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Socio-economic profile of Rohilkhandi cattle farmers in the upper Gangetic plains of Northwestern Uttar Pradesh

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Abstract

Indigenous cattle have been an essential part of traditional agriculture and have contributed significantly from a social, cultural, emotional and ecological perspective in addition to their contributions to the economy and means of livelihood. The present study was conducted to assess the socio-economic characteristics and herd structure of farmers rearing Rohilkhandi breed of cattle in the Rohilkhand region of Uttar Pradesh. A total of 450 respondents were selected from the study area and via structured questionnaires and personal interviews information was collected on various socioeconomic and sociopersonal variables. The findings revealed that the majority of respondents (61.5%) belonged to the middle age group (31–50 years) and most were male (89.58%). A large proportion of farmers belonged to Other Backward Classes (81.4%) and followed the Hindu religion (97.9%). In terms of education, 37.3% of respondents had completed secondary education, while 24.0% were illiterate. Joint family systems were slightly more prevalent (51.6%) than nuclear families (48.4%), with medium family size (49.0%) being the most common. Agriculture was the primary occupation for the majority of respondents (70.7%), while animal husbandry served as a major secondary occupation (51.9%). Most farmers had high levels of livestock rearing experience (38.0%) and very high dairying experience (36.5%). The herd size was predominantly small, with 85.7% of farmers maintaining 1–3 animals, reflecting the smallholder nature of livestock production systems in the region. Indigenous cattle alone constituted the most common herd composition (35.1%), followed by mixed herds of indigenous cattle and buffalo (30.0%). Landholding patterns indicated that most respondents belonged to marginal (38.22%) and small (34.89%) categories and the majority had low annual income levels (81.7%). Mobile phones (76.0%) and radio or television (54.7%) were the primary sources of information regarding livestock management. Overall, the study highlights the dominance of smallholder farmers practicing mixed crop–livestock farming and underscores the importance of indigenous cattle in sustaining rural livelihoods, nutritional security and agricultural sustainability in the Rohilkhand region.

Keywords: Animal husbandry, herd structure, indigenous cattle, livestock production system, mixed crop–livestock system, rural livelihoods

Introduction

India possesses one of the largest livestock sectors in the world, playing a crucial role in rural livelihoods, employment generation and economic development. Livestock provides livelihood support to nearly two-thirds of the rural population and contributes significantly to household income and nutritional security. The sector contributes approximately 5.5 percent to the national Gross Domestic Product (GDP) and about 31 percent to the agricultural GDP, highlighting its importance in sustaining the rural economy (BAHS, 2025) ^[2]. Livestock also contributes around 16 percent to the income of small farm households, compared to an average of 14 percent for all rural households and provides employment to nearly 8.8 percent of the population in India. About 20.5 million people depend upon livestock for their livelihood.

India is home to one of the largest livestock populations in the world, accounting for about 19.46 percent of the global cattle population (193.46 million) and 59.29 percent of the world's buffalo population (109.85 million), thereby contributing significantly to food security and livelihood generation (20th Livestock Census, 2019) ^[1]. Out of the total cattle population, approximately 142.11 million (73 percent) are indigenous cattle, while the remaining 50.42 million consist of crossbred and exotic cattle.

Although the overall cattle population has shown a marginal increase of 1.3 percent, the population of indigenous cattle has declined by nearly 6 percent between 2012 and 2019. Indigenous cattle are well adapted to local agro-climatic conditions and traditional farming practices and their continued decline poses a threat to genetic diversity and rural cultural heritage (Belew *et al.*, 2016) ^[4]. India possesses a rich diversity of livestock genetic resources, including 55 recognized breeds of cattle and 22 breeds of buffalo, which play a significant role in ensuring livelihood security for resource-poor farmers. These indigenous breeds are widely known for their adaptability to harsh environmental conditions, disease and drought resistance, efficient feed utilization and ability to perform draught work under low-input production systems. However, a substantial proportion of the livestock population remains non-descript, with nearly 52 percent of cattle and 45.4 percent of buffalo populations lacking clear breed identification, indicating the need for systematic characterization and conservation efforts.

Uttar Pradesh is an important livestock-producing state and is home to 6 registered indigenous cattle breeds, including draught breeds like *Ponwar*, *Kenkatha*, *Kherigarh* and dual purpose breeds like *Rohilkhandi*, *Gangatiri* and *Mewati*. Among these, *Rohilkhandi cattle* represent a recently registered dual-purpose indigenous breed with accession number

INDIA_CATTLE_2000_ROHILKHANDI_03055, originating from the Rohilkhand region of northwestern Uttar Pradesh (Fig.1). The breed derives its name from its native breeding tract, which includes districts such as Bareilly, Badaun and Pilibhit. *Rohilkhandi cattle* perform multiple functions in rural farming systems by providing milk, draught power and manure. Male animals are primarily used for ploughing fields, transporting agricultural produce and performing local haulage tasks, while female animals are valued for their reproductive efficiency and

efficient milk yield. Under low- to medium-input production systems, cows produce approximately 5 kilograms of milk per day and males exhibit good draught capacity.

Despite the economic and functional importance of *Rohilkhandi cattle* in the farming systems of the region, limited information is available regarding the socio-economic characteristics of farmers maintaining this breed. Therefore, the present study was undertaken to assess the socio-economic profile of livestock farmers rearing this indigenous breed in the Rohilkhand region of Uttar Pradesh.

Methodology

The present study was conducted in the Rohilkhand region of northwestern Uttar Pradesh, which forms part of the Upper Gangetic Plains and is characterized by fertile soils, moderate climate and a predominantly mixed crop–livestock farming system. The region includes districts such as Bareilly, Badaun and Pilibhit, where indigenous cattle rearing is an important component of rural livelihoods and agricultural sustainability. *Rohilkhandi cattle* are commonly maintained by small and marginal farmers in these districts under traditional production systems. A multistage random sampling technique was adopted for the selection of respondents. Districts were selected based on the presence and concentration of *Rohilkhandi cattle* populations (Fig. 1). From the selected districts, villages were identified and respondents were randomly chosen. A total of 450 cattle rearers maintaining *Rohilkhandi cattle* were selected as the sample for the study. Relevant variables pertaining to socioeconomic profile and livestock management were selected purposively for the study. These included demographic characteristics such as age, gender, education level, family type and occupation, as well as economic and production-related variables such as land holding, annual income, livestock rearing experience, herd size, herd composition and housing characteristics. Data were collected using a structured and pre-tested interview schedule through personal interviews with the respondents. Prior informed consent was obtained from all respondents before conducting the interviews. Care was taken to ensure clarity, consistency and accuracy of responses during data collection. The collected data were compiled, tabulated and analyzed using appropriate statistical tools with the help of Microsoft Excel to facilitate interpretation and presentation of results in a systematic manner.

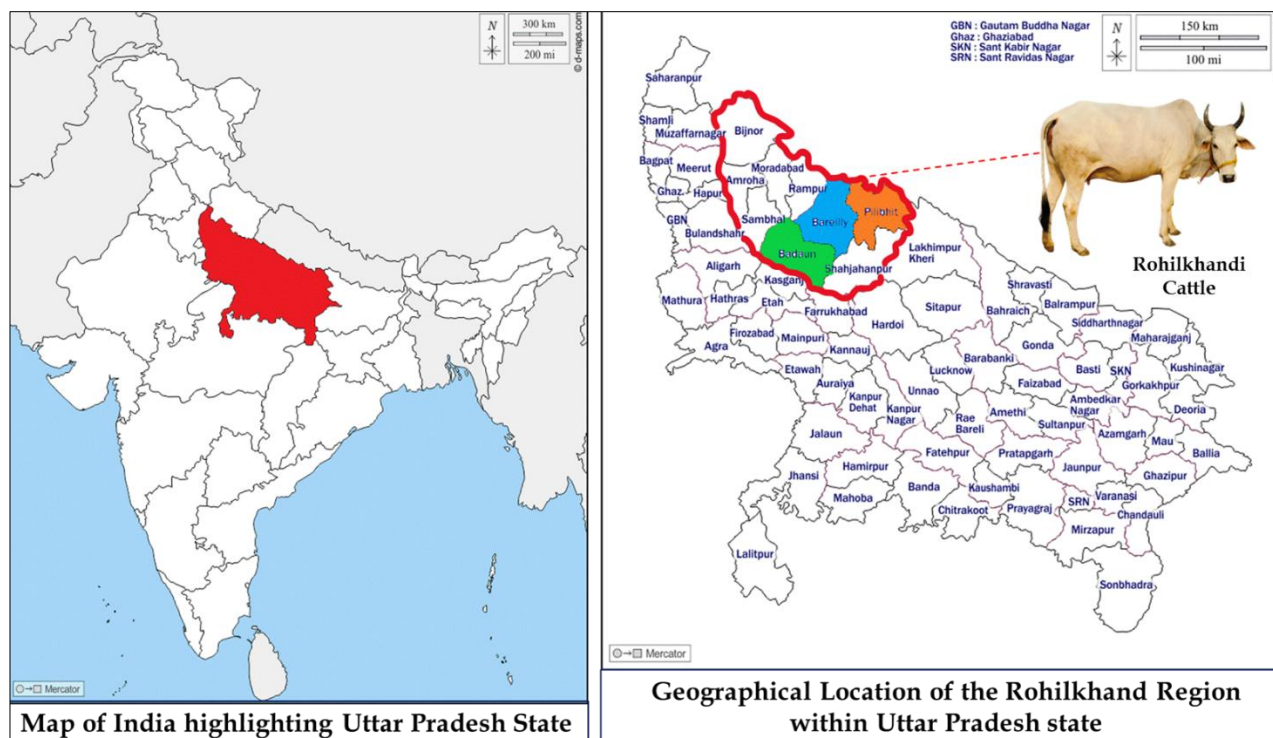


Fig 1: Map of the study area viz., Rohilkhand region of Uttar Pradesh

Results and Discussion

Respondents, represented by livestock farmers in the present study, form the fundamental unit of social research. Hence, it is important to describe their background characteristics, as socio-personal and socio-economic attributes (Table 1) significantly influence the functioning and sustainability of livestock production systems.

Age: The age distribution of respondents in the present study revealed that the majority belonged to the middle age group (31–50 years) (61.5%), followed by the old age group (above 51 years) (22.9%) and young respondents (below 30 years) (15.6%). The predominance of middle-aged respondents suggests their active involvement in indigenous cattle rearing due to greater experience and responsibility in farm management. The comparatively lower participation of younger respondents may be attributed to their engagement in education or non-farm employment opportunities.

This observation aligns with the findings of Rathod *et al.* (2011) [15], who reported that a larger proportion of farmers belonged to the middle age group. Comparable findings were reported by Naveen *et al.* (2019) [11], Pasare *et al.* (2022) [12] and Chavan *et al.* (2023) [5], who also documented a higher proportion of respondents in the middle age category. In contrast, Thesinguraja *et al.* (2017) [20] and Desai *et al.* (2012) [6] reported a higher proportion of respondents in the older age group, indicating regional variation in the age composition of livestock farmers.

Gender: The gender distribution indicated that the majority of respondents were male (89.58%), while females constituted 10.42%. Males are typically responsible for decisionmaking related to livestock production, marketing and financial management. However, women also contribute significantly to routine livestock activities such as feeding, cleaning, milking and general animal care. Men are often associated with management and working of bullocks in agricultural operations.

These findings are consistent with those reported by Verma (2013) [21] and Naveen *et al.* (2019) [11], who observed male predominance among livestock farmers. Similar trends were documented by Rajashekhar *et al.* (2023) [14]. Conversely, Rathod *et al.* (2011) [15] and Joshi (2017) [7] reported relatively higher participation of women in dairy farming activities in Kerala and Uttarakhand, respectively, reflecting differences in gender roles across production systems.

Category: The caste composition of respondents indicated that a majority belonged to the Other Backward Classes (OBC) category (81.4%), followed by the General category (10.4%) and Scheduled Caste (SC) (8.2%). This distribution suggests the predominant involvement of backward communities in livestock rearing activities in the study area. These results are consistent with those reported by Verma (2013) [21], Naveen *et al.* (2019) [11] and Pasare *et al.* (2022) [12], who also observed a higher proportion of livestock farmers belonging to backward categories. In contrast, Desai *et al.* (2012) [6] reported a higher representation of farmers from forward caste groups, indicating regional differences in the social composition of livestock farmers.

Religion: The religious composition of respondents revealed that the majority belonged to the Hindu religion (97.9%), while a small proportion were Muslims (2.1%), indicating that livestock rearing activities in the study area were predominantly practiced by Hindu households. This observation is in agreement with the findings of Kulkarni *et al.* (2013) [9], Pasare *et al.* (2022) [12] and Rajashekhar *et al.* (2023) [14], who reported similar patterns in rural livestock farming communities. However, Rathod *et al.* (2011) [15] documented participation from diverse religious groups in livestock farming in other regions.

Education level: The educational status of respondents indicated that the majority had attained secondary level education (37.3%), followed by illiterate respondents

(24.0%), primary education (14.7%) and higher secondary and graduate level education (12.0% each). This pattern suggests moderate levels of literacy among livestock farmers in the study area.

These findings are consistent with those reported by Pasare *et al.* (2022) ^[12] and Chavan *et al.* (2023) ^[5], who observed that most livestock farmers had education up to primary or secondary level. Similarly, Mahla *et al.* (2015) ^[10] reported limited educational attainment among livestock farmers. In contrast, Desai *et al.* (2012) ^[6] and Naveen *et al.* (2019) ^[11] reported higher levels of education among respondents in their respective study areas.

Family type: The study revealed that 51.6% of respondents belonged to joint families, while 48.4% lived in nuclear families, indicating the continued prevalence of traditional joint family systems in rural livestock-rearing households. These findings are consistent with those reported by Verma (2013) ^[21], Naveen *et al.* (2019) ^[11] and Singh *et al.* (2023) ^[18], who observed a higher proportion of joint family systems among livestock farmers. However, Rathod *et al.* (2011) ^[15], Kauthale *et al.* (2019) ^[8] and Pasare *et al.* (2022) ^[12] reported a gradual shift toward nuclear family structures in certain regions.

Family size: The distribution of respondents according to family size showed that the majority belonged to the medium family size category (5–7 members) (49.0%), followed by small families (27.1%) and large families (24.0%). This indicates the predominance of moderately sized households among livestock farmers.

These findings align with those reported by Potdar *et al.* (2020) ^[13], Pasare *et al.* (2022) ^[12], Chavan *et al.* (2023) ^[5] and Rajashekhar *et al.* (2023) ^[14]. In contrast, Desai *et al.* (2012) ^[6] and Verma (2013) ^[21] reported a higher proportion of respondents belonging to large families.

Primary occupation: The occupational distribution revealed that the majority of respondents were engaged in farming or agriculture (70.7%), followed by animal husbandry (13.1%), daily wage labour (12.0%) and a small proportion involved in both farming and labour (3.2%) or business (1.0%). This indicates that agriculture remains the primary livelihood activity among livestock farmers in the study area.

These findings are consistent with those reported by Kulkarni *et al.* (2013) ^[9], Verma (2013) ^[21], Pasare *et al.* (2022) ^[12], Singh *et al.* (2021) ^[16] and Rajashekhar *et al.* (2023) ^[14]. In contrast, Thesinguraja *et al.* (2017) ^[20] and Kauthale *et al.* (2019) ^[8] reported animal husbandry as the primary occupation in their respective study areas.

Secondary occupation: The distribution of respondents according to secondary occupation indicated that the majority were engaged in animal husbandry as a secondary occupation (51.9%), followed by agriculture (20.8%). Smaller proportions reported labour (7.6%), private jobs (2.0%) and business (1.0%), while 16.7% reported no secondary occupation. This suggests that livestock rearing serves as an important supplementary source of income for rural households. These findings are consistent with those reported by Kulkarni *et al.* (2013) ^[9], Pasare *et al.* (2022) ^[12] and Rajashekhar *et al.* (2023) ^[14]. In contrast, Thesinguraja

et al. (2017) ^[20] reported animal husbandry as the primary occupation rather than a subsidiary activity.

Livestock rearing experience: The distribution of respondents according to livestock rearing experience revealed that the majority possessed a high level of experience (35–50 years) (38.0%), followed by medium experience (19–34 years) (35.9%) and low experience (3–18 years) (22.8%), while only a small proportion had very high experience (3.3%). This pattern indicates that most livestock farmers had substantial practical experience in animal husbandry activities.

These findings are consistent with those reported by Verma (2013) ^[21] and Singh *et al.* (2021) ^[16], who observed that a considerable proportion of livestock farmers possessed moderate to high levels of rearing experience. Similar trends were documented by Rajashekhar *et al.* (2023) ^[14]. In contrast, Pasare *et al.* (2022) ^[12] reported comparatively lower levels of livestock rearing experience among respondents in their study area.

Dairying experience: The distribution of respondents according to dairying experience indicated that the majority possessed very high experience (more than 20 years) (36.5%), followed by medium experience (10–15 years) (34.4%), low experience (less than 10 years) (18.3%) and high experience (15–20 years) (10.8%). This finding suggests long-term involvement of respondents in dairying activities and the accumulation of practical knowledge over time.

Herd size: The distribution of respondents according to herd size revealed that a vast majority maintained small herds (1–3 animals) (85.7%), followed by medium herds (3–5 animals) (12.1%), while only a small proportion possessed large herds (more than 5 animals) (2.2%). This reflects the predominance of smallholder livestock production systems in the study area.

These findings align with those reported by Singh *et al.* (2002) ^[17] and Verma (2013) ^[21], who observed that most farmers maintained small herd sizes with limited numbers of animals. Comparable observations were documented by Mahla *et al.* (2015) ^[10] and Pasare *et al.* (2022) ^[12]. In contrast, Desai *et al.* (2012) ^[6] reported a higher proportion of farmers maintaining larger herd sizes.



Fig 2: Rohilkhandi cattle with its owner



Fig 3: Depiction of Rohilkhandi cattle

- Herd composition:** The herd composition pattern revealed that the majority of respondents maintained indigenous cattle (IC) alone (35.1%), followed by combinations of indigenous cattle with buffalo (IC + BU) (30.0%) and indigenous cattle with crossbred cattle (IC + CB) (14.0%). Smaller proportions maintained mixed herds involving small ruminants or poultry. This indicates the continued preference for indigenous cattle either alone or in combination with buffalo within traditional mixed farming systems. These findings are consistent with those reported by Verma (2013)^[21] and Kulkarni *et al.* (2013)^[9], who observed that livestock farmers commonly maintained indigenous cattle along with other livestock species as part of diversified farming systems. Balaraju *et al.*, (2016)^[3] reported that the majority of respondents possessed more than one livestock species in their households in Karnataka. Similar observations were documented by Pasare *et al.* (2022)^[12] and Rajashekhar *et al.* (2023)^[14], where mixed livestock rearing was commonly practiced to enhance livelihood security and resource utilization. In contrast, Naveen *et al.* (2019)^[11] reported that a higher proportion of farmers maintained specialized herds consisting of a single breed.
- Land holding:** The distribution of respondents according to land holding revealed that the majority belonged to the marginal land holding category (38.22%), followed by small farmers (34.89%) and semi-medium farmers (14.22%). Only a small proportion were landless (7.33%), medium farmers (4.22%) or large farmers (1.11%). This pattern indicates the predominance of marginal and small-scale farming systems among livestock farmers in the study area. These findings are consistent with those reported by Verma (2013)^[21] and Potdar *et al.* (2020)^[13], who observed that most livestock farmers possessed marginal land holdings. Similar trends were documented by Kauthale *et al.* (2019)^[8] and Pasare *et al.* (2022)^[12]. In contrast, Desai *et al.* (2012)^[6], Thesinguraja *et al.* (2017)^[20] and Naveen *et al.* (2019)^[11] reported comparatively larger land holdings among respondents in their respective studies.
- Annual family income:** The annual income distribution indicated that the majority of respondents belonged to the low income category (up to Rs. 75,000) (81.7%), followed by the medium income group (Rs. 75,000 to 1,50,000) (17.2%), while only a very small proportion fell under the high income category (1.1%). This reflects the limited earning capacity of smallholder livestock farmers in the study area. These findings align with those reported by Verma (2013)^[21], Pasare *et al.* (2022)^[12], Singh *et al.* (2021)^[16] and Rajashekhar *et al.* (2023)^[14], who also observed that most livestock farmers belonged to low or medium income groups. In contrast, Chavan *et al.* (2023)^[5] reported a higher proportion of farmers in higher income categories.
- Types of houses possessed:** The housing status of respondents indicated that all respondents (100.0%) possessed their own houses, while none lived in rented accommodation. With regard to the type of house, a majority of respondents (56.3%) resided in pucca houses, followed by 30.2% living in kutchha houses and 13.5% residing in semi-pucca or mixed houses. Similar findings were reported by Tanusha (2015)^[19], who observed that most respondents resided in pucca houses and possessed their own residential houses in rural areas.
- Source of information:** The distribution of respondents according to sources of information revealed that mobile phones (76.0%) and radio or television (54.7%) were the major sources of information, followed by fellow farmers (34.7%) and newspapers (29.3%). Only a small proportion relied on veterinary officers (2.7%) and formal training programs (1.3%). This indicates the growing importance of modern communication tools, particularly mobile phones, in disseminating livestock-related information among farmers. These findings are consistent with those reported by Singh *et al.* (2021)^[16], Rajashekhar *et al.* (2023)^[14] and Pasare *et al.* (2022)^[12], who observed that mass media and interpersonal communication were the primary sources of agricultural and livestock information. In contrast, Verma (2013)^[21] reported relatively greater reliance on extension personnel and institutional sources of information in certain regions.

Table 1 Personal and socio-economic characteristics of Rohilkhandi Cattle farmers

S. No.	Variable / Category	Particulars	Frequency (N=450)	Percentage (%)
1.	Age Category	Young (Below 30 years)	70	15.60
		Middle (31–50 years)	277	61.50
		Old age (Above 51 years)	103	22.90
2	Gender	Male	403	89.58
		Female	47	10.42
3	Caste	General	47	10.40
		OBC	366	81.40
		SC	37	8.20
4	Religion	Hindu	441	97.90
		Muslim	9	2.10
5	Education Level	Illiterate (No education)	108	24.00
		Primary (Up to 4 th standard)	66	14.70
		Secondary (5 th to 10 th standard)	168	37.30
		Higher secondary (11 th to 12 th standard)	54	12.00
		Graduation (Degree holders)	54	12.00
6	Type of Family	Joint (> 4 members)	232	51.60
		Nuclear (1–4 members)	218	48.40
7	Family Size Category	Small (Less than 4 members)	122	27.10
		Medium (5–7 members)	221	49.00
		Large (More than 8 members)	107	24.00
8	Primary Occupation	Farmer / Agriculture	318	70.70
		Daily wage labour	54	12.00
		Both (Farmer + Labour)	14	3.20
		Animal husbandry	59	13.10
		Business	5	1.00
9	Secondary Occupation	No occupation	75	16.70
		Private job	9	2.00
		Business	5	1.00
		Agriculture	94	20.80
		Animal husbandry	234	51.90
		Labour	34	7.60
10	Livestock Rearing Experience	Low (3–18 years)	103	22.80
		Medium (19–34 years)	162	35.90
		High (35–50 years)	171	38.00
		Very high (51–66 years)	14	3.30
11	Dairying Experience	Low (Less than 10 years)	82	18.30
		Medium (10–15 years)	155	34.40
		High (15–20 years)	49	10.80
		Very high (More than 20 years)	164	36.50
12	Herd Size Category	Small (1–3 animals)	386	85.70
		Medium (3–5 animals)	54	12.10
		Large (More than 5 animals)	10	2.20
13	Herd Composition*	IC	158	35.10
		IC + CB	63	14.00
		IC + BU	135	30.00
		IC + CB + BU	45	10.00
		IC + SR	11	2.40
		IC + BU + SR	22	4.90
		IC + BU + Poultry	3	0.70
		IC + BU + SR + Poultry	5	1.10
		IC + Poultry	3	0.70
14	Land Holding Category	IC + BU + SR + CB	5	1.10
		Landless	33	7.33
		Marginal (Below 1.00 ha)	172	38.22
		Small (1.00–2.00 ha)	157	34.89
		Semi-Medium (2.00–4.00 ha)	64	14.22
		Medium (4.00–10.00 ha)	19	4.22
		Large (Above 10.00 ha)	5	1.11
15	Annual Income Category	Low (Up to Rs. 75,000)	368	81.70
		Medium (Rs. 75,000 to 1,50,000)	77	17.20
		High (Above Rs. 1,50,000)	5	1.10
16	Farmer's house	Pucca house	253	56.30
		Kutch house	136	30.20
		Semi pucca / Mixed	61	13.50
17	Ownership of House	Own	450	100.00
18	Source of Information	Radio / TV	246	54.70
		Mobile	342	76.00
		Newspaper	132	29.30
		Farmers	156	34.70
		Vet / AVO	12	2.70
		Training	6	1.30

*IC: Indigenous Cattle, CB: Crossbred Cattle, BU: Buffalo, SR: Small Ruminants, Poultry: Chicken/Duck/Birds

The heatmap given below (Fig.4) presents a comprehensive distribution of the socioeconomic and farm characteristics of *Rohilkhandi cattle* farmers (N = 450), with color intensity reflecting the relative concentration of respondents across categories. A clear dominance is observed in the middle age group (61.5%), male respondents (89.58%), OBC category (81.4%) and Hindu religion (97.9%), indicating a socially homogeneous sample. Educational attainment is concentrated at the secondary level (37.3%), while joint (51.6%) and medium-sized families (49.0%) prevail. Agriculture emerges as the principal occupation (70.7%), with animal husbandry as a major secondary activity (51.9%). Experience levels are largely moderate to high in

both livestock rearing and dairying, suggesting substantial practical exposure. Structurally, most farmers operate with small herd sizes (85.7%) and marginal to small landholdings, accompanied by a high proportion in the low-income category (81.7%), reflecting resource constraints. Mobile phones (76.0%) and mass media serve as the primary information sources, whereas formal extension channels such as veterinary services and training show minimal reach. Overall, the heatmap highlights a pattern of smallholder, resource-limited, yet experienced farming systems with increasing reliance on digital information channels.

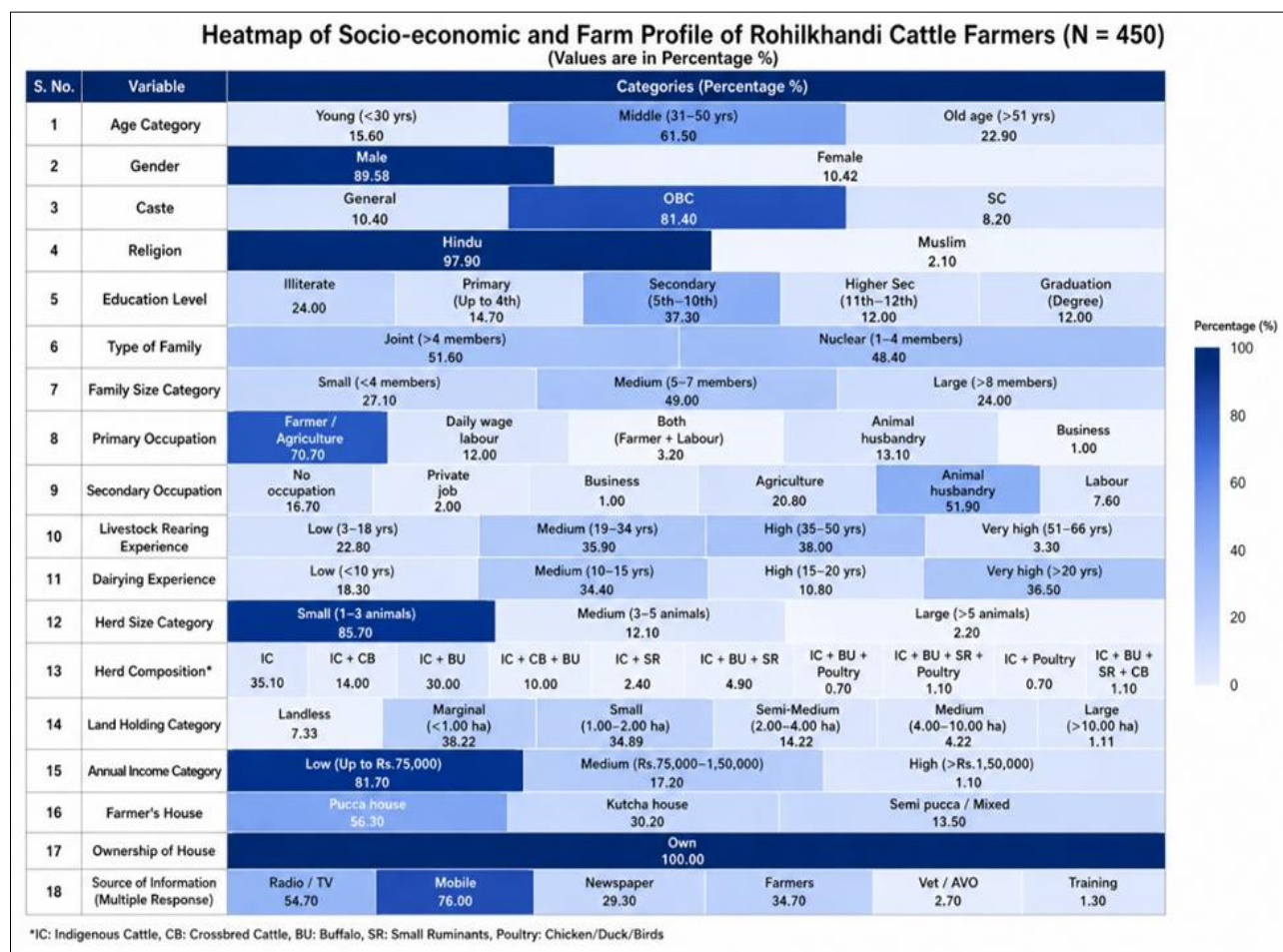


Fig 4: Heatmap of Socio-economic and farm profile of Rohilkhandi cattle farmers

Conclusion

The present study conducted to assess the socio-economic characteristics of farmers rearing *Rohilkhandi cattle* in the Rohilkhand region of northwestern Uttar Pradesh revealed that the majority of respondents belonged to the middle age group, possessed secondary level education and lived in joint families with medium family size. Agriculture was identified as the primary occupation of most respondents, while animal husbandry served as an important supplementary source of livelihood. The findings further indicated that most farmers had considerable livestock rearing and dairying experience, maintained small herd sizes and depended largely on marginal and small land holdings with low annual income levels, reflecting the smallholder nature of indigenous cattle production systems in the region. The continued maintenance of *Rohilkhandi cattle* by rural households demonstrates their importance in providing

draught power, manure, income and livelihood security under resource-limited conditions.

The study highlights that the maintenance of *Rohilkhandi cattle* is primarily sustained by small and marginal farmers practicing traditional mixed crop-livestock farming systems. These farmers play a crucial role in preserving indigenous cattle genetic resources and supporting rural livelihoods through the utilization of locally adapted breeds. The findings provide valuable baseline information for researchers, planners and policy makers to design appropriate development and conservation strategies aimed at improving the socio-economic status of indigenous cattle rearers and ensuring the sustainable continuity of native cattle populations in the Rohilkhand region. Overall, strengthening community-based livestock systems rooted in local resources and socio-economic conditions is essential for long-term sustainability of indigenous cattle production.

Conflict of interest: The authors declare that there is no conflict of interest regarding the publication of this study.

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References

1. 20th livestock census. Government of India. New Delhi: Ministry of Agriculture and Farmers Welfare, Department of Animal Husbandry and Dairying; 2019.
2. Basic animal husbandry statistics (BAHS) 2025. Department of Animal Husbandry and Dairying. New Delhi: Government of India; 2025. Available from: <https://dahd.gov.in/sites/default/files/2025-2/BasicAnimalHusbandryStatistics2025.pdf> Accessed 2026 Apr 15.
3. Balaraju BL. Role of indigenous cattle in the livelihood security of resource poor farmers: an exploratory study in Karnataka. Thesis [dissertation]. Izatnagar: Indian Veterinary Research Institute; 2016.
4. Belew AK, Tesfaye K, Belay G, Assefa G. The state of conservation of animal genetic resources in developing countries: a review. *Int J Pharm Med Biol Sci*. 2016;5(1):58-66.
5. Chavan PT, Mane SH, Kankhare DH, Suryawanshi PD, Deokate TB. Socio-economic status and constraints faced by indigenous cattle owners under field conditions in western Maharashtra. *Pharma Innov*. 2023;12(11):2292-2296.
6. Desai MD, Biradar N, Manjunath L, Doddamani MT, Mulla JA, Kataraki PA. Livelihood profile of farmers in western region of Maharashtra. *Karnataka J Agric Sci*. 2012;25(2):217-220.
7. Joshi P. Role of Badri cattle for sustainable livelihood security among farmers in hills of Uttarakhand. Thesis [dissertation]. Izatnagar: Indian Veterinary Research Institute; 2017.
8. Kauthale VK, Chirfare SR, Khadse JR. Socio-economic status of Red Kandhari cattle rearing farmers in Kandhar block of Nanded district in Maharashtra. *Int J Agric Sci*. 2019;11(13):8744-8746.
9. Kulkarni S, Bhagat RL, Pande AB, Gokhale SB. Management and physical features of tribal Kathani cattle of Vidarbha region in Maharashtra state. *Indian J Anim Sci*. 2013;83(6):625-627.
10. Mahla V, Choudhary VK, Saharan JS, Yadav ML, Kumar S, Choudhary S. Study about socio-economic status and calf rearing management practices adopted by cattle keepers of western Rajasthan. *Indian J Agric Res*. 2015;49(2):189-192.
11. Naveen KR, Veeranna KC, Gopala GT, Harisha M, Thirumalesh T, Shettar VB, *et al*. Socio-economic profile of farmers rearing Gir cattle in Karnataka. *Int J Curr Microbiol Appl Sci*. 2019;8(10):877-882.
12. Pasare G, Waghmare PG, Patil VM, Chandra S, Biradar PR, Dodamani S. Socio-economic status of farmers maintaining indigenous cattle in Bidar district of Karnataka state. *Pharma Innov*. 2022;11(9):1927-1929.
13. Potdar VV, Gaundare YS, Khadse JR, Joshi S, Swaminathan M. Socio-economic survey of Uttar Pradesh, Bihar and Maharashtra states of Indian continent. *Asian J Agric Ext Econ Sociol*. 2020;38(4):75-81.
14. Rajashekhar K, Jagadeeswary V, Shree JS. Socio-economic and psychological characteristics of livestock farmers owning Khillar cattle of Karnataka. *Res J Agric Sci*. 2023;14(1):156-159.
15. Rathod PK, Landge S, Nikam TR, Vajreshwari S. Sociopersonal profile and constraints of dairy farmers. *Karnataka J Agric Sci*. 2011;24(4):619-621.
16. Singh AK, Singh AK, Maji S. A study on socio-economic profile of the dairy farmers in central plain zone of Uttar Pradesh. *Int J Curr Microbiol Appl Sci*. 2021;10(1):988-995.
17. Singh G, Gaur GK, Nivsarkar AE, Patil GR, Mitkari KR. Deoni cattle breed of India: a study on population dynamics and morphometric characteristics. *Anim Genet Resour*. 2002;32:35-43.
18. Singh M, Lathwal SS, Prasad CK, Ruhil AP, Magotra A, Bidhan DS, *et al*. Socio-economic profile and constraints of farmers rearing Haryana cattle. *Indian J Dairy Sci*. 2023;76(4):376-382.
19. Tanusha. Utilization pattern and managerial practices of pack animals as a source of livelihood in hills of Uttarakhand. Thesis [dissertation]. Izatnagar: Indian Veterinary Research Institute; 2015.
20. Thesinguraja S, Mathialagan P, Thilakar P, Devendran P, Palanichamy V. Socio-economic profile of Pulikulam cattle rearers in Madurai and Sivagangai districts of Tamil Nadu. *Int J Curr Microbiol Appl Sci*. 2017;6(12):424-429.
21. Verma AK. Utilization pattern including conservation measures: a case of Kherigarh breed of cattle. Thesis [dissertation]. Izatnagar: Indian Veterinary Research Institute; 2013.