Full Length Article

ANALYSING THE MANAGEMENT PRACTICES OF BACKYARD GOAT PRODUCTION IN CAUVERY DELTA ZONE OF TAMIL NADU

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ABSTRACT

An attempt was made to document the management practices of the backyard goat production in Cauvery Delta zone of Tamil Nadu. The primary data were collected by interviewing 180 backyard goat farmers selected by multi-stage random sampling using pre-tested interview schedule and analyzed through descriptive statistics. About 46.11 per cent of the respondents kept their animals under open system of housing and floor of the goat shed was mud type in 96.67 per cent of the sampled farmers. All the farmers stored manure in an open place. Majority of goat farmers raise their goats solely on browsing and grazing stubble of field crops, natural pasture and tree leaves. Majority of farmers did not possess their own breeding buck but they use community buck for breeding purpose. Middlemen (57.22 per cent) played a major role in marketing of goat in all categories of flocks, followed by butcher (36.11 per cent). Only one-fifth of flock owners dewormed their flocks yearly twice. None of the sample respondents vaccinated their goat against infectious diseases. Goats were marketed round the year (87.78 per cent) and about 12 per cent marketed their goats on special occasions. The major reasons for marketing was found to be the want of money to overcome financial problem (61.07 mean score) in case of bucks / male kids and culling due to old age (66.00 mean score) in case of breeding does. Majority of the sample backyard goat farmers did not follow scientific management practices at their farm level, which warrants intensive extension programmes. Implementation of best management practices among backyard goat farmers in Cauvery Delta zone of Tamil Nadu would improve the profitability.

Key words: Backyard Goat, Management, Housing, Feeding, Breeding, Marketing

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INTRODUCTION

Archaeological evidence shows that goats (*Capra hircus)* are the first ruminants to be domesticated between 10,000 and 6,000 BC in South-western Asia. According to Basic Animal Husbandry Statistics (2019), India is endowed with 148.89 million numbers of the goat (27.74 per cent of total livestock). By producing 1.266 million tonnes of chevon in the year 2021-22, goats are considered as one of the major sources of meat (13.62 per cent of total meat) in India (Basic Animal Husbandry Statistics, 2022). Backyard goat farming is largely practiced by the resource poor households for commercial and family support purposes because of their low initial investment and thus becomes an integral part of landless, small and marginal agricultural farmers. Improvement in goat farm production level has direct bearing on the socio-economic status of landless, marginal and small farmers and thereby the overall economic development of a region (Prabu *et al.*, 2011). In this context, the present study was conducted to document the management practices in backyard goat farming in Cauvery delta zone of Tamil Nadu in order to enable them with technical support.

METHODOLOGY

A total sample size of 180 sample backyard goat farmers were selected in Cauvery Delta zone of Tamil Nadu through multi-stage random sampling. Three districts *viz.* Nagapattinam (5.34 per cent), Thanjavur (4.84 per cent) and Thiruvarur (3.52 per cent)were selected purposively from the state, as these districts comprised 5.34 per cent, 4.84 per cent and 3.52 per cent of the total goat population of the state (Livestock census, 2012). From each of the three selected districts, two blocks were selected randomly, from which five villages from each block were selected randomly. From each selected village, six goat farmers were selected by simple random sampling method, which constituted a total sample size of 180 respondents. The primary data on backyard goat management practices were collected from the sample respondents through personal interview method using the pre-tested interview schedule during the month of January to April 2017. Descriptive statistics were used to ascertain the management practices of backyard goat production. Major reasons for marketing of bucks and does as reported by backyard goat farmers in the study area were analysed by Garrett ranking technique (Garrett and Woodworth, 1969).The respondents were asked to rank various attributes. The sum of score for each attribute was worked out. The order of merit thus given by the respondents were converted into per cent position by using the following formula.

$$\text{Per cent position} = 100 * (R_{ij} - 0.5) / N_j$$

where,

R_{ij}- Ranks given for i^{th}factor by j^{th} individual

Nj - Number of factors ranked by j^{th} individual

The per cent position for each rank thus obtained was converted into scores by referring to the table given by Garrett and Woodworth (1969). Then the mean scores were calculated for each factor/attribute and the appropriate rank was given and interpreted accordingly.

RESULTS AND DISCUSSION

The total sample respondents were classified into three categories based on flock size as small farmers (less than 5 goats), medium farmers (6-15 goats) and large farmers (more than 15 goats) based on previous study of Singh *et al*. (2011).

Housing Management practices

The housing management practices carried out by the sample respondents are presented in Table 1. It was noticed that 46.11 per cent of the respondents kept their animals under open system of housing whereas, 41.11 percent and 12.78 per cent of the respondents preferred to keep their animals in kutcha and pucca housing, respectively. The results concur with the findings of FAO (2016) and Mordia (2018). The results contradicted with Sabapara *et al.* (2014), who revealed that majority of the goat farmers preferred to keep their goats in closed houses.

It was observed that floor of the goat shed was mud type in 96.67 per cent of sample farmers while, only 3.33 per cent had cement floor, which helped them in easy washing and cleaning. There was a common feeling among the goat keepers of Cauvery delta zone to offer natural comfort and conditions to the goats by providing mud flooring.

The materials used for roof of goat sheds were thatches (41.11 per cent), asbestos (12.22 per cent) and iron sheet (0.55 per cent). Majority of goat keepers constructed goat shed using coconut palm fronds. Sabapara *et al.* (2014), Islam *et al.* (2018) and Mordia (2018) revealed similar findings in their studies. The materials used for goat housing varied according to the economic status of the family.

Storage and disposal of goat manure

The details on storage and disposal of goat manure in the study area are presented in Table 2. It was found that all the farmers stored manure in an open place forming a stack. No other method for manure storage was prevalent in the study area.

Majority of the goat rearers used manure for own agricultural purpose (58.88 per cent), followed by selling manure to other farmers (37.77 per cent) and both, for own farm use and sale (3.33 per cent). Majority of the farmers (40.55 per cent) sold manure once in a year. Further, the farmers opined that there was a good demand for goat manure throughout the year. As revealed by Upendrakumar *et al.* (2014), goat manure act as a good source of income in traditional goat production system in Rajasthan, India. Apart from collection and sale of manure, there is a practice of goat penning (keeping their animals in the farmland)to improve soil fertility through goat manure in the study area. Similar practice was also revealed by Souzaa *et al.* (2019).

Table 1. Housing for backyard goat farms

S.No.	Particulars	Small (n=87)	Medium (n=78)	Large (n=15)	Total (n=180)
Type of housing					
1	Open	49 (56.32)	32 (41.02)	29 (13.33)	**83 (46.11)**
2	Pucca	5 (5.74)	10 (12.83)	8 (53.33)	**23 (12.78)**
3	Kutcha	33 (37.94)	36 (46.15)	5 (33.34)	**74 (41.11)**
Location					
1	Attached to human dwelling	10 (11.49)	9 (11.53)	3 (20.00)	**22 (12.22)**
2	Nearby their dwelling	28 (32.18)	37 (46.15)	10 (66.66)	**74 (41.11)**
Flooring					
1	Mud	84 (96.55)	77 (98.72)	13 (86.67)	**174 (96.67)**
2	Cemented	3 (3.45)	1 (1.28)	2 (13.33)	**6 (3.33)**
Type of roofing materials used					
1	Iron sheet	-	1 (1.28)	-	**1 (0.55)**
2	Asbestos	5 (5.74)	9 (11.53)	8 (53.33)	**22 (12.22)**
3	Thatched	33 (37.93)	36 (46.15)	5 (33.33)	**74 (41.11)**

Figures in the parentheses indicate the per cent to the total

Table 2. Storage and disposal of goat manure

S. No.	Particulars	Small (n=87)	Medium (n=78)	Large (n=15)	Overall (n=180)
I	**Storage method**				
1	Open method	87 (100.00)	78 (100.00)	15 (100.00)	**180 (100.00)**
2	Manure pit	-	-	-	**-**
II	**Disposal of manure**				
1	Own farm use	53 (60.91)	44 (56.41)	9 (60.00)	**106 (58.88)**
2	Sale	32 (36.71)	30 (38.46)	6 (40.00)	**68 (37.77)**
3	Both	2 (2.29)	4 (5.12)	-	**6 (3.33)**
III	**Frequency of manure sale**				
1	Monthly	-	-	-	**-**
2	Quarterly	-	-	-	**-**
3	Half yearly	-	1 (1.28)	-	**1 (0.55)**
4	Annually	34 (39.08)	33 (42.30)	6 (40.00)	**73 (40.55)**

Figures in the parentheses indicate the per cent to the total

Feeding management practices

The details on feeding management by backyard goat farmers in the study area are presented Table 3. It was observed that tree leaves were lopped and fed to goats during rainy and cultivable season. Concentrate supplementation (mostly gingelly oil cake) was offered by a very few farmers and the finding concurs with Laouadi *et al.* (2018). None of the flock owners offered dry fodder, salt and mineral mixture to their goat. Majority of the farmers adopted semi-intensive feeding system (88.89 per cent). About two-third of the sample respondents allowed their goats in common land for grazing and it concurs with Shalanderkumar *et al.* (2010), Tudu and Goswami (2015), Islam *et al.* (2018) and Laouadi *et al.* (2018) and similar to the findings of Upendrakumar *et al.* (2014) and majority of goat farmers raise their goats solely on browsing and grazing stubble of field crops, natural pasture and tree leaves. About one-fifth of the farmers used their own land as their grazing site for goats, similar to feedlot system stated by Souzaa *et al.* (2019), where goats are released to feed on the crops remains after the harvest period (dry season).

Table 3. Feeding management practices

S. No.	Particulars	Small (N=87)	Medium (N=78)	Large (N=15)	Total (N=180)
1	Semi intensive	73 (83.91)	73 (93.59)	14 (93.33)	**160 (88.89)**
2	Intensive	14 (16.09)	5 (6.41)	1 (6.67)	**20 (11.11)**
Grazing site					
1	Own land	14 (16.09)	17 (21.79)	4 (26.66)	**35 (19.44)**
2	Community land	73 (67.81)	61 (71.79)	11 (66.66)	**145 (66.66)**

Figures in the parentheses indicate the per cent to the total

Breeding management practices

The details on oestrus detection technique practiced by backyard goat farmers in the study area is presented Table 4. The major oestrus detection technique followed by the backyard goat farmers were bleating (63.38 per cent) followed by mucous discharge (38.48 mean score) and tail wagging (35.57 mean score). The goat rearers followed almost similar practice to detect estrus in goats as reported by Tanwar *et al.* (2007) and Deshpande *et al*. (2009). The study further revealed that majority of farmers did not possess their own breeding buck but they use community buck for breeding purpose. The community bucks which were used for breeding purpose were of Kanni and non-descript type.

The reproductive traits of backyard goat farming in the study area are presented in Table 4. The age at first mating in does, age at first mating in bucks, age at first kidding, kidding interval and weaning age in backyard goat farming were worked out to be 9.05 ±0.17, 10.41± 0.09, 14.01 ± 0.17, 7.84± 0.10 and 4.58 ± 0.10 months, respectively. The percentage of kidding, twinning, triplet and quadruplet were observed at the rate of 93.23, 48.58, 7.88 and 0.94 per cent, respectively. The age at puberty / first mating and age at first kidding was in agreement with Mayenuddin and Waheb (1989) and Ahamed (1992) and Zeshmarani *et al.* (2007). The percentage of kid mortality was revealed to be 15.31 per cent, which concurs with the findings of Manoj *et al.* (2020).

Table 4. Breeding management in backyard goat farmers

Oestrus detection by backyard goat farmers			
S. No	**Oestrus detection**	**Garret score**	**Rank**
1	Bleating	63.38	I
2	Mucous discharge	38.48	II
3	Tail wagging	35.57	III

Reproductive traits in sample backyard goat farms		
S. No	**Particulars**	**Overall**
1	Number of flocks	**180**
2	Age at first mating – Male (months)	**10.41± 0.09**
3	Age at first mating – Female (months)	**9.05 ±0.17**
4	Age at first kidding (months)	**14.01 ± 0.17**
5	Kidding interval l(months)	**7.84± 0.10**
6	Weaning period (months)	**4.58 ± 0.10**
7	Kidding percentage	**93.23**
8	Single kid percentage	**74.88**
9	Twinning percentage	**48.58**
10	Triplet percentage	**7.88**
11	Quadruplet percentage	**0.94**
12	Kid mortality rate (per cent)	**15.31**

Health management practices

The results of health management practices of backyard goat farming are presented in Table 5. The results indicated that only 37.21 per cent of the respondents practiced deworming, while remaining goat keepers did not deworm their goats. Only 22.77 per cent of the farmers dewormed at yearly twice, followed by yearly once (9.44 per cent) and yearly thrice (5.00 per cent). Deworming was done by flock owners themselves in 30.55 per cent of the samples studied. Only 6.66 per cent of the flock owners availed the services of veterinarian and para-veterinarian for deworming. These observations are in contradictory with the findings of Sharma *et al*. (2007), Gurjar *et al*. (2008), Khadda *et al*. (2012) and concurs with Deshpande *et al*. (2009).

Table 5. Health management practices

Particulars	Small (n=87)	Medium (n=78)	Large (n=15)	Overall (n=180)
Yearly once	9 (10.34)	5 (6.41)	3 (20.00)	**17 (9.44)**
Yearly twice	18 (20.68)	18 (23.07)	5 (33.33)	**41 (22.77)**
Yearly thrice	4 (4.59)	4 (5.12)	1 (6.66)	**9 (5.00)**
Deworming done by				
Self	20 (22.98)	26 (33.33)	9 (60.00)	**55 (30.55)**
Veterinarian and Para veterinarian	-	1 (1.28)	-	**12 (6.66)**
Vaccination practices against diseases				
Enterotoxaemia	-	-	-	-
HS	-	-	-	-
Foot and mouth disease	-	-	-	-
Anthrax	-	-	-	-
Peste-des-petits ruminants	-	-	-	-
Tetanus Toxoid	12 (13.79)	23 (9.48)	4 (6.66)	39 (21.66)
Vaccination done by				
Veterinarian	8 (9.19)	10 (12.82)	2 (13.33)	20 (11.11)
Quacks	4 (4.59)	13 (16.66)	2 (13.33)	19 (10.55)
Separation of sick animals				
Yes	30 (34.48)	17 (21.79)	4 (26.66)	**51 (28.34)**
No	57 (65.51)	61 (78.20)	11 (73.33)	**129 (71.66)**
To whom treat the sick animals				
Veterinarian	42 (48.27)	37 (47.43)	10 (66.66)	**89 (49.44)**
Livestock inspector	4 (4.59)	3 (3.85)	1 (6.66)	**8 (4.44)**
Quacks	40 (45.97)	38 (48.71)	4 (26.66)	**82 (45.55)**
Own	1 (1.14)	-	-	**1 (0.55)**

Figures in the parentheses indicate the per cent to the total

Vaccination was practiced by 21.66 of goat rearers for their animals against tetanus only, while 78.34 per cent of respondents had not vaccinated their animals, against Enterotoxaemia, Haemorrhagic septicemia, Foot and mouth disease and *Peste-des-Petits Ruminants*. These observations are in contradictory with the findings of Sharma *et al*. (2007), Gurjar *et al*. (2008), Khadda *et al*. (2012).

The practice of isolation of sick animals did not vary with respect to goat flock size. The overall results indicated that majority of goat rearers (71.66 per cent) had not isolated their sick animals from rest of the flock. These observations are in agreement with the findings of Gurjar *et al*. (2008) and Deshpande *et al*. (2009).

Marketing of backyard goat

The details on marketing of backyard goat are presented in Table 6. Middlemen (57.22 per cent) played a major role in marketing of goat in all categories of flocks, followed by butcher (36.11 per cent). The findings concur with findings of Byaruhanga *et al.* (2015). In small and medium-sized flocks, majority of the farmers reported that price for their goat was fixed based on physical appearance in 50.58 per cent and 51.28 per cent, respectively in small and medium flocks; whereas in large-sized flocks, age of animal (46.67 per cent) was reported to be a major factor for price fixation. Overall, it could be concluded that one-half of the respondents considered physical appearance for price fixation; one-fourth of respondents considered body weight and one-eighth of them considered age for price fixation of goat. Physical appearance was one of the deciding factors in goat marketing in the study area as revealed by Kocho *et al.* (2011) who stated majority of goats in Ethiopia were marketed on 'eye-ball' basis.

In the study area, kids were marketed at the age group of 6 to 12 months for meat purpose and for breeding purpose, female kids were marketed at the age group of 6 to 18 months. Out of the total respondents about 12 per cent sold their animals during special and festival occasions. The average frequency of selling the goats / kids is 0.72 times in a year. The selling interval of goats in the study area was calculated to be 8.72 months.

The present study revealed that the goats were marketed round the year (87.78 per cent) and about 12 per cent marketed their goats on special occasions, which contradicted with findings of Kocho *et al.* (2011), who stated that majority of sheep and goats are collected, assembled and transported to terminal markets as the festival days approach.

Major reasons for marketing of bucks and does as reported by backyard goat farmers in the study area were analysed by Garrett ranking technique and results are presented in Table 7. Among bucks, want of money to overcome financial problem (61.07 mean score) was ranked first among various reasons for marketing of bucks / male kids, followed by fetching more profit during religious festivals (46.56 mean score), disease problem (43.00 mean score) and culling due to age (37.85

Table 6. Marketing of backyard goat

Particulars	Small (n=87)	Medium (n=78)	Large (n=15)	Overall (n=180)
a. Buyers				
Butcher	25 (28.74)	30 (38.46)	10 (66.67)	**65 (36.11)**
Middleman	54 (62.07)	46 (58.98)	3 (20.00)	**103 (57.22)**
Butcher and Middleman	4 (4.60)	2 (2.56)	2 (13.33)	**8 (4.44)**
Farmer	2 (2.31)	-	-	**2 (1.11)**
Farmer and Middleman	1 (1.14)	-	-	**1 (0.56)**
Consumer	1 (1.14)	-	-	**1 (0.56)**
b. Criteria used for price fixation				
Physical appearance	44 (50.58)	40 (51.28)	5 (33.33)	**89 (49.44)**
Weight	25 (28.75)	20 (25.64)	3 (20.00)	**48 (26.68)**
Sex	2 (2.30)	-	-	**2 (1.11)**
Age	4 (4.59)	12 (15.37)	7 (46.67)	**23 (12.78)**
Physical appearance and Weight	6 (6.90)	2 (2.57)	-	**8 (4.44)**
Physical appearance and Sex	1 (1.14)	2 (2.57)	-	**3 (1.66)**
Weight and Age	5 (5.74)	2 (2.57)	-	**7 (3.89)**
c. Time of marketing				
Round the year	73 (46.20)	70 (44.30)	15 (9.50)	**158 (87.78)**
Special	14 (63.64)	8 (36.36)	-	**22 (12.22)**
Average frequency of selling in a year	0.69	0.74	0.87	**0.72**
Average selling interval (months)	8.28	8.88	10.44	**8.72**

Figures in the parentheses indicate the per cent to the total

Table 7. Reason for marketing of goats

S. No.	Reason for marketing	Garrett's mean score	Rank
Breeding buck / male kids			
1	To overcome financial problem	61.07	I
2	To get more profit during religious festivals	46.56	II
4	Disease problem	43.00	III
5	Culling due to age	37.85	IV
Breeding doe / female kids			
1	Culling due to age	66.00	I
2	Reduced birth weight / vigour of the kids	47.34	II
3	Reproductive problems	41.16	III
4	To overcome financial problem	38.97	IV
5	Poor mothering ability	30.50	V
6	Disease problem	28.60	VI

mean score). In case of breeding does/female kids, culling due to old age (66.00 mean score) was ranked first and disease problems (28.60 mean score) occupied sixth rank among various reasons for marketing. Reproductive problems (41.16 mean score), want of money to overcome financial problem (38.97 mean score), poor mothering ability (30.50 mean score) were other reasons reported by the farmers for marketing of does female kids. The present findings concurs with Kocho *et al.* (2011), who stated that the major reasons for household sale of goats are to generate cash for purchasing food and farm inputs, school and medical expenses, pay credit, purchase livestock and build assets.

CONCLUSION

Majority of the respondents (46.11 per cent) kept their animals under open system of housing. The major oestrus detection technique followed by the backyard goat farmers was bleating followed by mucous discharge and tail wagging. Only one-fifth of flock owners dewormed their flocks yearly twice and about one-third of the flock owners dewormed their goats by themselves. None of the sample respondents vaccinated their goat against infectious diseases and about 20 per cent of them administered Tetanus Toxoid. Thus, it could be concluded that majority of the sample backyard goat farmers had not

followed scientific management practices at their farm level, which warrants intensive extension programmes on economically viable and scientific small scale goat farming.

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