

RESEARCH ARTICLE

A Comparative Study of Management Approaches for Khari Goats in Traditional Versus Commercial Farming Systems in the Terai Region of Nepal

Hem Raj Dhakal¹, Durga Rawat²

¹*Sheep and Goat Research Program, Nepal Agricultural Research Council, Kathmandu, Nepal,* ²*Directorate of Agricultural Research, Nepal Agricultural Research Council, Kathmandu, Nepal*

Received: 01-07-2024; Revised: 30-07-2024; Accepted: 15-08-2024

ABSTRACT

A survey was conducted in the Nawalpur district of Nepal to compare traditional and commercial goat farming systems. The study encompassed various aspects such as demographic characteristics, housing parameters, and feeding systems. Age distribution in traditional farming showed that 31% were aged 20–35 years, 56% were 36–50 years, and 13% were above 50 years, whereas commercial farming had 25%, 66%, and 9% in these age groups, respectively. Gender analysis revealed that traditional farming involved 29% males and 71% females, while commercial farming was male-dominated with 91% males and only 9% females. Educational levels showed a stark contrast, with 33% of traditional farmers having no formal education and the rest having only primary or secondary education. In contrast, commercial farmers had higher educational attainments, with 49% having higher secondary education and 14% being graduates. Occupation-wise, traditional farmers were mainly landless farmers (32%) and agricultural laborers (46%), while commercial farmers were primarily small business holders (61%) and servicemen (39%). Housing conditions varied significantly; traditional farming houses were mainly earthen-walled (60%) with sack curtains (68%) and non-paved floors (71%), while commercial farming houses had more brick walls (50%), tirpal curtains (66%), and an equal mix of paved and non-paved floors. Traditional farms were typically attached to residences (77%) with a mix of ventilation quality, while commercial farms were separate (100%) and lacked ventilation (100%). Feeding practices highlighted that traditional farmers relied heavily on natural grasses (98%) and used grazing (44%) and tethering (41%) methods, whereas commercial farmers used cultivated grasses (86%) and the cut-and-carry method (82%). Moreover, 83% of commercial farms processed their feed, and 100% provided concentrated mixtures, which were notably absent in traditional farming (76% not supplied). Both systems predominantly used tube well water, but traditional farms also used pond water (24%).

Key words: Comparative study, traditional farming, commercial farming, Khari goats

INTRODUCTION

Goat is a key component of livestock in Nepal. The current population of goats about 14 million goat heads.^[1,2] The country has four native goat breeds, for example, Terai, Khari, Sinhal, and Chyangra.

Exotic breeds are Boer, Barberi, Sirohi, Beetal, Jamnapari, and crossbreds between the indigenous and exotic goats. Khari goat is distributed all over the country. This breed is very much suitable in harsh environmental conditions for its unique characteristics over other goat breeds. The breed is well known for its adaptability, fertility, fecundity, delicacy of meat, extreme disease resistance, and superior skin quality.^[3] It is also able to eat a wide range of poor quality forages and browses, capable

Address for correspondence:

Hem Raj Dhakal

E-mail: dhakalhemraj44@gmail.com

of walking long distances, and easily managed compared to other small ruminants and even other goat breeds available in the country.^[3,4]

The goat is often referred to as a poor man's cow due to requiring small investment and less management provision. The goat farmers in Nepal mostly practice semi-intensive, tethering, and intensive systems due to the lack of abundant land and competition between humans on this land for grain production.^[5] Goats are fed concentrate in stalls and grasses are supplied through a cut-and-carry system in intensive conditions. Farmers allow goats to tether with poor natural vegetation and crop stubbles, without or with partial supplementation and partly allow grazing the goat in fallow land, roadsides, and river banks in semi-intensive production systems.^[6]

Traditional farming systems, while rich in indigenous knowledge and practices, often suffer from limited resources, outdated techniques, and low productivity. On the other hand, commercial farming systems, which adopt modern management practices, face issues related to high input costs, market access, and sustainability. The lack of comprehensive data on the comparative efficacy of housing and feeding practices in these two systems hampers the development of targeted interventions. In addition to that, information regarding the housing and feeding of Khari goats is yet limited. Therefore, the present study was conducted to know about the housing and feeding management practices of Khari goats under the traditional and commercial farming systems.

REVIEW OF LITERATURE

Age does not have any role in livestock rearing. However, young and middle-aged people are more active and productive in keeping livestock than the aged groups.^[7] Male always dominates in livestock keeping and their marketing programs. Increased farmer education has a positive influence on the adoption of improved practices.^[3] The main referential feeds included bean soup, Napier grass, sorghum porridge, and other crop residues provided in various combinations depending on the availability. Farmers prioritized these preferential feeds for the lactating goats.^[8] In Nepal, an extensive system of goat management is not common. The

most adopted system is a semi-intensive system in which semi-commercial type farmers are involved and do not have technically well-built sheds but have a larger number of goats in their sheds and they earn a good amount of profit from goat farming.^[4] They lack technical knowledge and technicians. The intensive system of housing is also increasing in Nepal in urban areas.^[4,9] Commercial farmers adopt this system. They generally have large numbers of goats with many technically built goat sheds, feed required concentrations and ration as well as highly nutritious fodder crops. They have access to veterinary technicians and their production purpose is solely meat.^[4] Management of the shed is also a major factor contributing to the production efficiency of goats.^[10] A house should be built considering the number of goats. The housing of the goat should be built in an elevated area and the shed should have the proper ventilation and waterproof roof.^[9] Feeding is an important factor of consideration in the goat farming business. In small-level farms, people depend on forests but in a large commercial farm, nutritious fodder and concentrated feed are very important to goats for high production. Rice bran, wheat bran, and crushed maize are the main feed concentrates of goats in Nepal.^[4,5,10]

MATERIALS AND METHODS

Survey Area

Twelve commercial farms including 80 traditional farmers were surveyed in Nawalpur district of Nepal. These areas were selected based on the population of Khari goats.

Experimental Design

The experiment was conducted under four headings: First was the farmer's bibliography. This heading was designed to collect data on different socioeconomic variables such as age, gender, educational status, occupation, and annual income. The second heading was housing conditions of Khari goats that included housing parameters, namely, wall, curtain, floor, location, direction, ventilation, and source of light. The third number heading was feeding management of Khari, which included some subheadings such as type of grasses, feeding system, processing,

concentrated mixture, and source of water to gather information on the whole feeding system.

Data Collection and Statistical Analysis

Data were collected through direct interviews and making frequent personal visits. Necessary consent was taken from the owners before data collection. Initially, the objectives of the study were explained clearly to the farmers. Then, the questions were asked in a simple manner with explanations whenever necessary.

The survey on different parameters was exploratory descriptive. Therefore, data were compiled, tabulated, and analyzed with a simple statistical method to fulfill the study objectives. The tabular technique was applied for the analyses of data using simple statistical tools such as averages and percentages.

RESULTS

Farmer's Bibliography

In this study [Table 1], age is an influential factor in rearing Khari goats both in traditional and commercial farming systems. Middle-aged farmers (36–50 years) were found much interested in rearing

Table 1: Personal characteristics of farmers in percentage in traditional and commercial farming systems

Variables	Traditional farming (%)	Commercial farming (%)
Age		
20–35 years	31	25
36–50 years	56	66
Above 50 years	13	9
Gender		
Male	29	91
Female	71	9
Level of education		
No formal education	33	0
Primary school	49	0
Secondary school	18	37
Higher secondary school	0	49
Graduate/or above	0	14
Occupation		
Landless farmer	32	0
Agricultural laborer	46	0
Small business holders	22	61
Serviceman	0	39

goats to support their families. This group covered 56% and 66% for traditional and commercial farming conditions, respectively.

More than 70% of females were found involved in traditional farming. In the case of commercial goat farming, more than 90% of males were found involved. The result showed that educated farmers were not interested in traditional farming whereas they were commercially doing goat farming. Almost 50% of primary school completed farmers were found doing Khari goat farming traditionally and a similar percentage of higher secondary school completed farmers were found doing Khari goat farming commercially.

Khari goat rearing in traditional farmers was much familiar amongst the agricultural laborers (46%) followed by the landless farmers (32%), small business holders (22%), and no serviceman were involved with Khari husbandry. In commercial farming practices, small businessmen (61%) held the highest percentage then service men (39%).

Housing Management

Wall

Survey data revealed that 60% of traditional farmers built their goat house wall with soil, 24% were brick-walled, and 16% were other type. In other type, they basically use bamboo stick and polythene. On the other hand, the majority housing wall of the commercial farming system was built with brick. It accounted for 50% of the total survey data. About 33% of houses wall were made of wood and 17% of house walls were made by an iron fence in the commercial farming system [Table 2].

Curtain

Curtain was found used to cover the empty space of the wall to protect the animals from wind blows, rain, and sun rays. Farmers responded to its use during the night in both traditional and commercial farming systems. Tirpal was found using as a curtain for both farming systems and it shared 21% and 66%, respectively, of the total survey data. The sack curtain accounted 68% and 34% in the traditional rearing system and commercial farming system, respectively. Tirpal was found mostly used in commercial farming conditions and the sack was found the main curtain in

Table 2: Housing characteristics of Khari goat in traditional and commercial farming systems

Housing parameters	Types	Traditional farming (%)	Commercial farming (%)
Wall	Brick	24	50
	Earthen/wood	60	33
	Others	16	17
Curtain	Tirpal	21	66
	Sack	68	34
	Others	11	0
Floor	Paved	29	50
	Non-paved	71	50
Location	Attached with residence	77	0
	Separate	23	100
Direction	North-south	24	67
	East-west	20	16
	Others	56	17
Ventilation	No ventilation	43	100
	well ventilated	57	0
Source of light	Natural	53	33
	Artificial	26	17
	Both	21	50

traditional systems. In rural areas, farmers were found using some sort of cloth as a curtain (11%) [Table 2].

Floor

The survey data manifested that about 71% farmers provided non-paved and only 29% of farmers arranged paved floors for rearing their goats in the traditional farming system. On the other hand, it was found two types of floors, namely, paved and slatted in commercial farming systems. Both types were found equally used where the paved floor was brick finished and the slatted floor was made using wood pallet or bamboo. A small number of farmers were found using paddy straw as bedding material during the winter season in the traditional system whereas, in the commercial farming system, about 75% of farmers were observed provided bedding material around the year to keep the floor clean and to reduce the disease occurring incidence [Table 2].

Location and direction

Regarding the location of housing, the study revealed that 77% of farmers kept their goats within their own houses and 23% of farmers used separate

houses adjacent to the farmer house in the traditional system whereas in the commercial farming system, 100% of farmers built their goat's house away from their residence. About 55% of traditional farmers have no idea concerning housing direction. Only 24% of farmer's goats' house were found south facing and 20% of farmer's goats' houses were east-faced in the traditional rearing system. In the commercial farming system, almost 67% of farms were observed north-south faced, and few houses deviated from that direction due to land location [Table 2].

Ventilation and source of light

The survey data showed that 57% of farmer's goat houses were equipped with good ventilation in traditional conditions but in the commercial system, 100% of farms were adequately ventilated to satisfy their objectives. Most of the farmers (53%) were found relied on natural light and the least farmers among the respondents (21%) used both natural and artificial lighting systems as their source of light in traditional farming. On the other hand, survey data revealed that the majority of the farmers involved in the study (50%) were found utilizing both types of lighting sources, 33% and 17% used natural and artificial lighting systems, respectively, in the commercial farming system [Table 2].

Feeding System

Type of grasses and feeding system

From the survey data, it was found that 98% of farmers provided natural grasses to their goats in traditional farming conditions. They do not cultivate fodder for their goats. However, 86% goat ranchers were found cultivated hybrid types of fodder to meet their goat's roughage requirements and only 14% of farmers were relied on natural grasses in commercial farming system. Furthermore, the result also showed that 44% of farmers allowed grazing of their goats on fallow land, in roadside and even on river banks, and 41% of farmers reared goats by tethering in the traditional farming system. In the commercial farming system, 82% of goat ranchers were found offered roughages to their animals by cut and carry method and only 18% of farmers provided grazing environment to rear animals. No tethering system of management was observed [Table 3].

Table 3: Feeding characteristics of Khari goat in traditional and commercial farming systems

Variables	Traditional farming (%)	Commercial farming (%)
Type of grasses		
Natural	98	14
Cultivated	2	86
Feeding system		
Grazing	44	18
Tethering	41	0
Cut and Carry	15	82
Processing		
Not processed	91	17
Processed	9	83
Concentrated mixture		
Not supplied	76	0
Supplied	24	100
Source of water		
Tube well water	76	100
Pond's water	24	0

Processing and concentrate feeding

Quality goat feed ensures quality meat or milk production. Providing adequate feed according to the demand of goats helps them to grow faster and produce more milk or meat. According to the survey, 24% of surveyed farmers were found provided concentrate feed along with natural grasses, tree leaves, and tree tops to meet their goat's nutrient requirements in the traditional farming system. The concentrate mixture contains wheat bran, broken rice, boiled rice, kitchen vegetables waste, and common salt. The data revealed, in a commercial farming system, 100% ranchers' supplied concentrate mixture to fulfill daily requirements. They either formulate a concentrate mixture themselves or purchase the ready-made feed from the feed industry according to the goat's daily nutrient requirements and provide that mixture according to their daily requirements. The study also revealed that more than 90% of the farmers, in traditional farming, offered feed without processing whereas 83% of the commercial farmers supplied processed feed to their goats [Table 3].

Source of water

It was found that tube well water was the main source of drinking water for goats in both systems. It covers 76% and 100% of data for traditional and commercial farming systems, respectively, and only

24% of farmers use water from ponds in traditional farming system [Table 3].

DISCUSSION

Illiterate people conventionally do livestock farming due to having less ideas, information, and financial shortages.^[5] Educated farmers may apply modern techniques and technologies that optimize resource use, improve productivity, and reduce costs, making commercial farming more attractive. Educated individuals are more likely to have access to information about advanced farming techniques, animal husbandry, and business management, which are crucial for successful commercial farming.^[6,11] A preference for more durable and long-lasting structures in commercial operations, likely due to their higher initial investment capacity and focus on reducing long-term maintenance costs.^[12] Earthen walls, beaten bamboo wall, wooden stick wall are more commonly used in traditional farming than in commercial farming, suggesting that traditional farmers rely on locally available, cost-effective materials.^[10,12]

Livestock in the terai and mid hills mainly rely on fodder trees and shrubs as a source of feed and open or semi-open grazing practices are common.^[9] In the terai and mid-hill areas, farmers often collect fodder and graze their goats in government forests.^[8,9] Farmers in Nepal typically feed tree fodders and shrubs to their livestock during dry periods, particularly in the winter season. However, there are sufficient feeding materials available, such as forages, crop residues, and by-products, during other seasons to feed ruminants.^[4] Small farmers, landless farmers keep small herds of goats and sheep and rear traditionally and mostly rely on feed resources from nearby forest tree fodders.^[9] Goat-rearing in mid hill in traditional farmers is much familiar among agricultural laborers, followed by the Landless farmers, and small business holders, and no serviceman are involved in goat husbandry.^[7] Commercial farmers keep more animals and to maintain a steady supply of nutritious feeds grow various species of fodder trees, such as *Artocarpus lakoocha* (Badahar), *Ficus roxburghii* (Nivaro), *Thysanolaena maxima* (Amriso), *Ficus semicordata* (Rai Khanyu), and *Bauhinia purpurea* (Tanki),

as part of a silvipastoral agroforestry system.^[4,9] Natural pastures are the main source of fodders and forages available to farmers in Nepal.^[4] The major sources of feed supply for livestock in Nepal are crop residues and milling byproducts, which account for 44.0% of the total feed supply, followed by forests at 20.5%.^[13] There has been a reduction of 26.8% in grassland area and a 7% reduction in forest area in Nepal, which has played an important role in shifting the farmers from grazing system of management to a stall-fed system. Conversely, agricultural land has increased by 7.6% and shrubland by 4.5%. This has resulted in an increase in feed supply for livestock as compared to the situation in 1990.^[13]

A survey indicated that 85.19% of the farmers provided local feed ingredients, roughages 70.99%, while 7.41% provided market ingredients to the goat in terai and mid hill of Nepal.^[9] Many farmers used roughages and rarely purchased concentrate except commercial farmers, indicating that small ruminants were being kept in low-input systems. Due to the unavailability of sufficient pastureland and forest, the commercial farmers cultivate oat, napier, berseem, vetch, bakaino, khanayo, ipil-ipil, etc, and feed the animals by cut and carry system.^[4,11,14] Commercial goat farmers prefer stall-fed system of management and give priority to both roughage and concentrate feeding for maximum profit.^[8,15] Small farmers raise goats together with barn of cattle; but for commercial goats farming, it is good to have goats shed constructed separately for better care.^[5,16]

Traditional goat shelters are mostly made from locally available materials such as mud, bamboo, and wood and walls are typically made of mud or bamboo, sometimes reinforced with wooden frames whereas commercial goat farms use more durable materials such as bricks, concrete, and metal sheets for constructing walls.^[12] Traditional farmers use cloth or jute sacks as makeshift curtains to provide shade and protect goats from harsh weather conditions. Floors are usually compacted earth or wood planks, and goat shelters are near the farmer's home or farmland.^[6,7] Shelters face east for morning sunlight, with water sourced from nearby streams, rivers, or wells. Commercial farms are made with scientific input, often orienting buildings to optimize sunlight and ventilation. Proper ventilation systems, including exhaust fans and adjustable openings, are

used to maintain optimal air quality and reduce the risk of respiratory issues.^[7] Commercial farms often have access to piped water or boreholes. Most of the commercial farms in Nepal use raised slatted floors to allow waste to fall through, keeping the pen cleaner.^[4]

CONCLUSION

This study reveals that middle-aged farmers having lower levels of formal education predominantly practice traditional goat farming in Nepal. These farmers rely on age-old management practices and locally available feed resources. Conversely, commercial goat farming attracts more educated farmers who adopt modern management techniques and structured feeding systems to boost productivity. By harmonizing traditional knowledge with contemporary methods, Nepal can foster a more efficient and sustainable goat farming sector that benefits both the economy and local communities.

ACKNOWLEDGMENT

Authors would like to express their most sincere gratitude and appreciation to Mr. Subash Kumal for his dedicated work in data recording.

REFERENCES

1. Livestock Statistics. Livestock Statistics of Nepal (2022/23). Harihar Bhawan: Ministry of Livestock Development, Department of Livestock Services, Statistics Section; 2023.
2. GoN. Statistical Information on Nepalese Agriculture 2021/22. Singha Durbar, Kathmandu: Ministry of Agriculture and Livestock Development; 2023.
3. Joshi A, Kalauni D, Bhatarai N. Factors affecting productive and reproductive traits of indigenous goats in Nepal. *Arch Vet Sci Med* 2018;1:19-27.
4. GRS. Annual Report 2017/18. Goat Research Station (GRS), NARC, Bandipur, Tanahun, Nepal; 2018.
5. Upreti CR. Food security contribution and vision of sustainable goat production in Nepal. *Agric Res Poverty Alleviation Livelihood Enhanc* 2008;27:295-9.
6. Khadka MS, Thapa G. Economic and financial returns of livestock agribusiness in high mountain of Nepal. *J Agric Rural Dev Trop Sub Trop* 2020;2:251-63.
7. Sohan MS. A Comparative Study on Housing and Feeding Management in Traditional and Commercial Farming

- System of Black Bengal Goat in some Selected Areas of Bangladesh. MS Thesis. Bangladesh Agricultural University (BAU), Mymensingh; 2017. p. 17-77.
8. Singh SB, Singh N. Nepal livestock feed balance and strategies to address the feed deficit. *J Agric For Univ* 2019;3:159-71.
 9. Shah MK, Pandey LN, Bastola R, Shah B, Shah S. Goat feed resources and feeding management in mid-hill of Nepal. *Int J Appl Sci Biotechnol* 2023;11:15-44.
 10. Baruwala OI. Empirical analysis of costs and returns to goat production under tropical conditions. *J Livest Sci* 2013;4:44-67.
 11. Nepali MB, Tiwari MR, Sapkota S, Poudel HP. Marketing constraints to goats in the Western Hill of Nepal. *Nepal Agric Res J* 2007;8:95-105.
 12. Kumar UP, Reader RA, Singh ML, Balwada RG. Economics of Goat farming under traditional low input production system in Bikaner district. *Asian J Anim Sci* 2014;9:160-5.
 13. Singh SB. Balance Sheet of Animal Feed and Forage Seed of Nepal and Impact Study of Forage Mission Program. Report Submitted by Institute of Research and Development Studies Pvt. Ltd., Min Bhawan, Kathmandu to National Animal Feed and Livestock Quality Management Laboratory (NAFLQML), Harihar Bhawan, Lalitpur; 2019.
 14. Degen AA, Pandey LN, Kam M, Pandey SB, Upreti CR. Goat production and fodder leaves offered by local villagers in the Mid-hills of Nepal. *Hum Ecol* 2010;38:625-7.
 15. Neupane N, Neupane H, Dhital B. A socioeconomic view of status and prospect of goat farming in rural areas of Nepal. *J Instit Agric Anim Sci* 2018;35:1-8.
 16. Goat Production Handbook. Heifer International-South Africa and KwaZulu-Natal Department of Agriculture and Rural Development; 2015, p. 5-15.