

Original Research Article

<https://doi.org/10.20546/ijcmas.2018.705.385>

Adoption Level of Improved Goat Farming Technologies by Commercial Goat Farmers in Tamil Nadu, India

M. Gunaseelan¹, B.P. Singh^{1*}, Med Ram Verma² and K. Pachaiyappan¹

¹Division of Extension Education, ICAR-Indian Veterinary Research Institute, Izatnagar, U.P.-243 122, India

²Division of Livestock Economics, Statistics & Information Technology, ICAR-Indian Veterinary Research Institute, Izatnagar, U.P.-243122, India

*Corresponding author

ABSTRACT

A study was undertaken to assess the adoption level of commercial goat farmers under semi-intensive and intensive systems of management in Tamil Nadu. To this survey, a sample of 120 commercial goat farmers (20 farmers from each district) was selected randomly from 6 districts of Tamil Nadu. Data revealed that, overall 46.67 per cent of the commercial goat farmers had medium level of adoption of improved goat farming practices, followed by high (33.33 %) and low (20.00 %) extent of adoption. Average adoption indices of improved goat farming technologies were 60.71, 64.61, 76.19 and 67.20 for small, medium, large and overall categories of farmers, respectively. Overall adoption index of improve goat husbandry practices by the commercial goat farmers revealed that, housing practices obtained highest adoption index (74.41-I) followed by feeding (67.42-II), health care (66.00-III), breeding (65.33-IV) and general management practices (62.81-V). Multiple linear regression analysis showed that, the factors viz., family income, investment on goat farming, flock size and economic motivation had positive and significant (1 % level) influence on the variability in adoption levels of commercial goat farmers. Education and system of management of goats showed positive and significant (5 % level) towards adoption of commercial goat farmers.

Keywords

Adoption level,
Commercial Goat
farmers, Tamil
Nadu

Article Info

Accepted:
22 April 2018
Available Online:
10 May 2018

Introduction

Goats are among the main meat-producing animals in India, whose meat (chevon) is one of the choicest and has huge domestic demand across the country. Besides meat, goats provide other products like milk, skin, fiber and manure. India, with 135.2 million goats is one of the largest goat owning countries in the world and playing a significant role in livelihood and nutritional security as well as

providing supplementary income to nearly 70 million farmers of over 5,00,000 remote villages (CIRG, Annual Report, 2015-16). However, the productivity of goats under the traditional production system is very low owing to their maintenance under extensive system on natural vegetation and shrinking common grazing lands and tree lopping. Moreover, adoption of improved technologies and management practices in the farmers' flock is very low (Singh and Kumar, 2007).

Adoption behaviour of goat farmers depends on knowledge, economic motivation, family education status, extension agency contact, social participation and income (Kumar *et al.*, 2014). The adoption is low in important scientific practices due to lack of exposure, henceforth extension agencies have to arrange training and demonstration programs of improved practices to goat keepers (Singh, 2017). Goat rearing using improved management practices undertaken for maximization of returns from the enterprise was considered as ‘commercial goat farming’ in the present context. The entry of large farmers, who have better access to technical knowledge, resources and market, into this activity would help in realizing the potential of goat enterprise (Kumar, 2007). The trend of commercialization has especially been prominent in the state of Tamil Nadu, where demand for marketing and availability of grazing sources is relatively better. Keeping in view the above facts, the present research was designed to study the adoption level of improved goat farming technologies by commercial goat farmers.

Materials and Methods

Commercial goat farmers were selected from Salem, Namakkal and Dharmapuri districts from North Western Zone (NWZ) and Thiruchirapalli, Nagapattinam and Thanjavur districts from Cauvery Delta Zone (CDZ) of Tamil Nadu. The agro-climatic zones and districts were selected purposively based on the density and highest population of goats and preliminary information collected regarding commercial goat farming practices, availability of commercial goat farms etc. From each district, 20 commercial goat farmers were chosen randomly and a total of 120 respondents were selected for the present research. The selected commercial goat farmers were post-stratified according to the flock size *viz.*, small (< 50 goats), medium

(51-100 goats) and large category (>100 goats) with their average flock sizes of 37.92, 77.30 and 192.45, respectively. According to Rogers (2003), adoption is the decision to make full use of an innovation as the best course of action available. The level of adoption was operationalized as the extent of which one makes use of the recommended goat farming technologies. The important goat farming technologies were selected in the major areas of housing, feeding, breeding, disease control, and general management practices based on review of literature and by consulting with veterinary and extension experts. The scores were assigned for the adoption of each scientific goat farming technologies in the following way.

The total score for a respondent was obtained by summing up the score obtained on each practice. The adoption level of the respondent was measured by using of adoption index developed by Karthikeyan (1994).

$$\text{Adoption Index} = \frac{\text{Respondent's total score}}{\text{Total possible score}} \times 100$$

Depending upon the extent of adoption of improved technologies, the respondents were categorized as low adopters, medium adopters and high adopters by computing mean and standard deviation. Also, the respondents’ adoptions towards different components of scientific goat farming technologies were classified based on frequency and percentage.

Multiple linear regression analysis was applied to analyze the socio-economic factors influencing the adoption level of improved goat farming technologies by commercial goat farmers. The following multiple linear regression models was fitted.

$$Y_a = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \dots + \mu$$

Where,

Y_a = Adoption level

α = Constant term

β_i 's = Regression co-efficients

X_i = Socio-economic variables

μ = Random disturbance term; ($\mu_i \sim 0, \sigma_i^2$)

Results and Discussion

A perusal of the Table 1 indicates that overall 46.67 per cent of the commercial goat farmers had medium adoption of improved goat farming practices, followed by high (33.33 %) and low (20.00 %) extent of adoption. Average adoption indices of improved goat farming technologies were 60.71, 64.61, 76.19 and 67.20 for small, medium, large and overall categories of farmers, respectively. It could be inferred from the findings that the adoption level of improved goat farming technologies determined by the extent of knowledge, resource availability, service availability and flock size, demonstration of efficient technologies and felt need of the commercial goat farmers. These findings are supported by the findings of Bihari and Singh (2016), Koli and Koli (2016) and Meena *et al.*, (2011).

It is evident from the Table 2 that the adoption index of improved goat housing practices in commercial goat farming indicated highest index score for use of feeding and watering devices (88.75), followed by adoption of recommended floor space for goats (83.33), Orientation (East-West) of goat shed (74.16), drainage facility (72.92) and adoption of slatted floor housing (52.91). Based on the adoption index, improved goat housing practices were ranked. It was observed that different feeding and watering devices for goats used by farmers based on the type of goat shed, local availability of materials, low cost devices; at the same time the farmers were also considered durability of the materials.

From the Table 2 it is evident that feeding colostrums to kids within one hour after birth obtained highest score (79.58) followed by feeding of concentrate at recommended quantity (74.17), flushing prior to breeding (67.50), fodder cultivation practices (65.83) and feeding mineral supplements (46.67). It was observed that majority of the small and medium commercial goat farmers practiced home-made concentrate feed by purchasing raw materials like oil cakes, rice bran, maize, etc. followed by large farmers used readymade commercial concentrate feed. The above findings are similar with the findings reported by Narmatha *et al.*, (2013).

It could be visualized from Table 2 that highest adoption index score was possessed by appropriate age (10-12 months) of breeding in Does (86.67), followed by identification of Does in heat (80.41), changing buck at regular intervals (72.92), pregnancy verification (44.17) and Artificial Insemination (42.50). It was reported by the commercial goat farmers that mounting behavior of Buck and Doe, bleeding and clear discharge from the vulva were the most reliable symptoms for detection of heat in Does. Least adoption of Artificial Insemination (21.67 %) by the commercial goat farmers was due to the fact that lack veterinary infrastructure facilities, limited availability of trained veterinary doctors and the facility available only in research stations. It can further be seen from Table 2 that the adoption index for health care practices revealed deworming of goats had highest score (82.08) and rank I, followed by vaccination (72.50), isolation of sick animals (66.25), disinfection of farm (65.00) and dipping in ecto-parasiticide (44.17). The findings of the study described that majority of the commercial goat farmers completely adopted deworming (75.00 %) and vaccination (55.00 %) in goats shows that the importance of preventive measures realized by the respondents.

The scores were assigned for the adoption of each scientific goat farming technologies

	Adoption pattern	Score
	Complete adoption	2
	Partial adoption	1
	Non adoption	0

Table.1 Distribution of respondents according to extent of adoption level of improved goat farming technologies

Adopter category	Score index	Small farmers (n=56)	Medium farmers (n=42)	Large farmers (n=22)	Overall N=120
Low adopters	< 54.59	13 (23.21)	9 (21.43)	2 (9.09)	24 (20.00)
Medium adopters	54.59-79.81	28 (50.00)	22 (52.38)	6 (27.27)	56 (46.67)
High adopters	>79.81	15 (26.79)	11 (26.19)	14 (63.64)	40 (33.33)
Mean ± SD	67.20 ± 12.61				
Mean adoption index		60.71	64.61	76.19	67.20

Table.3 Overall adoption of goat husbandry technologies by commercial goat farmers

Practices	Obtained score	Adoption index	Rank
A. Housing	893	74.41	I
B. Feeding	809	67.42	II
C. Breeding	784	65.33	IV
D. Health care	792	66.00	III
E. General management	754	62.81	V

Table.2 Practice wise distribution of respondents according to the adoption of improved goat farming technologies

Sl. No.	A. Housing	Adoption (N=120)			Adoption index	Rank order
		CA	PA	NA		
1.	Recommended floor space for goats	88 (73.33)	24 (20.00)	8 (6.67)	83.33	II
2.	Orientation (E-W) of goat shed	70 (58.33)	38 (31.67)	12 (10.00)	74.16	III
3.	Use of feeding and watering devices	98 (81.67)	17 (14.17)	5 (4.16)	88.75	I
4.	Adoption of slatted floor housing	51 (42.50)	25 (20.83)	44 (36.67)	52.91	V
5.	Proper drainage facility	72 (60.00)	31 (25.83)	17 (14.17)	72.92	IV
B. Feeding						
1.	Feeding of concentrates at recommended quantity	84 (70.00)	10 (8.33)	26 (21.67)	74.17	II
2.	Feeding mineral supplements	39 (32.50)	34 (28.33)	47 (39.17)	46.67	V
3.	Flushing prior to breeding	63 (52.50)	36 (30.00)	21 (17.50)	67.50	III
4.	Colostrum feeding to kids (< 1 hr. after birth)	82 (68.33)	27 (22.50)	11 (9.17)	79.58	I
5.	Fodder cultivation practices	68 (56.67)	22 (18.33)	30 (25.00)	65.83	IV
C. Breeding						
1.	Identification of Does in heat	80 (66.67)	33 (27.50)	7 (5.83)	80.41	II
2.	Pregnancy verification	38 (31.67)	30 (25.00)	52 (43.33)	44.17	IV
3.	Artificial Insemination (AI)	26 (21.67)	50 (41.66)	44 (36.67)	42.50	V
4.	Appropriate age of breeding in Does	95 (79.17)	18 (15.00)	7 (5.83)	86.67	I
5.	Changing buck at recommended intervals	76 (63.33)	23 (19.17)	21 (17.50)	72.92	III
D. Disease control						
1.	Deworming	90 (75.00)	17 (14.17)	13 (10.83)	82.08	I
2.	Dipping	37 (30.83)	32 (26.67)	51 (42.50)	44.17	V
3.	Vaccination	66 (55.00)	42 (35.00)	12 (10.00)	72.50	II
4.	Farm disinfection	60 (50.00)	36 (30.00)	24 (20.00)	65.00	IV
5.	Isolation of sick animals	64 (53.33)	31 (25.83)	25 (20.83)	66.25	III
E. General management						
1.	Weaning	83 (69.17)	22 (18.33)	15 (12.50)	78.33	I
2.	Tagging	69 (57.50)	31 (25.83)	20 (16.67)	70.41	III
3.	Hoof trimming	12 (10.00)	25 (20.83)	83 (69.17)	20.41	V
4.	Farm record maintenance	75 (62.50)	30 (25.00)	15 (12.50)	75.00	II
5.	Castration of kids	77 (64.17)	14 (11.67)	29 (24.17)	70.00	IV

(Figures in the parenthesis indicate percentage); CA-Complete Adopters, PA-Partial Adopters, NA-Non Adopters

Table.4 Factors influencing the adoption of improved technologies by commercial goat farmers
N=120

Sl. No.	Independent variables	'b'	S.E.(b)	't' value
Constant		1.346		
X ₁	Age	0.027	0.073	0.308
X ₂	Gender	0.017	1.620	0.47
X ₃	Education	0.116*	0.658	1.997
X ₄	Family size	0.029	0.405	0.344
X ₅	Family type	-0.70	1.330	-0.762
X ₆	Occupation	0.012	0.416	0.247
X ₇	Income	0.683**	0.026	6.637
X ₈	Experience in goat farming	- 0.004	0.057	- 0.180
X ₉	Livestock possession	-0.019	0.105	-0.391
X ₁₀	Land holding	0.338*	0.248	2.095
X ₁₁	Investment	0.527**	0.017	4.082
X ₁₂	Flock size	0.659**	0.008	9.516
X ₁₃	Social participation	-0.043	0.057	-1.887
X ₁₄	Contact with extension agency	0.031	0.060	1.202
X ₁₅	Training on goat farming	0.256*	0.159	2.178
X ₁₆	Economic motivation	0.392**	0.166	5.742
X ₁₇	System of management	0.782*	0.071	2.023
R² = 0.762 Adjusted R² = 0.736 F = 22.93**				
** - Significant at 0.01 level of probability				
* - Significant at 0.05 level of probability				

Dipping of goats to prevent ecto-parasites infestation is a very important activity which has been least concerned by the respondents; in disease prevention faction. It is recommended that the goat farmers need to be sensitized about dipping and other needy technologies for disease prevention through training, awareness, demonstration by the extension agencies in the study areas.

Regarding general management practices (Table 2) adopted by the farmers, weaning of kids (78.33) had higher adoption index score followed by farm record maintenance(75.00), tagging (70.41), castration of kids (70.00) and hoof trimming (20.41). This is in agreement with the findings of Singh *et al.*, (2017); Suresh and Vasanthakumar (2017) who reported that castration of male had fewer adoption score and weaning of kids had

higher adoption score, respectively. Kumar (2007) reported in his study on commercial goat farming in India that, overall 6.00 per cent of the commercial goat farmers had adopted hoof trimming, 67.00 per cent adopted tagging of kids for identification and 72.00 per cent and 50.00 per cent of them had awareness and adoption of farm record maintenance, respectively.

Overall adoption of improved goat husbandry practices by commercial goat farmers

Overall adoption index of improve goat husbandry practices by the commercial goat farmers presented in the Table 3 reveals that housing practices obtained highest adoption index (74.41) followed by feeding (67.42), health care (66.00), breeding (65.33) and

general management practices (62.81). These findings differ with the results of Roy and Tiwari (2017), Narmatha *et al.*, (2013) and Nepali *et al.*, (2010) who reported that the overall adoption behavior of traditional goat farmers was only less than 50.00 per cent. The results of the study clearly differentiate the adoption behavior of traditional and commercial goat farmers.

The factors influencing the adoption level were portrayed in Table 4. The results revealed that the value of co-efficient of multiple determination (R^2) was 0.762, indicating 76.20 per cent of variation in adoption level of commercial goat farmers which was due to the combined influence of all the selected independent variables (Table 4). The regression analysis also described that the variables, family income, investment in goat farming, flock size and economic motivation had positive and significant (1 % level) influence on the variability in adoption level of commercial goat farmers. Variables viz., education, land holding, training on goat farming and system of management showed positive and significant (5 %level) towards adoption level of commercial goat farmers. These findings are in agreement with the findings of Guntoro *et al.*, (2016) and Kumar (2014).

The results of the present study indicated that the level of technology adoption by commercial goat farmers was medium to high and is highly influenced by family income, flock size of the farm (number of goats), investment on goat farming, economic motivation, followed by education, land holding, training on goat farming and system of management of goats. Based on the mean adoption index, the findings revealed that, small commercial goat farmers are low adopters as compared to medium and large farmers. Hence, the study recommends that innovations in technological interventions on

scientific goat farming shall be supported with vocational training, demonstration of efficient technologies and motivating the commercial goat farmers to optimize the flock size with extension support and services might help them to adopt recommended improved technologies and sustainable goat production thereby enhancing the farmers' livelihood.

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How to cite this article:

Gunaseelan, M., B.P. Singh, Med Ram Verma and Pachaiyappan, K. 2018. Adoption Level of Improved Goat Farming Technologies by Commercial Goat Farmers in Tamil Nadu, India. *Int.J.Curr.Microbiol.App.Sci*. 7(05): 3293-3300. doi: <https://doi.org/10.20546/ijcmas.2018.705.385>