

Abstract

Present study was aimed to identify causes and constraints in equine rearing in Haryana, India. The study was descriptive in nature and survey based. Structured interview schedule was adopted for data collection and data analysis was done by adopting Statistical Package for Social Sciences (SPSS) version. In current study, it emerged out that respondents are facing constraints in equine rearing and 9.9% responded that input cost is more and out-put cost is less in equine rearing and this is the prime cause, 10.2% mentioned that closure of equine fairs is major cause, 5.6% responded lack of government veterinary, 29.7% mentioned lack of work due to excessive use of automobile, 10.6% responded scarcity of financial help from government, 9.9% social taboo, 5.3% lack of enthusiasm among younger generation toward equine, 1.3% heavy traffic and construction of fly-over and expressway, 0.7% re-occurrence of Glander disease in India and 15.8% are unable to say anything on causes and constraints for equine rearing in Haryana. As suggestions are concern, 42.4% respondents delineated in their feedback that loan facilities on subsidized rates should be made available to expand equine rearing business, 24.6% demanded expert government veterinary services, 6.6% adequate insurance facilities, 7.3% restart of equine fairs, 2% arrangement of adequate work for equines and 1.3% demanded that awareness camps for equine farmers by Haryana government authorities. The current study is very significant and will be helpful to visualize and address the situation in changed scenario.

1. Introduction:

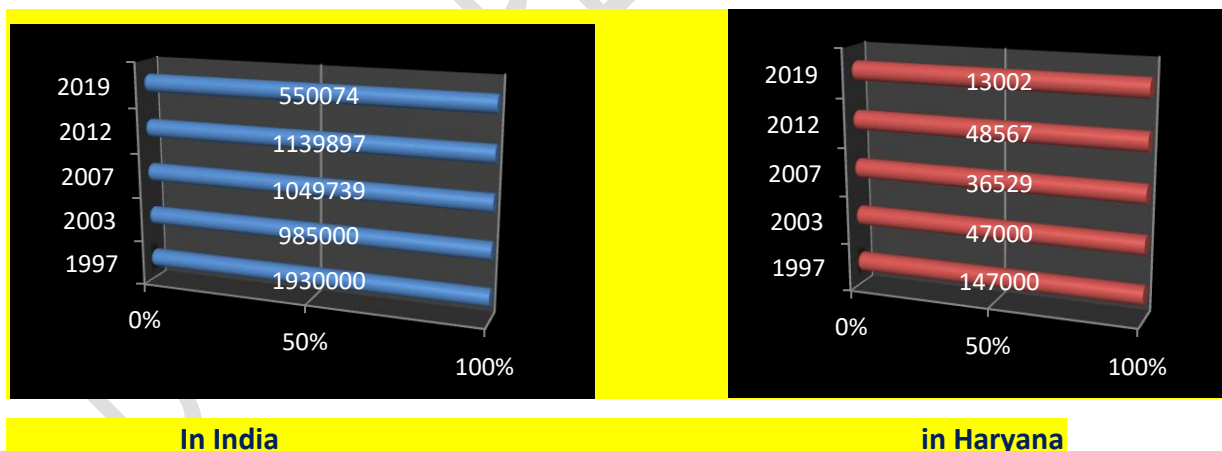
India has been blessed with various species of livestock. This sector is source of wealth and power and approximately two-third families of farming communities are associated with any one species of

livestock to earn their livelihood through sale of livestock and sale of their by-products or utilizing their draught powers. In India, livestock sector is one of the largest sectors in the world and its equines

population is 1.4% of world's equines population. Livestock are considered as a walking bank and insurance for family [1]. Present study was aimed to identify causes and constraints of respondents in equine rearing in Haryana, India. Respondents are equines farmers engaged in equine rearing profession since ages; their livelihoods depend on equine rearing and it is an integral part of farming sector in Haryana. Equines help in generating direct and indirect income of their owners. Equines are major components of livestock; play important role in socio-economic aspects of households engaged in their rearing and

their contribution is crucial for livelihood of these households in Haryana [13]. Equines 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*) [10]. In India, equines are generally reared by landless, small and marginalized farmers and these farmers are dependent on earning of these animals and multiple tasks are taken from equines [11 & 14]. It was observed that equine population is in declining trend during last few decades in India and in Haryana as well (Figure-1).

Figure 1: Graphic presentation of trend of equine population in Haryana and India [24]:



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 [7].

2.2 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. Result and discussion:

Table-1: Causes and constraints in equine rearing in Haryana:

Responses	Frequency (Percentage)				
	Hisar (n-88)	Bhiwani (n-77)	Jind (n-73)	Rohtak (n-65)	Overall (n-303)
In-put cost is more than out-put cost	17 (19.3%)	05 (6.5%)	04 (5.5%)	04 (6.2%)	30 (9.9%)
Closure of equine fairs	13 (14.8%)	06 (7.8%)	06 (8.2%)	06 (9.3%)	31 (10.2%)
Lack of availability of expert veterinary services & AI facilities for equines	07 (8%)	06 (7.6%)	04 (5.5%)	00 (0.0%)	17 (5.6%)
Decrease in demand of work for equines due to excessive use of automobile.	14 (15.8%)	27 (35.1%)	25 (34.2%)	24 (36.9%)	90 (29.7%)
Non availability of loan, insurance and any other governmental financial facilities	06 (6.8%)	08 (10.4%)	07 (9.6%)	11 (16.9%)	32 (10.6%)

Social taboo	06 (6.8%)	12 (15.6%)	03 (4.1%)	09 (13.8%)	30 (9.9%)
Loss of enthusiasm among younger generation towards equines	07 (8%)	02 (2.6%)	02 (2.7%)	05 (7.7%)	16 (5.3%)
Heavy traffic and tracks are not suitable for equine walking	00 (0.0%)	00 (00%)	01 (1.4%)	00 (0.0%)	01 (0.3%)
Four-lane of highways and construction of fly-over	02 (2.3%)	00 (00%)	01 (1.4%)	00 (0.0%)	03 (1%)
Re-occurrence of Gander's disease	02 (2.4%)	00 (00%)	00 (00%)	00 (0.0%)	02 (0.7%)
Fear of theft, especially donkeys	00 (0.0%)	01 (1.3%)	02 (2.7%)	00 (0.0%)	03 (1%)
Cannot say	14 (15.8%)	10 (13%)	18 (24.7%)	06 (9.2%)	48 (15.8%)

3.1 Causes and constraints in equine rearing in Haryana:

In the current study, every respondent was asked to delineate a major constraint in his feedback being faced by him in equine rearing. While analyzing the feedback, the following major causes and constraints were emerged out and presented below:

3.1.1 In-put cost is more than out-put cost:

Due to non-availability of adequate government veterinary services and adequate work for equines; rearing cost is increasing in comparison of out-put cost. Overall, 9.9% delineated in their feedback that this is the major cause responsible for declining trend of equine population in Haryana. In Hisar district, 19.3%, in Bhiwani district 6.5%, in Jind district 5.5% and in Rohtak district 6.2% respondents delineated in their feedback that this is the major cause responsible for declining

trend of equine population in Haryana (Table-1]). The current study agree with the study conducted in Banswara district of Rajasthan that rearing cost is more due to lack of pasture land is a major constraint in livestock rearing and it has a high ranking of RBQ value 98.34 [1]. It was observed that non-availability of pasture land and lack of grazing increases cost of rearing in livestock sector and it was found one of the major constraints in livestock rearing [17].

3.1.2 Closure of equine fairs:

Equine fairs are the places where equine breeders, equine lovers and equine experts meet and interact with each other at one place. Beri (Jhazzar) and Kapalmochan (Yamuna Nagar) are famous equine fairs in

Haryana and a large number of equine farmers visit these fairs with their equines for trading. These fairs were discontinued since last few years, previously due to re-occurrence of Glanders disease in India and recently due to COVID-19 pandemic and lockdown. Due to closure of equine fairs trading of equines is affected and respondents are facing monetarily loss in equine trading. In overall 10.2%, in Hisar district 14.8%, in Bhiwani district 7.8%, in Jind district 8.2% and in Rohtak district 9.3% respondents delineated in their feedback that this is the major cause responsible for declining trend of equine population in Haryana (Table-1).

3.1.3 Lack of expert government veterinary services and breeding policies for equines:

In current study, it emerged out that government veterinary services are not satisfactory for equines in Haryana. In overall 5.6%, in Hisar district 8%, in Bhiwani district 7.6%, in Jind district 5.5% and in Rohtak district non respondents delineated in their feedback that this is the major cause responsible for declining trend of equine population in Haryana (Table-1). If government veterinary services are not available, equine farmers are compelled

either to hire private services on payment of high charges or they have to use their own ITK for treatment of their ailing equines. Equines are very sensitive animals and treatment is required immediately; if it is sick and its movement is not possible to veterinary clinic for its treatment [14]. The current study agree with study which was conducted in purposively selected Jaipur district of Rajasthan and it was found that 58.33% constraints in livestock rearing are due to less availability of experts and 54.16% due to non-availability of emergency treatment at doorstep, 62.50% due to hiring of private veterinary services on high cost [16]. This constraint exists globally in livestock sector and it was revealed out in a study conducted in Ethiopia that government veterinary clinics have scarcity of facilities to handle clinical cases and lacking adequate equipments [8]. It was observed that breeding facilities are not satisfactory in the state and majority of respondents reported that neither good quality stallions nor Artificial Insemination (AI) facilities are available for equines and they have to take their mares for breeding to a long distance and this exercise involves lots of time and money. The current study

agree with the study which was conducted in purposively selected Jaipur district of Rajasthan and it was found that 79.6%

3.1.4 Decrease in demand of work for equines due to excessive use of automobiles:

Previously, equines were exclusively used as major sources of operation in agricultural sector, transportation sector, bricklins and construction sector [20]. Equines use has decreased drastically in these sectors and automobiles are preferred. In overall 29.7%, in Hisar district 15.8%, in Bhiwani district 35.1%, in Jind district 34.2% and in Rohtak district 36.9% respondents delineated in their feedback that demand of work for equines has decreased due to excessive use of automobile and this is one of the cause and constraint in equine rearing [Table-1]. It was observed that demand of work for equines is decreasing due to mechanization and excessive use of automobile [15].

3.1.5 Lack of financial help from government of Haryana:

Financial help and insurance coverage are required to expand any business for its successful running. It was observed that there is no provision for loan facilities for equine farmers in Haryana. Insurance

constraints are due to less availability of AI facilities at doorstep [16].

facilities are either not available or not attractive for equines and Ignorance of policy maker is responsible for decline of equine population in Haryana [5]. In overall 10.6%, in Hisar district 6.8%, in Bhiwani district 10.4%, in Jind district 9.6% and in Rohtak district 16.9% respondents delineated in their feedback that there is lack of adequate financial help from Haryana government to expand equine rearing business and this is the major cause responsible for decline trend of equine population in Haryana (Table-1).

3.1.6 Social issues:

As per social taboos are concern, in overall 9.9%, in Hisar district 6.8%, in Bhiwani district 15.6%, in Jind district 4.1% and in Rohtak district 13.8% respondents delineated in their feedback that social taboo is the major cause responsible for decline trend of equine population in Haryana (Table-1). As per loss of enthusiasm among younger generation towards equines is concern, in overall 5.3%, in Hisar district 8%, in Bhiwani district 2.6%, in Jind district 2.7% and in Rohtak district 7.7% respondents

delineated in their feedback that ignorance of younger generation toward equines is one of the constraints in equine rearing (Table-1). This study also agree with study which was conducted that Himachal Pradesh that advancement in education have been observed major threats to equine rearing activities [4].

3.1.7 Heavy traffic, expresway and construction of fly-over:

Equines were the prime means of transportation before the increase of popularity of automobiles; riding of horses and horse driven vehicle were common on roads and equines were the primary source of transportation until automobiles took over as transportation medium. There are advancements and automobiles are used for transportation and due to increasing trend of automobiles; load of traffic has increased on road and express-way and fly-over have enhanced speed of traffic. In current study, overall 1.3% respondents reported that present roads, fly-over's and heavy traffic are not suitable for walking of equines and this is one of the cause and constraint in equine rearing (Table-1).

3.1.8 Re-emerging of Glanders diseases in India:

Glanders is a contagious, zoonotic and highly fatal disease of equines. It is caused by the gram-negative bacteria known as *Burkholderia mallei*. Human are accidental host and the disease usually results from occupational contact and its treatment is difficult and it is a notified disease worldwide under Glanders and Farcy Act 1899. The occurrence of the disease leads to international trade restrictions. Recently, reports show re-emergence of the dreaded disease in India [9]. In the current study 0.7% respondents reported that they are afraid of this disease and are reluctant to expand equine rearing (Table-1).

3.1.9 Fear of theft, especially for donkeys:

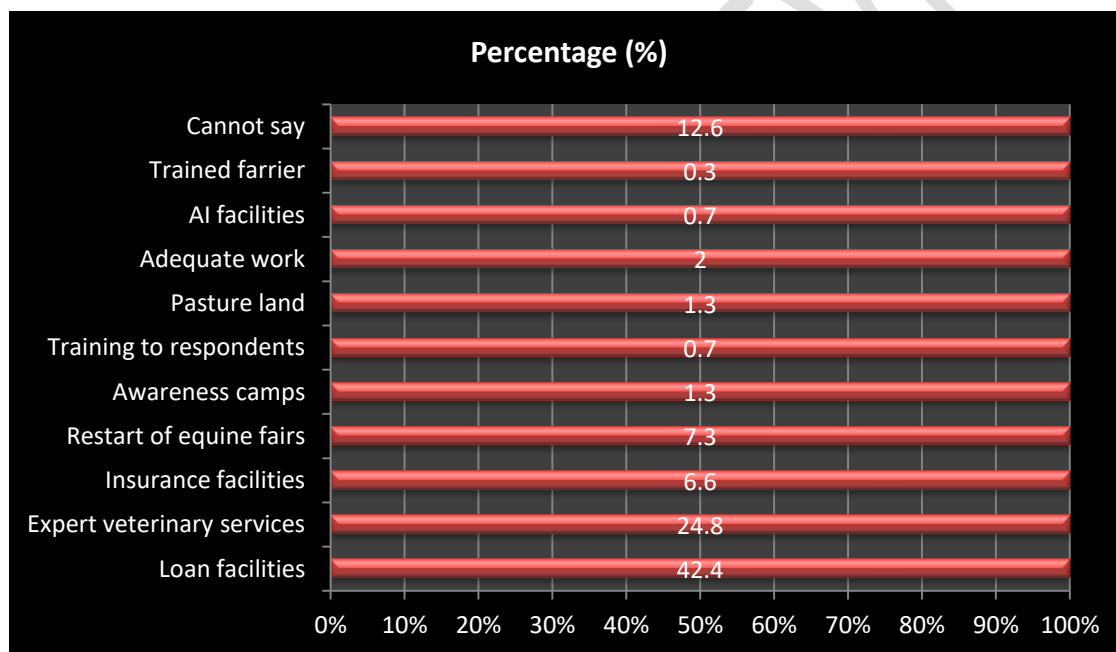
Reports of donkey theft have been received and 1% respondents delineated in their feedback that they are afraid of theft of donkey and equine population, especially donkey population is declining in the state. This constraint is very important and respondents are reluctant to maintain equines, especially donkeys (Table-1). Demand of donkey has increased and there are reports of donkey theft in Haryana and Rajasthan [21].

3.1.10 Cannot say:

In the current study, in overall 15.8%, in Hisar district 15.8%, in Bhiwani district 13%, in Jind district 24.7% and in Rohtak district 9.2% respondents delineated in their feedback that they are not able to comment on causes and constraints being faced in equine rearing in Haryana (Table-1). This group is very important and during current

study, it was personally felt that this group of respondents is on boarder line and thinking about shifting from equine rearing to some other profession and exploring other sources of income due to causes and constraints in equine rearing and don't want to comment on the topic.

Figure-2: Graphic presentation of suggestions to improve equine husbandry in Haryana:



3.2 Suggestions to improve equine husbandry in Haryana:

In the current study, every respondent was asked to delineate at least one suggestion in his/her feedback to improve equine husbandry. While analyzing the feedback of respondents, the following suggestions

were emerged out on different variables and furnished below:

3.2.1 Analysis of loan facilities was done and 42.4% respondents delineated in their feedback that loan facilities should be provided for equines

rearing in Haryana (Figure-2). Therefore, it is suggested that special provision of fund for loan facilities for equines should be done in annual budget in Haryana and this facility should be made available on subsidized rates for equine farmers as it is being provided to other livestock and poultry farmers.

3.2.2 As expert government veterinary services for equines in Haryana are concern, 24.8% respondents demanded in their feedback that these services should be made available at village level (Figure-2). It is understood that equine population is scattered in the state and it seems impractical to depute equine experts at every stage. Therefore, it is suggested that an ambulatory and mobile equine clinic services should be initiated by Department of Animal Husbandry, Haryana on block/subdivision or every possible level. Regular training programmes and refresher courses in equine health and management should be organized for existing

Veterinary and Para-veterinary staff of Animal Husbandry Department of Haryana in coordination with State Veterinary University and ICAR-National Research Centre on Equines located in the state at Hisar (Haryana) India.

3.2.3 In the current study, 6.6% respondents responded that insurance facilities should be available for equines (Figure-2). Therefore, it is suggested that insurance facilities should be made available on low premium with adequate risk cover for equines, as these are being provided to other livestock and poultry by Department of Animal Husbandry.

3.2.4 Equine trading is adversely effected due to closure of equine fairs and 7.3% respondents delineated this incident in their feedback ([Figure-2). It is suggested that equine fairs should be re-organized on regular basis as early as possible with participation of government departments.

3.2.5 As awareness camps are concern, 1.3% respondent's pin pointed in

their feedback for organization of awareness camps (Figure-2). It is suggested that equine health and awareness camps should be organized on regular basis by Department of Animal Husbandry, Haryana in coordination with National Institutes, State Veterinary Universities and Non-Government Organizations (NGO's).

3.2.6 In the current study, 0.7% respondents mentioned in their feedback that formal trainings should be provided to respondents on equine husbandry (Figure-2). Hence, it is suggested that special drives should be organized for formal training on equine rearing for respondents on every possible level by Department of Animal Husbandry, Haryana in coordination with National Institutes, State Veterinary Universities and Non-Government Organizations (NGO's).

3.2.7 In the current study, 1.3% respondents mentioned in their feedback that common land should be demarcated for equines (Figure-2). It is suggested that special land

should be allocated for grazing of equines at every possible level.

3.2.8 In the current study, 2% respondents submitted in their feedback that adequate work should be made available for equines (Figure-2). Equines use has decreased drastically in agricultural sector, transportation sector, bricklins and construction sector and automobiles are preferred. It is suggested that equine power should be utilized as per the prevailing work requirements in following way:

- **As an alternate in agriculture operations and other transportations:** Being light weight, equines use can be promoted in agriculture and dairy farm for transportation of material/public and goods as a replacement of non-equine species and tractor power, especially in hilly region, desert and remote area [6].
- **As an equine-entrepreneurship:** Equine industry can be promoted as equine husbandry based agri-entrepreneurship. Following can be the area to promote equine husbandry as an agri-entrepreneurship [15]:
 - Eco-tourism.

- Equine Safari.
- Equines riding school and sports activities.
- Ceremonial activities.
- **Proper utilities of equine by-products:**
 - **Equine dung:** Equine dung can be promoted for use in vermin-composting and mushroom cultivation etc [20].
 - **Donkey milk:** Equine milk, especially donkey milk, has tremendous medicinal value as curative agent for metabolic and allergic diseases [2 & 3]. Equine husbandry can be enhanced promoting donkey dairy and utilization of donkey milk for various purposes.
 - **Equine meat:** Due to some misconceptions, equine meat is not consumed in India [22]. In future, if governmental policies permit, equine husbandry can be enhanced through export of equine meat.
 - **Equine bone:** Equine bones are comparatively thick and dense [12]. This sector needs further exploring to boost as entrepreneurship.

➤ **Equine leather:** Presently due to some social issues and misconceptions skin is not recovered from carcass of equines. [22]. These issues are to be addressed on government and social level and in future this leather industry can be a good source for income for equine farmers.

➤ **Donkey skin:** Donkey skin is not used in India for commercial purposes due to some social issues and these issues are to be addressed on government and social level and this can be helpful to enhance income through donkey rearing. Donkey rearing is practiced in some countries, especially China, to recover their skins to produce Ejiao (a medicinal gelatin) [23].

3.2.9 Good quality stallion and AI facilities should be made available at village level to enhance equine population in Haryana (Figure-2).

3.2.10 Farriery work is a very specialized job for maintenance of foot of equines. In the current study, it was found that there is lack of trained farrier and number of respondents mentioned in their feedback that a

trained farrier should be made

available (Figure-2).

4. Conclusion:

Equines play an important role in socio-economic livelihood of millions of households in rural and urban as well. Output cost is decreasing in comparison of input cost from equine rearing and their owners are not getting adequate income from equine rearing and as a result, equine farmers are shifting from equine rearing profession to other animal rearing or some another profession. Hence above mentioned causes and constraints need to address by Haryana government and output cost of equine farmers need to be enhanced. Equine industry needs to be taken as an entrepreneurship and every by-product of equines should be treated as a product for sale. It is concluded that more study should be undertaken on equine related issues and entrepreneurship covering economical and statistical aspects Of equine husbandry. The current study is very significant in current situation when equine farmers are migrating from equine rearing and exploring new source of income. This study will be helpful for policy makers in addressing causes and constraints of equine farmer's community in Haryana.

Ethical Statement:

Present study was a survey-based study 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.

Authors Contribution:

All authors provided intellectual input and critically revised the manuscript. Final manuscript was read and approved by all authors.

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