

CHARACTERIZATION OF GOAT PRODUCTION SYSTEMS IN BADULLA DISTRICT OF SRI LANKA

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Abstract

Goat farming in Sri Lanka has a great potential for expansion, especially in rural economies where it can be operated with low input levels. Badulla district is considered as a rural area where agricultural activities are predominant. However, the available information on goat farming in Badulla is limited. Since identification of existing information is important in exploring the opportunities for further development, the present study was conducted with the objective of characterization of the goat production systems in Badulla district. A survey was conducted using 320 goat farmers in 15 divisional secretariats of Badulla district using stratified and simple random sampling techniques. A pre-tested structured questionnaire was used to collect data on farmers' general information, herd characteristics, management practices and constraints of farmers. Descriptive statistics were obtained using MS-Excel and Minitab 17 statistical software. The results indicated that goat farming is more popular among Tamil (76.9%) and Muslim (19.7%) communities. In 91.9% goat farms, herd owner is a male although housewives and children helped in farming activities. Majority of goat farmers (80.6%) had only the primary education although majority (58%) of goat farmers are having more than 10 years of goat farming experience. Almost all farmers (99.7%) in the area considered goat farming as a secondary income source. Most of goat herds were indigenous (75.6%) while 24.4% were Jamnapari crosses. The average herd size was 6.65 ± 4.70 . All farmers rear goats under semi-intensive management system. Although, cut and feed, tethering and free grazing were found as major roughages feeding systems, these can vary in different areas of Badulla according to the resource availability. Further, almost all the goat farmers provide some kind of housing facility to their goats and around 50.0% farmers used raised slatted floor houses. According to the farmers' perception, lack of goat breeds, less government support and less land availability were identified as main problems in goat farming in Badulla. Therefore, based on proper data, short-term and long-term development plans should be implemented for development of goat farming in Badulla.

Keywords: Goat Farming, Badulla District, Survey

INTRODUCTION

Goat farming is turning into very popular venture with the increasing consumption of goat meat and milk all over the world. Currently, there is nearly 1 billion goat population is distributed around the world where nearly 90% of them is positioned in Asian and African countries (FAO, 2016). Goats are considered as important animals in smallholder farming systems due to their contribution to the socioeconomic status of the poor farmers. According to Devendra (1981), goats provide a definite means of livelihood and sustainability for landless peasants and laborers (Devendra, 1981). Although goat farming has many advantages,

goat industry in Sri Lanka still has low level of productivity, and its contribution to the food basket and economy of the country is minimal (Subasinghe, 2016). Hence, there is a great potential for expansion of goat production in Sri Lanka, especially among rural sector smallholder farmers. Badulla district is dominated by rural areas where agriculture based activities are predominant. The total goat population in Uva Province is 16,559 out of which 12,587 are from Badulla district (Department of Animal Production and Health, 2017). Apart from the population information, goat farming and production information in Badulla district is limited. Since, the proper description of existing farming and production status systems in the

area is one of the first steps necessary for any intervention for improvement of the system; present study was carried out with the objective of characterization of the goat production systems in Badulla district.

MATERIALS AND METHOD

The study area was Badulla district of the Uva province of Sri Lanka. All 15 divisional secretariats of Badulla district were included in the study (Figure 1), and each divisional secretariat area was considered as a stratum. A total of 320 goat farmers were selected in such a way to represent 20% of total goat farmers in each stratum (Table 1). StatTrek sample size calculator (2018) was used to

calculate the sample size in each stratum, within which simple random sampling technique was applied to select the goat farmers for the study.

The study was conducted during September to November 2018 and a pre-tested structured questionnaire was used to collect data on demographic information of farmers, herd characteristics, management practices and constraints of goat farming in the area. Face-to-face interviews and direct observations were used to complete the questionnaires.

The collected data were analyzed by descriptive statistical analysis using MS-Excel and Minitab17 software.



Figure 1: Location of study area in Uva Province

(Source: <http://www.daph.gov.lk/web/>)

Table 1: Calculated sample sizes from each divisional secretariat in Badulla district

Divisional Secretariat/ Strata	Total number of goat farms	Sample size
Badulla	186	40
Bandarawela	16	4
Ella	67	15
Haldumulla	195	42
Haputale	69	15
Haliela	439	93
Kandaketiya	29	7
Lunugala	149	32
Mahiyanganaya	49	11
Meegahakiwle	22	5
Passara	14	4
Rideemaliyadda	30	7
Soranathota	60	13
Uva Paranagama	51	11
Welimada	95	21
Total	1471	320

RESULTS AND DISCUSSION

Socio-economic Background of Goat Farmers

The results of the survey indicated that goat farming is popular among Tamil and Muslim ethnic communities representing 76.9% Tamil farmers and 19.7% Muslim farmers and only 3.4% Sinhalese farmers, irrespective to the ethnic representation of around 73.0%, 21.1% and 5.5% of Sinhalese, Tamil and Muslim communities of the district (Department of Census and Statistics, 2014). Cultural affiliations and religious beliefs could have contributed for the ethnic distribution of goat farmers in the study area.

Majority of the farm owners were males (91.9%) which is similar to the observations of Serasinghe and Marapana (2015) in Southern province and Fonseka et al. (2018) in Mahaoya veterinary range in Ampara

district. Although herd ownership belongs to males, almost all goat farmers (99.7%) included in the study were engaged in goat farming as a secondary source of income. Most of the farmers work as estate workers which generate their primary income. These results are comparable to the findings of Sarmini et al. (2017) who reported that goat farming was a part time income generating activity for many farmers. Since males are engaged in primary income generation activities, they have limited time for goat farming activities. Therefore, females and children in the family are playing major role in goat farming activities. Family labour (from females and children) is used in farming agreeing with the conditions observed by Serasinghe and Marapana (2011).

There was a wide variation of the age of the goat farmers ranging from 20 to 70 years having majority belonging to the category of 41-50 (40%). Further, majority of them

(80.6%) are having only primary education which is similar to the findings of Wijethunga et al. (2015) who have conducted the research in Bulathkohupitiya Veterinary range where main income source of goat farmers is generated through working in tea and rubber plantations (Figure 1). However, around 58% of goat farmers had more than 10 years of experience (Figure 2). Mainly these goat farmers have been engaged with goat farming activities from their childhood and they are well experienced in goat rearing with traditional practices. However, the presence of around 42% of goat farmers with less than 10 years of experience and having a wide distribution of age categories in the present study reflect that goat farming has being attractive as a farming venture in the area. Thus, there is a potential for improving the goat farming in Badulla district.

Herd characteristics

The average herd size of goats under semi-intensive management system which is the predominant management system in Badulla district was 6.65 ± 4.70 and this value is less

than the observations of Sarmini *et al.* (2018) which is 19.9 ± 1.85 . However, Wijethunga et al. (2015) have observed similar herd size under intensive management system in Bulathkohupitiya veterinary range. The observed average herd size in Badulla district is biased due to the presence of few farms with large number of goats. However, most of the goat farmers in the area maintained few number of goats in herd. Govindrao (2015) explained that it is impossible to maintain a large herd due to limited land availability. This explanation is valid for the present study too as there was a high variation in average herd size among different divisional secretariats of Badulla district according to the availability land and other resources within the area (Table 2).

When the herd composition of goat farms in Badulla district was considered, does were the prominent category in the herds followed by kids. It is well known that goat farmers do not prefer to keep mature male animals in their herds. Only few billy goats are kept in the herds for breeding purpose while all the other male goats are sold once matured (Table 3).

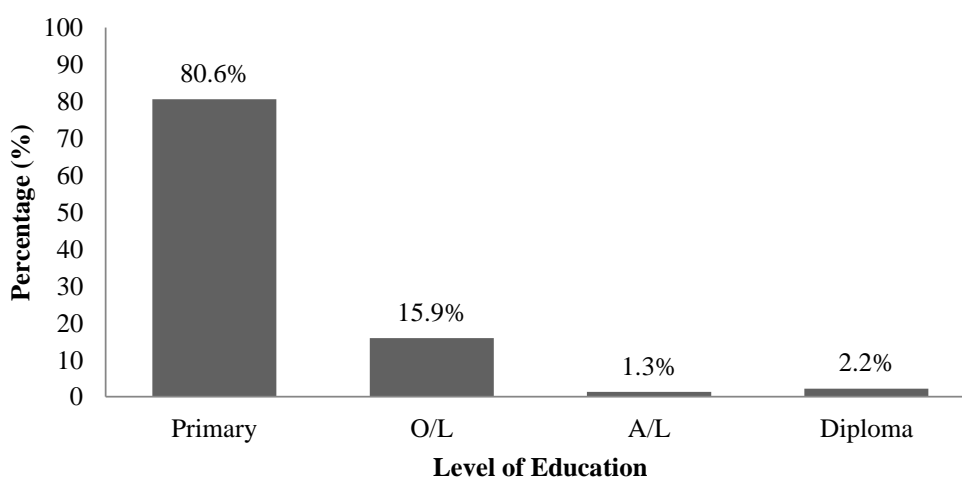


Figure 1: Education level of goat farmers in Badulla district

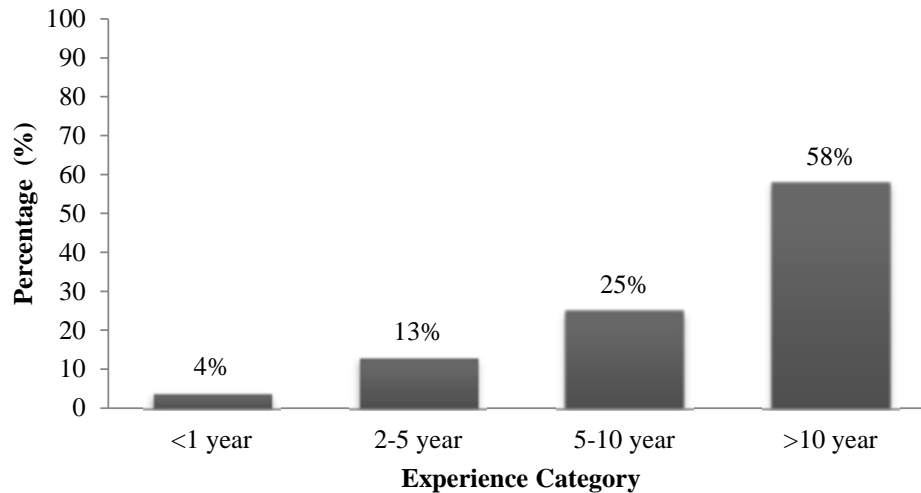


Figure 2: Experience of goat farmers in Badulla district

Table 2: Distribution of average herd size within divisional secretariats of Badulla district

Divisional Secretariats	Herd size (Average Number of Goats±SD)	Goats (%)		
		Female	Male	Kids
Badulla	9.13±9.43	41.07	24.42	34.50
Bandarawela	5.50±3.79	40.90	22.72	36.36
Ella	6.45±1.69	45.43	24.81	29.92
Haldumulla	5.12±1.86	46.48	20.00	33.40
Haputale	6.04±3.67	46.19	21.36	32.95
Haliela	5.60±2.06	51.25	22.68	26.25
Kandekatiya	7.57±2.37	47.16	26.42	26.42
Lunugala	5.03±2.58	43.54	19.28	37.36
Mahiyanganaya	9.18±5.42	40.63	20.70	38.67
Meegahakiwle	11.00±5.20	36.36	21.82	41.82
Passara	7.75±2.50	38.71	25.85	35.48
Rideemaliydda	6.43±2.23	42.14	17.78	39.97
Soranathota	7.46±5.27	46.38	24.80	28.82
Uvaparanagama	9.09±3.45	42.90	20.90	35.97
Welimada	6.71±3.05	47.54	25.48	26.97

*SD – Standard Deviation

Table 3: Herd composition of goats in Badulla district

Type of goat	Number of goats Mean±Standard Deviation	Percentage	Maximum
Female	2.96±1.98	52.7%	21.0
Male	1.48±1.29	14.0%	14.0
Kids	2.21±1.95	33.3%	25.0

Mainly two types of goat genotypes, namely; Sri Lankan Indigenous and Jamnapari crossbred can be found in Badulla district. Majority of goat herds belongs to Sri Lankan Indigenous goats (76%) whereas 24% goat herds belong to Jamnapari crossbred type. Goat farmers prefer to rear Jamnapari crossbred goats due to their high weight gain compared to Sri Lankan Indigenous goats.

Management Practices of Goats

Semi-intensive management system is the prominent goat management system in the district. However, goat management practices in Badulla district varies according to the differences in resources availability and climatic conditions in the area.

Housing facilities

Almost all goat farmers (99.7%) in Badulla district had provided permanent or temporary housing facilities for goats. The requirement for housing is high in Badulla district due to limitations in land and climatic condition. However, type of housing varied with financial strength of farmers and material availability. Houses were with slattered floor, earthen floors or concrete floor, and with ground level or elevated floor were found (Table 4). Ground level or concrete floor was rare since the prevailing cold climatic conditions of the area could negatively affect goat health.

Table 4: Variation of type of goat houses in each divisional secretariat of Badulla district

Divisional Secretariat	Housing Type (%)		
	Slattered Floor	Ground level or Concrete Floor	Ground Level with Elevated Floor
Badulla	42.5	-	57.5
Bandarawela	100	-	-
Ella	53.3	-	46.7
Haldumulla	35.7	-	64.3
Haputale	48.4	1.1	50.5
Haliela	66.7	-	33.3
Kandekatiya	100	-	-
Lunugala	34.4	-	65.6
Mahiyanganaya	45.5	-	54.5
Meegahakiwle	100	-	-
Passara	50.0	-	50.0
Rideemaliydda	100	-	-
Soranathota	53.8	7.7	38.5
Uvaparaganagama	72.7	27.3	-
Welimada	42.9	-	57.1

Feeding Management of goat

Farmers follow mainly three methods in providing roughages, i.e. cut and fed, tethering and free grazing. However, according to the weather condition in different periods of the year farmers select suitable feeding method from the above three methods. Usually free grazing is not practiced during rainy season. Further, tethering and free grazing time also had variation according to the climatic condition in the area. The areas with dry climatic condition, such as Mahiyanganaya and Rideemaliyadda, tethering or free grazing is generally practiced until late noon of the day while in cold climatic areas tethering or free grazing is practiced until middle of the day. *Gliricidia sepium*, *Megathyrus maximus*, *Erythrina variegata*, *Calliandra calothyrsus*, *Tithonia diversifolia*, *Artocarpus heterophyllus*, *Hibiscus rosa sinensis*, *Persea Americana*, *Zea mays*, *Michelia champaca*, *Moringa oleifera* are the common roughages available for goats in Badulla district.

Majority of goat farmers (81.6%) practiced supplementary feeding for goats. It was noted that all the goat farmers in Mahiyangana and Rideemaliyadda areas do not practice concentrate feeding for goats (Figure 3), since their attention on goat farming is minimum

and practicing goat farming with minimum input level. Coconut poonac, cattle feed and rice bran are the commonly used supplementary feeding materials used for goats in Badulla district. However, farmers do not pay attention for the quality of supplementary feed since they are not interested in milk production. Moreover, goat farmers pay least attention for the vitamin and mineral supplementations. Only 1.3% of goat farmers were practicing mineral and vitamin supplementation for goats.

Breeding practices and other management

In Badulla district, natural breeding is the main breeding method observed in goat rearing. Artificial Insemination was not popular among smallholder goat farmers due to lack of awareness on artificial insemination and absence of facilities in the area.

It was clear that the goat farmers were paying minimum attention on breeding and kid management. There was no habit of keeping any records. Thus, the information regarding individual doe productivity, age of first kidding, kid mortality, age of weaning and weight of weaning of kids were not known. Kids were reared with the herd and allowed to feed milk from mother until natural weaning.

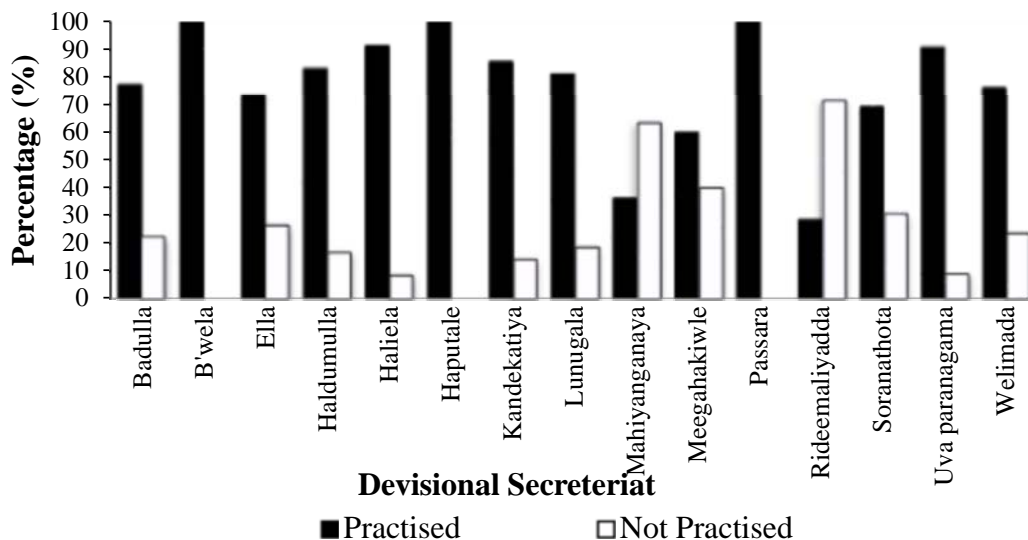


Figure 3: Practice of supplementary feeding in different divisional secretariats of Badulla district

Health Status and Disease Control

According to the survey, common goat diseases prevailed in Badulla district are diarrhea, pneumonia, paralysis conditions, fever and physiological disorders such as bloat. Further, the common reasons for loss of animals in the area were recorded as animal theft and predatory attacks of dogs, snakes and leopards.

Only 44.4% farmers used western medicine to treat their animals during illnesses while other farmers used indigenous medicines. This may be due to the lack of affordability as well as accessibility for veterinary facility and the western medicine.

Goat products and their services

In Badulla district most of the farmers rear goats with the purpose of selling for meat (86.6%). Around 2.8% farmers were involved in milking and only few goat farmers rear goats since they inherit the herds from parents, and also as a pet (0.6%). However, among all these goat farmers, some farmers milk their goats once they need goat milk for medicine or if there is a request from neighbors and some goats are devoted for religious sacrifices.

Apart from meat and milk purposes, goat farmers utilize goat manure as a fertilizer. However, 10.6% of farmers of the study sample were using goat manure in their cultivation and only 4.4% farmers were selling manure. Moreover, some of the goat farmers (62.8%) were positively responded to their preference for rearing goats with the milk purposes. These observations reflect that there is a potential for development of goat farming in Badulla district, especially by facilitating and increasing farmer awareness on income generating activities with demand, such as milk production and sale of goat manure.

Constraints for Goat Farming

According to the farmers' perspective, lack of government intervention in promoting goat farming as a venture was one of the main constraints in all divisional secretariats of

Badulla District. Limitations in land availability is another major problem faced by goat farmers. Since most of goat farmers are estate workers they have a limited area for rearing animals. Further, due to the urbanization in Badulla district, the free grazing land and communal land have been gone down limiting the feeding resources availability. Devendra (2007) reported the same as a constraint in animal production throughout South East Asia and South Asia.

Main constraints regarding breeding were identified as inadequate availability of breeding buck and lack of knowledge about modern breeding practices. Further, it was highlighted that lack of veterinary services, high cost of treatment, and lack of knowledge on diseases and absence of routine vaccination programs were some of the constraints related to the health care of goats.

CONCLUSION

Goat farming in Badulla district is popular as a secondary income generating activity and characterized by minimum to marginal level of inputs and dominated by smallholder operation. Production systems showed a variability representing the variation of local resource availability and climatic condition. Though existing farming focus solely on meat production, there is a potential for dairy goat production in Badulla district. Proper planning on limited resource utilization with well-defined intervention program will help to overcome the constraints of goat farming Badulla district.

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