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## Assessment of Behavior and Health of Farm Goat in District Rahim Yar Khan

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**Abstract:** This study presents an integrated assessment of the behavior and health status of farm goats. In order to assess a prototype protocol's viability in farms, ten dairy goat farms participated in testing. All other limitations were considered and the time allotted for implementing the prototype was noted. There were twenty-one animal-based indications in the prototype; eleven at individual level and ten at group level. A comprehensive ethogram was utilized to catalog a wide range of behaviors, including aggressive, agitated, alert, bored, frustrated, lively, relaxed, suffering and sociable. Concurrently, health parameters such as body condition score, fecal soiling, vulvar discharge, overgrown claws, ocular discharge and nasal discharge were measured. The findings indicate a strong connection between behavior and health among farm goats. Positive behaviors, such as active social interactions and engaged feeding, linked to goats with optimal health indicators. Conversely, negative behaviors, including lethargy, isolation, and abnormal repetitive movements, were associated with goats displaying signs of suboptimal health. A notable aspect of the study was the identification of potential stressors within the farming environment, such as overcrowding and inadequate shelter, which seemed to impact both behavior and health. The results emphasize the need for holistic animal management practices that consider both behavior and health.

**Keywords:** Farm goats, behavior assessment, health evaluation, animal welfare, husbandry practices.

### 1. Introduction

From ancient times, goats, often known as "the versatile livestock," have played a crucial role in human society. As domesticated mammals, they have been an essential resource in many societies because of their versatility, hardiness, and use in a variety of industries, such as the production of dairy, meat, and fiber. Because of their adaptability to a variety of climates and landscapes, including hilly and desert areas, as well as grasslands and forests, they are among the most sustainable livestock choices for small-scale and resource-constrained farmers (Jamelli, Bernard, & Melo, 2021).

Goats are clever and gregarious animals that have been shown to develop relationships with people. They are even used as pets or in therapeutic situations (Celozzi, Battini, Prato-Previde, & Mattiello, 2022). Goats come in a wide variety of breeds with distinctive characteristics all around the world. Notable for their adaptability and production in South Asian settings are the Beetal Rahim Yar Khan, Boer,

Nubian, Alpine, Saanen, and Beetal Faisalabadi (Ramzan et al., 2020).

Goats are effective grazers who can use bushes, trees, and plants that are frequently inappropriate for other animals since they eat a variety of flora (Chesterton, Chesterton, & Laven, 2022). Goat meat, also known as "chevon" or "capretto," is a staple protein in many cultures, and goat milk is extensively consumed, particularly by those who are lactose intolerant or allergic to cow's milk (Zobel & Nawroth, 2020).

Goats have enormous socioeconomic and cultural value in Pakistan. One excellent example is the district of Rahim Yar Khan in the Punjab province, which is distinguished by its substantial cattle population and fertile agricultural terrain. With more than 1.12 million goats overall, this district is essential to the production and distribution of goat milk and meat (Ali, Saleem, Irshad, Mehmood, Nisar, & Ali, 2020). Rahim Yar Khan, Sadiqabad, Khanpur, and Liaquatpur are among the tehsils in the

area that support the goat farming industry (Salas, Mondragón-Ancelmo, Badillo, Licea, & Napolitano, 2021). During religious and cultural celebrations like Eid-ul-Adha, when it is frequently offered as a sacrificed animal, goat meat is particularly prized. By sharing meat with family members and the less fortunate, this custom, which has its roots in Islamic history, promotes a sense of community (Mouftah, 2022). Furthermore, a staple food in Pakistan, goat mutton provides crucial minerals including protein, iron, and zinc, which are especially helpful in malnutrition-affected areas.

A significant portion of the rural population is economically supported by goat farming, which creates jobs in allied industries like meat markets and logistics in addition to giving farmers, herders, and meat dealers a means of subsistence (Javed et al., 2018). Additionally, Pakistan exports halal goat meat, which increases foreign exchange and showcases the industry's potential in international markets (Stilwell et al., 2020).

Goat husbandry has several difficulties despite its importance, particularly with regard to disease control. The production and economic stability of impacted areas are seriously threatened by viral illnesses including Foot-and-Mouth Disease (FMD) and Peste des Petits Ruminants (PPR) (Khan et al., 2018). Improving goat productivity and guaranteeing food security require addressing these health concerns.

In addition to analyzing the difficulties faced by regional farmers, this study intends to investigate the economic, cultural, and nutritional significance of goat farming in the Rahim Yar Khan district. The study aims to support the creation of long-term plans for raising goat productivity, protecting animal health, and raising living standards in

Pakistan's rural areas. By doing this, the study will fill important gaps in the literature on livestock and promote evidence-based decisions in the agricultural industry.

Aggressive, agitated, alert, bored, content, curious, fearful, frustrated, lively, relaxed, sociable, and suffering are just a few of the behaviors that were assessed in this study. Additionally, various health parameters were evaluated, including fecal soiling, vulvar discharge, udder asymmetry, cleanliness, abscesses, lesions, overgrown claws, knee calluses, ocular discharge, and nasal discharge.

## **2 Materials and Methods**

### **2.1 Study Area**

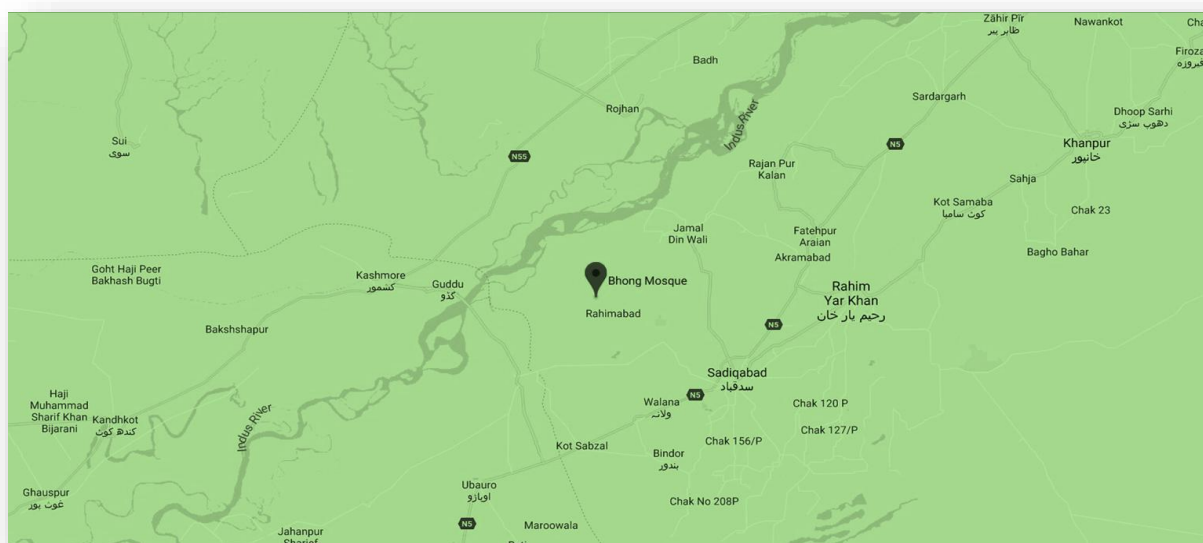
The study was carried out in District Rahim Yar Khan, which is located in Punjab, Pakistan's southeast. Liaquatpur, Khanpur, Rahim Yar Khan, and Sadiqabad are the four tehsils that make up the district. Data for this study was only gathered in the cities of Sadiqabad and Rahim Yar Khan City. Figure 2.1 shows the locations of Sadiqabad, which is situated on the Punjab-Sindh border.

### **2.2 Study duration and training**

The study was carried out between July 2023 and December 2023, a period of six months. Early in July 2023, a one-month training program was started that included field trips to nearby goat farms in District Rahim Yar Khan (RYK) as well as theoretical and practical components.

### **2.3 Study Parameters**

Animal welfare was assessed using 21 animal-based indicators, categorized into group-level and individual-level parameters. These indicators, drawn from the welfare assessment protocol by (Battini, Barbieri, Vieira, Stilwell, & Mattiello, 2016), used in this study are detailed in Table 2.3.



**Figure 2.1:** Map showing city Rahim Yar Khan and Sadiqabad

**Table 2.1:** Parameters included in the animal welfare assessment protocol

No.	Parameter	Explanation	Level	Location
1	Queuing at feeding	Count of goats queuing at feeding rack (15 min scan)	G	O
2	Queuing at drinking	Count of goats queuing at water rack (15 min scan)	G	O
3	Hair coat condition	Observation of poor hair condition	G	O
4	Oblivion	Number of isolated or mentally detached goats	G	O
5	Abnormal lying	Goats lying with sternum raised	G	O
6	Panting score	3-point scale to assess heat stress	G	O
7	Shivering score	3-point scale to assess cold stress	G	O
8	QBA	Qualitative descriptors for behavior	G	O
9	Avoidance distance test	Reaction to approaching assessor	G	I
10	Severe lameness	Count of goats with mobility issues	G	I
11	Body condition score	3-point visual BCS scoring	I	R
12	Fecal soiling	Visual sign of diarrhea	I	R
13	Vulvar discharge	Observation of purulent discharge	I	R
14	Udder asymmetry	At least 20% asymmetry in udder	I	R
15	Cleanliness	Dirt on legs, udder, hindquarters	I	R
16	Abscesses	Presence of abscesses on body	I	R
17	Lesions	Visible wounds, scabs, or hair loss	I	R
18	Overgrown claws	Visual assessment of claw condition	I	R
19	Knee calluses	3-point rating of calluses	I	R
20	Ocular discharge	Mucus from eyes	I	R
21	Nasal discharge	Mucus from nostrils	I	R

G = Group; I = Individual; O = Outside pen; R = Restrained

## 2.4 Data collection

Information on farm structure, management practices, and goat characteristics was collected through direct observation and farmer interviews. Only one pen per farm was selected based on welfare risk factors, such as resource availability and horn status of goats.

At the group level, all goats within the selected pen were assessed. For individual-level assessments, goats were

manually restrained within the pen or at the feeding rack. After assessment, each goat was marked with blue spray paint to avoid repetition.

Group-level indicators (except queuing) were presented as percentages of affected goats. For queuing at feeding and drinking, the maximum scan count was used relative to the total.

**Table 2.2:** Qualitative Behavior Assessment Descriptors

Descriptor	Definition
Aggressive	Goats attacking, biting, or butting others
Agitated	Restless, twitchy, easily startled
Alert	Vigilant and responsive
Bored	Inactive, uninterested
Content	Relaxed, joyful, playful
Curious	Inquisitive and responsive to new stimuli
Fearful	Timid, hiding, or avoiding
Frustrated	Blocked from accessing needs/resources
Irritated	Discomfort due to environment or peers
Lively	Energetic, active
Relaxed	Calm and at ease
Sociable	Engaging in social behaviors
Suffering	In pain, unresponsive, isolated

## 3. Results

### 3.1: Farm Characteristics

Farm characteristics that were studied in farms listed in table 3.1. The entire assessment process took an average of two hours, and there were no statistically significant differences across the farms. Group-level evaluation took approximately one hour and thirty minutes, and again, no significant variation

was noted between farms. Individual-level assessment duration was comparatively longer due to a higher number of animals sampled on various farms. The specific durations for each indicator are presented in Table 3.1.

**Table 3.1:** Farm characteristics

Farm Characteristic	Means $\pm$ SE
No. of lactating goats in the farm ( $\pm$ SE, min-max)	9.9 $\pm$ 5.71 (0-60)
No. of pens ( $\pm$ SE, min-max)	1.6 $\pm$ 0.45 (0-4)
No. of feeding places ( $\pm$ SE, min-max)	2.5 $\pm$ 0.96 (0-8)
Breeds at farm	Teddy (38.82%) Beetal (29.96%) Cross-breed (23.93%)
Average age ( $\pm$ SE, min-max; year)	8.27 $\pm$ 0.72 (7-10 years)
No. of deliveries	3.5 $\pm$ 0.67 (1-7)
Age at kidding ( $\pm$ SE, min-max; year)	2.0 $\pm$ 0.07 (1.5-2 years)
Annual milk yield/head ( $\pm$ SE, min-max; kg)	273.7 $\pm$ 49.05

Milking procedure	(0.00-365) Hand Milking
Bedding material	No routine
Frequency of bedding replacement	No routine
Frequency of bedding addition	No routine
Frequency of claw trimming	Every six month Every 5 <sup>th</sup> month Monthly
Presence of exterior pens (% of farms)	Every year 90%
No. of permanent workers ( $\pm$ SE, min-max)	1.5 $\pm$ 0.45 (0-4)

### 3.2. Time Duration of Data Collection

**Table 3.2:** Time duration for data collection during the welfare assessment

No.	Indicators	Time Duration
1	Queuing at feeding	15 min
2	Queuing at drinking	15 min
3	Hair coat condition	15 min
4	Oblivion	10 min
5	Abnormal Lying	10 min
6	Panting score	10 min
7	Shivering score	10 min
8	Qualitative Behavior Assessment (QBA)	30 min
9	Avoidance distance test	10 min
10	Severe lameness	10 min
11	Body condition score (BCS)	3-4 min/goat
12	Fecal soiling	3-4 min/goat
13	Vulvar discharge	3-4 min/goat
14	Udder asymmetry	3-4 min/goat
15	Cleanliness	3-4 min/goat
16	Abscesses	3-4 min/goat

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17	Lesions	3-4 min/goat
18	Overgrown claws	3-4 min/goat
19	Knee calluses	3-4 min/goat
20	Ocular discharge	3-4 min/goat
21	Nasal discharge	3-4 min/goat

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### 3.1.2. Welfare Indicators (Group Level)

**Table 3.3:** Group-level welfare indicators (Means  $\pm$  SE; min–max) for 10 farms

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No.	Indicator	Mean $\pm$ SE	Range
1	Queuing at feeding (% of animals)	0.6 $\pm$ 0.4	0.00–6.00
3	Hair coat condition (% of animals)	0.00 $\pm$ 0.00	0.00–0.00
4	Oblivion (% of animals)	0.2 $\pm$ 0.13	0.00–2.00
6	Panting score (% of animals)	2.6 $\pm$ 1.03	0.00–26.0
8	QBA Descriptors	(detailed below)	

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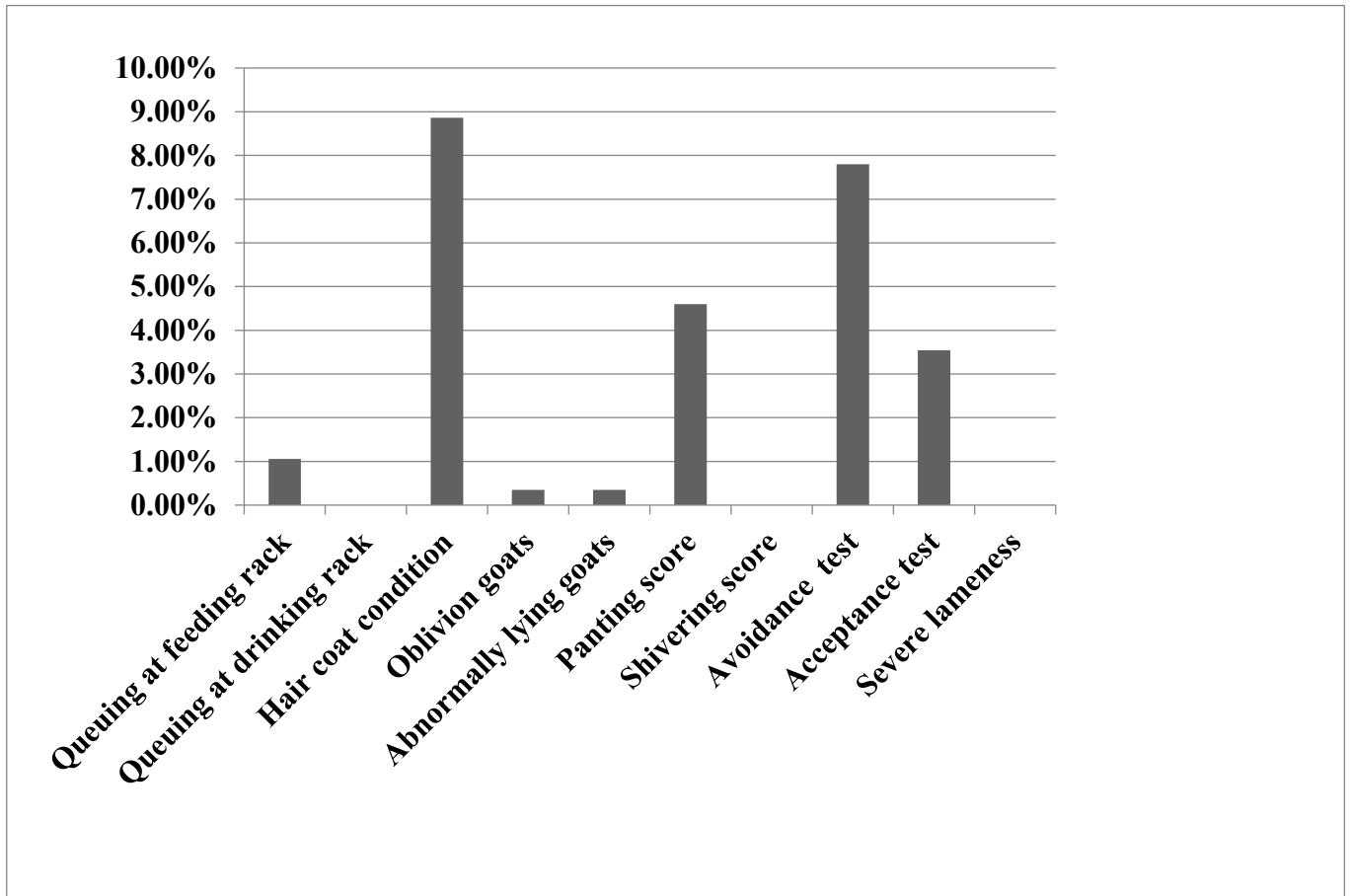


Figure 3.2: Column chart showing percentage of group level indicators.

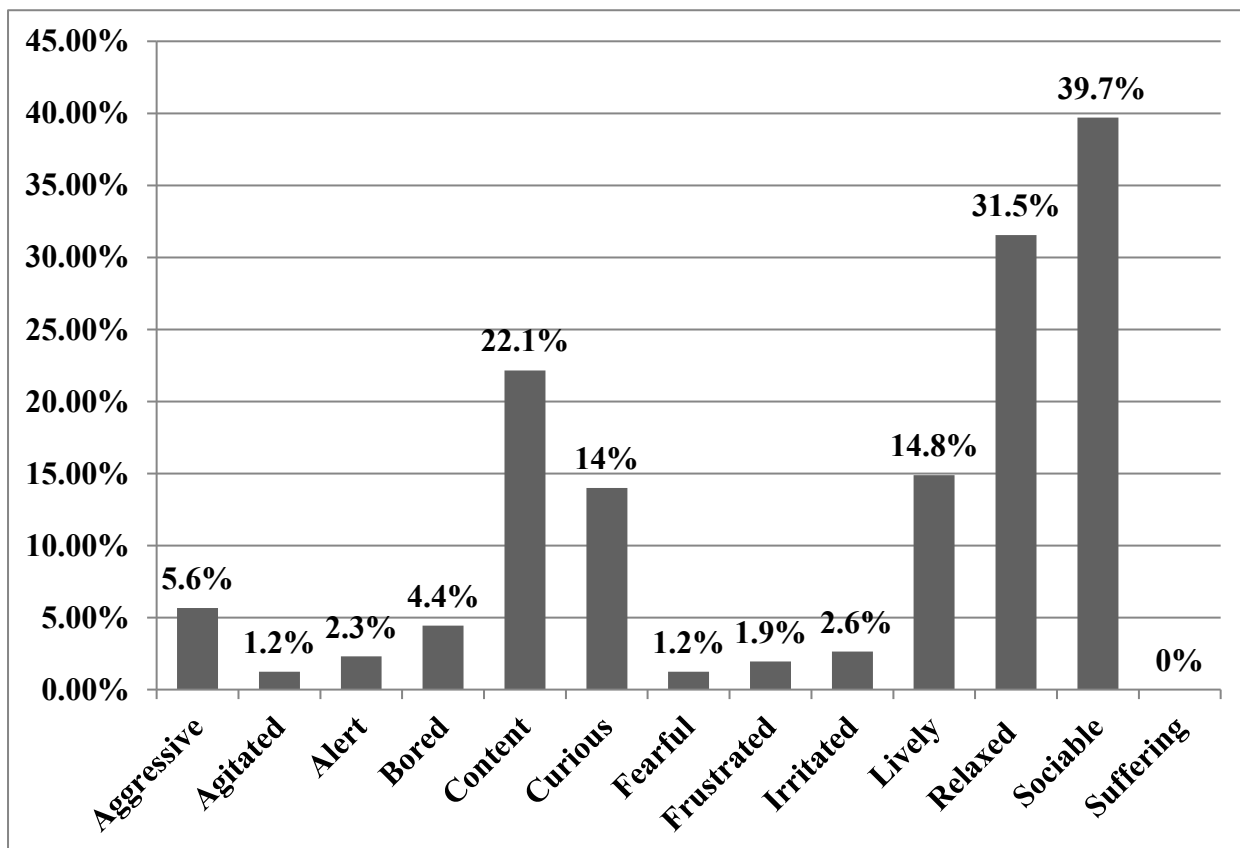


Figure 3.3: Column chart showing QBA descriptor scores.

**QBA Descriptors:**

- **Positive Mood Indicators:** Content ( $2.5 \pm 1.96$ ), Relaxed ( $8.4 \pm 1.49$ ), Sociable ( $17.8 \pm 7.08$ )
- **Negative Mood Indicators:** Aggressive (0.0), Agitated ( $3.2 \pm 0.99$ ), Frustrated ( $7.9 \pm 1.98$ )
- **Activity Level Indicators:** Curious ( $12.5 \pm 4.12$ ), Bored ( $1.3 \pm 0.3$ ), Lively ( $1.5 \pm 0.34$ )

QBA outcomes show that goats exhibiting contentment, sociability, and curiosity were prevalent on farms with better conditions, while agitation and frustration were noted where welfare concerns existed.

**Table 3.4:** Individual level indicators

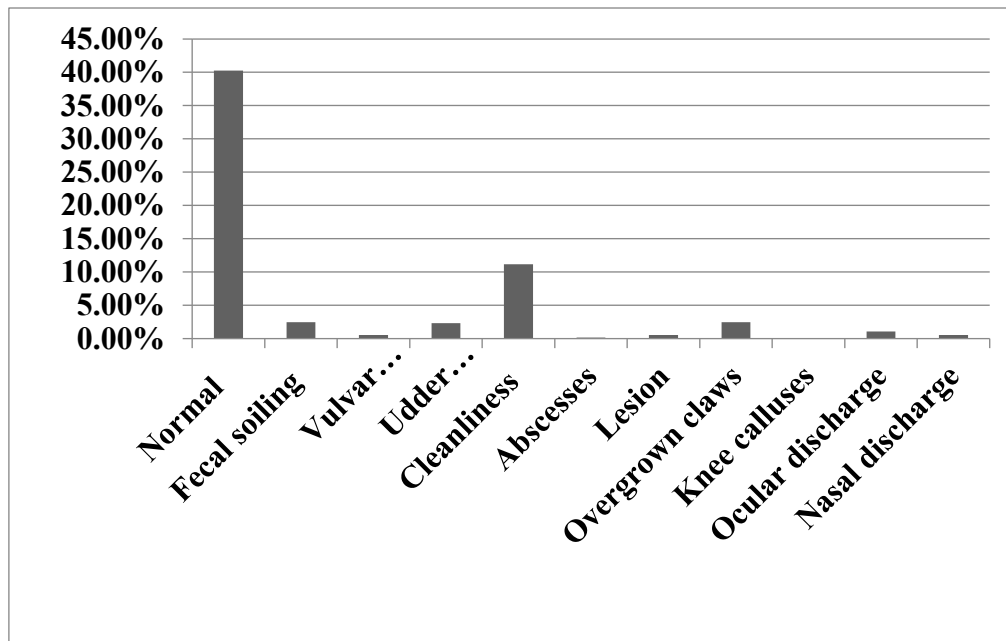
No.	Indicator	% of Animals
1	Normal	40.24%
2	Fecal soiling	2.48%
3	Vulvar discharge	0.53%
4	Udder asymmetry	2.30%
5	Cleanliness (dirty animals)	11.17%
8	Overgrown claws	2.48%
10	Ocular discharge	1.06%
11	Nasal discharge	0.53%

**3.1.3. Avoidance Distance and Lameness**

- **Avoidance:**  $4.4 \pm 0.49$  (0.00–44.0%)
- **Acceptance:**  $2.0 \pm 0.44$  (0.00–20.0%)
- **Severe Lameness:**  $0.00 \pm 0.00$  (Not observed)

**3.2. Individual Level Assessment**

A total of 564 goats were assessed (Teddy 38.82%, Beetal 29.96%, Cross-breed 23.93%). Out of these, 40.24% were categorized as normal. Some indicators such as severe lameness, discharges, and shivering were absent. Table 3.2.1 lists the indicators and their frequencies.



**Figure 3.4:** Line chart showing individual level assessment data.

#### 4. Discussion

The results revealed relatively low levels of welfare issues across the assessed farms. Individual-level data showed that 40.24% of animals exhibited normal health indicators, which is in line with previous research on dairy goats (Battini et al., 2016; Can, Vieira, Battini, Mattiello, & Stilwell, 2016). Indicators such as abscesses, overgrown claws, and lesions were nearly nonexistent, highlighting good hygiene and farm management practices.

QBA findings suggested that most farms maintained a positive emotional environment for the goats, evident through behaviors such as contentment, relaxation, and sociability. This supports earlier studies (Ellingsen, Coleman, Lund, & Mejdell, 2014), where animal mood correlated strongly with handler behavior. The minimal prevalence of overgrown claws (2.48%) reflects open grazing practices, unlike intensive systems where limited mobility can lead to higher claw issues (Anzuino, Bell, Bazeley, & Nicol, 2010). Similarly, the low incidence of dirty animals (11.17%) supports the significance of cleanliness as a welfare indicator (Spigarelli, Zuliani, Battini, Mattiello, & Bovolenta, 2020).

Comparison with prior studies conducted in Europe, the UK, and Mexico show that our regional farms exhibit similar or even better welfare indicators. Notably, in contrast to reports of 16.8–55.5% claw overgrowth in intensive farms, our data suggests that proper mobility and management significantly reduce such issues (Andreasen & Forkman, 2012).

Overall, this study provides the first extensive assessment of dairy goat welfare in the region, and highlights areas of strength as well as points for future monitoring such as maintaining hygiene and monitoring subtle behavioral changes that may precede physical symptoms.

#### 5. Conclusions

The overall well-being of farm goats is reflected in both their health and behavior. This study found that most goats exhibited normal indicators, such as cleanliness, healthy body condition, and positive emotional states, which suggest that the general management and welfare practices on the assessed farms were adequate. Routine monitoring of behavioral and physical indicators like queuing behavior, overgrown claws, and cleanliness proved effective in detecting early signs of potential health or welfare issues.

Proactive welfare management, including good hygiene, proper nutrition, and gentle handling, contributes significantly to maintaining healthy and productive animals. Farms that encouraged natural behaviors and maintained cleanliness saw better welfare outcomes. These findings underline the importance of regular welfare assessments as part of daily farm management.

For future research, it is recommended to expand such welfare assessments across different seasons and management systems to gain a broader understanding of goat welfare dynamics. This will help refine welfare benchmarks and guide more targeted

interventions for improving animal care in diverse farming contexts.

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