

Assessing the Impacts of COVID 19 on Livestock Production, Market Value Chain and Health Practices at Selected Districts of East Wollega Zone, Ethiopia

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Abstract

Coronavirus disease 2019 (COVID-19) caused by a newly discovered strain of coronavirus (SARS-CoV-2) around the end of December 2019, has had a significant impact on many sectors at global, regional and national levels, including the livestock sector. A questionnaire survey and observational study were carried out from September 2020 to November 2020 with the aim of assessing the impacts of COVID 19 crisis on livestock farming practices, market value chain, animal health care services and human perception towards consumption of livestock products in selected districts of East Wollega zone. Small scale farmers, abattoirs workers, consumers, private sectors involved in the production, processing and distribution of livestock products, hotel owners and veterinarians were purposively selected for this study. According to the present survey the pandemic's has had negative impact on livestock production, market value chain and animal health care practices. Based on the survey 365 (91.25%) respondents agreed as the pandemic was the major challenge on livestock farming practices. The assessment shows that COVID 19 created worst 270 (67.5%) and high impact 75 (18.75%) while about 17 (4%) respondents said the disease has little impact. The major reason mentioned were measures taken by the government such as lockdown, economic decline, low number of manpower due to calls to stay at home and social distance. Observational study indicated that dairy shops, meat shops, and local abattoirs, hotels and restaurants were totally/partially closed especially during the first 6 months of the pandemic. The average monthly income from livestock and their products showed about 60.93% shortfalls (from 1,130,500 birr to 688,800 birr). With regard to consumer perception there was low demand for livestock products such as meat and dairy products and about 164 (41%) respondents were avoiding the consumption of animal-sourced foods mainly due to the perceived disease risk. Regarding animal health services, about 89.75% (365/400) respondents agreed as COVID 19 has indirect impact on the health of animals. The most important animal health constraints during this pandemic were unusual preventive practices such as vaccination and deworming, scarcity of drugs at veterinary clinic, low number of veterinarians and inability to cover cost of drugs and personnel. The present study suggest that the pandemic's impact on the livestock production, product supply chain and animal health services might be continue which will have significant effect on the sustainability of livestock production systems and contribution of livestock subsectors on the house hold and national economy and global food security. It is therefore, essential that the government and other concerned body should give attention to the livestock sector to mitigate the impacts of the disease.

Introduction

Ethiopia, with its extensive climate and topography, has one of the world's largest livestock populations [1]. The livestock sector is being increasingly organized into long market chains that employ at least a billion people and directly support the livelihoods of 600 million poor smallholder farmers in developing countries [2, 3]. The livestock sector is very crucial to provide food to the local market and serve as a source of raw materials, cash income, and foreign currency earnings [4, 5, 6, 7, 8]. The full range of activities needed to get livestock products such as milk, meat, and eggs to the final consumer through the

various stages of production, manufacturing, distribution, wholesaling/retailing, and final consumption are referred to as livestock value chains [9].

The novel coronavirus (COVID-19) epidemic is thought to have started in Wuhan, and it has rapidly spread to almost every country in the world, including Ethiopia [10]. The pandemic is a worldwide problem that necessitates intensive efforts from governments, individuals, companies, and other stakeholders. COVID-19 has been declared a global emergency by the World Health Organization (WHO) on March 11, 2020, posing a threat to a broad range of sectors, including health, agriculture, manufacturing, services, retail, social, national, and international value chains, and population groups (rural, urban, casual laborers, self-employed, factory, and government workers) [11, 12].

The diversion of financial, labor and material resources is one of the early actions that the government has taken to limit the potential spread of COVID-19. This, however, could affect the capacity of various actors not to ensure livestock development and food security in Ethiopia. Lessons from past epidemics such as SARS, MERS-Cov, and Ebola indicate that the current occurrence of COVID-19 will have impact on the livestock sectors disrupting value chains and threatening livelihoods. These will have impact on contribution of livestock for household food security and pose risks to national economy. Possible negative impacts of the COVID 19 pandemic on livestock sector may be due to closure of government and non-government sectors, restriction of movement, social distancing and decline in economic growth which further limits the demand for livestock products [13]. Movement restriction due to COVID-19 may cause reduction in availability and delay of timely distributions of veterinary inputs such as drugs and feed and shortage of labor for intensive farm activities. The other may be absence of market or sudden demand drops in consumer countries during this pandemic [14].

The other factor may be due to local demand and consumption of animal products has critically declined, mainly because of perception not to consume raw and chilled animal products with the assumption that such foods are the main routes for the transmission of the virus. As a result, consumers in major market destinations have either reduced the amount they buy or completely avoided consumption of raw animal products. These negatively affect the livelihood of producers, processors and value chain actors involved in the livestock businesses. On the other hand, the COVID may have tremendous effect on export of animal and animal products primarily due to the inability for export to other countries [15].

Supply food of animal origin to the public and increase in rural income and foreign currency earning of the country through improving the quality and quantity of market oriented livestock and their items are the main objectives of the agricultural development polices of Ethiopia [16]. Despite the COVID-19 pandemic has enormous impacts, there is still lack of scientific documents on the impacts of the disease in the livestock sector in Western Oromia. Therefore, the general objective of this study was to assess the major impacts of the novel Corona virus pandemic on livestock production, market value chain and animal health practices in selected districts of East Wollega zone. It is very crucial to quantify the impacts of the pandemic in the livestock sectors in order to design effective strategies for mitigation of the impacts in the sector.

Specific objectives

- To assess challenges in livestock production during the pandemic in the study area
- To assess the impacts of COVID 19 on livestock market value chains and income
- To assess the indirect impacts of COVID 19 on animal health care service in the study areas
- To assess consumer perceptions towards livestock products

Materials And Methods

Study Area Description: The study was conducted in four purposively selected districts of East Wollega zone (Nekemte, Sibu Sire, Leqa Dullacha and Jima Arjo districts). East Wellega zone of Oromiya region is administratively divided in to 21 woredas. The area is agro-ecologically split into 11% highlands, 49% midland and 40% lowlands. The zone has one long rainy season extending from March to mid-October with annual rainfall ranging from 1000–2400mm. Mixed agriculture (crop and livestock) is the main stay of the farming communities on which their livelihood is fully dependent [17]. East Wellega zone is also acknowledged for its livestock breed known as Horro-breed1 (derives its name from the sub-province of the former Horro Guduru) that has spread widely through Wellega, Illubabor and Keffa and on small scale to Shewa Zones of the region [18].

Study Design: A cross sectional study design in the form of questionnaire survey and observational methods were carried out from September 2020 to November 2020 to collect the data needed for the study. A structured questionnaire was prepared and administered to government, non- government and individuals involved in livestock sectors, to assess the major impacts of COVID 19 pandemic on livestock farming practices, marketing system, animal health care practices and human perception towards consumption of animal products. The questionnaire is framed in such a way that the respondents could give information that are recent and easy to recall and it was filled directly by interviewing purposively selected livestock/farm owners (dairy, beef and poultry farm), abattoirs personnel, local consumers, sellers and veterinarians in selected study areas.

Sample Size Determination: The number of respondents included by purposive sampling was based on the formula recommended by [19].

$$N = 0.25/SE^2$$

Where N = sample size, SE = standard error assuming the standard error of 5% at a precision level of 0.05 and the confidence interval of 95%. Accordingly, a total of 400 respondents (100 individuals from each district) were selected and interviewed considering different age, sex and working conditions.

Data Analysis: Questionnaire data was entered in Microsoft excels. Data analysis and summarization was made by descriptive by using SPSS Statistical software Version 20.

Results

Livestock Production: The present study revealed that out of the 400 interviewed respondents 307 (76.75%) were keeping livestock mainly for traction power, egg production, dairy products such as milk and milk products, meat, and other purposes such as manure. According to the survey, livestock are used to earn cash income by selling live animals and their products. The observational study also indicated that in the study area there were different livestock product distributors such as animal farms, dairy shops, butchers, abattoirs and street business from where people can buy food of animal origin such as milk, meat and egg for home consumption, restaurants and other purposes (Table 1).

Table 1
Information on the livestock production in the study areas

Knowledge questions n = 400	Districts				
	S/Sire	Nekemte	L/Dulecha	J/ Arjo	Total (%)
Do you keep livestock?					
Yes	80	66	82	79	307 (76.75)
No	20	34	18	21	93 (23.25)
Purpose of keeping livestock					
Dairy products	23	27	18	16	84 (21)
Meat	8	12	7	5	32 (8)
Egg	36	45	51	24	156 (39)
Traction power	52	7	66	49	174 (43.5)
Manure	14	8	22	46	90 (22.5)
Cash income	38	46	52	41	177 (44.25)
Who manages the animals/farm					
Husband	14	2	32	26	74 (18.5)
Wife	7	9	15	11	42 (10.5)
Children	16	4	8	6	34 (8.5)
Laborers	5	18	3	6	32 (8)
All family	31	9	24	37	101 (25.25)
Main income					
Dairy	27	12	18	24	81 (20.25)
Meat shop	12	26	23	17	78 (19.5)
Poultry	33	29	40	34	136 (34)
Egg	42	50	48	62	202 (50.5)
Beef fattening	18	7	11	16	52 (13)
Government employee	5	9	3	7	24 (6)

Impacts of COVID 19 on Livestock farming practices: In the present study, managers, workers and owners of animal farms, dairy shops, butchers, abattoirs, and small scale animal farmers were interviewed to assess the major challenges of livestock farming practices during the pandemic. The survey shows that

livestock production was constrained following the COVID-19 outbreak. The primary constraints were the measures taken by the government such as lockdown, shortage of man power and decline of income. Calls to stay at home and social distance have affected the humanitarian-dependent services in farms, affecting the routine work and animal husbandry (low number of laborers, veterinarian visits and services, and workers in product processing) (Table 2).

Table 2
Major impacts of COVID 19 crisis on livestock farming practices in the study areas

Knowledge questions n = 400	Districts				
	S/ Sire	Nekemte	L/Dulecha	J/Arjo	Total (%)
COVID 19 is major constraints to the livestock farming					
Yes	89	98	82	96	365 (91.25)
No	11	2	18	4	35 (8.75)
Measures taken such as lockdown have negative impact on livestock farming					
Yes	78	94	83	92	347 (86.75)
No	22	6	17	8	53 (13.25)
Scale of impacts of the COVID 19					
No significant impact	-	1	-	2	3 (0.75)
Little impact	4	6	2	5	17 (4)
High impact	27	14	16	18	75 (18.75)

S/Sire = Sibul Sire L/Dulecha = Leka Dulecha

Impacts of COVID-19 on daily income, marketing chains and consumer perception: The present study shows that the small scale livestock farmers and private sectors engaged in the production and processing of livestock products are the major distributors to local market, nearby consumer, hotels, local butcher and some to government institution such as University. The study shows that the consumers get livestock products from these local distributors for house hold consumption especially for children. Based on the assessment and observational survey the marketing and supply chains of livestock and their products are challenged during the COVID- 19 outbreak, from the production process to marketing and consumption of animal products. The study shows slaughter houses, meat shops, dairy vendors and other animal product sellers have been significantly affected. The survey with local distributors and consumers indicated that there was low demand for livestock products such as meat, dairy and poultry products since the start of the COVID-19 crisis. Important reasons mentioned were the measurement taken to tackle the disease, perceptions of the disease risk and decline incomes (Table 3). The daily income from livestock products was declining with the prices slightly lowered in retail and local markets since the start of the COVID 19 outbreak. The average monthly income from livestock and their products showed about 60.93% shortfalls (from 1,130,500 birr to 688,800 birr) (Fig. 1).

Knowledge questions n = 400	Districts				
	S/ Sire	Nekemte	L/Dulecha	J/Arjo	Total (%)
Worst impact	58	77	64	71	270 (67.5)
There are challenges in animal breeding due to COVID 19					
Yes	85	74	81	72	312 (78)
No	15	26	19	28	88 (22)
If yes what are the main reason/s					
Unable to pay for the laborers	5	18	3	6	32 (8)
Unable to purchase vet. drugs	27	19	31	43	120 (30)
Activity is not in normal situation	65	55	62	58	240 (60)
Low number of laborers or Veterinarians	20	16	13	17	66 (16.5)
S/Sire = Sibul Sire L/Dulecha = Leka Dulecha					
<p>Impacts of COVID-19 on daily income, marketing chains and consumer perception: The present study shows that the small scale livestock farmers and private sectors engaged in the production and processing of livestock products are the major distributors to local market, nearby consumer, hotels, local butcher and some to government institution such as University. The study shows that the consumers get livestock products from these local distributors for house hold consumption especially for children. Based on the assessment and observational survey the marketing and supply chains of livestock and their products are challenged during the COVID- 19 outbreak, from the production process to marketing and consumption of animal products. The study shows slaughter houses, meat shops, dairy vendors and other animal product sellers have been significantly affected. The survey with local distributors and consumers indicated that there was low demand for livestock products such as meat, dairy and poultry products since the start of the COVID-19 crisis. Important reasons mentioned were the measurement taken to tackle the disease, perceptions of the disease risk and decline incomes (Table 3). The daily income from livestock products was declining with the prices slightly lowered in retail and local markets since the start of the COVID 19 outbreak. The average monthly income from livestock and their products showed about 60.93% shortfalls (from 1,130,500 birr to 688,800 birr) (Fig. 1).</p>					

Table 3
Major challenges of livestock marketing chains, income and consumer perception during COVID-19 in the study areas

Knowledge questions n = 400	Positive responses by Districts				
	S/Sire	Nekemte	L/Dulecha	J/ Arjo	Total
Where do you sell your animals or animal products?					
To local market	48	32	51	64	195 (48.75)
To nearby hotel/restaurant	26	38	29	11	104 (26)
To local consumer	5	18	2	17	42(10.5)
To local butcher	9	8	13	-	30 (7.5)
To government institution	2	5	1	3	11 (2.75)
Is food of animal origin have been used for consumption as usual?					
Yes	98	100	82	99	379 (94.75)
No	2	-	18	1	21 (5.25)
Did you face difficulties in selling animal/products in the last 6 months?					
Yes	87	75	93	81	336 (84)
No	13	25	7	19	64 (16)
There is a change in the price of livestock/products in the last 6 months					
Yes	92	88	94	91	365 (91.25)
No	8	12	6	9	35 (8.75)
Scale of daily income change from livestock and their products					
No change	2	-	2	1	5 (1.25)
Declining	34	18	26	12	90 (22.5)
Highly declining	56	70	66	78	270 (67.5)

Knowledge questions n = 400	Positive responses by Districts				
	S/Sire	Nekemte	L/Dulecha	J/ Arjo	Total
The most important marketing problems during the pandemic					
Income declining	72	64	76	63	275 (68.75)
Restaurant/hotel lockdown	54	67	41	38	200 (50)
Lockdown of local distributors	42	75	55	47	219 (54.75)
Consumer perception	45	58	32	29	164 (41)
Stay home	19	12	9	16	56 (14)

Challenges on Animal health Services during the pandemic crises: In the present study, the indirect impacts of COVID-19 on the animal health care practices have been studied. Accordingly, about 250 respondents agreed as COVID 19 has indirect impact on the health of animals. Based on the survey, the most important animal health constraints during

this pandemic were unusual preventive practices such as vaccination and deworming, scarcity of drugs at veterinary clinic, low number of veterinarians, unable to cover cost of drugs and personnel. The other reasons mentioned were measurements taken such as partial lockdown and physical distancing to combat the pandemic (Table 4).

Table 4
Major challenges on animal health care services during the COVID-19 pandemic

Knowledge questions n = 400	Districts				
	Sibu Sire	Nekemte	L/Dulecha	J/Arjo	Total
COVID 19 has indirect impact on health of animals					
Yes	85	92	86	96	359 (89.75)
No	15	8	14	4	41 (10.25)
Do you face challenges to treat sick animals?					
Yes	62	66	71	77	276 (69)
No	38	34	29	23	124 (31)
Measurement taken to tackle COVID 19 has impacts to treat sick animals					
Yes	85	91	84	78	338 (84.5)
No	15	9	16	22	62 (15.5)
Major animal health constraints during the pandemic					
-Scarcity of veterinary drugs following lockdown	13	18	7	23	61 (15.25)
-Veterinarians not available as usual	20	23	14	16	73 (18.25)
-Preventive measures like vaccination are not in practice as usual	32	21	11	18	82 (20.5)
-Unable to buy drugs or pay for vets due to income declined	22	29	52	31	134 (33.5)

Knowledge questions n = 400	Districts				
	Sibu Sire	Nekemte	L/Dulecha	J/Arjo	Total
COVID 19 has impacts on animal disease control/prevention					
Yes	78	59	63	68	268 (67)
No	22	41	37	32	132 (33)
Did you vaccinate or deworm animals for the last 6 months					
Yes	37	41	32	35	145 (36.25)
No	63	59	68	65	255 (63.75)
Animal health extension service is possible during the pandemic					
Yes	26	34	18	39	117 (29.25)
No	74	66	82	61	283 (70.75)

Discussion

COVID-19 has had a substantial impact on many sectors at global, regional and national levels, including the livestock sector [14]. It is important to recognize the impacts of COVID 19 crisis on the contributions livestock towards household nutrition, global food security and economic growth. In the present study, survey was conducted in four selected districts of East Wollega zone (Sibu Sire, Guto Gida, Leka Dulecha and Jima Arjo) with the objectives of assessing major challenges in animal farming practices, marketing chains, animal health care practices and consumer perception during the COVID 19 pandemic.

In the study area, animal production has been considered as the main component of agricultural development. About 270/400 (67.5%) of the respondents were keeping livestock with different purposes such as traction power, dairy and poultry products and manure. Chickens were the main source of income in the study site, followed by dairy, meat selling and beef fattening while few are government employee. According to this survey small scale livestock owners and regular livestock product sellers such as butchers, dairy and poultry products sellers were one of the major distributors of livestock and livestock products to local consumers, restaurants, hotels and markets.

In the present study, livestock owners, animal farms owners, managers, farm workers, dairy shops, butchers, abattoirs, hotels and local consumers were interviewed to assess the major impacts of COVID 19 pandemic on livestock farming practices, marketing channel, animal health care practices and consumer perceptions. According to this survey the pandemic's has created impact on livestock production and value chain that are critical to deliver economic, social, and nutritional gains in the study areas. Disruptions in the business as a result of the COVID-19 crisis are creating challenges for the distribution of livestock products. The constraints during the COVID-19 outbreak were from the production process to marketing and consumption of animal products. Based on the survey and observational study, the small scale farmers, hotels, livestock private sector enterprises engaged in the production, processing, and distribution of livestock products such as meat sellers, dairy vendors and other animal product sellers were critically affected following the pandemic. Observational study indicated that that

dairy shops, meat shops, and local abattoirs which are the major livestock product distributors were totally closed especially during the first 6 months of the pandemic. There were also closure of hotels and restaurants in the study areas during the study period.

The survey with local consumer and distributors shows that the consumption of livestock products such as meat, dairy and poultry products in the study area was not as usual since the start of the COVID-19 crisis. Regarding the income, daily income from livestock products was declining with the prices slightly lowered in retail and local markets since the start of the COVID 19 outbreak. The primary constraints were the measures taken by the government such as lockdown, shortage of man power and decline of income. Inability to purchase veterinary inputs due to economic decline, low number of laborers, veterinarian and other farm workers due to calls to stay at home and social distance has affected the routine farm activities in the study areas. The lockdown to tackle the pandemic have meant that closure of local markets, hotels, abattoirs and other animal oriented business that were very important in distribution of animal/products to consumers, local hotels and markets. The small scale producers and distributors who rely on animal production for their livelihoods are faced difficulties in selling live animal and products.

With regard to consumer perception 164 (41%) of the total respondents in the survey were avoiding the consumption of animal-sourced foods due to the perceived COVID-19 risk. This low demand for livestock products might be linked to Ethiopian media reports at the beginning of the outbreak suggesting that consumption of livestock products such as meat, dairy and poultry products can result in greater chances of infection. The Ministry of Health has warned the public to avoid consumption of raw foods because of the potential risk of contamination through droplets coming from food handlers. Thus the perception of risk from livestock products remains particularly, meat and dairy products. Similar survey in Addis Ababa indicated a significant drop in the demand for livestock products such as meat and milk due to consumers fear for the disease risk.

Different studies indicated that the COVID-19 pandemic's has had negative impact on livestock production and supply chain. Many livestock producers and traders have lost their global or local market

opportunities, and thus their incomes [14, 20]. Some studies in Ethiopia also indicated COVID-19 has a wide range of impact on livestock production, consumption of food of animal origin and value chains [20, 15]. A qualitative appraisal survey conducted between April 15 and May 10, in Addis Ababa on the dairy value chain supplying shows commercial and small dairy farmers in urban and rural areas, dairy processors, traders, development agents, urban retailers, and consumers were affected [21]. Previous abattoir survey in Ethiopia indicates that the export abattoirs were faced difficulties to export meat to Middle East [22].

In the present study, the indirect impacts of COVID-19 on the animal health care practices have been also studied. Both veterinary professionals and clients were included in the survey. Accordingly, about 89.75% (365/400) respondents agreed as COVID 19 has indirect impact on the health of animals. Based on the survey, the most important animal health constraints during this pandemic were unusual preventive practices such as vaccination and deworming, scarcity of drugs at veterinary clinic, low number of veterinarians, unable to cover cost of drugs and personnel. The other reasons mentioned were measurements taken such as partial lockdown and physical distancing to combat the pandemic. About 276 (69) respondents were faced difficulties in treating sick animals; while about 255 (63.75) did not vaccinate or deworm their animals during the pandemic. It is suggested that the restriction on human activities affect veterinary services, and therefore, affect animal health. This is due to in fact that the COVID-19 outbreak negatively disrupted regular activities. This led to restrictions on the activities of veterinary professionals and insufficient applications of daily routine veterinary practices. Such a situation limits a close monitoring of animal requirements and health status and thus impedes the intervention to tackle animal health problems.

Conclusion And Recommendations

In the present study, survey with the objectives of assessing the major impacts of COVID 19 on the livestock subsector was conducted in selected districts of East Wollega zone. The assessment shows that the COVID 19 pandemic has disrupted the livestock production system. The pandemic's has created negative impact on livestock production and value chain that are critical to deliver economic, social, and nutritional gains in the study areas. The livestock production constraints during the pandemic were from the production process to marketing and consumption of animal products. Based on the survey and observational study, the small scale farmers and livestock private sector involved in the production, processing, and distribution of livestock products were critically affected following the pandemic. Control measures taken towards the pandemic control such as lockdown and stay home, economic decline and consumer perception were the main reasons mention by the respondents. Above all, the pandemic had a major animal health constraints with the most important were uncommon preventive practices such as vaccination and deworming, scarcity of drugs at veterinary clinic, low number of veterinarians, inability to cover cost of drugs and personnel. The present study suggest that the pandemic's impact on the livestock production and product supply chain might be continue which will have significant effect on the sustainability of livestock production systems and contribution of livestock subsectors on the house hold and national economy and global food security.

Based on the above conclusions, the following recommendations were forwarded:

Government and NGO should give strong attention to livestock sector during the COVID 19 pandemic.

Government and other concerned body should plan and implement policies to alleviate impact of COVID-19 on livestock production and marketing chains.

Slaughterhouses and private sectors engaged in the production, processing, and distribution of livestock products should be encouraged to be functioning under careful COVID19 prevention measures.

There should be establishing of COVID 19 team to monitor livestock related problems during pandemic.

Government should arrange especial circumstances to provide veterinary inputs and technical support.

There should be training for consumers regarding the relationship between the COVID 19 virus and livestock products to clear consumer confusions.

Studies to investigate the occurrence of the virus in food of animal origin should be conducted.

Experimental studies to show the susceptibility of domestic animals to the COVID 19 should be conducted.

Declarations

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Ethical Clearance: This thematic research does not require ethical approval because it is based on a questionnaire survey and does not include an experimental study.

The authors declare no competing interest.

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Figures

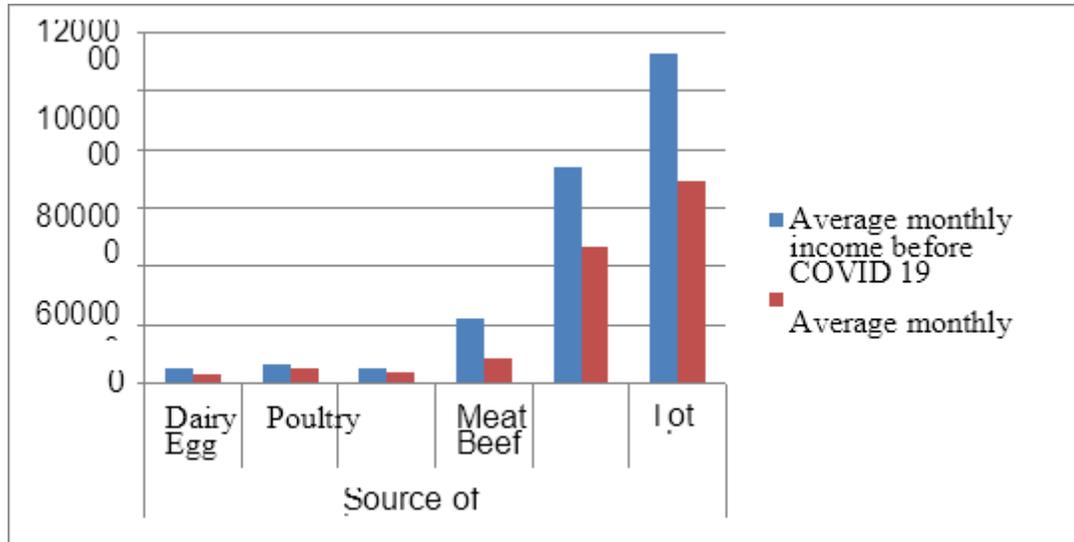


Figure 1

Average monthly income before and after the occurrence of COVID 19 crises