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The Impacts of COVID-19 on Animal Production and Product Processing in Arsi Zone, Oromia, Ethiopia

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Abstract: This survey is conducted to assess the impact of COVID-19 on Animal Production and Product Processing in Arsi Zone, Oromia, Southeastern Ethiopia. The data for the survey were collected from April to June, 2020. The study explores the impact of COVID-19 on Animal Production and Product Processing of farm households in the three Agro-ecological zones of the study area. Data were collected from 180households across the study area in 2020 using a systematic random sampling design. The data were collected from six districts of Arsi Zone from a total of 26 districts representing the three agro-ecological zones (highland, midland and lowland) by semi-structured questionaries and observations from farmer's activities to see the impact of COVID-19 on animal production and product processing. The survey indicated that in all agro-ecological zones, the pandemic has an impact on Livestock production activities, partly on purchased animal feed sources, inputs on animal breeding materials and AI service and caused market disruptions in the study area. Therefore, if this livestock production as part of agriculture and market disruptions is likely to continue, there would be food insecurity and life challenges for livestock and humans also if rapid measures are not taken to control the pandemic and even to continue agricultural activities with intensive care during this outbreak, since, it occurs during the farming season in Ethiopia in which most of the agricultural activities are undertaken.

INTRODUCTION

After the first infections in China at the end of 2019, the Coronavirus disease (COVID-19) has continued to spread across the world. COVID-19 (coronavirus disease of 2019) is not exceptional which face currently. COVID-19 is an infectious disease caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) (Mayo Clinic, 2020). The first confirmed case of COVID-19 was detected in Wuhan (capital of China's Hubei province) epicenter of coronavirus outbreak. Then WHO has declared COVID-19 outbreak as a global

pandemic on March 11, 2020 (Cucinotta D and Vanelli M.). Even in a developed country like America, Agriculture is one of the important sectors for the world economy and is crucial to food security and human development[1]. FAO has estimated that >60% of the world population relies on agriculture for survival[2]. Ethiopia holds the largest livestock population and the livelihood of a farmer is related to agriculture which includes both livestock production and land farming activities. Smallholder farmers represent about 85% of the population. However, the productivity of livestock can be affected by natural and manmade caused problems. Among this disease like the COVID-19 pandemic virus, greatly affect the economic potential of our country. The GDP of Ethiopia would also be decreased in some remarkable numbers. Therefore, it was very important to assess the impact of the COVID-19 pandemic on Animal Production and Product Processing in Arsi Zone.

Objectives

General objective: To assess the impact of the COVID-19 pandemic on animal production and product processing in the study area.

Specific objectives:

- To evaluate the impact of COVID 19 on animal production-related activities in the study areas
- To evaluate the impact of COVID -19 on animal product processing related in the study areas

MATERIALS AND METHODS

Area description: The survey was conducted in (6) selected districts from three agro-ecological zones of Arsi Zone in Southwestern Ethiopia. Thus Limubilbilo and Tiyo (highlands), Lode Hetosa and Robe (Midland) and Ziway Dugda and Mert i(lowland) were selected from (26) districts of zone based on agro-ecological zones.

Sampling technique and sample size: For the survey purpose, (6) districts from the Arsi Zone were purposively selected from the three agro-ecology. A representative study Kebele (the lower administration structure) was purposively identified and from identified ones, (2) Kebeles were randomly selected for the survey. Then 60 households were purposively identified from each selected agro-ecology for the survey and (30) households from each Kebele was identified randomly for the interview.

Data collection: Semi-structured questionnaires, interviews and observations were used for data collection from the respondents.

Analysis: The collected data were recorded in the Excel sheet, checked, coded and analyzed by SPSS Software (Ver. 22). The result was expressed by descriptive statistics viz. mean, frequency and percentage.

RESULTS AND DISCUSSION

Respondents profile: The respondent profiles of the interviewed individuals have summarized in Table 1. The majority of the respondents in this study were male account for about 90.8% of the total sampled household in the three agro-ecological zones. The age of the respondents was found mostly between 20-39 age groups followed by 40-50 which was characterized by prime working-age and was the nation's key socio-economic contributors. This might be due to the reason that the survey on the COVID-19 pandemic outbreak was done during farming season calendar in Ethiopia and this prime working-age was responsible to contact the outsider with care than children and older ages.

The respondents of the survey were mostly youngers. The adult age who identify and understand the case of COVID-19 pandemic outbreak because children and older age were forced to stay at home rather than working in the field for farming and livestock husbandry for the fear of outbreak and not approaching to the outsider in the study areas. However, 90.8% of the respondents were married and almost half of the respondents (50.8%) attend the primary school before they engage in the agricultural activity. The highest number of family members per household were observed in lowland area compared to highland and midland with the overall average family of 6.49 person per household. This could be higher than the number of people allowed to stay together during the outbreak of COVID-19 pandemic to reduce the rate of transmission and person in contact with each other which was 4 person, as the government of Ethiopia announced during the state of emergency. Therefore, very critical care should be taken in the area, since, they are above average person allotted to stay together and this may expose them to the virus transmission during undertaking the agricultural activity, marketing and other social circumstances in the study area.

Impact of COVID-19 on animal productions: The impact of the COVID-19 pandemic outbreak on Animal production has been presented in Table 2. On average, majority of the respondents in the survey area (68.3%) assumes that COVID-19 pandemic virus had a connection with livestock production and related activities while 31.7% do have negative response toward their relatedness in terms of transmission and impact on production activities[3,4]. However, respondents in the study area have no exactly equal awareness between the three agro-ecology.

Table 1: General information of the respondent profile (percentage)

Variables	Parameters	Study area (N = 60)			Overall mean (N = 180)
		Highland	Midland	Lowland	
Gender	Male	92.5	85.0	95.0	90.8
	Female	7.5	15.0	5.0	9.2
Age	20-29	27.5	15.0	35.0	25.8
	30-39	22.5	35.0	20.0	25.8
	40-49	22.5	25.0	12.5	20.0
	50-59	15.0	17.5	15.0	15.8
	≥60	12.5	7.5	17.5	12.5
Marital status	Single	12.5	5.0	NA	5.8
	Married	87.5	87.5	97.5	90.8
	Widowed	NA	7.5	2.5	3.3
	Divorced	NA	NA	NA	NA
Educational background	Can't read and write	12.5	25.0	7.5	15.0
	Primary school	52.5	45.0	55.0	50.8
	Secondary school	27.5	17.5	32.5	25.8
	Vocational school	NA	7.5	2.5	3.3
	Certificate	2.5	2.5	2.5	2.5
	Degree	5.0	2.5	NA	2.5
Number of family members	Mean	5.77±2.5	5.43±2.4	8.27±4.5	6.49±3.5

NA = Not Available; N = Number of respondents

Table 2: Impact of animal production in the study areas (%)

Variables	Parameters	Study area (N = 60)			Overall mean (N = 180)
		Highland	Midland	Lowland	
COVID-19 connection with livestock production	Yes	60.0	72.5	72.5	68.3
	No	40.0	27.5	27.5	31.7
Impact on animal feed	Yes	94.7	91.7	100.0	96.7
	No	5.3	8.3	0.0	3.3
Supply and market disruption of animal	Yes	45.0	50.0	60.0	51.7
feed during COVID-19	No	55.0	50.0	40.0	48.3
On which animal feed source	Purchased from the market	94.7	100.0	100.0	98.4
	Home produced feed	5.3	0.0	0.0	1.6
Associated problems with Animal	Increased price	94.7	83.3	89.7	90.0
feed during COVID-19	Decreased price	0.0	8.3	6.9	5.0
	Not available on market	5.3	8.3	3.4	5.0
Owner fear during handling, milking and	Yes	47.4	25.0	51.7	45.0
working with Animal	No	52.6	75.0	48.3	55.0
Access to service due to COVID-19					
Veterinary	Yes	71.1	94.4	82.1	82.3
	No	28.9	5.6	17.9	17.7
Farmer Advising on					
	Yes	44.7	47.2	82.1	58.4
	No	55.3	52.8	17.9	41.6
AI service					
	Yes	28.9	29.4	23.1	27.1
	No	71.1	70.6	76.9	72.9
Obtain Live stock inputs due to COVID-19					
Vet supply and treatment	Yes	78.9	97.2	87.2	87.6
	No	21.1	2.8	12.8	12.4
AI service	Yes	28.9	34.4	23.1	28.8
	No	71.1	65.6	76.9	71.2
Semen for AI	Yes	18.4	40.4	28.2	29.0
	No	81.6	59.6	71.8	71.0
Forage seed	Yes	50.0	55.6	30.8	45.1
	No	50.0	44.4	69.2	54.9

AI = Artificial Inseminations, COVID-19 = Corona Virus disease 19, vet = veterinary, N = Number of respondents

However, 60.0% of the respondents believe that the COVID-19 pandemic outbreak has caused disruption on the supply and marketing of animal feed in the lowland area followed by midland and highland areas. This might be due to the purchase of feed for their animals that was why they recognized mostly on the supply and market disruption of the feeds during the COVID-19 outbreak[5, 6]. Moreover, this could be due to the movement restriction of people from a place to place that reduced the supply of Animal feeds by retailers and disruption of supply routes during the COVID-19 pandemic outbreak. Conversely, 98.4% of the respondents

Table 3:Animal product and processing in the study area (%)

Variables	Parameters	Study area (N = 60)			Overall mean (N = 180)
		Highland	Midland	Lowland	
Impact of COVID-19 on animal products and processing	Yes	100.0	100.0	100.0	100.0
	No	0.0	0.0	0.0	0.0
COVID-19 impact on Animal product	Meat	54.5	50.0	2.9	33.0
	Milk	4.5	3.1	0.0	2.3
	Milk product	0.0	0.0	5.9	2.3
	Egg	4.5	0.0	11.8	5.7
	Meat, Milk	9.1	0.0	11.8	6.8
	Meat, Milk and milk product	13.6	43.8	58.8	42.0
	All product of Animal	13.6	3.1	8.8	8.0
Quality on animal product during COVID-19	Increase	0.0	4.3	22.2	12.0
	Decrease	93.8	91.3	75.0	84.0
	No change	6.3	4.3	2.8	4.0
Delivering of animal and animal product to market or consumer	Yes	100.0	100.0	100.0	100.0
	No	0.0	0.0	0.0	0.0
Possible problems of product to reach market/consumer	Lack of transportation	18.2	10.0	0.0	8.4
	Reduced demand	54.5	60.0	90.3	69.9
	Reduced price	22.7	16.7	6.5	14.5
	Unhygienic processing	4.5	0.0	0.0	1.2
	Other problems	0.0	13.3	3.2	6.0
Animal product collection from producers by truck	Yes	12.8	0.0	2.6	5.2
	No	87.2	100.0	97.4	94.8

COVID-19 = Corona virus disease 19, N = Number of respondents

in the survey area incarnate in the three agro-ecological zones understood that the COVID-19 pandemic had an impact on purchased feed source from a market than home-produced animal feed sources (1.6%). Due to this, 90% of the respondents had indicated the associated problems during COVID-19 with animal feed as increments of purchased feed followed because of theirless available in the market (5%) in the study area while they have no problems with naturally grown feeds in their locality (Table 3).

Respondents in rural areas also share a common shelter with their livestock like sheep, goat, calf, chicken, and equine. Even though, 55.0% of the respondent in the surveyed area do not have any fear during handling, milking and working with farm animals after the outbreak of COVID-19 in Ethiopia while on average 45.0% fear and still living in one shelter with their tension.

On average, most of the respondents (82.3%) in the study area had access to veterinary service despite the outbreak of COVID-19 pandemic for their livestock treatment if they got sick. However, farmer advising wasn't equally reaching them even if more respondents (58.4%) are getting sound while 41.6% of the respondents have no access to receive advice from the expert about their farm during COVID-19 pandemic outbreak across the study area.

Moreover, breeding inputs were very important tools for farmers to improve their livestock and impregnate their animals especially dairy cows in the absence of bull. The disruption of public services in the area of input provision for farmers was highly observed in the area of providing breeding materials required for the service. Consequently, 87.6% of the respondents were obtained veterinary service and treatment across the surveyed area. However, on average, 71.2 and 71.0% of the respondent wouldn't obtain AI service and semen for their livestock during the COVID-19 pandemic due to movement restriction, respectively across the surveyed area while forage seed problems have been insignificant.

Impact of COVID-19 on Animal product and product processing: The survey presented in Table 3 revealed that the impact of COVID-19 on animal products and processing. The majority of the respondents (42.0%) indicated that the COVID-19 pandemic has an impact on meat, milk and milk producttogether followed by meat (33.0%) alone across the study area as indicated in Table 3. However, the impact of COVID-19 pandemic on milk alone was null in the lowland due to the reason that lowland respondents (residents) do not practice selling milk to the market rather they use for home consumption and further processed into butter that can be stored for a longer period than milk[7, 8].

The majority of the respondents (84.0%) indicated that the COVID-19 pandemic outbreak decreases the quality of the animal product as they suspected that the virus would cause contamination of the product. All respondents (100.0%) in the study area replied that they all deliver their animal and animal products to market or consumer. However, the demand for the product was decreased as confirmed by 69.9% of respondents irrespective of agro-ecology. Therefore, the COVID-19 pandemic has a great hit on supplying the animal product to market or consumer, this might be due to the total lockdown period time which was lasted for a short period and still fear of the disease that it might be transmitted

through livestock product consumption. Consequently, 14.5% of the respondents show that the price of the animal and their product decreases due to the low demand for animal and animal products by the market and consumers. This is due to the rumors that the virus will also found in animal and animal products. The majority of respondents (94.8%), indicated that milk collection by using truck was not practiced, therefore, there was no significant impact on the milk and other product collection from producers by a truck during COVID-19 pandemic outbreaks across the study areas.

CONCLUSION

The livestock production, product processing, marketing, provision of services and livestock input were affected by COVID-19 pandemic across the study area. Animal breeding inputs (AI service and semen) decreased during the pandemic outbreak due to movement restrictions. The prevalence of the COVID-19 pandemic outbreakinterruptedtheforage production seasons and crop cultivation season.Generally, the study and observations on the impact of COVID-19 pandemic virus on the livestock production and product processing revealed disruptions of input supply for livestock production activities. This indicated that the disruptions are likely to increase, along with their terrible, socio-economic consequences if the action to protect this sector and its activities, services and products upon which the farmer's livelihood relies is not taken immediately[9].

RECOMMENDATIONS

Awareness creation to the farmers on the negative impact of COVID-19 pandemic related to livestock production, product processing and provision of services and livestock inputs may be very important as mitigation to continue livestock production activities as part of agriculture.Office of Agriculture and concerned stakeholder shall engage in delivery/ support/ of livestock inputs and service provision. Empowering farmers to access all necessary livestock production inputsand breeding materials at nearby markets and officesto restrict the movement of people from place to place. This would help to minimize the risk of virus transmissionwhich was highly required during the COVID-19 pandemic outbreak.

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