



## Original Article

# Assessment of the impact of covid-19 on working equines in Lesotho

Paseka Pascalis Kompi\* and Setsumi Molapo  
Department of Animal Science, National University of Lesotho

## ABSTRACT

A cross sectional study was conducted on 141 randomly selected respondents using the structured questionnaire to determine the extent to which COVID-19 affected working equines and in Lesotho. The cross tabulation was used to determine the percentages while Chi-square test within SPSS (16) was utilized to assess the strength of the associations between agro-ecological zones and the tested parameters. The results revealed a general decline in the numbers of equines during the pandemic. There was a decline in the capacity of equines to generate income while on the other hand the cost of maintaining equines increased. As a way of coping with the crisis of the pandemic, most owners had to use inexpensive feed supplementation while others halted feed supplementation. There was a decline on the availability of basic equine services while their prices mostly increased. Most equine owners reported a decline in the health status and body condition of their animals during the pandemic. A general increase in the household spending was observed while on the other the household income declined. These results convey ample evidence on the detrimental impact COVID-19 had to equines as confirmed by reduction in the availability of basic services as well as an increase in the costs of such services. Important welfare parameters were also affected which implies that the welfare of equines during the pandemic was compromised to a certain extend.

**Keywords:** Equines: Owners, COVID-19, Agro-ecological zones.

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**Corresponding Author:** Paseka Pascalis Kompi <[pasekakompi3@gmail.com](mailto:pasekakompi3@gmail.com)>

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## INTRODUCTION

Lesotho is divided into four distinctive agro-ecological zones from which the mountains (59%) represent the greater proportion of the country (Cauley, 1986). According to Bureau of Statistics and Planning (2007) 9% of the total area of the country is arable and the remainder is mainly dominated by rangelands which makes it suitable for extensive livestock production. Given the progressively escalating rates of unemployment the majority of Basotho nation has invested more in livestock production for their subsistence. More than 80% of the population of Lesotho, like many other developing nations, depends on subsistence agriculture, which includes livestock and crop subsectors.

Livestock industry provides a major source of cash income, food (milk and meat), draught power, and transport. It is an unequivocal fact that livestock in Lesotho is a major driver of economic development in many areas and is crucial to the livelihoods of a large number of people. The significance of livestock is confirmed by Herrero *et al.* (2012) who attested that they are a crucial asset and safety net for the poor. Narayan *et al.* (2000) further stipulated that livestock serve as stores of wealth that can be sold or exchanged for other services like paying school fees.

Most Basotho farmers raise equines as one of their livestock. A horse was taken into account as a livestock pet or companion animal by Payne *et al.* (2017). Humans employ equines for a variety of purposes, such as transportation, recreation, transporting objects or pulling carts, or to assist farmers in plowing their fields. This is consistent with statements made by Moltumo *et al.* (2020) and Seyoum *et al.* (2015) that horses, donkeys, and mules are widely used, especially in rural socioeconomic activities. Due to a lack of adequate road infrastructure in Lesotho, people in remote areas rely solely on horses for transportation. Equines play important roles, yet they are still likely to be impacted both directly and indirectly by the outbreak of diseases like COVID-19.

The World Health Organization declared COVID-19 a global pandemic (WHO, 2020). According to Lu *et al.* (2020), a previously unidentified coronavirus that was first identified and reported in Wuhan, China in December 2019 was the primary cause of the illness. As per Li *et al.* (2020), COVID-19 has been found in a seafood market in Wuhan, China. On May 13, 2020, Lesotho reported the first imported COVID-19 case. It is an undeniable reality that the virus has endangered human health as well as severely damaged the livestock sector in terms of management and welfare. The pandemic has negatively impacted consumers' opportunities to purchase livestock and livestock products (Chen and Yang, 2021).

As per Rahimi *et al.* (2021), the COVID-19 had a number of significant drawbacks, including port restrictions, border restrictions, curfews and social distance restrictions that affected the quality, productivity, and competitiveness of vital production sectors. The restrictions have had a negative impact on the livestock industry by disrupting the

supply chain for animal feed, reducing animal farming services, limiting access to markets and consumers, reducing labor force participation, and limiting animal health services, including delays in disease diagnosis and treatment. It is highly anticipated that the pandemic has amicably affected livestock sector in Lesotho in general because Lesotho relies mainly on importing livestock inputs from South Africa. Given this circumstance, the current study was carried out to evaluate the extent to which the pandemic affected equine industry in Lesotho.

## MATERIALS AND METHODS

### Description of the study site

The study was conducted in three distinctive agro-ecological zones of Lesotho namely the Lowlands, Foothills and the Highlands. The Lowlands were represented by Morija and Thabana-morena while the Foothills were represented by Ramabanta, Ribaneng and Matelile and finally the Highlands were represented by Marakabei and Bobete. Table 1 summarizes the characteristics of per agro-ecological zones of Lesotho.

**Table 1: Agro-ecological characteristics of Lesotho**

Agro-ecologica zone	Area (km <sup>2</sup> )	Altitude (m) above sea level	Topography	Mean annual rainfall (mm)	Mean annual temperature (°C)
Lowlands	5200	<1800	Flat to gentle	600-900	-11 to 38
Foothills	4588	1800-2000	Steep rolling	900-1000	18 to 30
Mountains	18,047	2000–3484	Very steep bare rock and gentle rolling valley	1000–1300	–8 to 30

### Study Design

A cross sectional study was conducted from September to December 2021 on 141 randomly selected households with equines.

### Sample Size Determination

The formula recommended by Taherdoost (2017) was utilized for sample size determination in the current study.

$$n = \frac{P(100-P)Z^2}{E^2}$$

N= sample size

P= percentage occurrence of a state (50%)

E= percentage maximum error required (5%)

Z= value corresponding to level of confidence required (1.96)

Utilizing this formula, the required sample size was 384 equine owners however, the available participants in the sampled areas was limited to reach the required sample size. In the light of the given condition only 141 owners were able to participate in the study and from that total, 39 were from the lowlands, 59 from the foothills and 43 from the mountains.

### **Data Collection**

A structured questionnaire was used to collect data on owner's profiles, changes in the number of equines during the pandemic, changes in income generation by equines, changes in the costs and accessibility of basic services, changes in the costs of keeping equines, changes in the health of equines and owners views on the level of economy. The study was conducted face to face while taking into consideration the regulations of World Health Organization and the government of Lesotho on COVID-19. Participant consent to be interviewed was highly considered.

### **Data Analysis**

The data was analyzed using SPSS version 16 where the descriptive statistics was utilized to obtain the percentages, means and averages. The Chi-square test was used to assess the level of significance. The significance was tested at 0.05 where values below or equal to 0.05 were considered significant while those above were insignificant.

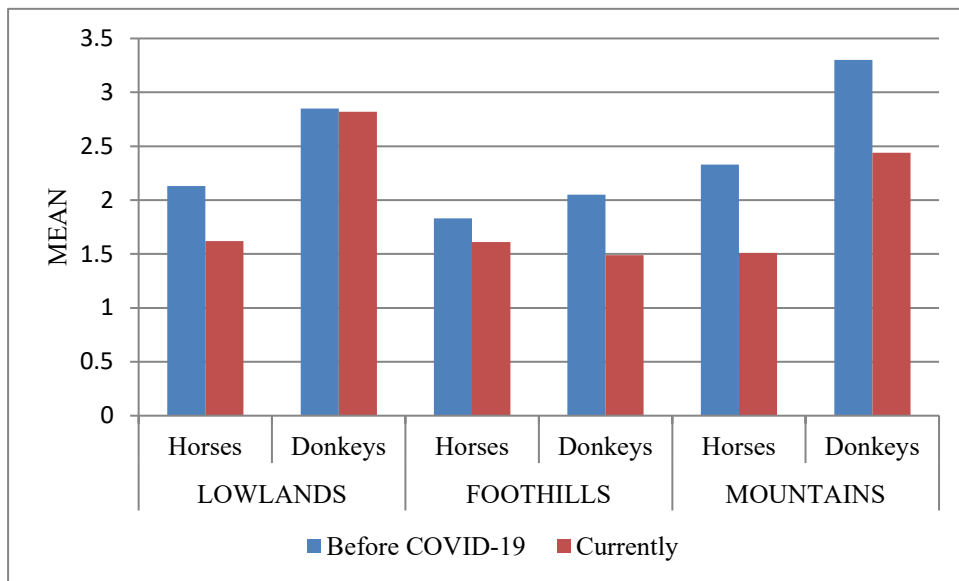
## **RESULTS**

The results shown in Figure 1 compare the means of equines before COVID-19 and during the course of the study. A notable decline in the number of both horses and donkeys was observed across the three agro-ecological zones. The results presented in Figure 2 revealed that the observed reduction in the number of horses and donkeys was mostly associated with selling of equines during the pandemic.

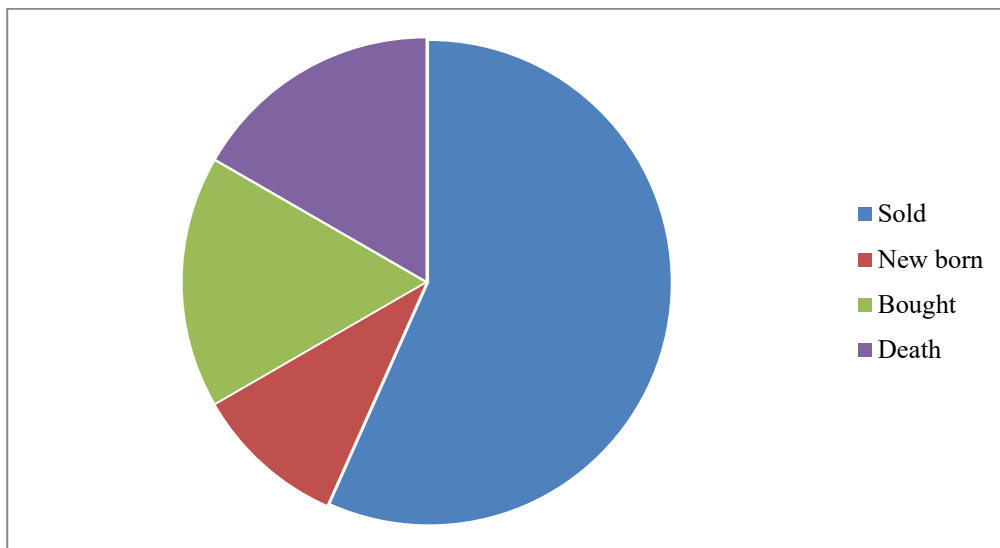
The results depicted in Table 2 indicate that most owners changed to cheaper feed staff during the pandemic while others had halt supplementation. Moreover, more respondents in the lowlands (53.8%), Foothills (39.0%), and mountains (51.2%) reported a decrease in income generated from equines per month. An increase in the total costs of keeping equines was reported by vast majority of owners across the agro-ecological zones (AEZs). Chi-square test has shown that AEZ was not associated with changes in caring for equines ( $p= 0.52$ ) as well as the changes in income generated from equines ( $p= 0.17$ ) as reflected in Table 2. On the other hand the Chi-

square test showed a significant association between AEZ and changes in the total costs of keeping equines ( $p= 0.009$ ).

The results in Figure 3 compare the rate of using farrier, veterinary and animal health services during the pandemic and before. It was observed that during the pandemic there was an amicable decline in the rate of using these services compared to before the pandemic across the three AEZs.



**Figure 1: Means of equines before and during the pandemic**



**Figure 2: Reasons for change in the number of equines**

**Table 2: Changes in the care of equines, income generation and the total costs of keeping equines during the pandemic**

Variable	Category	Lowlands %	Foothills %	Mountains %	X <sup>2</sup>	Sig
<b>Change in the care of equines</b>	No change	24.2	13.6	20.9	3.2	0.51
	Stop supplement	28.2	42.1	32.6		
	Change to cheap feed	51.3	44.4	46.5		
<b>Change in income from equine</b>	No change	17.9	33.9	25.6	9.0	0.17
	Decreased	53.8	39.0	51.2		
	Increased	0.0	1.7	7.0		
<b>Change in total costs for keeping equines</b>	Increased	82.1	72.9	51.2	13.5	0.009
	Decreased	2.6	0.0	0.0		
	No change	15.4	27.1	48.8		

%= percentage, X<sup>2</sup>= Chi-square value, Sig= significance

**Table 3: Changes in the cost and availability of services (farrier, veterinary and animal health)**

Variable	Category %	Lowland%	Foothills%	Mountains%	X <sup>2</sup>	Sig
<b>Cost accessing services</b>	Increased	82.1	69.5	67.4	2.59	0.27
	Same	17.9	30.5	32.6		
<b>Availability of services</b>	Increased	0.0	1.7	0.0	1.63	0.80
	Decreased	66.7	61.0	62.8		
	Same	33.3	37.3	37.2		

%= percentage, X<sup>2</sup>= Chi-square value, Sig= significance

**Table 4: Changes in the health and body condition score**

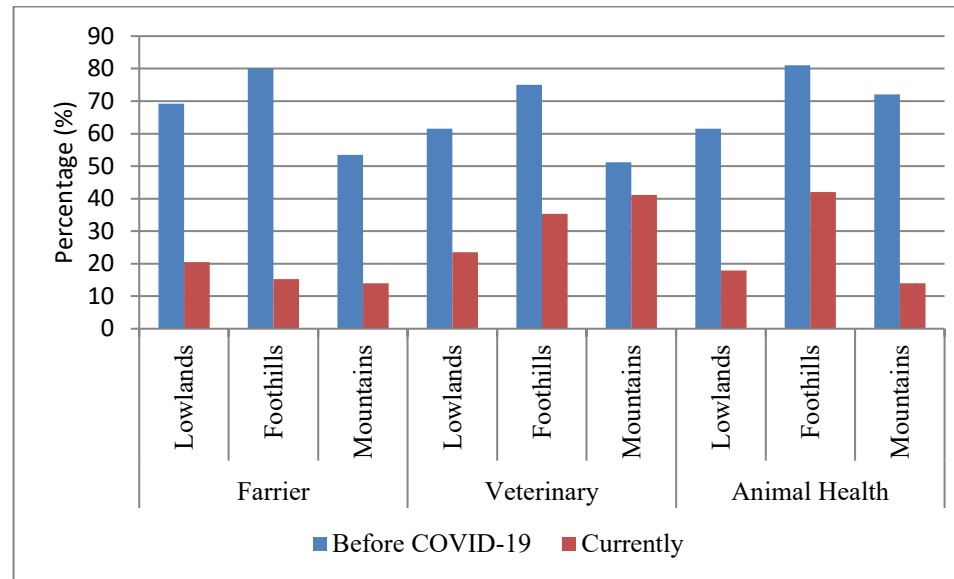
Variables	Category	Lowlands%	Foothills%	Mountains%	X <sup>2</sup>	Sig
<b>Changes in the health</b>	No change	48.7	33.9	48.8	5.88	0.20
	Deteriorated	51.3	62.7	51.2		
	Increased	0.0	3.4	0.0		
<b>Change in body condition</b>	Decreased	74.4	62.7	67.4	10.73	0.03
	Increased	0.0	11.9	0.0		
	The same	25.6	25.4	32.6		

%= percentage, X<sup>2</sup>= Chi-square value, Sig= significance

**Table 5: Changes in household spending and income per month and reasons**

Variable	Category	Lowlands%	Foothills%	Mountains%	X <sup>2</sup>	Sig
<b>House hold spending</b>	Increased	66.7	69.5	74.4	2.65	0.61
	Decreased	10.3	13.6	4.7		
	Same	23.1	16.9	20.9		
<b>Reasons for changes</b>	No change	30.8	22.0	34.9	15.62	0.00
	Increased prices	56.4	52.6	58.1		
	Poor harvest	12.8	20.3	7.0		
<b>Changes in household income</b>	Increased	5.1	0.0	0.0	8.21	0.08
	Decreased	79.5	71.2	67.4		
	Same	15.4	28.8	32.6		
<b>Reasons for change in income</b>	Lost job	28.2	11.9	0.0	21.26	0.00
	Few means of making money	56.4	61.0	72.1		
	No change	15.4	22.0	14.0		
	Others	0.0	5.1	14.0		

%= percentage, X<sup>2</sup>= Chi-square value, Sig= significance



**Figure 3: Use of farrier, veterinary and animal health services before and during the pandemic**



The majority of respondents reported an increase in the cost of accessing basic equine services while on the other hand availability of services was very low. Chi-square test confirmed that AEZ was not associated with cost of services ( $p=0.27$ ) and availability of services ( $p= 0.80$ ).

The majority of owners in the lowlands (51.3%), foothills (62.7%) and mountains (51.2%) revealed that their equines' health deteriorated during the pandemic (Table 4). Moreover, the greater proportion of respondents across the three AEZs reported a decline in the body condition of their equines. The Chi-square test confirmed that AEZ was not associated with changes in the equine health ( $p=0.20$ ) while on the other hand AEZ was significantly associated with changes in the equine body condition ( $p=0.03$ ).

Most respondents across the three AEZs reported an increase in the household spending and the majority of them associated the increase with an increase in the prices of goods and services. Moreover, the vast majority of respondents reported a decline in household income and the reduction was mostly associated with reduction in the general means of making money during the pandemic. The Chi-square test confirmed that AEZ was not associated with house hold spending ( $p=0.61$ ) and income ( $p= 0.08$ ) however it was significantly associated with reason for change in household spending (0.004) and household income ( $p= 0.02$ ).

## DISCUSSION

The findings of this study which reveal the decline in the number of equines during the pandemic offer convincing evidence of the destructive effects COVID-19 had on the livestock industry in Lesotho. The decline in equine populations is a significant sign because most owners during the pandemic believed equines were no longer worth keeping. This could be due to a number of reasons, including but not limited to a rise in the expense of maintaining equines. This was evidenced by the majority of respondents in the lowlands (82.1%), foothills (72.9%) and mountains (51.2%) who confirmed an increase in the cost of keeping equines during the pandemic. Rahimi *et al.* (2022) have validated an increase in the cost of keeping livestock during the pandemic by reaffirming that worldwide and local restrictions have led to a substantial increase in the expenses of keeping animals through an increase in animal feed

materials and many other basic needs. In the same way Uddin *et al.* (2021) in Bangladesh, reported a 3.7% increase in the prices for animal feeds.

The results of the current study are in consonance with the report of Rahimi *et al.* (2022) who revealed that some farmers had to cull their animals during the pandemic. The results further showed that the decline in the number of equines during the pandemic was associated with owners selling their equines. Given the rising costs of essential products and services, one reason why most owners decided to sell their equines might be because they needed extra cash to accommodate everyday needs especially feeding the families. This was regarded as a group of extremely vulnerable owners who were forced to use asset stripping as a crisis coping strategy.

The findings further justify the detrimental impact COVID-19 had on livestock industry as it was observed that the vast majority of owners chose to use inexpensive feed staff during the pandemic while some owners were forced to halt supplemental feeding. It is unequivocal fact that in most cases inexpensive feed staff is usually of low nutritional value. This can be considered as a fatal welfare issue which implicates that during the pandemic some equines suffered poor nutrition. Ellis *et al.* (2010) stated that the impact of nutrition on the health and welfare of the equines cannot be underestimated. Davidson *et al.* (2007) indicated that a balanced and appropriate diet is crucial for the optimal health and welfare of any horse.

The results of the present study which reveal a general decline in income generated from equines are in accordance to the report of Olugbemi and Salihu (2021) which stated that during the pandemic livestock value chains actors suffered substantially with farmers making less profit due to a considerable decline in demand. Similarly, Obese *et al.* (2021) in Ghana reported a lowered profit margin for farmers during the pandemic. This can be considered as serious economic thread which justifies how terrible equine owners were affected by the pandemic. This decline in income generated from equines can be another potential explanation for why some owners had to sell their equines.

It was further observed that during the pandemic, the use of farrier, veterinary and animal health services drastically declined. This decline in the use of services could be attributed to several factors including but not limited to the cost and availability of such services. The present results are in accordance with those of Bukuma (2020) who reported that farmers were unable to get veterinary services and animal health supplies during the epidemic, while veterinary specialists were unable to visit farms. Rahimi *et al.* (2022) also confirmed that the pandemic had threatened livestock in that pivotal materials needed for livestock keeping were largely unavailable.

Moreover, the present findings are in line with Obese *et al.* (2021) who stipulated that during the pandemic there were few service providers who were even difficult to reach. Similar authors further reiterated that the costs of using animal health services escalated during the pandemic. In the same way, Gortazar and de la Fuente (2020) showed that veterinary healthcare services and other animal health preventative services have been markedly reduced during the pandemic. Unavailability of veterinary services during the pandemic is another potential indication of poor animal welfare as Islam (2015) attested that among other factors, good animal welfare requires disease prevention and veterinary treatment. Similarly, Edwards and Schneider (2005) indicated that to accomplish good animal welfare disease prevention and veterinary medical treatment are highly recommended.

The deterioration in the health status and body condition of equines as reported by majority of respondents might be attributed to lack of health care services which was confirmed by the results of this study. This deterioration could also be associated with unavailability of good nutrition during the pandemic as it was discovered that some owners changed to cheap feed staff while others halted feed supplementation. Another potential explanation for the deterioration in the body condition could be unavailability of health services during the pandemic which could possibly predispose animals to infection by different diseases.

The results of the current study also highlight how the economy of equine owners was affected during the pandemic. This is evidenced by an increase in the household spending due to escalating prices while on the other hand the rate of income generation declined due to reduced means of making money. The obtained results are in line with Kansime *et al.* (2021) who stipulated that despite the fact that COVID-19 pandemic is causing detrimental effects on all economic sectors, farmers are more likely than salary and wage earners to report suffering income shocks.

This could be justified by the fact that during the pandemic the demand for farm produce declined drastically. These findings are comparable to the report of Demeke and Kariuki (2020) who confirmed loss of income for people specifically those working in the informal sectors who usually survive on daily hand to mouth wages. There were several owners who pointed out that “before the pandemic I used my donkeys to collect water for community members who would pay me for that service but since the pandemic people are no longer demanding that service”. This could be as a result of limited cash for people to pay for services.

## CONCLUSION

COVID-19 has adversely affected equine sector in Lesotho as evidenced by decline in availability and increase in the cost of basic equine services. The pandemic has amicably affected income generating activities by equines which ultimately impacted negatively to the livelihoods of owners who rely on them. The report of deterioration in the health status of equines implicates that the productivity and efficiency of equines was badly affected during the pandemic. The results of this work confirm that the welfare of equines was to a certain extent compromised.

## Acknowledgement

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## CONFLICT OF INTEREST

Authors declare no conflict of interest.

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