

Spatial and temporal distribution of donkey and mule population in India

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Summary

The donkeys and mules are members of the Equidae family. Spiti, Halari and Kachchhi are registered breeds of donkeys in India. They are well acclimatized to the different agro-climatic conditions to which they belong. Donkeys and mules constitute about 37% of the total Indian equine population and play multifarious roles in human life, especially for the poorest of the poor section of society. They are mainly reared by underprivileged and weaker communities of the society and used for various purposes like transportation of goods, farm produces, pack animals at brick kilns, transportation of garbage, building materials and by nomadic pastoralists etc. The severe decreasing trend observed in Livestock Census elicited us to understand the present status of donkeys and mules. The total donkey and mule populations decreased by 61.23% and 57.10%, respectively in 2019 over the last census. This can be due to their decreased working utility, as alternate economic sources of mechanization are available. Further, motorized vehicles are replacing donkeys and mules in plains and hilly regions where there is a road network. Presently, donkeys and mules are more in rural area than urban area of the country, indicating their utility still exists among rural masses and rural transport depends on these equids. The density of mules is high in the hilly states of India, indicating their utility in difficult hilly terrains.

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Introduction

The donkey (*Equus asinus*) was domesticated more than 6,000 years ago (Rossel et al. 2008). Initially, donkey has an African wild ass, *E. africanus asinus* as its wild ancestor. Donkeys have been used for the transportation of agricultural goods, building materials and people worldwide. In India, the majority of the donkey population is owned by socially, and economically deprived landless people. These animals serve as the source of livelihood for their owners and play a significant role in their socio-economic status. The contribution of donkeys has been huge in agriculture, shepherding and carrying materials with migratory herds of cattle, sheep and goats, transportation of agricultural produce, household material and provision as well as material for building manufacture. Although donkeys support the rural livelihood and low-income poor farmer's families by providing economy at minimal maintenance cost, they are not yet considered as farm animals. Donkeys are neglected in spite of their multifarious utility. For many centuries, the donkey has been used as beast of burden playing an important role in transportation (Pal et al. 2013).

Status of Livestock in India

As per 20th Livestock census (2019) India's livestock

livestock population of 536.76 million, which mainly includes cattle, buffaloes, goats, sheep and pigs. The contribution of cattle, buffalo, sheep, goat, pig and others in total livestock population is 36.04, 20.47, 13.83, 27.74, 1.69 and 0.23%, respectively. Mithun, yaks, horses & ponies, donkeys, mules and camels together contribute 0.23% of total livestock. Livestock population in India has increased substantially in West Bengal (23.51%), Telangana (22.27%), Andhra Pradesh (15.86%), Madhya Pradesh (11.81%), Bihar (10.94%), Karnataka (4.73%), and Maharashtra (1.83%), whereas livestock population decreased marginally in Gujarat, Uttar Pradesh and Rajasthan. India possesses 0.20 million donkeys and mules as per the Livestock census, 2019. Major population of donkeys and mules provide a livelihood to the rural and semi-urban societies living in arid, semi-arid and hilly regions, especially within the foothills of the Himalayas, through transport and draught (Khadda et al. 2016; Singh et al 2020).

Donkeys

Donkeys are used as packing and carting animals. They play a substantial role in the country's pastoral economy and are very important in providing livelihood to their owners through direct and indirect financial contributions (Singh et al. 2021). These can thrive in hot climates (Pal et al. 1997; Pal et al. 2000) and survive even in adverse conditions such as feed scarcity (Gupta et al. 1999, Pal & Gupta 2004, Pal & Gupta 2004a). There are three registered breeds of donkeys in India viz., Spiti, Halari and Kachchhi. Spiti donkeys are scattered in Spiti and Yangthang regions of Himachal Pradesh. Halari donkeys are native of the Saurashtra region of Gujarat state.

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sector is one of the largest in the world, having a huge

Kachchhi donkeys are found in the Kachchh District of Gujarat. All other donkeys distributed in other parts of India are non-descript till now. These breeds of

donkeys are well acclimatized to the different agro-climatic conditions to which they belong.

Table 1. Population Trends of Donkeys & Mules from 1956 to 2019 in India (in millions)

Species / Year	Mules	Donkeys	Total
1956	0.04	1.10	1.14
1961	0.05	1.10	1.15
1966	0.08	1.10	1.18
1972	0.08	1.00	1.08
1977	0.09	1.00	1.09
1982	0.13	1.02	1.15
1987	0.17	0.96	1.13
1992	0.19	0.97	1.16
1997	0.22	0.88	1.10
2003	0.18	0.65	0.83
2007	0.14	0.44	0.58
2012	0.20	0.32	0.52
2019	0.08	0.12	0.20
% Change from 1956-2019	(+) 100.00	(-) 89.09	(-) 82.45
% Change from 2012-2019	(-) 57.09	(-) 61.23	(-) 61.54

Source: Basic Animal Husbandry Statistics, 2019; Deptt. of Animal Hus. & Dairying, Ministry of Fisheries, Animal Husbandry and Dairying

In 1956, donkey population was 11.0 lakh and decreased steadily to 8.8 lakh by 1997; thereafter a steep fall was observed upto 2019 and donkey population reached to 1.20 lakhs (Table 1). The total donkey population has decreased by 61.23% in 2019 over the last census. Presently, total donkeys are more in a rural area (104,344) as compared to urban area (19,243) of the country, indicating their utility still exists among rural masses, and rural transport is dependent on these

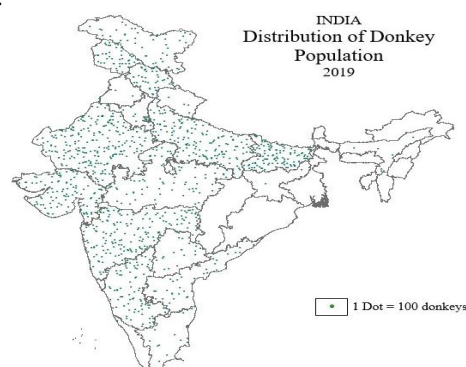
animals. The population of donkeys declined by 1.55% per year from 1956 to 2019. A negative annual growth rate (-1.49%) of donkeys and mules for draught work over the year 1956 to 2019 (1.14 to 0.20 million) indicates farmers' inclination towards the faster and more economical mode of mechanized transport. Donkeys are scattered in almost every state in India and their state-wise population is shown in Table 2.

Table 2. Donkey population 2012 and 2019 of major state

S. No.	States	Population (in lakhs) 2012	Population (in lakhs) 2019	% Change
1	Rajasthan	0.81	0.23	-71.31
2	Maharashtra	0.29	0.18	-39.69
3	Uttar Pradesh	0.57	0.16	-71.72
4	Gujarat	0.39	0.11	-70.94
5	Bihar	0.21	0.11	-47.94
6	Jammu & Kashmir	0.17	0.10	-44.55
7	Karnataka	0.16	0.09	-46.11
8	Madhya Pradesh	0.15	0.08	-45.46
9	Himachal Pradesh	0.07	0.05	-34.73
10	Andhra Pradesh	0.13	0.05	-65.16

As per the 20th Livestock census, Rajasthan, Maharashtra and Uttar Pradesh had 0.23, 0.18 and 0.16 lakh donkeys, respectively. The sharp decline in donkey population was observed in Uttar Pradesh (-71.72%), Rajasthan (-71.31%), Gujarat (-70.94%), and Andhra Pradesh (-65.16%), respectively as compared to the previous census of 2012 as indicated in Table 2. The map shows that donkeys are scattered throughout the country, with the least population in the eastern states. The density of donkeys is high in the northern-western belt of the country i.e. Rajasthan, Uttar Pradesh, Bihar and Gujarat. Donkey population density declined drastically while moving towards the eastern or southern parts of the country. The population of donkeys in Punjab, Haryana and Uttrakhand was 2909, 2902 and

1509 in the year 2012 and it reduced to 471, 800 and 589 in the year 2019, respectively. It indicates donkey population has reached at an alarming level in these states.



Mules

Mule is a hybrid cross between a horse mare and a donkey stallion. A mule contains a horse's body and a donkey's extremities. Ears of a mule are smaller than those of donkey, but larger than a horse. The Mane and tail of a mule are not as thick as a horse's. The height of a mule depends on the size of its parents (mare and donkey stallion). A mule requires less feed and fodder and needs less protein and forage than a horse. But the maintenance cost of a mule is many times higher than a donkey's (BIRTHAL et al. 1999). Mules are widely used for pulling carts in plains (Haryana, Punjab and Uttar Pradesh) and for carrying men and luggage in difficult hilly terrains (J&K, Himachal, Uttarakhand) as pack animals, where motorized vehicles cannot reach. The mules being surefooted, could walk through tracks on which no vehicle could reach. Hence, mules are used to

provide logistics support to Indian posts and troops fighting in the sector by the Indian army. Mules used to carry guns and weapons are called MA mules, whereas mules to carry general supplies ranging from food to medicine and even water are called GS mules.

In 1956, the mule population was only forty thousand and reached to a peak of 2.20 lakhs in 1997 (Table1). Thereafter, the mule population started decreasing and reached 84,261 in 2019. The total population of mules in the country was 84,261 in 2019 and decreased by 57.1% over the previous Census in 2012. Presently, total mules are more in a rural area (76,600) than an urban area (7661) of the country, indicating their utility in rural areas. However, the contribution of mules as draught animals has increased substantially at an annual growth rate of 0.06% per year during 1956 and 2019.

Table 3. Mules Population 2012 and 2019 of Major State

S. No.	States	Population (in lakhs) 2012	Population (in lakhs) 2019	% Change
1	Uttarakhand	0.27	0.26	-02.25
2	Himachal Pradesh	0.23	0.20	-12.44
3	Jammu & Kashmir	0.37	0.17	-54.20
4	Uttar Pradesh	0.43	0.09	-79.06
5	Madhya Pradesh	0.07	0.03	-63.61

As per the 20th Livestock census, Uttarakhand, Himachal Pradesh and Jammu & Kashmir had 0.26, 0.20 and 0.17 lakh mules, respectively. It indicates that mules are still in use in hilly terrains, whereas their use in plains has decreased significantly. The decline in mule population was observed in Uttar Pradesh (-79.06%), Madhya Pradesh (-63.61%), and J&K (-54.20%), respectively as compared to the previous census of 2012 as shown in Table 3. Fig shows that mules are available only in the northern states. The density of mules is high in the country's hilly states (Uttarakhand, Himachal Pradesh and Jammu & Kashmir).

Army breeds mares for mule production at military farms to meet out the demands of the army. However, mules are produced for civilian use in the northern plains (Haryana, Punjab and UP) and foothills (Uttarakhand). People living near the banks of the Yamuna and Ganga River also rear mares for mule production (Pal and Legha, 2008). Mules also carry the tourists and their belongings up and down the Himalayan Mountains while tracking over the beautiful slopes of the valley. The Amar Nath (Kashmir) and Vaishno Devi Yatra (Katra pilgrimage, Jammu) are visited by millions of Hindus every year were only possible with mules. The map shows the distribution of mules in India. It can be clearly seen that mules are found in high density in hilly states of Himachal Pradesh and Uttarakhand.

References

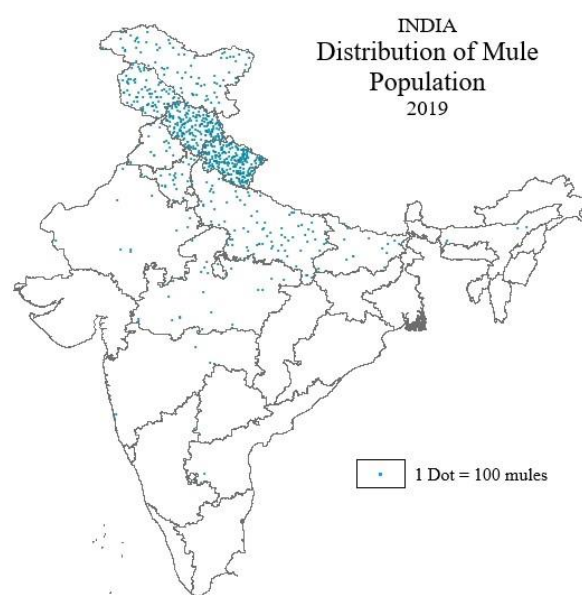
1. 20th Livestock Census. All India report: ministry of agriculture, department of animal husbandry, dairying & fisheries, Krishi Bhawan, New Delhi, India. 2019. Available from: <https://ruralindiaonline.org/en/library/resource/20th-livestock-census-2019-all-india-report/>
2. BIRTHAL PS, Arya SN, Pal Y & Yadav MP. 1999. Socio-economic Issues in Equine Husbandry: A Study in Haryana and Delhi. Published by NRCE, Hisar pp 1-44.
3. Gupta AK, Pal Y, Mamta & Yadav MP. 1999. Effect of feed deprivation on biochemical indices in equids. *Journal of Equine Science*, 10 (2):33-38.
4. Khadda BS, Lata K, Kumar R, Jadav JK & Khajuria S. 2016. Effect of supplementary feeding on productive and reproductive performance of milch buffalo and feed economics under field conditions in Panchmahal district of Central Gujarat. *Journal of Agriculture and Ecology*, 2: 51-56.

Declarations of interests

All authors of this manuscript declare that they have no conflict of interest.

Data sharing

All relevant data are within the manuscript.



5. Pal Y & Gupta AK. 2004. Effect of transient feed withdrawal stress on physiological indices and acid base balance in equid. *Annals of Arid Zone*, 43: 1–6.
6. Pal Y & Gupta AK. 2004a. Comparative physiological and biochemical studies in equids under short-term feed deprivation stress. *Indian Journal of Animal Sciences*, 74 (6): 662–666.
7. Pal Y & Legha RA. 2008. A study on socio-economic status of mule producers and management practices of mule production in rural areas. *Indian Journal of Animal Sciences*, 78(11): 1281-1284.
8. Pal Y, Ghei JC, Gupta AK & Yadav MP. 1997. Comparative studies on heat tolerance in ponies and donkeys. *Indian Veterinary Journal*, 75: 78–79.
9. Pal Y, Gupta AK & Yadav MP. 2000. Heat tolerance in donkeys and mules. *Annals of Arid Zone*, 39(4): 461–464.
10. Pal Y, Legha RA, Lal N, Bhardwaj A, Chauhan M, Kumar S, Sharma RC & Gupta AK. 2013. Management and phenotypic characterization of donkeys of Rajasthan. *Indian Journal of Animal Sciences*, 83(8): 793–797.
11. Rossel S, Marshall F, Peters J, Pilgram T, Adams MD & Connor DO. 2008. Domestication of the donkey: timing, processes, and indicators. *Proceedings of the National Academy of Sciences of the United States of America*, 105(10): 3715–3720.
12. Singh B, Mahajani K & Meena KC. 2020. Knowledge of improved dairy husbandry practices of farmers of Kauroli, district of eastern Rajasthan. *Journal of Agriculture and Ecology*, 9: 48–54.
13. Singh, A, Pal Y, Kumar R, Kumar S, Rani K, Prasad J. 2021. Working equids: Their conditions, invisible earning and challenges- A Review. *Asian Journal of Agricultural Extension, Economics & Sociology*, 39 (11): 357-364.