19 on livestock health management (n=162)

| Constrained in livestock health management | Proportion | Percentage | Ranking |
|---|---|---|---|
| Scarcity of veterinary drugs | 142 | 87.6 | 2 |
| Veterinarians not available as usual | 130 | 80.2 | 3 |
| Vaccination and deworming of the animal were not in practices | 110 | 67.9 | 4 |
| Unable to buy drugs or pay for veterinary services | 153 | 94.4 | 1 |

* Responses are not 100% due to multiple responses of the respondents.
**Source:** Field survey, 2021

*I. The impact of COVID-19 on livestock marketing*

Government policies encouraging people to stay at home and social isolation due to the COVID-19 pandemic greatly influence livestock marketing. Farmers said it was challenging to sell livestock because dealers were unavailable (96.3%), local distributors were scarce (89.5%), and the price of livestock products had changed (82.1%) (Table 4). The results support [30]'s assertion that during the COVID-19 shutdown, all marketing facilities were shuttered, making it impossible for farmers to sell their produce.

**Table 4:**The impact of COVID-19 on livestock marketing (n=162)

| Constrained inlivestock marketing | Proportion | Percentage | Ranking |
|---|---|---|---|
| Restaurant/hotel closed | 96 | 59.2 | 5 |
| Shortage of local distributors | 145 | 89.5 | 2 |
| Traders not available | 156 | 96.3 | 1 |
| Unable to visit the market | 101 | 62.3 | 4 |
| Change in price of livestock products | 133 | 82.1 | 3 |
| Other reason | 74 | 45.7 | 6 |

* Responses are not 100% due to multiple responses of the respondents.

**Source:** Field survey, 2021

## IV. DISCUSSION

COVID-19 pandemic has significantly influenced numerous industries, particularly livestock, at the global, regional, and national levels [18]. It is necessary to acknowledge the impact of the COVID 19 pandemic on the contribution of livestock production to family nutrition, global food security, and economic growth [6]. Livestock production has long been regarded as the most important aspect of agricultural development in the study region. Farmers kept livestock for various reasons, including cash, home consumption, religious or cultural practices, traction power, and manure.

The restrictions on movement and transportation imposed by Sierra Leone's governments to combat the virus' spread have significantly impacted livestock markets and severely hampered all livestock value chain economic operations. The delivery of animal products is hampered by commercial disruptions caused by the COVID-19 crisis [31]. Border closures resulted in trade cutbacks for imports and exports, leading to lower incomes and revenues for livestock players [32]. Market crashes decreased economic activity, and the inability to transit items and supplies severely affected livestock production [4]. The government also prohibits the sales of livestock products on the street, which badly harms the livelihood of traders involved in informal marketplaces [33]. The shutdown of livestock values chain operations has broken food distribution, decreasing livestock-sourced food production. Food loss and spoiling rates have increased due to issues with product mobility [34]. The daily income from livestock products has been dropping, with prices in retail and local markets marginally lower [35].

Many livestock farmers (84.0%) have reported trouble obtaining livestock inputs such as livestock feed. Feed costs have risen sharply due to the COVID-19 pandemic and shortages caused by agricultural output shortfalls due to droughts and water scarcity brought on by climate change. Livestock farmers are now faced with the issue of keeping animals alive without enough feed, which harms livestock welfare and health [36]. In addition, increasing livestock feed prices have boosted production expenses [37].

Most farmers have been unable to care for their livestock owing to a lack of financial resources and revenue [38]. The study regions' ordinary livestock operations have been impacted by the inability to acquire veterinary inputs owing to an economic downturn, a limited number of laborers, veterinarians, and other farm employees due to calls to stay at home, and social distance. The COVID-19 pandemic's lockdown has resulted in the closure of local markets, hotels, abattoirs, and other animal-related businesses. The impact on weekly markets and transit logistics was the most detrimental to the cattle trade in Sierra Leone, which resulted in reduced sales and a decline in farmers' revenue [39]. A substantial increase in the price of livestock commodities has occurred due to the lower output of animal-sourced food, affecting both demand and supply. Even though livestock product prices are high, lockdown-induced unemployment and informal/street economic activity collapse cause consumers' buying power to diminish drastically [7]. This has resulted in lower revenues and profitability for livestock farmers. COVID-19 pandemics have also significantly influenced livestock production and supply chains, leading many livestock farmers and merchants to lose access to global and local markets, reducing their earnings [18]. This made it tough for small-scale producers and wholesalers that rely on livestock production for their livelihood [40].

In this study, the impacts of the COVID-19 pandemic on livestock health care practices were also assessed. According to the survey, the most significant animal health impact during the pandemic was a lack of medicines at veterinary clinics, a shortage of veterinarians, and the inability to afford treatment and labor costs. The livestock farmers had difficulty treating sick animals and vaccinating and deworming animals [41]. It has been proposed that restrictions on human activities impact veterinary services and animal health [42]. This is because the COVID-19 outbreak caused significant disruption to daily routines. As a result, veterinary professionals' activities were restricted, and everyday routine veterinary practices were insufficiently applied. This condition makes it difficult for livestock farmers to keep track of animal needs and health and, hence, intervene to address animal health issues [43].

## V. CONCLUSION

The COVID-19 pandemic has impacted the livestock sector, according to the findings. The pandemics have had a detrimental influence on livestock production marketing and animal health. During the pandemic, livestock production activities were limited, ranging from the breeding process to the marketing and consumption of livestock products due to pandemic control measures such as lockdown and staying at home. Above all, the pandemic posed a significant animal health challenge, with the most notable being the lack of conventional preventative treatments such as vaccination and deworming due to scarcity of medicines at veterinary clinics, a shortage of veterinarians, and the inability to afford treatment and labor costs.

The current study suggests that government and non-governmental organizations should pay special attention to the livestock industry. The government and other responsible bodies should plan and implement policies to alleviate COVID-19's influence on livestock production and marketing chains. The government should set up special conditions to give veterinary inputs and technical assistance to livestock farmers. Furthermore, livestock farmers should be assisted in establishing cooperative market connections and community-managed livestock health systems.

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