Management strategies and constraints faced by Barbari goat farmers

A.K. Singh[1*], P. Singh[2], B. Kumar[1], S. Kumar[3], S. Kumar[4]

[1]Krishi Vigyan Kendra, Amihit, Jaunpur-222142, [2]Krishi Vigyan Kendra, Varanasi-221311, [3]Crop Research Station (ANDUAT), Masodha, Ayodhya-224133, [4]Krishi Vigyan Kendra, Behraich-271801, India
*Corresponding author: amitkumarsingh5496@gmail.com

Journal of Livestock Science (ISSN online 2277-6214) 16: 712-720
Received on 3/4/25; Accepted on 12/12/25; Published on 15/12/25
doi. 10.33259/JLivestSci.2025.712-720

Abstract

Farmers in mass follow practices of other experienced farmers and adopt such management strategies in their farming. This paper aims to study the profile, management strategies and constraints of experienced Barbari goat farmers in the Jaunpur district of India. Barbari breed is one of the most farmed breeds of goats in Uttar Pradesh due to its prolificacy and growth performance among other attributes. A total of 220 goat farmers were surveyed randomly from different villages of Jaunpur district and 48 farmers who possessed 10 or more goats and 5 or more years of experience in goat rearing were selected for detailed interviews through pre-formulated questionnaire. Results of this study showed that farmers had mean land holding (1.20 ± 0.09 acre), age (39.38 ± 0.90 years), mostly graduate as level of education (43.75%), and flock size (19.69 ± 1.05 goats). The major reasons for goat farming and preferring goats over other livestock species were income generation (87.50%) and quick returns (35.42%). Apart from goat husbandry, the farmers were engaged in crop farming and other livestock species, including cattle, buffalo, poultry, sheep, pigs, and rabbits. Most important characteristics of the selection of goat breed and culling of goats were selection of goat breed and culling of the growth performance (68.75%) and poor growth (43.75%). Among management practices, most of the farmers followed semi-intensive rearing (58.33%) with separate housing (79.17%), soil as floor surface (85.42%), most of the farmers used bedding material during winter (81.25%), and mostly straw as bedding material (84.61%), most followed feeding method was grazing with concentrate feeding (58.33%), grazing for 1-4hrs/day (58.33%). Only 41.67% of farmers performed one of the vaccinations. Most vaccinations were against PPR (60.00%). 54.17% of farmers dewormed their goats, but most farmers lacked bio-security measures (70.84%) at their farm. Kid diarrhea (31.25%) was the most encountered disease in Barbari goats. Among the breeding constraints, poor knowledge about breeding (79.17%) was the main constraint. Lack of knowledge of feed formulation (43.75%) was the main feeding constraint. Lack of veterinary facilities (50.00%) was the main healthcare constraint for goat farmers. Middlemen indulgement (64.58%) was the main marketing constraint. Overall, feeding constraint (45.83%) was a major constraint for Barbari goat farmers. From this study, it may be concluded that experienced Barbari goat farmers need knowledge up-gradation and training regarding improved animal husbandry practices along with improved veterinary health care facilities for enhanced income from goat husbandry.

Keywords: Barbari goat farmers, Constraints**,** Management, Profile

Introduction

India stands second in goat population in the world with a total of 148.89 million goats contributing to more than 20% of world's total goat population (FAOSTAT, 2019). Goat population showed an increase of 10.1% in population of goats from previous census (BAHS, 2019). It is a noticeable point that more than 80% of Indian farmers are small and marginal (Ministry of Science and Technology, 2023), and goat husbandry is one of their major farming components (Singh, 2018; Singh et al., 2023; Singh et al., 2025a). Goats provide quality nutrients through meat and milk to humans, and they have become a source of poverty alleviation through employment generation (Sivachandiran et al., 2020; Kisku and Singh, 2022). Farmers are increasingly involved in goat husbandry as it may provide them with food and financial security (Swaminathan & Bhavani, 2013; Ponnusamy & Devi, 2017). Goats have become an important livestock species due to their high market demand, no social taboo, short generation intervals, and high prolificacy (Singh et al., 2008; Sejian et al., 2021; Singh et al., 2025b). Feasibility for a sustainable and profitable local goats' production is strived for all over world especially in developing countries (Zailani et al., 2016).

Barbari goat is considered one of the best-purpose medium-sized goats, having high prolificacy, early maturity, and high growth performance, and suited to stall feeding conditions that make it suitable for rearing in towns and areas where grazing facilities are lacking (Mandal et al., 2016; Singh et al., 2021). However, it may thrive under grazing conditions and upon tree leaves feeding (Acharya, 1982; Mandal et al., 2016; Singh et al., 2021). Barbari goat has around 2.19 million populations and stands at fourth in terms of highest goat population in India (Behl et al., 2022). Most goat farmers practice semi-intensive semi- intensive system of rearing, and fewer farmers practice an intensive system of housing for goats (Kumar et al., 2010; Singh et al., 2018). Most of the farmers provide concentrated feed to goats after they return from grazing, and water from tube wells acts as a source of water for goats (Kumar et al., 2010; Singh et al., 2018). Major diseases in goats include Peste des Petits Ruminants (PPR), ET (Enterotoxaemia), FMD (Foot and mouth disease), and respiratory diseases (Singh et al., 2018; Prank et al., 2023). Progressive goat farmers follow vaccination and deworming in goats (Singh et al., 2018; Prank et al., 2023; Singh & Bandopadhyay, 2015).

Experienced farmers have deep traditional knowledge of farming passed over generations. They rely on conventional methods of farming. Income generated by them is generally not high (Balkrishna et al., 2022). However, if they are trained well and assisted with government policies, they may improve their livelihood and become a progressive farmer (Kumar et al., 2015). Progressive farmers are experienced, innovators and entrepreneurs in their field who are avid learners, they continuously enhance their knowledge levels through attending Kisan gosthis (fair), Krishi Vigyan Kendras, meetings, internet sources, etc. They have efficient livestock production (Kaur and Kumar, 2023). Progressive farmers are found to adopt higher rate of information and communication technology in their farming as compared to that of non-progressive farmers (Kumari et al., 2022; Srivastava et al., 2022). Hence, understanding about profile, rearing practices, common diseases and constraints faced by the experienced farmers may help in formulating policies for upliftment of rural livelihood through goat farming.

There is no information regarding profile, rearing practices, common diseases and constraints faced by the experienced farmers involved in Barbari goat rearing. Therefore, this study aimed to investigate the profile of experienced Barbari goat farmers, their management practices, common diseases in goats and constraints of experienced Barbari goat farmers in Jaunpur district of India.

Materials and methods

Design and place of sampling

This survey-based cross-sectional study was conducted from mid of January to June 2023 for about 6 months. The multi stage random sampling methodology was adopted in this study. Survey was done in randomly selected villages of 11 allotted blocks to Krishi Vigyan Kendra, Amihit, Jaunpur, namely Kerakat, Dobhi, Shahganj, Muftiganj, Dharmapur, Sirkoni, Jalalpur, Rampur, Ram Nagar, Barsathi and Mariyahu. 20 samples were taken from each block. A total of 220 goat farmers were surveyed and their characteristics are presented in Table (1). However, specific and detailed interviews were organized interpersonally for the farmers who reared 10 or more Barbari goats and had 5 or more years of experience in goat rearing. A total of 48 farmers qualified for this interview schedule. Interpersonal questionnaire had four sets for i) characteristics of Barbari goat farmers, ii) rearing practices by Barbari goat farmers, iii) common diseases in Barbari goats, and iv) constraints of Barbari goat farmers. In addition to this, direct observations were also made in the farm premises of respective Barbari goat farmers.

Jaunpur district lays in the northwest of the Varanasi division, stretching from 24.24 degrees N to 26.12 degrees N latitude and 82.7 degrees 82.7 degrees E to 83.5 degrees E longitude. The average mean height above mean sea level is 261 to 290 ft. Temperature here ranges from 4 to 44.6 degree centigrade with an average of around 25 degree centigrade. It has majorly sandy loam type of soil, and Jaunpur district is mainly dependent upon agriculture for its economic development (https://jaunpur.nic.in/geographicalinfo/).

Table 1: Characteristics of goat farmers in different villages of Jaunpur district

Particulars	Frequency (n=220)	Percentage (%)
Flock size		
Small (2-4)	105	47.73
Medium (5-9)	67	30.45
Large (10 or more)	48	21.82
Gender		
Male	119	54.09
Female	101	45.91
Experience (years)		
1-2	114	51.82
3-4	58	26.36
5 or more	48	21.82

Statistical analysis

Data were collected from a pre-formulated questionnaire and then transferred to Microsoft Excel 2007. IBM SPSS Version 26.0 software was used to perform descriptive analysis to determine the frequency and percentage of various data sets. Microsoft Excel 2007 was used to interpret the results graphically.

Results and Discussion

Profile of experienced Barbari goat farmers

Table 1 shows the profile of goat farmers of Jaunpur. It was observed that majorly, goat rearers had small flock size (47.73%), male farmers (54.09%) were more than female (45.91) in this study. About 51.82% goat rearers had 1-2 years of experience and only 21.82% goat rearers were observed to possess more than 5 or more years of experience. Table 2 represent the profile and farming practices of experienced Barbari goat farmers of the Jaunpur district of India. The overall average land area cultivated by the farmers was 1.20 ± 0.09 acres, average age of experienced Barbari goat farmers was found to be 39.38 ± 0.90 years. These farmers possessed, on an average, 19.69 ± 1.05 goats. It was investigated that most of the farmers were graduates (43.75%; n=21). From a perusal of Table 2, it may be found that, on an average experienced Barbari goat farmers of the Jaunpur district had the experience of 7.29 ± 0.29 years. From Table 3, it can be observed that experienced Barbari goat farmers also practiced cereal crop production, vegetable cultivation along with fruit cultivation. Apart from goat husbandry, some farmers also possessed cattle, buffaloes, poultry birds, sheep, pigs and rabbits as subsidiary enterprises.

Rai and Singh (2010) reported that more than 95% of farmers in Uttar Pradesh had a flock size of 2-6 goats. Mohan et al. (2015) found that goat farmers' prime occupation (54.29%) was agricultural labors.

Reason for rearing, selection and culling of goats

From the perusal of Table 4, it was observed that most experienced Barbari goat farmers were rearing goats for income generation (87.50%). In addition to this, experienced Barbari goat farmers preferred goats over other livestock species as goats provided quick returns (35.42%). From referring to table 4, it was found that the most desired characteristics of goats while selection was growth performance (68.75%). Whereas, none of the farmers considered the meat color (0.00%) of goats as a criterion for goat selection. However, the most important reason for culling (Table 5) was poor growth (43.75%).

Shehar et al. (2021) reported that 37.74% of goats sold for cash income. Farmers sold their goats at 4.88%, 9.6% in nearby village villages at 4.88%, 9.6% in nearby villages, and 73.05% to middlemen. 39.61% of goats were sold due to seasonal market demand. Male goats contributed to 92.21% selling as they fetch more money. The average age of selling goats was reported to be 28.06 months. Interestingly, major purchase of goats occurred in self-village. It was shown that seasonal market demand and price were major problems faced during the buying and selling of goats. It was highlighted that rise in per capita income of country has boosted the demand for high quality food products such as chevon (Singh, 2018; Lalhriatpuii and Singh, 2021). Goat plays a significant role in poverty alleviation of rural livelihood through regular and considerable income from commercial goat farming (Singh and Kisku, 2022).

Table 2: Profile of experienced Barbari goat rearers of Jaunpur district

S.N.	Profile	mean ± S.E	Min	Max
1	**Land (acre)**	1.20 ± 0.09	0.2	3.0
2	**Age of farmer (years)**	39.38 ± 0.90	27	56
3	**Flock size of goats**	19.69 ± 1.05	10	41
4	**Level of education (percentage and frequency)**			
	a. 10^{th}	14.58% (n=7)		
	b. Below 10^{th}	6.25% (n=3)		
	c. 12^{th}	29.17% (n=14)		
	d. Graduate	43.75% (n=21)		
	e. > Graduate	6.25% (n=3)		
5	**Experience (years)**	7.29 ± 0.29	5	14

Table 3: Farming practices by experienced Barbari goat farmers

SN	Enterprise	mean ± S.E	Min	Max
Cultivated crops(acres)				
1	Cereals	0.95 ± 0.08	0.15	2.8
2	Vegetable	0.07 ± 0.001	0.0	0.2
3	Fruits	0.03 ± 0.001	0.0	0.3
Livestock species reared (frequency)				
1	Cattle	1.23 ± 0.17	0	5
2	Buffalo	0.44 ± 0.13	0	4
3	Poultry	2.21 ± 0.50	0	18
4	Goat	19.69 ± 1.05	10	41
5	Sheep	0.48 ± 0.29	0	10
6	Pig	0.08 ± 0.08	0	4
7	Rabbit	0.21 ± 0.14	0	6

Table 4: Reason for Barbari goat farming and preferring goats over other livestock species

S.N.	Particulars	Percentage and frequency
Reason for goat farming		
1	Pleasure	4.16%; n=2
2	Income generation	87.50%; n=42
3	Household needs	6.25%; n=3
4	For manure	2.08%; n=1
Reason for preferring goats over other livestock species		
1	Availability of feed resources	2.08%; n=1
2	Resistance against diseases	16.67%; n=8
3	Quick returns	35.42%; n=17
4	Easy market	8.33%; n=4
5	No social taboo	31.25%; n=15
6	Easily available Germplasm	6.25%; n=3

Table 5: Most desired characteristics of goats while selection and culling by the farmers

SN	Desired characteristics	Percentage and frequency
Most desired characteristics of Barbari goats while selection		
1	Breed	12.50%; n=6
2	Growth performance	68.75%; n=33
3	Reproduction	4.17%; n=2
4	Health	2.08%; n=1
5	Docile behavior	6.25%; n=3
6	Coat color	2.08%; n=1
7	Meat color	0.00%; n=0
8	Milk yield	4.17%; n=2
Most important reason for goat culling		
1	Poor growth	43.75%; n=21
2	Poor reproduction	22.92%; n=11
3	Illness	16.67%; n=7
4	Poor milk production	4.17%; n=2
5	Poor litter performance	8.33%; n=4
6	High fighting behavior	6.25%; n=3

Table 6: Management practices of experienced Barbari goat farmers

SN	Reasons of preferences	Percentage and frequency
System of rearing goats		
1	Intensive system	25.00%; n=12
2	Extensive system	16.67%; n=8
3	Semi intensive system	58.33%; n=28
Housing pattern		
1	Separate housing	79.17%; n=38
2	Housing with other animals	20.83%; n=10
Floor material		
1	Soil	85.42%; n=41
2	Concrete	14.58%; n=7
Bedding material provision		
1	Yes	81.25%; n=39
Type of bedding material used		
A	Straw	84.61%; n=33
B	Dry leaves	15.49%; n=6
2	No bedding used	18.75%; n=9
Feeding		
1	Only grazing	16.67%; n=8
2	Grazing with concentrate	58.33%; n=28
3	Fodder and concentrate	25.00%; n=12
Grazing period		
1	No grazing	25.00%; n=12
2	1-4 (hrs)	58.33%; n=28
3	5-8 (hrs)	12.50%; n=6
4	>8 (hrs)	4.16%; n=2
Vaccination		
1	Yes	41.67%; n=20
A	PPR	60.00%; n=12
B	ET	5.00%; n=1
C	FMD	35.00%; n=7
D	Goat pox	0.00%; n=0
2	No	58.33%; n=28
Deworming		
1	Yes	54.17%; n=26
2	No	45.83%; n=22
Bio-security measure: Provision of foot dip at entrance		
1	Yes	29.16%; n=14
2	No	70.84%; n=34

Management practices followed by experienced Barbari goat farmers

Table 6 represents management practices followed by the experienced Barbari goat farmers of the Jaunpur district. It was investigated that most farmers followed semi-intensive (58.33%) type of rearing goats followed by an extensive system (25.00%) and only 16.67% of farmers followed an extensive system of rearing goats. More than two-thirds of farmers had provided separate housing (79.17%) than housing goats with other animals (20.83%). Around 85.42% of farmers had soil as floor material for Barbari goats. 81.25% of farmers provided goats with bedding material and 84.61% of farmers utilized straw as bedding material. Most of the farmers practiced grazing with concentrates feeding (58.33%) whereas most farmers took goats for grazing for about 1-4 hours/day and only 4.16% of farmers preferred grazing for goats for more than 8 (hrs/day). About 41.67% of farmers were found to follow one of the PPR, ET, FMD, or goat pox vaccines for Barbari goats, and 58.33% of farmers did not vaccinate goats. PPR vaccine was considered as the most done vaccination by farmers (60.00%) followed by FMD (35.00%), ET (5.00%), and none followed vaccination against goat pox. Around 54.17% of farmers dewormed their goats, and 45.83% did not do deworming. For provision of foot dip at entrance as bio security measure, most farmers (70.84%) did not follow foot dip at entrance of goat farm.

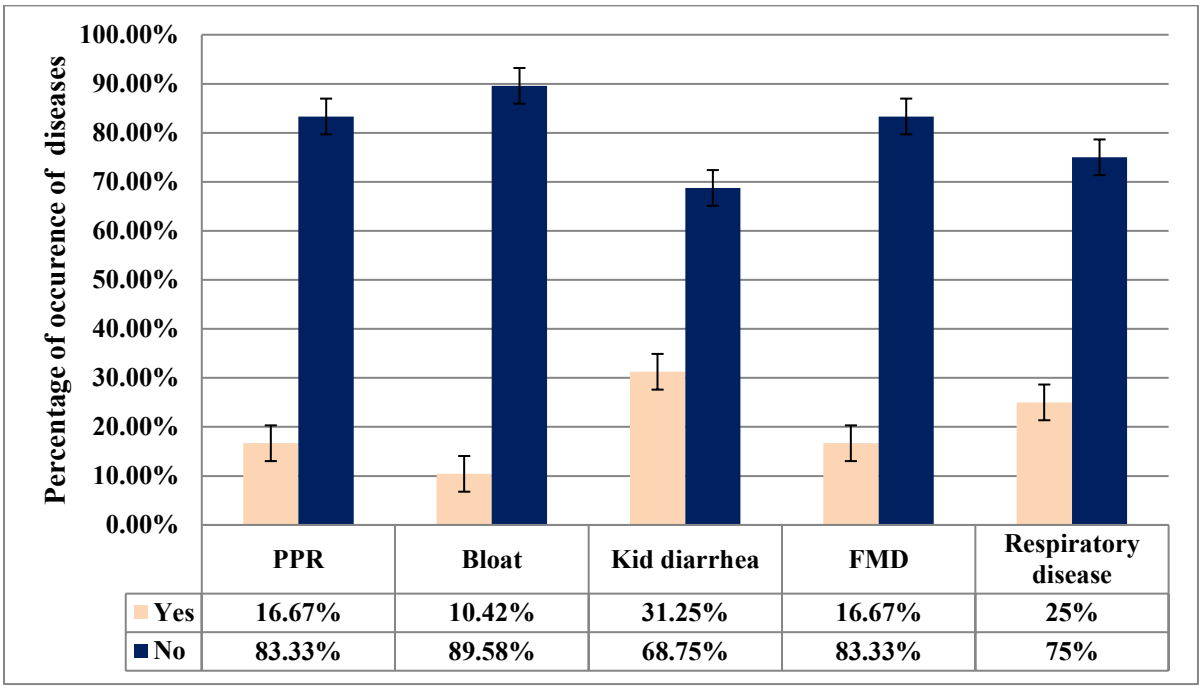
Singh et al. (2022) reported that recently goat farming had been popularized among big farmers, youth and retired persons. They suggested that judicious breeding and healthcare strategies may improve the survival and performance of female goats. In addition to this, health measures such as deworming and vaccination may

minimize mortality were also suggested. Singh et al. (2020) suggested that Barbari goats are suitable under stall feeding conditions for gaining more as compared to those in only grazing system. Kumar et al. (2018) showed that 81.4% of farmers kept their goats in separate housing than farmer's dwelling places. They found that most of the floor material was made up of soil (88.78%), ventilation was average (67.85%), sanitary conditions were poor (83.78%), roof material was mostly thatch (70.91%), and most farmers preferred grazing (85.73%) in Jaunpur and Allahabad districts of Uttar Pradesh. Singh et al. (2022) suggested that proper housing management is necessary for farm animals to ensure their well being (Singh and Kisku, 2022). Sharma et al. (2007) observed that goats were mostly fed on tree loopings as grazing source. They investigated that most (39%) farmers selected goats based on their physical characteristics. 82% of goat sheds were attached to farmers' residences. 56% of farmers practiced vaccinations, whereas 74% practiced deworming in goats, and body weight was considered for selling of goats by the farmers. Singh et al. (2021) in Gorakhpur reported that 68.02% of owners had non-descript breeds, whereas 10.18% had Barbari, and 21.80% of farmers possessed Black Bengal goats.

Farmers have peculiar behavior of consulting and following other progressive farmers to adopt any new farming technique. In this view, this study may help formulate policy for new goat rearers. Singh et al. (2022) reported that recently goat farming had been popularized among big farmers, youth and retired persons. They suggested that judicious breeding and healthcare strategies may improve the survival and performance of female goats. In addition to this, health measures such as deworming and vaccination may minimize mortality were also suggested. Singh et al. (2020) suggested that Barbari goats are suitable under stall feeding conditions for gaining more as compared to those in only grazing system. Kumar et al. (2018) showed that 81.4% of farmers kept their goats in separate housing than farmer's dwelling places. They found that most of the floor material was made up of soil (88.78%), ventilation was average (67.85%), sanitary conditions were poor (83.78%), roof material was mostly thatch (70.91%), and most farmers preferred grazing (85.73%) in Jaunpur and Allahabad districts of Uttar Pradesh. Singh et al. (2022) suggested that proper housing management is necessary for farm animals to ensure their well being (Singh and Kisku, 2022).

Common diseases in Barbari goats

Most of the experienced Barbari farmers encountered kid diarrhea (31.25%), followed by respiratory disease (25.00%), FMD (16.67%), PPR (16.67%), and Bloat (10.42%). Figure 1 shows the common diseases encountered by experienced Barbari goat farmers in last two years. Pawaiya et al. (2017) showed that highest number of mortality in goats was due to enteritis followed by gastro-intestinal parasites and least hepato- billary diseases. Singh et al. (2015) highlighted that more than Rs. 12,000-14,000 crores of economic loss occurs only due to foot and mouth disease in cloven hooved animals. Singh et al. (2021) observed that PPR was most encountered disease followed by FMD in goats in Gorakhpur district of Uttar Pradesh. Eradication of such diseases through standardized husbandry protocols and preventive measures may further boost socio economic of goat farmers. Notwithstanding the findings of this study, Sivachandiran et al. (2020) indicated that major outbreak of disease occurs due to non compliance of vaccination and deworming in farm animals.



	PPR	Bloat	Kid diarrhea	FMD	Respiratory disease
Yes	16.67%	10.42%	31.25%	16.67%	25%
No	83.33%	89.58%	68.75%	83.33%	75%

Figure 1: Diseases encountered by experienced Barbari goat farmers in last two years in their goats

Table 7: Constraints faced by Barbari goat farmers

SN	Constraints	Percentage and frequency
Breeding constraints		
1	Availability of superior Germplasm	20.83%; n=10
2	Poor knowledge of breeding	79.17%; n= 38
Feeding constraints		
1	Lack of knowledge of feed formulation	43.75%; n=21
2	Non availability of green fodder	22.92%; n=11
3	Non availability of dry fodder	4.17%; n=2
4	High cost of market goat feed	29.17%; n=14
General management constraints		
1	Improper housing (wrong orientation, poor ventilation, etc)	10.42%; n=5
2	Poor sanitary conditions	18.75%; n=9
3	No bio-security measures	70.84%; n=34
Health care constraints		
1	Lack of veterinary facilities	50.00%; n=24
2	High treatment cost	20.83%; n=10
3	Lack of knowledge of goat diseases	29.17%; n=14
Marketing constraints		
1	No uniform market infrastructure	18.75%; n=9
2	Middleman indulgement	64.58%; n=31
3	Non uniform rates	16.67%; n=8
Most important constraint faced by Barbari goat farmers		
1	Breeding	10.42%; n=5
2	Feeding	45.83%; n=22
3	Health care	37.50%; n=18
4	Marketing	6.25%; n=3

Constraints faced by experienced Barbari goat farmers

As shown in table 7, poor knowledge of breeding (79.17%), followed by the availability of superior Germplasm (20.83%), was major breeding constraints for experienced Barbari goat farmers. Lack of knowledge of feed formulation (43.75%) was major feeding constraint. Among general management constraints, no bio-security measure (70.84%) was a major constraint Lack of veterinary facilities (50.00%) was the main healthcare constraint. Middleman indulgement (64.58%) remained major marketing constraint. Overall major constraints were in feeding (45.83%) followed by health care (37.50%), breeding (10.42%), and marketing (6.25%) were observed as important constraints by the experienced Barbari goat farmers.

Similar to the findings of the present study, Kumawat et al. (2017) also reported that major health constraints of goat farmers were lack of veterinary services, knowledge of vaccination and deworming. Singh et al. (2021) in Gorakhpur observed that no farmers practiced vaccination against ET and goat pox disease, and amongst those who followed vaccination, PPR vaccination was done by only 30.43% and FMD vaccination. 41.74% of farmers had hut-type housing for goats. For health-related practices, 51.30% farmers relied upon private veterinary practitioners and only 13.91% through government veterinary hospitals. Singh et al. (2010) reported a scarcity of good Germplasm for goat farmers. Singh et al. (2024) reported that the multiplier flock scheme in Barbari goats that trains goat keepers with foundation flock might be an efficient breeding model for conservation and improvement towards scientific goat farming from the root level.

Conclusion

This study revealed the profile, management strategies and constraints of experienced Barbari goat farmers. From this study, it may be concluded that experienced Barbari goat farmers need knowledge up-gradation and training regarding improved animal husbandry practices along with improved veterinary health care facilities for enhanced income from goat husbandry. These informations may be helpful during formulation of policies and development schemes for goat farmers. This study may be replicated in other parts of the country to formulate region-specific policies for new goat farmers.

Acknowledgments

The authors are highly thankful to the Indian Council of Agricultural Research, New Delhi, India, and the Director, Extension of Acharya Narendra Deva University of Agriculture and Technology, Ayodhya, India, for providing the necessary facilities to conduct this study. Special thanks to Dr. Upali Kisku, Assistant Professor (Agriculture Extension), Birsa Agricultural University, Ranchi, India for assisting in structuring the manuscript. They are also thankful to the farmers who participated in this study. Every person who was involved directly and indirectly in this work is acknowledged with thanks.

Author contributions

AKS, PS and BK designed the study and did statistical analysis and helped in drafting the manuscript. SK^3 and SK^4 helped in drafting and proof reading. All the authors considerably contributed to this work.

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