



Livestock services delivery during COVID-19 lockdown: An appraisal of accessibility and constraints

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ABSTRACT

COVID-19 has devastated many sectors of Indian economy including livestock sector which got more turmoil during the lockdown period. With an intuition to find out the appraisal of livestock management and health services accessed by the farmers and delivered by the private veterinary practitioners, the present study was conducted in Uttar Pradesh. The production parameters, viz. milk production, sell, consumption and utility pattern of milk similarly the pattern of milk supply chain was studied and compared before and during lockdown period. The results revealed that except milk consumption remaining parameters showed negative trend as compared to before lockdown, and dairy co-operative has played a major role in maintaining the milk supply chain during lockdown. The major constraints perceived by the farmers during lockdown were accessed and it was observed that increase in price of feed and fodder followed by fear of corona were major problems. The delivery of livestock services viz. AI, treatment, livestock extension and vaccination by the private veterinary practitioners was accessed and compared before lockdown and during lockdown period. The results revealed that less number of cases attended during lockdown due to low response from farmers for availing the service from them, and fear of corona virus.

Keywords: Livestock, COVID-19, Lockdown, Constraints, Vaccination

COVID-19 has created an unforeseen crisis and grave societal threat to each and every citizen. Globally, the COVID-19 severely affected more than 5 billion people's life and livelihoods, and in India it has affected the income of 80% of the population (OECD 2020). As per IMF (2020), the world economy will lose \$9 trillion due to COVID-19 and further the pandemic will also etch a very deep psychological impact on the minds of the people of all ages. According to Care Ratings (2020), among all the sectors, agriculture will be affected by 17% due to lack of labourers during lockdown. Further, the rate of unemployment had gone up to 23.5% in April and May 2020, whereas 27 million youth lost their jobs in April 2020 following a nationwide lockdown in India (CMIE 2020). The effects of COVID-19 on the livestock sector are still largely unquantified and yet to be fully felt. Formal assessments have not yet been possible, but current observations revealed disruptions to livestock value chains (FAO 2020). Lockdown ignores livestock farmers' time-sensitive needs, such as artificial insemination, pregnancy checks, vaccinations, de-worming, and more importantly, feed and fodder. To keep the livestock alive, productive, healthy and protection from any infection, it is also pertinent to give

equal importance to community-level ethno-veterinary practitioners, private para-veterinary workers/AI inseminator and other livestock service providers to permit them to provide livestock service to the farmers since they have usually a better rapport with them and even are more accessible. Like human healthcare staff, AI Inseminator/paravets also need to be allowed smooth movement for administering inseminations when the animals are in heat as well as to deliver the other veterinary services that they might require (Rawat 2020). In given context, present study was carried out with the objective of appraisal of livestock services (AI, health, vaccination etc.) provided through government institution, Paravets, AI Inseminator and the livestock management practices followed by the farmers during lockdown due to COVID-19.

MATERIALS AND METHODS

Secondary and primary data were used for conducting the study, which were collected through email and telephonic survey from the farmers and veterinary institutions providing first-aid veterinary and AI services. Secondary data, were collected from BAIF and Department of Animal Husbandry of Uttar Pradesh (12 districts). Primary data were collected, telephonically, from randomly selected 60 private AI Inseminator/ Para-vets, trained as rural educated unemployed youth by Department of Animal Husbandry, Uttar Pradesh. Further, 100 dairy farmers who

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Table 1. Artificial inseminations (AI) carried out by BAIF and District Animal Husbandry Department, Uttar Pradesh during Feb to April 2020

Particulars	20 Feb	20 Mar	20 Apr
<i>AI at BAIF centre</i>			
No. of AI centres	4,769	4,763	4,088
No. of artificial inseminations performed with semen of:			
Cattle	252,487	213,972	105,249
Buffalo	192,819	114,771	35,619
Total	445,306	328,743	140,868
AI cases (April 2020) in comparison to February 2020			31.63%
AI cases (April 2020) in comparison to March 2020			42.85%
<i>AI by Animal Husbandry Department, UP (12 districts)</i>			
Amroha	39,041	42,855	7,695
Chitrakoot	60,120	81,040	1,053
Bareilly	117,601	190,541	5,027
Hardoi	58,618	77,232	6,793
Lakhimpur	21,603	28,883	5,762
Auraiya	11,754	25,057	1,925
Kousambi	12,370	14,822	3,851
Moradabad	135,186	158,006	5,405
Sant Kabir Nagar	8,948	8,220	2,548
Shamli	15,364	12,421	7,600
Sonbhadra	14,825	24,950	3,327
Agra	67,156	89,139	3,865
Total	562,586	753,166	54,851
AI done (April 2020) in comparison to February 2020			9.70%
AI done (April 2020) in comparison to March 2020			7.20%

got training, two years back, from Indian Veterinary Research Institute, Izatnagar under Kamdhenu scheme were also contacted telephonically for the data collection. The data were modified using adequate statistical treatment viz, frequency, percentage, mean and standard error using SPSS 20 Package.

RESULTS AND DISCUSSION

Delivery of Artificial Insemination Services (AI)

Number of AI done at AI centres of BAIF reduced in April 2020 in comparison to February and March 2020 because the lockdown was imposed on 22nd April 2020 (Table 1). In comparison to the month of February and March 2020, the AI cases at BAIF centres were reduced in month of April 2020. The drastically reduced number of AI in livestock during lockdown were not due to lack of availability of AI services but the fear and fatigue of COVID spread among the farmers due to the rumour and lack of knowledge that livestock may also get infected by COVID. The missing of timely breeding services in livestock may cause huge loss to the farmers and nation. Madkar *et al.*

Table 2. Socio-economic profile of farmers, milk production, consumption and sale at farmers level during COVID-19 (N=100)

Variables	Frequency	Percentage	Mean (standard error)
Age			48.32 (1.83)
Sex			1.05 (0.034)
(a) Male	96	96	
(b) Female	4	4	
Education			4.00 (0.18)
(a) Primary	10	10	
(b) Upper primary	15	15	
(c) Secondary	20	20	
(d) High school	25	25	
(e) Graduate and above	30	30	
Land size (acres)			7.37 (1.26)
Herd size			42.35 (6.47)
Buffalo milking	58	58	
Male	31	31	
Heifer	45	45	
Young one	36	36	
Crossbreed milking	48	48	
Male	21	21	
Heifer	33	33	
Young one	48	48	
<i>Milk production (litres)</i>			
(a) Before lockdown	Nil	Nil	129.17 (24.17)
(b) After lockdown	Nil	Nil	87.95 (19.14)
<i>Milk sell (litres)</i>			
(a) Before lockdown	Nil	Nil	120.26 (25.11)
(b) After lockdown	Nil	Nil	76 (19.64)
<i>Milk consumption</i>			
(a) Before lockdown	Nil	Nil	7.72 (1.08)
(b) After lockdown	Nil	Nil	8.17 (1.10)
Utility of milk			1.17 (0.17)
Distributing to others	60	60	
Consuming at home	80	80	
Converted into value added product	20	25	

(2018) reported the loss of ₹ 5,000–7,000 if one oestrous is missed without insemination and conception in livestock. Further, Adnan (2019) estimated the loss of Rs 425.85 crore due to delayed conception in his study conducted in Jammu and Kashmir.

Socio-economic characteristics of dairy farmers

Results revealed (Table 2) that the average age of the farmer was 48.32 years, and 96% of the farmers were male which is in consonance with the findings of Pathade *et al.* (2020) in Maharashtra. Further, 30% of the farmers were graduate followed by high school level education (25%), average landholding and herd size were 7.37 acres, 42.35 animal units, respectively, herd size comprises 58 and 48% milking buffalo and crossbred animals, respectively. Similar findings were reported by Chandrasekar *et al.* (2017). The milk production, sale and consumption pattern before and

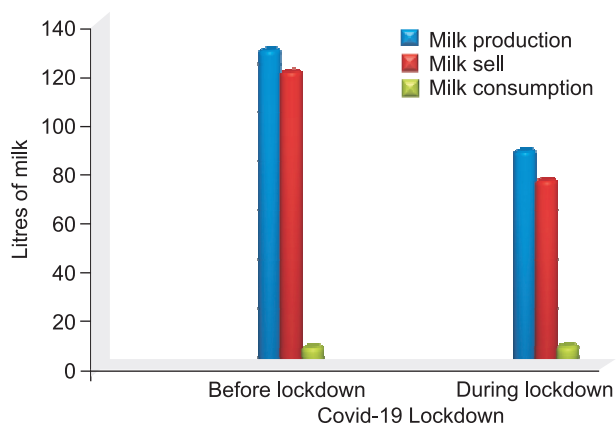


Fig 1. Milk production, sell and consumption pattern.

during lockdown (Fig.1) revealed that average milk production and milk sell reduced after lockdown, while consumption of milk enhanced during lockdown.

The marketing pattern of the milk before and during lockdown (Table 3) depicted the change in supply chain pattern of milk after lockdown. Agrawal and Raju (2021) in Madhya Pradesh found that major milk supply chain was Producer–Village co-operative societies–District Milk union–Retailer–Consumer.

The marketing supply chain pattern of milk:

- Before lockdown : Daily consumers ⇒ Private dairy ⇒ Hostels, Hotels and Restaurants ⇒ Dairy co-operative ⇒ Village distribution
- During lockdown: Daily consumers ⇒ Dairy co-operatives ⇒ Private dairy ⇒ Village distribution.

The feeding management of livestock during lockdown revealed that only 35 and 60% farmers got access to concentrate and green fodder, respectively, during lockdown period (Table 4). The unavailability of green pasture and closing of feed shops during lockdown aggravated the crisis situation of feed and fodder management. The study conducted by Bala (2019) in Odisha stated that livestock productivity was constrained by shortage of feed and fodder. As far as livestock health services of State Department of Animal Husbandry (SDAH) is concerned, it was found that most of the farmers (52%) received treatment services followed by artificial insemination (48%) and vaccination

Table 3. Marketing of milk (N=100)

Milk selling agency	Before lockdown		During lockdown	
	Frequency	Percentage	Frequency	Percentage
(a) Daily consumers	40	40	45	45
(b) Hotels, Restaurants	25	25	0	0
(c) Dairy co-operative	24	24	40	40
(d) Private dairy	30	30	35	35
(e) Distributed in village	20	20	30	30

Table 4. Feed and fodder management, accessibility of livestock services and reasons for not getting livestock services during lockdown period (N=100)

Type of feed	Feed availability (N=100)		Mean (Standard error)
	Frequency	percentage	
Dry	75	75	0.75 (0.069)
Green	60	60	0.60 (0.078)
Concentrate	35	35	0.35 (0.079)

Type of services	Services received N=100 frequency		Mean (standard error)
	Frequency	Percentage	
Artificial insemination	48	48	0.48 (0.079)
Treatment	52	52	0.52 (0.082)
Vaccination	32	32	0.32 (0.070)
Extension advisory services	5	5	0.05 (0.025)

Reasons for not getting livestock services	Frequency		Standard error
	Frequency	Percentage	
Fear of corona	95	95	0.034
Unavailability of veterinary personnel (doctor/paravets)	50	50	0.080
Shut down of veterinary polyclinic	57	57	0.070
Difficulty in transportation to polyclinic	67	67	0.075
Lack of response from veterinary personnel	32	32	0.075

*The figures in parenthesis indicate standard error.

services (32%) during lockdown (Table 4). The study conducted by Verma *et al.* (2020) in Haryana reported that farmers demanded livestock extension services in case of artificial insemination, fodder production etc.

The reasons for not availing the livestock services by the farmers are presented in Table 4, which revealed that most of the farmers (95%) did not prefer to avail it due to fear of corona infection and 67% farmers reported that even if in emergency it was difficult to visit polyclinic due to unavailability of transportation services during lockdown. The study conducted by Neeraji and Kumar (2018) in Jammu and Kashmir reported that distant location of veterinary hospital was the major problem perceived by the farmers in utilization of livestock extension services of State Department of Animal Husbandry.

The major constraints faced by the livestock farmers during lockdown are presented in Table 5, which envisaged

Table 5. Major constraints faced by the farmers during lockdown

Major problems	Frequency	Percent
Selling of milk and milk products	95	95
Shutdown of regular market (hostels, hotels, bakery, sweet mart)	85	85
Increase in price of feed and fodder	97	97
selling and purchasing of animals	77	77
Accessibility of veterinary and extension services	68	68
Low market price for milk	92	92
Profitability of dairy farm diminished during lockdown	50	50

that majority of the farmers (97%) faced the burden of price hike of feed and fodder due to shutdown of feed and fodder shops and unavailability of feed and fodder. Similar findings were reported by Smitha (2019). Further, it was recorded that 95% of farmers faced the difficulties in selling of milk and milk products and 92% farmers reported low price of milk during lockdown. Similar results were reported by Rachna *et al.* (2018) study conducted in Haryana.

Livestock health and AI services delivered by paravets/ AI inseminator during lockdown

The results regarding livestock health and management services delivered by the paravets/AI inseminator revealed that the average experience (years) in delivering the livestock health service by the paravets /AI inseminator was 11.2 years. This is in line with the findings of Sen and Chander (2001) who found average working experience of 5–10 years of private veterinary practitioner in West Bengal. Further, about the type of cases attended by the paravets (Table 6; Fig. 2), it was found that the average number of artificial insemination (AI) and pregnancy diagnosis (PD) cases attended were reduced per day during lockdown. There might be various other reasons like fear of corona, fear of police, followed by no calls from the farmers in getting the livestock health services during lockdown. Further, veterinary first-aid cases and number of villages

Table 6. Overview of livestock health services delivered by private paravets/AI inseminator (N=60) during lockdown

Variables	No of respondents	Mean	Standard deviation
Experience of livestock service providers (years)		11.5	5.95
No of cases attended per day			
Artificial insemination (AI)			
a) AI before lockdown		6.41	2.52
b) AI during lockdown		2.93	1.95
Veterinary First Aid			
c) Medicinal cases before lockdown		2.82	2.16
d) Medicinal cases during lockdown		1.42	0.92

(Table 6 concluded)

Variables	No of respondents	Mean	Standard deviation
Reasons for less no. of AI during lockdown		7.34	2.31
a) No calls from farmers	35 (58.3)		
b) Fear of police	46 (76.6)		
c) No movement pass was issued	33 (55)		
d) Fear of corona	51 (85)		
Problems faced in delivering other services during lockdown		4.09	3.29
a) Farmer wanted free of cost services	32 (53.3)		
b) Challan by police	01 (1.66)		
c) Lack of veterinary medicine	18 (30)		
d) Lack of availability LN ₂	16 (26.6)		
Reasons for attending less number of cases during lockdown		0.9	1.05
a) No phone calls from farmer	40 (66.66)		
b) Lack of availability of semen	20 (33.3)		
Suggestion to support paravets during COVID like situation			
a) Honorium grant	52 (86.7)		
Source of earning of livestock health service providers during lockdown		2.65	1.05
a) Agriculture	14 (23.3)		
b) Animal Husbandry (AH)	02 (3.3)		
c) Agril +AH	34 (56.7)		
d) Saving only	10 (16.7)		
Stay before lockdown		1.41	0.9
a) Urban/Peri-Urban	25 (41.7)		
b) Village	35 (58.3)		
Stay during lockdown		1.03	0.18
a) Urban/Peri-urban	08 (13.3)		
b) Village	52 (86.7)		
Village coverage to provide livestock health services			
a) No. of village covered before lockdown		16.8	6.5
b) No. of village covered during lockdown		5.69	3.54
Pregnancy diagnosis (PD) attended			
a) Before lockdown		24.47	4.11
b) During lockdown		6.98	1.8

*The figures in parenthesis indicate percentage.

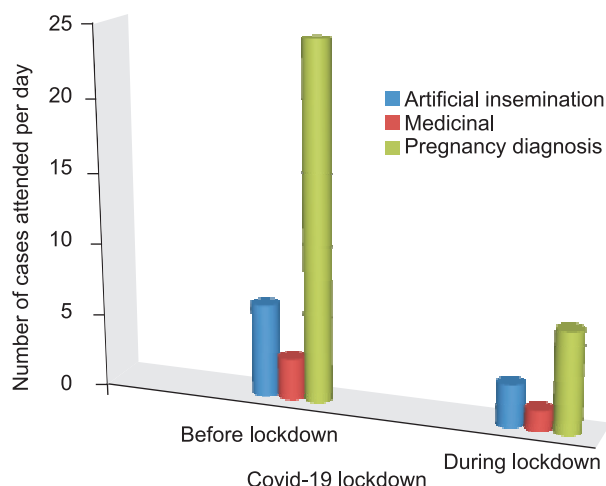


Fig. 2. The types of cases attended by the paravets before and during lockdown.

covered to provide livestock services got reduced during lockdown. The problems faced by the paravets in delivering the livestock health services during lockdown were—the farmers expected to get free of cost services in view that government had offered many incentive/welfare scheme for the farmers and others whose livelihood affected due to COVID-19. Further, lack of availability of veterinary medicine and liquid nitrogen (LN_2) were also the major constraints in delivering the livestock health services. The suggestions to overcome the issue of delivering the livestock services were recorded from the paravets /AI inseminator and they reported that honorium grant should have also been provided to them for disseminating livestock services as their jobs were also affected due to COVID. Similar findings were reported by Channaappagouda and Sasidhar (2018) in their study conducted in Karnataka.

Regarding the source of income /livelihood during the lockdown period among the paravets and AI inseminator, it was found that most of the paravets (56.7%) were involved in agriculture and animal husbandry sector to earn their livelihood. Further, most of the paravets (58.3%) were living in urban/peri-urban areas before lockdown to provide better education to their children and better living to their family and during the lockdown they shifted from urban to their own village (86.7%) to make their daily lives easy. The above findings clearly indicated that the paravets/AI Inseminator, who were working privately, faced serious repercussion of COVID-19 lockdown in delivering the livestock health, AI and veterinary first aid services to the livestock farmers.

The study concluded that situation needs critical analysis to ameliorate the condition of the farmers in terms of providing hassle free services to them during COVID like situation and private veterinary practitioner/AI inseminators should also be given free movement pass to enable them to provide the services at the doorsteps of the farmers. Also, an educational campaign need to be launched exclusively for the farmers to remove their fatigue that corona does not infect their livestock, because it has not been proved so far.

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