INTRODUCTION

Rajasthan state consists 12 percent of country's geographical area and comprised of 61 percent of India's total arid zone i.e., western part of Rajasthan known as Thar desert, where animal husbandry is not merely a subsidiary to agriculture but it is a major economic activity especially in arid and semi-arid areas, thus providing the much needed insurance against prominently occurring scarcity conditions. Parallel to crop production, animal husbandry is the most important activity in Rajasthan state (Kumar et al., 2017). Income from livestock sector accounts for 30 to 50% of the rural household’s income, with wide variation in region to region. Because of the limited water resources, most of the agriculture production is rain-fed and as such, the livestock sector assumes much more importance. Animal husbandry enhances the economic viability and sustainability of farming systems particularly in rain fed areas. In arid western region, livestock farming essentially works as an insulating factor against vagaries of drought and famines, and provides a kind of stability and sustenance livelihood to the rural poor (Kumar et al., 2017; Ishfaq et al., 2017). In Rajasthan, income from livestock averages 22.5 percent of the total household income, whereas in arid region the contribution of livestock sector is even more than 50 percent of the total household income (Kumar et al., 2017).

Livestock sector has also the highest potential for rural self-employment generation at the lowest possible investment per unit. The animal husbandry sector is harbouring a fabulous livestock wealth having very significant role in providing subsidiary to major sources of income to the large numbers of cultivators, small farmers, marginal farmers and agricultural labourers. Milk enterprise generates income on regular basis as against the crop enterprise, which is mostly seasonal and is more prone to droughts.
The provision of assured market for the milk leads to their increased participation and the availability of cash income encourages them to take up social development programmes (Bilegjargal et al., 2017). As per the livestock census 2012, there are 577.32 lacs livestock, which include cattle, buffalo, sheep, goat, pig, camel, horse and donkey. Among all livestock, cattle play a major role and it has about 7% of country’s cattle population in which about 87 percent are indigenous cattle. Almost 60% of all cattle are nondescript. A total of nine recognized breeds of indigenous cattle viz., Rathi, Kankrej, Nagouri, Tharparkar, Har- yana, Malvi, Gir, Sanchori and Mehwati are spread across the state of Rajasthan. These breeds play a significant role in the livelihood security of farmers, especially in desert area of Rajasthan. Rajasthan contributes over 10% of total milk production and third in milk production. It ranks first in producing more than 93% of cow milk from indigenous cows, and ranked second in total milk produced from indigenus cows in the country. Hence the indigenous cattle play a major role in livelihood security of farmers in desert region of Rajasthan (Kumar et al., 2017). Indigenous cattle support the livelihood of farmers through supply of milk/ manure / draught /breeding animals etc. The indigenous cattle populations are diverse with unique genetic attributes such as adaptation to heat and drought, tolerance to diseases and utilization of low-quality forages. However, despite this immense diversity, majority of the indigenous cattle are the local types considered to be of low genetic potential in terms of milk production. Low productivity and very large numbers of unproductive animal holding are major developments constraints facing the sector across the state (Kumar et al., 2017; Kumar et al., 2013). The objective of the current study was to identify the constraints faced by farmers in indigenous cattle dairy farming in Rajasthan region of India.

MATERIALS AND METHODS

STUDY DESIGN AND DATA COLLECTION
The study was conducted in western part of Rajasthan state which comprised of Bikaner, Sri-Ganganagar and Jodhpur districts, that were selected purposively for collecting the data from indigenous cattle dairy farmers. From each district two blocks were selected and two villages from each block and thirty indigenous cattle holder-farmers were selected from each village randomly. Thus, a total of 180 respondents were contacted to elicit the major constraints faced by the farmers in indigenous cattle dairy farming. The selected respondents were interviewed personally with the help of a semi-structured interview schedule in order to get relevant information. The collected data were tabulated and analysed using Garrett ranking technique to interpret the obtained result.

RESULTS AND DISCUSSION
The major constraints faced by the farmers in indigenous cattle farming in Rajasthan have been presented in Table 1. The study revealed that, lack of knowledge about improved dairy farming practices was ranked as a major constraint faced by the farmers (86.1%), as most of the herd type in the study area was indigenous cattle and respondents were not aware of most of the management practices for management of indigenous cattle. Mahla et al. (2015) and Singh et al. (2016) also found that lack of knowledge about improved dairy farming practices like clean milk production etc. in the area of Rajasthan state was a major constraint associated with indigenous cattle farming.

Furthermore, in our study, low milk productivity of indigenous cattle was perceived as a second important constraint bya large majority (80.5%) of the respondents as it has the direct implications to the economic returns from cattle farming. Non-existence of exclusive marketing facilities for indigenous milk and milk products was reported as another major constraint and perceived by 74.4 percent of the respondents in the study area. Due to large scattered area and lack of transportation facilities respondents was not able to sell indigenous milk and its products directly in the market at a premium price. Kumar et al. (2017b) and Shinde et al. (2011) also reported that lack of exclusive marketing facilities for indigenous milk and milk products
Table 1: Major constraints faced by the respondents in indigenous cattle farming

| S. No. | Constraints                                                                 | Frequency* | Percentage | Ranking** |
|--------|------------------------------------------------------------------------------|------------|------------|-----------|
| 1      | Inadequate knowledge about improved indigenous cattle dairy farming practices | 155        | 86.1       | 1         |
| 2      | Low milk productivity of indigenous cattle                                   | 145        | 80.5       | 2         |
| 3      | Non-availability of exclusive marketing facilities for indigenous milk and its products. | 134        | 74.4       | 3         |
| 4      | Non-availability of pasture or grazing land in village                       | 133        | 73.8       | 4         |
| 5      | Late maturity of indigenous cattle                                          | 132        | 73.3       | 5         |
| 6      | Long dry period in indigenous cattle                                         | 130        | 72.2       | 6         |
| 7      | Lack of development Programmes/policy support/incentives for indigenous cattle rearing | 121        | 67.2       | 7         |

*Multiple responses were collected.
**Calculated as per Garrett’s ranking technique.

was a major constraint perceived by the respondents. For indigenous cattle rearing, pasture land plays a major role in meeting out the feed requirement through intensive grazing. Non availability of pasture land in their locality for grazing of cattle is continuously decreasing therefore lack of pasture land for indigenous cattle grazing was felt as a major constraint by 73.8 percent of the respondents and ranked fourth in order. In addition to this, late maturity of animals and long dry period of indigenous cattle were the other major constraints perceived by more than 70 percent of respondents and ranked as fifth and sixth in order, respectively. Patil et al. (2013) and Kumar et al. (2017b) also reported that low milk productivity, late maturity of animals and long dry period of indigenous cattle are the major constraints in indigenous cattle rearing. Even though it is widely agreed by all the stakeholders that much emphasis needs to be given for promotion of indigenous cattle in our country. Inadequate policy support particularly for indigenous cattle development, specific programmes for indigenous cattle development and lack of training programmes for preparation of various by-products from indigenous cattle dung and urine was a major constraint as perceived by 62.7 percent of the respondents in the study area.

CONCLUSION

The study concluded that, majority of the farmers in the study area would like to continue their farming along with indigenous cattle breeds as they perceive that these breeds are most suitable to their regions and besides its milk, it’s unique by-products viz., dung and urine has great potential for higher economic returns to the farmers. Hence it is the need of the hour to initiate a specific-policy and programmes to develop the potential of our native breeds and encourage the indigenous cattle farming among the farmers for the sustainable agriculture.

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CONFLICT OF INTEREST

The authors have declared no conflict of interest.

AUTHORS CONTRIBUTION

All authors contributed equally in constructing the experimental study, collection, analyzing data and preparing Manuscript.

REFERENCES

• Anonymous (2002). Report of the National Commission on Cattle (Rashtriya Goyansh Ayog). Department of Animal Husbandry and Dairying Ministry of Agriculture Government of India, New Delhi.
• Bilegjargal B, Lu Q, Ahmad I, Saeed M (2017). Effect of hypothermia and droughts on livestock mortality in southern and eastern mongolia effect of hypothermia and droughts on livestock mortality in southern and eastern mongolia. J. Anim. Health Prod. 5(4): 149-158. https://doi.org/10.17582/journal.jahp/2017/5.4.149.158
• Garrett EH, Woodworth RS (1969). Statistics in psychology and education. Vakils, Feffer and Simons Pvt. Ltd., Bombay, Pp. 329.
• Garrett HE (1981). Statistics in Psychology and Education. Published by Vakils, Feffer and Simons Ltd., Mumbai.
• Ishfaq A, Ganai AM, Ahmed HA, Beigh SA, Khan HM, Ahmad SB (2017). Rearing practices, production
performance and reproductive problems of cattle of budgam district in kashmir valley. J. Anim. Health Prod. 5(2): 68-73.

• Kumar PR, Shukla SN, Purkayastha RD (2013). Economical analysis of the estimated cost of management of anestrus buffaloes under field conditions using different hormonal and non–hormonal strategies. J. Anim. Health Prod. 1(4): 39 – 41.

• Kumar S, Subash S, Jangir R (2017a). Feeding and milking management practices adopted by indigenous cattle farmers in thar desert of Rajasthan. J. Anim. Health Prod. 5(1): 14-18. https://doi.org/10.14737/journal.jahp/2017/5.1.14.18

• Kumar S, Subash S, Jangir R, Prasad D (2017b). Constraints faced by farmers in adoption of indigenous technical knowledge associated with indigenous cattle dairy farming in Rajasthan. J. Commun. Mobiliz. Sustain. Develop. 12(2): 249-252.

• Livestock census (2012). Statistical cell, Department of Animal husbandry and veterinary services, Government of Rajasthan.

• Mahla V (2015). Study about socio-economic status and calf rearing management practices adopted by cattle keepers of western Rajasthan, India. Indian J. Agric. Res. 49 (2). https://doi.org/10.5958/0976-058X.2015.00029.3

• NBAGR (2016). Registered Breeds of Cattle. Retrieved from www.nbagr.res.in/tegcatt.html. Accessed on 09.12.2016.

• Patil AP (2009). Constraints faced by the dairy farmers in Nagpur district while adopting animal management practices. Vet. World. 2(3):111-112.

• Sheikh AS (2015). Kankrej cattle management practices followed in rearing at northern part of Gujrat. Life Sci. Leaflets. 78-86.

• Shinde SV (2011). Socio - economic profile of dairy farmers in Solapur district of Maharashtra state. Indian Streams Res. J. 1(1).

• Shruti (2015). Assessing knowledge of tribal farmers regarding scientific animal husbandry practices. Indian Res. J. Ext. Edu.15 (2).

• Singh CV (2016). Cross-breeding in cattle for milk production: achievements, challenges and opportunities in India—a review. Adv. Dairy Res. 4(3): 2-14.

• Singh V, Gupta J (2015). Promoting clean milk production: The path for milk quality improvement. J. Commun. Mobil. Sustain. Develop. 10(2): 163-167. https://doi.org/10.1016/j.jclepro.2014.12.026

• Solanki D (2011). Improved dairy cattle management: technical know-how among rural women. J. Commun. Mobil. Sustain. Develop. 6 (2): 185-189.

• Srivastava S, Singh B, Kumar S (2014). Food security status and nutritional adequacy in arid part of India: A District Level Analysis. J. Agric. Life Sci. 1(2): 29-38.