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RESEARCH

Changing Characteristics of Goat Farming Practices in the Eastern Province of Sri Lanka

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ABSTRACT

Purpose: *In rural areas, most goat farmers keep various breeds under different farming systems, subject to change based on seasons, grazing resource availability, and government breeding policies. This study aimed to investigate the evolving characteristics of goat farming practices in the Eastern Province of Sri Lanka, which hosts a large goat population.*

Research Method: *A total of 266 goat farmers were randomly selected from all veterinary divisions in the Eastern Province with the assistance of local veterinary offices. Data were collected from each farmer using a pre-tested, semi-structured questionnaire administered through face-to-face interviews, supplemented by farm visits and observations. The study protocol was approved by the Ethics Review Committee (ERC/FT/2022/09). The collected data were tabulated and analyzed using Microsoft Excel. The data was tabulated and analyzed using MS Excel. The results were then compared with existing literature to identify and explore recent changes in farming practices.*

Findings and Values: *Most of the goat farmers were male (92%), had primary or secondary education (75%), and were self-employed (75.8%) rearing goats at a subsistence level. The breed composition changed with the introduction of Jamnapari (45%) and Saanen (6.9%) breeds. Whereas, rearing goats for meat production (98.1%) remained unchanged. A majority of farmers (54%) had adopted a semi-intensive system, representing a shift from the previously dominant extensive system. Farmers adapt their feeding methods based on grazing resource availability, often adopting short-term, seasonally-dependent intensification strategies. These findings indicate that goat farming continues to coexist with the prevailing ecosystem as a sustainable production entity, albeit with evolving characteristics. These evolving characteristics, namely breed composition and farming systems, driven by policy and resource availability are critical for farmers and relevant authorities to inform field-level decision-making.*

Keywords: *Breed composition, Breeding policy, Feeding methods, Grazing resources, Semi-intensive system*

INTRODUCTION

Goat farming contributes significantly to the rural economy and livelihood of the smallholder farmers by providing meat, milk, cashmere, skins, mohair, and manure (Haenlein & Ramirez 2007) and plays an important role in the income source for small-scale goat farmers (Wijethunga *et al.* 2015).

Because of the adaptation to the harsh environmental conditions, goats can be raised on natural grasslands in many regions that cannot be used for crop cultivation and eventually goats provide a practical solution for the utilization of resources, abandoned otherwise (Silanikove 2000). The increase in the world population and

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the changes in the food consumption patterns as a result of changes in the living standards exert a huge pressure on livestock production systems to produce more food. On the other hand, the unfavorable changes in the world's environmental conditions, including climate change requires a sustainable animal production.

Thus, goat farming and the changes in their characteristics are considered important owing to their contribution to food production and the rural economy. Recent studies have documented a considerable decline in grazing resources within goat management systems (De Rancourt *et al.* 2006), a trend that has spurred the rapid growth of intensive production methods (Bouwman *et al.* 2005). Dubeuf *et al.* (2001) identified the development of a "false grazing system" in dairy goats, where, although the animals browse during the day, their primary nutritional requirements are met in the barn through concentrates and forages. The decrease in grazing resources and the increase in goat production intensification are driven by several factors, including a shortage of shepherds, the use of high-yielding breeds, difficulties in grazing within protected areas, rising land prices, the intensification of plant production, and the need to minimize seasonal effects on meat and milk production (Oregui & Falagán 2006). Castel *et al.* (2011) identified the drivers of the shift from grazing to intensification as: 1) the loss of traditional grazing resources, 2) favorable feed prices, 3) increased demand for milk from the processing industry, 4) subsidies and 5) farmers' enthusiasm for improving their working conditions.

Despite this trend towards intensification, growing public awareness of its negative impacts has pressured researchers to focus more on enhancing the overall sustainability of farming systems rather than solely on improving productivity. This shift in focus is crucial because pursuing a higher level of economic sustainability can often come at the expense of environmental sustainability (Ripoll-Bosch *et al.* 2014). To implement sustainability principles in these evolving systems, Castel *et al.* (2003) recommended that broad intensification should be discouraged in areas with adequate grazing resources, and that production systems there should be oriented towards sustainable practices.

Goat farming in Sri Lanka is considered as an integral part of the rural economy. There are 91,409 goat farmers rearing 750, 987 goats in Sri Lanka and most of them are rural and small-scale farmers (DAPH 2023). The goat population in the Eastern Province is 271,116, which is 36.1% of the total goat population in the country (DAPH 2023). A large number of families (35,147 goat farms), most of them are rural, partially or fully depend on goat farming for their livelihood in the Eastern Province of Sri Lanka. Three key factors the National Livestock Breeding Policy (2010), government-led development programs, and improved socioeconomic characteristics among farmers are poised to change the characteristics of goat farming. According to DAPH (2008), farmers primarily practiced an extensive goat farming system in the dry zone, which includes the Eastern Province.

In contrast, DAPH (2020) later reported that goat farming comprised semi-intensive and intensive production systems. This suggests a shift in production systems between 2008 and 2020. Further, a recent study carried out by Abeysinghe *et al.* (2022) showed that farmers mainly practiced a semi-intensive farming system in Ampara district. Whereas the study by Fonseka *et al.* (2018) showed that they mainly adopted extensive goat rearing in Mahaoya veterinary division, both of these studies indicate that production systems may vary between different divisions within the Eastern Province. Since goat farming is one of the important rural economic activities in the Eastern Province of Sri Lanka, the understanding of the changing characteristics of the goat farming activities will be helpful for farmers as well as for authorities to formulate strategies to face the socio-economic and goat production related challenges in short and long term. Previous studies (Sarmini *et al.* 2017, Nandasena *et al.* 2019, Abeysinghe *et al.* 2022) investigated the goat farming systems in different areas of Sri Lanka with different objectives; however, these studies have rarely focused on how characteristics of goat farming

systems have changed. Hence, the present study was an attempt to investigate present conditions of goat farming activities and compare them with the previous studies to identify the changes in characteristics of the goat farming operations in the Eastern Province of Sri Lanka.

MATERIALS AND METHODS

Study location

The Eastern Province is located on the eastern coast of Sri Lanka (Fig. 1) and falls within the latitude of 6° 44' 52" – 8° 55' 14" and longitude of 80° 44' 52" – 81° 52' 53". The total area of the Eastern Province is approximately 9607 squre kilometers. A large extent of scrub lands, grass lands, unproductive lands and the lands at the off-seasons are available which can be used as grazing lands for farming activities in the Eastern Province (Ministry of Lands 2016).

Climate

The Eastern Province falls under the low country dry zone according to the agroclimatic zones of Sri Lanka (Ministry of Lands 2016). The mean annual temperature in the Eastern Province varies between 25°C and 35°C. The warmest months are recorded between March and May, while the minimum temperatures occur between November and January.

The annual average rainfall ranges from 1569 mm to 1750 mm. Most of the rainfall is received between November and February during the North-East monsoon. Lesser rainfall occurs from April to September through inter-monsoonal periods, with the driest conditions typically observed in June.

Data collection and analysis

The study was conducted among goat farmers in the Ampara, Trincomalee, and Batticaloa districts. Covering all veterinary divisions in each district, 100 goat farmers from Ampara, 106 from Batticaloa, and 60 from Trincomalee were selected. The study was carried out during February–April 2021.

Both registered and unregistered farmers were included. Registered farmers were selected randomly, while unregistered farmers were selected with the assistance of veterinary officers from each district. Ethical approval for the study was obtained from the Ethical Review Committee (ERC/FT/2022/09) of the Faculty of Technology, South Eastern University of Sri Lanka.

A semi-structured questionnaire was prepared and pre-tested. Data were collected through face-to-face interviews, along with farm visits and observations. Secondary data were obtained from research articles, annual reports of the Department of Animal Production & Health, and veterinary offices.

The collected data were entered into Microsoft Excel and analyzed using Excel. Results were presented in tables. The findings were compared with existing literature from 1992 onwards on goat farming activities in the Eastern Province to identify changes in farming characteristics.

RESULTS AND DISCUSSIONS

Socio-economic characteristics of goat farmers in the eastern Province

The socio-economic characteristics of goat farmers in the Eastern Province were analyzed and are presented in Table 1. The results (Table 1) show that goats were managed mainly by males (92%). These males represent the primary labor force. Goat management systems practiced by farmers in the Eastern Province require male laborers, as goats are taken over long distances for browsing while being protected from predators.

This finding agrees with previous studies (Nandasena *et al.* 2019, Abeysinghe *et al.* 2022), which reported that the majority of goat farmers in the Ampara and Badulla districts were males. However, Joshi *et al.* (2020) found that most goat farmers in rural production systems in Nepal were women.

Most farmers (64%) were in the age range of

Figure 1. Location map of Eastern Province (Thadshayini *et al*. 2020)

25–45 years, representing a younger and more productive group, while only 11% were above 55 years. Previous studies reported that 62.4% of farmers were aged 40–50 years (Sarmini *et al.* 2017), and the average age of goat farmers was 48 years (Joshi *et al.* 2020). In the present study, 25% of farmers were aged 25–35 years, indicating the involvement of younger individuals in goat farming. This trend suggests positive development in the sector in the Eastern Province.

Regarding education, most farmers (75%) had primary or secondary education, while 16% had tertiary education. The relatively low education level may explain why most farmers were self-employed (75.8%). In terms of experience, 56.4% of farmers had 2–5 years of experience in goat farming. In contrast, Abeysinghe *et al.* (2022) reported that 50% of farmers in the Ampara district had more than five years of experience. The age distribution and experience levels indicate increasing involvement of the younger generation in goat farming.

The results (Table 1) also show that most farmers (81.5%) had a monthly on-farm income of Rs. 10,000–20,000. This suggests that goat farming is mainly practiced as a livelihood activity rather than a commercial enterprise. Furthermore, 90.4% of farmers reported a monthly off-farm income exceeding Rs. 40,000, indicating that their primary income source is off-farm activities.

Characteristics of goat farming activities in the eastern Province

Goat farming characteristics are important for determining and predicting farm performance. Data related to these activities were analyzed and are presented in Table 2.

Table 1. Socio-economic characteristics of goat farmers in the Eastern Province of Sri Lanka.

Socio-economic characteristics	Category	Percentage (%)
Gender	Male	92
	Female	8
Age (years)	25–35	25
	36–45	39
	46–55	25
	>55	11
Education	Primary	39
	Secondary	36
	Advanced level	9
	Tertiary	16
Occupation	Government	14.2
	Private	10
	Self	75.8
Farming experience (years)	<1	2.7
	2–5	56.4
	6–10	32.8
	>10	8.1
Monthly on-farm income (Rs.)	10000–20000	81.5
	20000–30000	18.5
	>30000	0.8
Monthly off-farm income (Rs.)	20000–30000	1.5
	30000–40000	8.1
	>40000	90.4

Breeds and purpose of goat rearing

According to the results (Table 2), most farmers (98.1%) reared goats for meat production in the Eastern Province, while only 0.4% kept goats for milk. These findings agree with previous studies conducted in Sri Lanka (*Sarmini *et al.* 2017; Nandasena *et al.* 2019; Abeysinghe *et al.* 2022*).

A considerable proportion of farmers (45%) kept Jamnapari goats, a dual-purpose breed promoted by the Department of Animal Production and Health (DAPH) to improve milk production under the National Livestock Breeding Policy (2010). In addition, 6.9% of farmers reported rearing Saanen goats. Although both breeds have high milk production potential, the reasons for their limited use in milk production were not investigated in this study. Further research is therefore needed to understand the lack of transition in production objectives.

Seresinhe & Marapana (2011) reported that 50% of herds in the Galle district consisted of dairy goats, with some farmers generating income from milk sales. In the present study, 9.6% of farmers reported keeping Kottukachchiya goats; however, these claims were not verified through morphological assessment during field visits. The results also show that 62.3% of farmers kept crossbred goats. No farmers reported maintaining indigenous breeds, although field observations indicated that many farmers kept mixed herds. Previous studies (*Wijethunga *et al.* 2015; Sarmini *et al.* 2017*) reported that over 75% of goats in other regions of Sri Lanka were

Table 2. Characteristics of goat farming activities in the Eastern Province of Sri Lanka.

Farm characteristics	Category	Values
Type of breed	Jamnapari	45%
	Kottukachchiya	9.6%
	Sri Lankan Boer	2.3%
	Beetal	4.6%
	Saanen	6.9%
	Cross breed	62.3%
Purpose of rearing	Meat	98.1%
	Milk	0.4%
	Meat and milk	1.5%
Farming systems	Extensive	45%
	Semi-intensive	54%
	Intensive	1%
Mixed/integrated farming	Goat and poultry	31.9%
	Goat and cattle	2.3%
	Goat and crop	8.1%
	Goat only	57.7%
Feeding methods	Browsing	43%
	Cut and feed	1%
	Browsing and cut and feed	56%
Feeding frequency	One time/day	27%
	Two times/day	51.4%
	More than two times/day	21.6%
Types of feed	Concentrate	0.4%
	Roughage	43.6%
	Concentrate and roughage	56%
Watering	Pipe water	5.8%
	Canal water	45.8%
	Well water	48.5%
	Minor tank	0%
	Automatic system	0%

indigenous.

According to DAPH (2010), *Saanen, Jamnapari, Sri Lankan Boer,* and *Kottukachchiya* are the goat breeds commonly available in Sri Lanka. Indigenous and crossbred goats are found throughout the country. However, according to the findings of the present study, the most commonly available breed in the Eastern Province is a crossbreed. The overall results of the study with regard to breeds and the purpose of goat rearing indicate that a change in breed composition in the Eastern Province of Sri Lanka can be observed, where farmers shifted to crossbreed by upgrading the existing breeds. However, the purpose of keeping goats

(for meat purposes) remains the same, without any change, although the change from meat purposes to milk purposes or to meat and milk purposes (dual purpose) was expected with the change in the breed composition. However, 0.4% and 1.5% of the farmers were found to be keeping goats for milk and dual purpose (meat and milk), respectively, which can be viewed as the beginning of a change in purpose.

Farming systems and feeding

The results (Table 2) showed that 45%, 54%, and 1% of the farmers practiced extensive, semi-intensive, and intensive farming systems, respectively, in the Eastern Province of Sri Lanka. These results indicate that the majority of goat farmers practice a semi-intensive farming system. The results further showed that intensive goat farming is at a very low level. The results may further indicate that farmers in the Eastern Province can feed their goats through grazing. The growing limitations on grazing resources may be one of the reasons for the transition from the extensive system to the semi-intensive system observed in the present study. The literature shows that farmers mainly practiced extensive goat farming systems in the Eastern Province in the past. For example, goat farmers in the dry zone, to which the Eastern Province belongs, practiced extensive farming systems (DAPH 2010, Subasinghe 2014) (Table 3). Furthermore, according to Hariharan *et al.* (1992), 79% of the goat farmers in the Batticaloa district in the Eastern Province of Sri Lanka practiced an extensive farming system. A recent study by Abeysinghe *et al.* (2022) showed changes in the goat farming system in the areas of the Eastern Province. They found that around 97 % of the goat farmers practiced a semi-intensive management system in the Ampara district, one of the districts in the Eastern Province. The findings of the present study and the very recent study by Abeysinghe *et al.* (2022) showed a significant change in goat farming from an extensive system to a semi-intensive system. In line with the findings of the present study, a higher percentage of semi-intensive farming systems was found in other parts of Sri Lanka by previous researchers.

For example, Sarmini *et al.* (2017) found that 47.8% of the farmers practiced semi-intensive farming systems compared to 43% of extensive farming systems in the Vavuniya district. According to Nandasena *et al.* (2019), all farmers practiced a semi-intensive farming system in the Badulla district. Seresinhe & Marapana (2011) found that more than 80% of the farmers in Matara and Galle districts practiced intensive goat farming systems, mainly due to the limitation of grazing lands, while 97% of the farmers in the Hambantota district practiced extensive farming systems in the southern province.

A recent study by Fonseka *et al.* (2018) showed that goat farmers in the Mahaoya Veterinary Range in the Ampara district primarily adopted an extensive farming system. The present study, in general, concludes that farmers in the Eastern Province mainly practice semi-intensive farming systems compared to extensive farming systems, even though area-wise adaptation between the extensive and semi-intensive farming systems is observed. As shown in Table 2, the feeding methods adopted by goat farmers in the study area were browsing (43%), cut-and-feed (1%), and a combination of both (56%). The high prevalence of the combined method is likely due to seasonality; specifically, during the rainy season, farmers in extensive and semi-intensive systems often partially or fully switch to the cut-and-feed method. This is because grazing resources become limited when crop farmers cultivate communal grazing lands. Another contributing factor is the increased risk of internal parasite infestation during this season (Dohare *et al.* 2013). Despite these challenges, the fact that 43% of farmers relied solely on browsing suggests that significant grazing resources remain available even during the rainy season. However, the availability of these resources varies across the Eastern Province, depending on the extent of cultivation. The present study indicate that the availability of the grazing resources determines the feeding method and both grazing resources and feeding methods together determine the farming systems.

As such, the choice of farming system by farmers is primarily determined by the availability of grazing resources. Previous

Table 3. Changing goat farming systems in the Eastern Province of Sri Lanka.

Farming and location	Farming systems	Reference
Goat farming in Batticaloa district	Extensive farming – 79%	Hariharan *et al.* (1992)
Goat farming in the Eastern Province	Extensive system – mainly	DAPH (2010)
Goat farming in Mahaoya (Ampara district)	Extensive farming – primarily	Fonseka *et al.* (2018)
Goat farming in Ampara district	Semi-intensive farming – 97%	Abeysinghe *et al.* (2022)

studies indicate that farmers tend to adopt intensive production systems when land is limited (Seresinhe & Marapana 2011). Considering the findings of this study alongside a review of previous literature, it is evident that grazing resources are a major determinant in selecting a farming system. As grazing resources become limited, farmers tend to shift from extensive to semi-intensive systems and, depending on the severity of the limitation, may further intensify by adopting cut-and-feed or stall feeding (Seresinhe & Marapana 2011), often in combination with supplementary feeding (Sarmini *et al.* 2017).

The existing goat farming systems and feeding practices align with the sustainability concept proposed by Castel *et al.* (2003), who emphasized that goat farming should be oriented towards sustainable production where appropriate grazing resources exist. Discussions with goat farmers revealed that due to the limited grazing resources in various areas of the Eastern Province during the rainy season, some farmers are compelled to adopt intensive systems, such as stall feeding. Consequently, a seasonally-dependent intensification of goat farming has become a common practice during the rainy season in these areas. This supports the conclusion of Ripoll-Bosch *et al.* (2014) that farmers rationalize their farming systems based on region-specific factors—such as access to communal resources, inputs, markets, and production potential—as well as their own intrinsic characteristics.

Several other previous studies have found that grazing resources are limited during dry spells too. For instance, Seresinhe & Marapana (2011) concluded that severe feed shortages caused by dry spells are a major constraint for goat farming in the Southern Province. They also noted that goat farmers face additional challenges, including the absence of grazing lands and the reduction of shrubs in reserve areas due to development programs. Similarly, Sarmini *et al.* (2017) identified a lack of grazing land as a primary constraint for goat farming in the Vavuniya district and recommended the practice of strategic feeding during dry periods.

According to Nandasena *et al.* (2019), farmers in the Badulla district employ cut-and-feed, tethering, and free grazing methods depending on local grazing resource availability, despite all of them operating under a semi-intensive farming system. Collectively, these studies demonstrate that grazing resources are constrained not only during the rainy season but also in the dry season, compelling farmers to adopt seasonally-dependent strategic feeding alongside supplementation (Sarmini *et al.* 2017).

An important finding of the present study was that a significant portion of goat farmers practiced mixed farming, goats together with poultry, or cattle, or crops. It was found that 57.7% of farmers reared only goats. This suggests that farmers who diversify their activities likely do so to secure a variety of products and income streams, thereby reducing their sensitivity to input supply shortages and price fluctuations—a strategy that aligns with the findings of Peacock & Sherman (2010). Overall, the findings of this study align with Castel *et al.* (2003), who identified the loss of grazing resources as a key driver of change in goat production.

This loss of grazing resources is both seasonal and driven by government-led development programs. Other identified drivers of change include government livestock breeding policies and the socioeconomic characteristics of the farmers themselves.

CONCLUSION

Having the results on the socio-economic characteristics of the farmers, it is concluded that those who engaged in the goat farming in the Eastern Province of Sri Lanka are mainly males relatively educated, self-employed and managing the farm at the subsistence level. With regard to breeds and purpose of rearing, the change in the goat breed composition occurred while the purpose of goat rearing remains unchanged. Therefore, it is suggested that the DAPH can educate and motivate the farmers to produce goat milk utilizing milk potential of Jamnapari and Saanen goats in the Eastern Province of Sri Lanka. Regarding the farming system and feeding methods, the goat farmers are resilient and change their feeding methods depending on the availability of grazing resources by practicing seasonality dependent short period intensification of goat production.

As a result of the dwindling grazing resources, permanent change from extensive system to semi-intensive system takes place in slow pace in the Eastern Province of Sri Lanka in goat farming sector. Further, characteristics and dynamics in the goat farming indicates that the current goat farming practices co-exists with prevailing ecosystem as a sustainable production entity in the Eastern Province. Further research is needed to explore the drivers behind these changing characteristics and their socioeconomic implications.

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