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Socio-demographic Status, Rearing System and Prevalence of Diseases in Black Bengal Goats Maintained in Nadia District of West Bengal

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ABSTRACT

Background: One of the most successful approaches for helping India's impoverished citizens alleviate poverty and enhance their sources of income is goat rearing. The present study was carried out with an objective to assess the current scenario of socio-demographic status of farmers, managemental practices and prevailing diseases of goats in Nadia district of West Bengal. The predominant availability of black bengal goat resources prompted the selection of these regions.

Methods: A descriptive cross-sectional study was undertaken over a period of six months. Survey data were collected from a total of 100 goat farmers in different villages in the Nadia district of West Bengal, India. For each household survey, a structured questionnaire was formulated.

Result: Survey data indicated that 72.0% of women farmers are associated with goat husbandry. The data found that 52.0% of goat farmers were in the middle age having attended primary schooling (86.0%). More than half of the farmers (51.0%) reared goats under intensive system of rearing. The majority of farmers (63.0%) did not follow vaccination programme while 52.0% farmers dewormed their goats. Our research revealed that the most prevalent disease-causing mortality of goats was PPR (61.0%). The results of this study indicate that farmers did not pay much attention to management systems and healthcare services because of the low socio-economic conditions. The present study recommends frequent training of farmers in a modern scientific way creating awareness with regular conduct of vaccination campaigns.

Key words: Black Bengal goat, Mortality, Rearing system, Socio-demographic status.

INTRODUCTION

In developing countries like India, goats are a valuable livestock resource. India has world's second largest reserve of goat population, accounting for around 13.19% of the global population (FAOSTAT, 2019). India now has approximately 148.88 million goats and livestock contributes 6.2% of GDP, according to Basic Animal Husbandry Statistics (BAHS, 2022). Goats are considered as the vital livestock species due to higher prolificacy rate, shorter generation interval, superior meat quality, better adaptability and have excellent market demands (Amin *et al.,* 2001; Biswas, 2010 and Faruque *et al*., 2016) and ecologically adaptable to harsh climatic conditions (Liotta *et al.,* 2020). They produce meat, milk and skin, which serves as a vital source of nutrition and providing the poor with food, financial security and act as a source of employment. Majority of the small, marginal and landless farmers particularly women, significantly rely on goat rearing for their livelihood in rural India (Rawat *et al.,* 2015; Singh *et al*., 2018a). Since goat farming offers smallholders and rural households with additional revenue, food and manure, it has become significantly important to their way of life which acts as a supplementary occupation (Chamboko *et al*., 2014). Rearing of goats among middle class and upper middle-class families is known to be the most common activity (Sato, 2011) and contributes significantly to the agrarian economy, particularly in places where crops and dairy production are uneconomic (Kakraliya *et al*., 2022). Generally, domestic goats are housed in an open shelter with *kutcha* shed under Indian conditions (Chopdar *et al*., 2022). Housing is crucial for

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protecting goats as it protects them from harsh climatic conditions, predators as well as thieves (Prank *et al.,* 2023; Das *et al.,* 2023a, b, 2024). There are scarce reports regarding the evaluation of management system and occurrence of common diseases in goats of Nadia district in West Bengal, India. Our study specifically focuses on i) socio-demographic status of goat farmers ii) the rearing system of goat and iii) diseases causing mortality in goats affecting animal productivity.

MATERIALS AND METHODS

From January 2021 to June 2021, a descriptive cross-sectional study was undertaken over a period of six months. The survey area chosen was Nadia district of West Bengal, India which is located between latitudes 22°53′N and 24° 11′N and longitudes 87°09′E and 88°48′E. A total of 100 farmers were randomly selected from different villages under Kalyani and Chakdaha block of the Nadia district where goats were raised for livelihood by farmers. For each household survey, a pre-designed questionnaire was formulated. The questionnaire was developed to elicit information from respondents about farmers' household socioeconomic factors and goat husbandry practices. A face- to-face question was asked to the farm personnel to fulfil the structure questionnaire in a single visit at farmer's door. Prior to a direct personal interview of the respondent, a verbal consent was taken and all the objectives of the study was explained. All data collected during the survey period were recorded in Microsoft Excel sheet. We further exported it to IBM SPSS software version 26.0 for analysis. Descriptive statistics were used to describe and summarise questionnaire data. We performed Chi-square (χ^2) test to determine frequency, percentage and statistical significance of categorial variables.

RESULTS AND DISCUSSION

Socio-demographic status of goat farmers

As depicted in Table 1, the present study indicated that majority of the farmers rearing goats were women (72.0%). In accordance with the current findings, Prank *et al.* (2023) reported that farmers involved in goat husbandry were female (57.0%). The higher number of female farmers could be due to the fact that men of every household choose to work as daily wagers, whereas women in the household prefer to taking care of the goats as an additional source of income to support their families. Similar findings were reported by other researchers from different regions (Nandi *et al*., 2011; Shoshe *et al.,* 2019; Sivachandiran *et al.,* 2020; Panth *et al.,* 2021; Rahman *et al.,* 2022). However, elsewhere some statistics prove otherwise (Getaneh *et al*., 2022; Nithiaselvi *et al.,* 2023; Hamadani *et al.,* 2023). As depicted in Table 1, our study indicated that majority of the goat farmers were in the middle age group (52.0%) *i.e.*, 30 to 49 years. Similarly, Salahuddin *et al.* (2017) and Nithiaselvi *et al.* (2023) found large number of middle-aged farmers who were interested in raising goats to support their household. Our findings also conform to several other studies as well (Nipane *et al.,* 2016; Islam *et al.,* 2018; Shivakumara *et al.,* 2020; Srinivasan and Roopa, 2021; Rahman *et al.,* 2022). The medium-aged farmers are economically sound and are involved with goat rearing (Alam *et al.,* 2023). Contrarily, some reports (Islam *et al.,* 2016b); Shoshe *et al.,* 2019) mention that maximum goat keepers are rather young between 15 to 30 years old. Our results also reveal that highest number of the farmers (58.0%) involved with goat rearing belong to the scheduled tribes. Alam *et al.* (2023), stated that all the goat farmers in the Kargil region belong to scheduled tribe (100%) category. The possible reason of higher percentage of schedule tribe farmers in our findings, could be due to the traditional way of life of rearing goat as a source of income for their livelihood. Earlier reports were in conformity (Tanwar *et al.,* 2008; Singh *et al.,* 2018b) or otherwise (Singh *et al.,* 2021; Nithiaselvi *et al.,* 2023). However, this distribution mostly depends upon the location of the study area.

Perusal of Table 1 indicated that majority of the farmers (54.0%) associated with goat rearing were of small family

Table 1: Socio-demographic status of goat farmers in the Nadia district of West Bengal (N=100).

Variables	Category	Percentage (%)
Gender	Women	72
	Men	28
Age	Young (14 to 29 years)	23
	Middle (30 to 49 years)	52
	Old (50 years and above)	25
Social status	General (UR)	11
	Scheduled caste (SC)	31
	Scheduled tribe (ST)	58
Family size	Small ≤4	54
	Medium ≤5-8	40
	Large >8	6
Educational level	Primary (1 to 5 class)	86
	Secondary (6 to 12 class)	9
	College (>12 class)	5

size (≤ 4), while medium and large family size accounts for 46.0%. In a similar result, Barman *et al.* (2017) reported that majority of the goat farmers belong to small-sized family (47.0%) with only 5 members whereas 16.0% were of large family size (>8). Small family size is trending because nuclear type family is increasing with increase in daily expenditure of the household. Conversely, Nwachukwu and Berekwu (2020) in Nigeria mentioned that 52.0% of goat farmers had a medium family size of 4 to 7 persons and 46.0% were of small family size with 1 to 3 members. Survey data showed that most of the goat owners attained primary education (86.0%) and only 14.0% farmers completed higher studies. Our findings are supported by several researchers, who mentioned that maximum goat farmers achieved primary education from class 1 to 5 standard (Salahuddin *et al.,* 2017; Islam *et al.,* 2018; Nwachukwu and Berekwu, 2020; Nithiaselvi *et al.,* 2023). It is believed that no formal education is required for goat rearing. However, Islam *et al.* (2016b) and Singh *et al.* (2018b) found that more than half of the farmers involved in goat rearing were illiterate. Contrastingly, Alam *et al.* (2023) found that the majority of goat farmers are highly educated in Ladakh valley of India.

Rearing system

In the present study, majority of the goat farmers reared goats in an intensive system (51.0%) whereas nearly half of the farmers managed their goats in semi-intensive system (49.0%) of rearing. However, Prank *et al.* (2023) revealed that most of the farmers used semi-intensive system (67.3%) for goat rearing but only a few farmers reared goats in an intensive system (8.5%) of rearing while 24.1% farmers practised free range system of rearing in Bangladesh. In the current findings, adoption of intensive systems of rearing by most of the farmers may be due to urbanization and drastic reduction in grazing land in the sampling area. Moreover, majority of the farmers had attended a course in goat training programmes conducted by Govt. aided institutions to initiate intensive system of rearing. This indicated that in regions with limited land resources, farmers opt for intensive systems to make the most of the available land by increasing animal stocking density (Giller *et al.,* 2021; Mandal *et al.,* 2022; Debbarma *et al*., 2024). Contrary to our findings, 100% of goats' farmers used semi-intensive system of goat rearing as reported by Islam *et al.* (2016a) and Shoshe *et al.* (2019). In rural areas, usually goat farmers let loose their goats unsupervised for grazing and the animals scavenge and subsequently, feed on farm or kitchen wastes (De Vries, 2008). As depicted in Table 2, 57.0% goat farmers housed their goats on mud floors, 15.0% on brick and concrete cement and the least on bamboo (2.0%) floors. In line with our findings, several studies inferred that majority of the goat keepers constructed their goat shelters with an earthen base (Nandi *et al.,* 2011; Jana *et al.,* 2014; Kumar *et al.,* 2018; Shoshe *et al.,* 2019; Sharma *et al.,* 2022; Tilahun *et al.* 2023). However, Sah *et al.* (2021) stated that mud floor increased the risk of pneumonia and causes respiratory distress to animals and is unsuitable for small ruminants. Conversely, bamboo floor is known to be beneficial for health of the goats, that often remain dry, relatively easy to clean and does not get messy very readily and has a milder odour (Prank *et al.* 2023). The survey data indicated that majority (33.0%) of goat shed were made up of tin-sheets. The second commonly used roofing material were polyethene covered over bamboo truss (29.0%) followed by tiled roofs (27.0), while only few farmers use concrete (9.0%) and asbestos roofing (2.0%). In a similar finding, Islam *et al.* (2018) reported that majority of farmers constructed their goat shelter with tin sheet (54.0%) and certain farmers were found to used bamboo-straw as roofing material but only few farmers used coconut or palm

Table 2: Management practices in the Nadia district of West Bengal, India (N=100).

Variables	Category	Percentage (%)
Rearing system	Semi-intensive	49
	Intensive	51
Floor type	Mud	57
	Brick	15
	Concrete cement	15
	Wooden	11
	Bamboo	2
Roofing	Tin sheet	33
	Earthen tiles	27
	Concrete	9
	Asbestos	2
	Polyethene covered over bamboo truss	29
Vaccination	Yes	37
	No	63
Deworming	Yes	52
	No	48

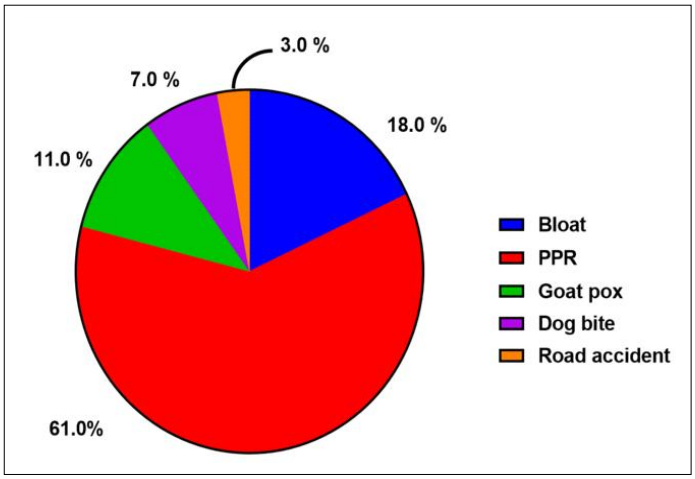

Fig 1: Major causes of mortality of Black Bengal goat in the sampling area.

leaves for sheltering goats. Sharma *et al.* (2022) however revealed that 42.0% farmers used asbestos as roofing material for construction of goat shelter but certain respondents used tin (26.0%) and RCC (18.0%) and only few used thatched roofs (10.0%). In tropical nations, thatch is the most commonly used roofing material for animal housing (FAO, 2004). In dairy housing, utilising paddy straw as roof insulation reduces thermal radiation and provides a thermo-comfortable environment to the animals, thereby improving milk yield (Mandal *et al.,* 2018; Mandal *et al.,* 2021).

Perusal of Table 2 shows that majority (63.0%) of the farmers do not vaccinate their goats but few (37.0%) number of goat owners follow immunization of animals, much akin to reports of Islam *et al.* (2016a) and Sivachandiran *et al.* (2020). Conversely, Jana *et al.* (2014) and Hossain *et al.* (2015) reported that most of the goat owners vaccinated their animals against common diseases *viz.* goat pox, peste-des-petits ruminants (PPR) and foot and mouth disease (FMD). There was a misconception amongst farmers that vaccination might cause health problems and even death of the animals. This could be the possible reason of low rate of vaccination in the present study. Islam *et al.* (2018) opined that farmers hold false beliefs about disease prevention, thus they neglected to regularly administer vaccines and seek the advice of veterinarians when they needed technical assistance (Islam *et al.,* 2018).

Our study revealed that more than half of the farmers (52.0%) used to practice deworming their goats whereas certain sections of farmers (48.0%) do not deworm their goats. Similar reports have been documented by Hossain *et al.* (2015) and Nithiaselvi *et al.* (2023), who inferred that majority of the goat farmers routinely dewormed their animals but few farmers do not practise deworming of goats. Islam *et al.* (2018), on the other hand revealed that 38.67% of goat owners used neither anthelmintics nor any other preventive measures to combat parasitic infestation but some farmers (31.0%) used anthelmintic to deworm their goats regularly.

Prevalence of common diseases

In the current study, we investigated the various reasons for mortality of Black Bengal goats in the sampling area and are presented in Fig 1. Black Bengal goat is generally susceptible to water logging after rains. However, this breed is known to be hardy and have high disease resistance capacity (Nandi *et al.,* 2011; Shoshe *et al.,* 2019). Lack of proper care and overall poor husbandry practices are responsible for occurrence of diseases in goat. The present survey data revealed that majority of the goats died due to PPR (61.0%) followed by bloat (18.0%) and goat pox (11.0%) whereas dog bite and road accident combined contribute to 10.0% mortality. Balamurugan *et al.* (2012) revealed that goats in India has lower incidence of PPR (17.90%). Various factors such as rearing system, housing condition, regionality, vaccination profile and seasonal characteristics were shown to be strongly correlated with the prevalence of PPR in Nigerian sheep and goats as reported by Victor *et al.* (2017). Generally, young and female animals fall prey to dog bite. Goats are the most affected species from dog bite as compared to other livestock (Islam *et al.,* 2016b). In the present study, the reason for mortality of goats due to dog bite could be attributed to densely population of domestic dog in the sampling area and exist in majority of the households which likely contributed to such incidence. Several diseases that are inevitably contracted while raising goats impair farming's profitability by increasing treatment costs, decreasing productivity and increases mortality in goats.

CONCLUSION

Middle aged females having basic primary education and belonging to small families are most actively involved in goat rearing in Lower Gangetic Plains of Nadia district. Most of the farmers reared goats in intensive system. Only few farmers vaccinated their goats, however most of the farmers dewormed goats on a regular basis. PPR was the most common disease contributing significantly to goat

mortality. Based on the above reports, it can be concluded that more frequent training of farmers is necessary to equip farmers with better management practices and scientific knowledge on goat rearing. These results could potentially be useful for village-level programs promoting the development of community-based goat farming.

Conflict of interest

The authors declare no competing interest.

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