Original Research Article

Socio-Economic Impacts of COVID-19 Pandemic on Equine Rearing in Haryana, India

Abstract

Current study was aimed to analyze socio-economic impacts of COVID-19 pandemic on equine farmers in Haryana, India and it was conducted in Haryana. The study was descriptive and exploratory in nature, including field survey. Structured interview schedule was adapted to conduct personal interviews of respondents. Statistical Package for Social Sciences (SPSS) version was adopted for data analysis. COVID-19 pandemic impacts were observed on equine community and 73.9% respondents reported that there was decrease in demand of work for their equines, 74.2% reported reduction in income from equines and 59% reported no change in expenses. 82.5% reported no change in health of their equines. Equine sector was adversely affected due to pandemic and socio-economic matters of respondents were totally disturbed and 33.7% respondents are not willing to continue with their current occupation of equine rearing and are willing to migrate from equine rearing and they are exploring new sources of income. Current study is very significant to address the problem of equine farmer in changed scenario.

Keywords : COVID-19, pandemic, equines, farmers, household

1. Introduction:

India is blessed with various species of livestock, this sector is source of wealth and power, and approximately two-third families in rural area are associated with any one species of livestock to sustain their livelihood through obtaining their by-products, draught power. In India, this sector is one of the largest sectors in the world, consisting 1.4% equines of world's equines population. Livestock are considered to act as a walking bank and an insurance against any unseen /natural calamities [1]. Animals play a vital role in resource-based livelihood for a huge population especially in developing countries like India and provide employment, revenue, and food. Livestock sector faces a number of challenges in the form of natural disaster; earthquake, flood, volcanoes, shortage of feed/fodder and incidence of emerging of pandemic and they

become susceptible to pandemic [2]. These types of disasters occur almost every year in one or other form and left long lasting effects on every sector, especially on livestock sector [3]. Natural calamities and pandemics affect health of livestock and subsequently decreasing their productivity. COVID-19 pandemic was a type of disaster and it was found equine sector was adversely affected it was also observed that its effects will be long lasting on livestock sector in general and on equine sector in particular.

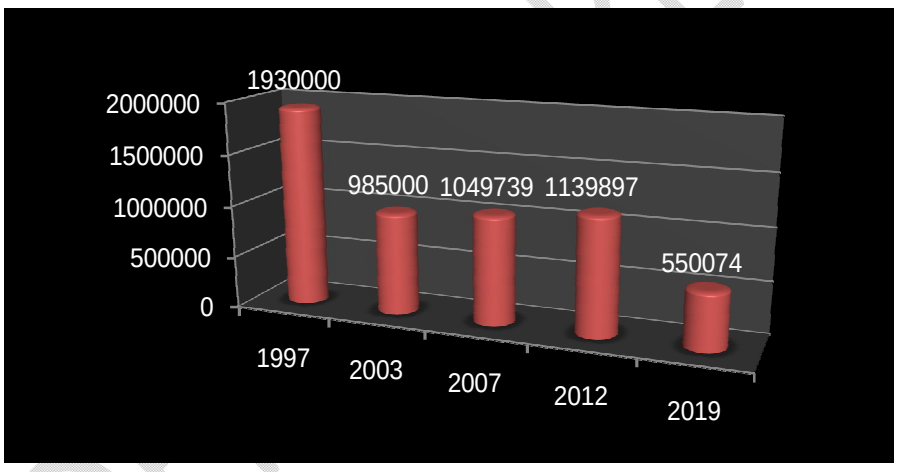
Equines play very important role in rural area in India; they are the reliable source of production chain of several industries and are used for transportation in construction, agriculture and transportation of people and goods [4]. Equines are major components of livestock and are herbivores, monogastric, non-ruminant and sure footed animals. There are further four sub groups of equines i.e. horse and pony (*Equus caballus*), donkey (*Equus asinus*) and mule (*Equus mulus*) [5]. Zebra (*Equus quagga*) is also a member of equine family. Equines are used for various purposes and they are essential part of agrarian economy and known as ATM for poor and marginalized people in rural area in Haryana. Equines are generally reared by landless and marginalized farmers to generate direct and indirect income [6]. In India, equines are generally reared by landless and marginalized farmers and these farmers are dependent on earning of these animals [7].

Equines play a vital role globally as well and they are known for speed, power, energy and they have played an important role in history of China [8]. Equines are essential part in agriculture and transportation in urban and peri-urban area in developing countries and are power source for these countries [9]. Equines are used worldwide for transportation of agricultural products, water, fuel and dairy products [10]. Globally, there are approximately 100–112 million equines and impacting lives of 600 million people [11].

It was observed that equine population is declining rapidly in India and Haryana as well [Figure-1 &2]. Covid-19 was a health emergency throughout the world and it was declared as a global pandemic on 11 March 2020 by World Health Organization (WHO) [12]. Haryana was not exceptional of this crisis and impacts of this pandemic were observed in various sectors in the state and adversely affected the economy of the state. Distress of millions of landless and

marginal farmers for saving their livestock, as this sector provides livelihood and employment to approximately 8.8% population in India [13]. As per UN data more than 65% parents were reluctant to continue education of their children, especially girl education and were restoring to child marriages to save costs, cyber violence and trafficking of women and girls were increased within the first few months of the pandemic and millions of people lost their jobs during COVID-19 in India and globally as well [14]. In UK impact of COVID-19 and prolonged lockdown was observed on equine industry [15]. Equine industry was adversely affected by COVID-19 pandemic in India due to COVID-19 protocol and restriction on movement of equines and affected their fitness due to lack of exercise. Lacking of veterinary services and shortage of feed and fodder was observed [16].

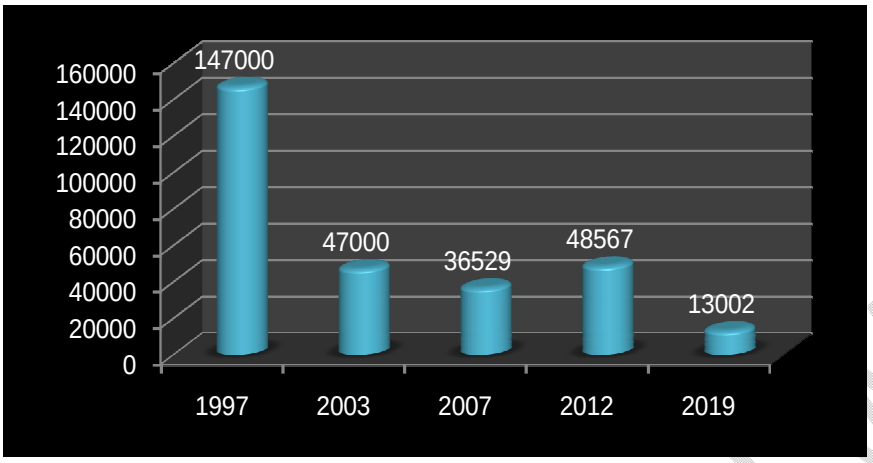
Figure 1: Graphic presentation of trend of equine population in India:



Source: https://dahd.nic

In India, equine population was 1930000 in 1997, 985000 in 2003, 1049739 in 2007, 1139897 in 2012, and 550074 in 2019. In this way, there is a declining trend in equine population [Figure-1].

Figure 2: Graphic presentation of trend of equine population in Haryana (India):



Source: https://dahd.nic.

In Haryana, equine population was 147000 in 1997, 47000 in 2003, 36529 in 2007, 48567 in 2012 and 13002 in 2019. In this way, there is a great decline in equine population [Figure-2].

2. Methodology:

2.1 Study area:

The study was conducted in four districts (Provinces) of Haryana; Hisar, Bhiwani, Jind and Rohtak and it was conducted in rural and urban area as well. Haryana is surrounded by National Capital New Delhi from three sides. Contribution of Haryana is significant in national GDP. There are 22 districts and as per national census-2011, human population of the state is approximately 25.3 million [17].

2.2 Methods of data collection:

Structured interview schedule was adopted for data collection containing questions designed especially as per the requirement of the study. Multistage random sampling method was applied for data collection and personal interview method was adopted.

2.3 Sample size:

Selection of respondents was done by simple random sampling method at sampling site. Overall 303 respondents took part in study and out of these 88 were from Hisar district, 77 from Bhiwani district, 73 from Jind district and 65 from Rohtak district.

2.4 Data management and analysis:

Interview schedules were arranged district and category wise. List was prepared and all filled interview schedules were examined thoroughly; missing digits were updated by contacted respondents through telephonic conversation. Editing and post coding was done and classification was done to convert raw data into a meaning full. Data entered in Microsoft office excel worksheet. Statistical analysis was done by using IBM Special Package for Social Sciences (SPSS) version.

3. Socio-Economic Impacts of COVID-19 pandemic on equine rearing in Haryana:

Table 1: Classification of respondents on the basis of their responses on various impacts of COVID-19 pandemic on equine rearing in Haryana:

Variables	Frequency (percentage)					
	Responses	Hisar (n-88)	Bhiwani (n-77)	Jind (n-73)	Rohtak (n-65)	Overall (n-303)
Demand of work for equines	Decreased	55 (62.5%)	53 (68.8%)	61 (86.6%)	55 (84.6%)	224 (73.9%)
	Increased	01 (1.1%)	01 (1.3%)	01 (1.4%)	01 (1.5%)	004 (1.3%)
	No Change	31 (35.2%)	22 (28.6%)	10 (13.7%)	08 (12.3%)	071(24.4%)
	Cannot say	01 (1.1%)	01 (1.3%)	01 (1.4%)	01 (1.5%)	004 (1.3%)
Income from equines rearing	Decreased	62 (70.5%)	51 (66.2%)	58 (79.5%)	54 (83.1%)	225 (74.2%)
	Increased	01 (1.1%)	01 (1.3%)	01 (1.4%)	01 (1.5%)	004 (1.3%)
	No Change	24 (27.3%)	24 (31.2%)	13 (17.8%)	09 (13.8%)	070 (23.1%)
	Cannot say	01 (1.1%)	01 (1.3%)	01 (1.4%)	01 (1.5%)	09 (13.8%)
Equine rearing expenses	Decreased	07 (8%)	01 (1.3%)	03 (4.1%)	01 (1.5%)	012 (3.9%)
	Increased	27 (30.7%)	21 (27.3%)	22 (30.1%)	37 (56.9%)	107 (35.3%)
	No Change	52 (59.1%)	54 (70.3%)	47 (64.4%)	26 (40%)	179 (59%)
	Cannot say	2 (2.3%)	01 (1.3%)	01 (1.4)	01 (1.5%)	005 (1.6%)
Equine health	Deteriorated	11 (12.5%)	05 (6.5%)	10 (13.7%)	13 (20%)	039 (12.8%)
	Improved	03 (3.4%)	03 (3.9%)	02 (2.7%)	01 (1.5%)	009 (2.9%)
	No Change	72 (81.8%)	68 (88.3%)	60 (82.2%)	50 (76.9%)	250 (82.5%)
	Cannot say	2 (2.3%)	01 (1.3%)	01 (1.4%)	01 (1.5%)	005 (1.6%)
Household total income	Decreased	62 (70.5%)	51 (66.2%)	60 (82.2%)	50 (76.9%)	223 (73.5%)
	Increased	01 (1.1%)	01 (1.3%)	01 (1.4%)	02 (3.1%)	005 (1.6%)
	No Change	24 (27.3%)	24 (31.2%)	11 (15.1%)	12 (18.5%)	071 (23.4%)
	Cannot say	01 (1.1%)	01 (1.3%)	01 (1.4%)	01 (1.5%)	004 (1.3%)
	Decreased	08 (9.1%)	05 (6.5%)	06 (8.2%)	02 (3.1%)	021 (6.9%)

Household total expenses	Increased	28 (31.8%)	21 (27.3%)	29 (39.7%)	41 (63.1%)	119 (39.2%)
	No Change	50 (56.8%)	50 (64.9%)	37 (50.7%)	21 (32.3%)	158(52.1%)
	Cannot say	02 (2.3%)	01 (1.3%)	01 (1.4%)	01 (1.5%)	005 (1.6%)
Availability of feed and fodder for equines	Decreased	20 (22.7%)	12 (15.6%)	16 (21.9%)	19 (29.2%)	067 (22.1%)
	Increased	02 (2.3%)	02 (2.6%)	01 (1.4%)	01 (1.5%)	006 (1.7%)
	No Change	64 (72.5%)	62 (80.5%)	55 (75.3%)	44 (67.7%)	225 (73.4%)
	Cannot say	02 (2.3%)	01 (1.3%)	01 (1.4%)	01 (1.5%)	05 (1.6%)
Availability of Veterinary services for equines	Decreased	14 (15.9%)	06 (7.8%)	10 (13.7%)	15 (23.1%)	45 (14.8%)
	Increased	01 (1.1%)	01 (1.3%)	01 (1.4%)	03 (4.6%)	06 (1.7%)
	No Change	72 (80.7%)	69 (89.6%)	61 (83.6%)	43 (66.2%)	245 (80.8%)
	Cannot say	01 (1.1%)	01 (1.3%)	01 (1.4%)	04 (6.2%)	07 (2.3%)

Results and discussion:

3.1 Demand of work for equines during:

COVID-19 pandemic was a trigger shooting for equine sector. Overall 73.9%, in Hisar 62.5%, in Bhiwani 68.8%, in Jind 86.6% and in Rohtak 84.6% respondents reported reduction in work for equines during COVID-19 pandemic [Table-1]. The same situation was reported for equines in 14 low-medium income Asian countries and a reduction in workload up to 73% was reported [18].

3.2 Monthly income from equines rearing:

Overall 74.2%, in Hisar 70.5%, in Bhiwani 66.2%, in Jind 79.5% and in Rohtak 83.1% respondents responded about reduction in income from equine rearing [Table-1]. This study also agree with study which was conducted in 14 low-medium income countries and up to 83% reduction in monthly income from equines was reported in Asian countries during COVID-19 pandemic [17]. This study agrees with study which was conducted in nine developing countries and found that equine farmers were not getting adequate work for their equines during COVID-19 resulting decrease in income from equine rearing during COVID-19 in nine developing countries [19].

3.3 Equine rearing expenses during:

Overall 35.3% responded increased, 59% responded no change; in Hisar 30.7% responded increased, 59.1% responded no change; in Bhiwani , 27.3% responded increased, majority of

respondents 70.3% responded no change; in Jind, 30.1% responded increased, 64.4% responded no change and in Rohtak, 56.9% responded increased, 40% responded no change in expenses on equine rearing [Table-1]. Working equids owners were getting less income from their animals, but their routine expenses were either same or increased in Himachal Pradesh, India [15].

3.4 Equine health during COVID-19 pandemic:

Majority of respondents in overall 82.5% responded no change in equine health. Hisar 81.8%, Bhiwani 88.3%, Jind 82.2% and Rohtak 76.9% responded no change in equine health during COVID-19 pandemic [Table-1]. 71% respondents from Asian countries reported that there was no change in health of their equines in 14 low-medium income countries during COVID-19 pandemic [17].

3.5 Household total monthly income:

Overall majority of respondents 73.5%, in Hisar 70.5%, in Bhiwani 66.2%, in Jind 82.2% and in Rohtak 76.9% responded that their household total monthly income decreased during COVID-19 pandemic [Table-2]. In Himachal Pradesh (India) that working equids owners were getting less income from their animals due to decreased work demands, [http://abc.net/au/news/horses-owners-suffer-2021]. Up to 83% reduction was there in total household income in 14 low-medium income Asian countries during COVID-19 pandemic [17].

3.6 Household total monthly expenses:

During COVID-19 pandemic household expenses either increased or remained unchanged in Haryana. In overall 39.2 reported increased, 52.1% responded no change; in Hisar 31.8% responded increased, 56.8% responded no change; in Bhiwani 27.3% responded, 64.9% responded no change; in Jind 39.7% responded increased, 50.7% responded no change and in Rohtak 63.1% responded increased, 50.7% responded no change in household total monthly expenses during COVID-19 pandemic [Table-1]. 32% respondents reported increased 46% reported no change in in household total monthly expenses during COVID-19 pandemic in 14 low-medium income Asian countries during COVID-19 pandemic [17].

3.7 Availability of feed and fodder for equines during COVID-19 pandemic:

Movements were restricted and supply of feed/fodder for equines was not possible in urban area, but there was no change in rural area. In overall 22.1% responded decreased, 55.1% responded no change; in Hisar 22.7% responded decreased, 72.5% responded no change; in Bhiwani 15.6% responded decreased 80.5% responded no change; in Jind 21.9% responded decreased 75.3% responded no change and in Rohtak 29.2% responded decreased, 67.7% responded no change in availability of feed and fodder for their equines during COVID-19 pandemic [Table-1]. However no data are available for comparison for supply of feed/fodder for equines during COVID-19 pandemic.

3.8 Availability of Veterinary services for equines during COVID-19 pandemic:

Majority of respondents reported that there was no change in government veterinary services for their equines during COVID-19 pandemic in Haryana. In overall 80.8%; in Hisar 80.7%; in Bhiwani 89.6%; in Jind 83.6% and in Rohtak 66.2% responded that there was no change in availability of veterinary services for equines during COVI-19 pandemic [Table-2]. However no data are available for comparison for availability of veterinary services for equines during COVID-19.

4. Willingness to further expand equine rearing business in changed scenario:

Table 2: Classification of respondents on the basis of their willingness to further Expand equine rearing business:

Responses	Frequency (Percentage)				
	Hisar (n-88)	Bhiwani (n-770	Jind (n-73)	Rohtak (n-65)	Overall (n-303)
Yes	57 (68.4%)	62 (80.5%)	35 (47.9%)	34 (52.3%)	188 (66.3%)
No	31 (35.2%)	15 (19.5%)	38 (52.1%)	31 (47.7%)	115 (33.7%)

Equine population is declining rapidly in Haryana and equine farmers are migrating from equine rearing profession and they are exploring new sources of income due to constraints being faced by them in equine rearing [20]. COVID-19 pandemic has played a role of catalyst in this process. In current study it reveled out that in overall 66.3% responded in yes, 33.7% responded in no; in

Hisar 68.4% in yes 35.2% in no; in Bhiwani 80.5% in yes, 19.5%; in Jind 47.9% in yes, 52.1% in no and in Rohtak 52.3% in yes, 47.7% in no[Table-2].

5. Suggestions:

Globally, livestock and allied sectors contribute 40% of agricultural production and in India its contribution is 24% [21]. This sector is facing a number of challenges in the form of natural disaster. COVID-19 pandemic was a type of disaster and it was observed that its effects will be long lasting on livestock sector, especially on equine sector.

Preventive measures for any pandemic: Animals, especially equines, are susceptible to diseases and become more susceptible during any pandemic and other disaster due to stress [3]). Proper veterinary aid is necessary to prevent the spread of zoonotic diseases. The following steps can be taken in advance to prevent occurrence of a pandemic in livestock.

- **Vaccination:** It is suggested that a proper vaccination schedule should be followed to Avoid out-break of pandemic.
- **Deworming:** To control internal parasitic infestation, regular deworming schedule should be followed to keep equines free from parasitic load.
- **Hygiene:** Regular cleanliness, use of disinfectants and insecticides spray should be practiced in animal paddocks and surrounding area.

Steps should be taken during disaster management:

- **Arrangement of feed/fodder**: Feed/fodder banks should be established at various points and loans from banks at cheaper rates for purchase of fodder must be made available to equine farmers to meet out requirements during emergency and to prevent starvation [2].
- **Segregation and carcass disposal:** During pandemic, animals get infected and these can spread disease to other animals. Hence segregation of infected animals should be done in proper way. Heavy mortality can occur during pandemic and disaster. Hence, disposal of carcass can be done properly by burning or burial method.
- **Livestock welfare activities:** It includes disposal of infected animals. If an animal is suffering from zoonotic disease, it needs to euthanize in a proper way to avoid spread of disease in human community. A veterinarian is well qualified and competent enough to

take the decision of whether an animal should be euthanized or not. This action should be well justified by a veterinarian.

- **Planning:** An accurate strategy is needed to stop occurrence of any pandemic in future and this is to be done at government and private level. Many NGOs are working for welfare of equines and these should be involved. If possible, susceptible species of livestock can be shifted to suitable places. Awareness camps should be organized at every level. Special disaster management fund should be established for equine welfare by Haryana government.

6. Conclusion:

Equines play a significant role in generating livelihoods for their owners and equine farmer's community was adversely affected due to COVID-19 pandemic and subsequent lockdown. There was a great reduction in demand of work for equines and there were remarkable impacts of this pandemic on routine life style of respondents, resulting reduction in income from equines. Equine welfare activities remained disturbed on large scale during pandemic and lockdown. This situation further needs close monitoring including follow-up guidelines to explore long-term impacts of the pandemic on equine sector. This pandemic situation has provided an opportunity to learn more and to make the systems more resilient to equine community, if this type of situation occurs in future. This study is an attempt to visualize the situation in changed scenario and in raising awareness in assessing seriousness of the situation. There is a need for special financial packages to be made available for welfare of affected equines owners by Haryana government.

Ethical Statement:

Present study was a survey-based and did not require any ethics committee approval. However, prior to start interview, respondents were explained about the study and their consents were taken to conduct interviews.

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