



Scientific Selection and Breeding is Required to Conserve The Genetic Pool of Nattukuttai Cattle in Tamil Nadu

Athilakshmy P^{1*}, Kumaravel P¹ and Thanga Tamil Vanan²

Department of Veterinary and Animal Husbandry Extension Education,
Madras Veterinary College, Tamil Nadu Veterinary and Animal Sciences University, Chennai

ABSTRACT

Indigenous non- descript cattle play a key role in the ecosystem and livelihood of small and marginal farmers. Nattukuttai cattle, short stout indigenous cattle are being reared under zero input system in Villupuram, Tiruvallur and Kancheepuram districts of Tamil Nadu. An exploratory study was carried out to bring forth the adoption behaviour and constraints faced by Nattukuttai cattle owners. Forty respondents were selected from each of the three districts and thus the total respondents accounted to be 120. The study revealed that majority of the farmers had the practice of housing cattle adjacent to their home (62.5 %) under open type and storing farm manure by heap method (100 %). A meager per cent of owners only fed concentrate feed (15 %) and green fodder (6.67%) to their cattle. The common diseases affecting Nattukuttai cattle were FMD, LSD and worm infestation. Around eighty-seven per cent of the farmers adopted natural service in breeding and few farmers were resorting to artificial insemination. Non availability of land to house the cattle adjacent to their homes and limited breed conservation measures were ranked as the major constraints by majority of farmers. Hence, selective breeding of cattle and capacity building on scientific dairy practices need to be initiated to conserve Nattukuttai breed of cattle in Tamil Nadu.

Key Words: Adoption, Behaviour, Cattle, Constraints.

INTRODUCTION

India, the world largest producer of milk with a production of 187.7 Mt of milk in 2018-19 with an annual growth of 4.2 per cent is expanding steadily since 2000. The milk cooperative system, introduction of crossbred animals, domestic milk price stability played a significant role in expanding India's dairy sector (Maurice *et al*, 2017). The total crossbred cattle population showed 26.9 per cent increase in the country over the last eight years, while the indigenous cattle population has decreased by 6 per cent as per the 20th livestock census. Farmers are replacing local cattle with crossbred animals due to their high milk yield potential (Torsten, 2003). The indigenous breeds of cattle need to be

conserved for their unique characteristics such as heat tolerance, disease resistance, sustaining zero input farming, ecosystem protection and draught capacity (Balaraju *et al*, 2017; Ullaand Katriina, 2017). Srivastava *et al* (2019) stated that conservation of indigenous breeds of cattle includes preservation along with improvement of genetic potential and management of a breed for use in future. The production performance of cattle depends on adoption of scientific dairy practices (Sathiadhas *et al*, 2003). Hence documentation of adoption of indigenous dairy farmers and constraints faced by them play a key role in capacity building and policy implications. Nattukuttai breed of cattle is a short stout cattle reared in Villupuram,

Corresponding author: drathiselvam@gmail.com

¹Department of Veterinary and Animal Husbandry Extension Education,

²Department of Livestock Production and Management

Madras Veterinary College, Tamil Nadu Veterinary and Animal Sciences University, Chennai.

Table 1. Distribution of respondents based on herd size of Nattukuttai cattle.**n=119**

Sr. No.	Herd size	Frequency (f)	Per cent (%)
1.	2-16	95	79.83
2.	17-34	16	13.45
3.	35-51	3	2.52
4.	52-68	5	4.20

Tiruvallur and Kancheepuram districts of Tamil Nadu (Vinothkumar, 2014). The documentation of management practices adopted in Nattukuttai breed of cattle and constraints faced by Nattukuttai cattle owners will facilitate sensitizing stakeholders towards the conservation of Nattukuttai breed of cattle. Thus, an exploratory study was conducted to study the adoption behaviour and constraints faced by Nattukuttai breed of cattle in Villupuram, Tiruvallur and Kancheepuram districts of Tamil Nadu.

MATERIALS AND METHODS

An exploratory study was designed to investigate the adoption behaviour and constraints faced by Nattukuttai cattle owners in Villupuram, Tiruvallur and Kancheepuram districts of Tamil Nadu. Forty farmers rearing Nattukuttai cattle were selected randomly from each of the three districts and thus the total respondents accounted to 120 owners. A pre-tested structured interview schedule was employed to elicit data on adoption behaviour and constraints faced by Nattukuttai cattle owners. The data were tabulated and analyzed using measures of central tendency and dispersion and other appropriate statistical techniques. Rank Based Quotient (RBQ) method was employed to rank the constraints faced by the farmers rearing Nattukuttai cattle.

RESULTS AND DISCUSSION

Adoption behaviour and constraints of dairy farmers rearing Nattukuttai cattle

It could be observed (Table 1) that in majority of the households (79.83%) the Nattukuttai cattle herd size ranged between 2 to 16 cattle. Thesinguraja (2017) and Nisha (2019) stated that majority of

dairy farmers who followed semi-intensive system rearing maintained small herd size. Due to shrinkage of land size, labour shortage, and attraction towards cross bred cows, the herd size of Nattukuttai cattle drastically reduced in the last decade. Srivastava *et al* (2019) divulged that the reasons for depletion of native breeds were crossbreeding with exotic breeds, low production, losing utility, reduction in herd size and the large-scale mechanization of agricultural operations.

Housing practices adopted by Nattukuttai cattle farmers

The data (Table 2) revealed that majority of the farmers (62.50 %) adopted the practice of housing the Nattukuttai cattle adjacent to their homes, followed by 29.17 per cent and 8.33 per cent of them who housed their animals in far off places and near cultivable lands respectively. On the contrary, Thesinguraja (2017) opined that majority of the Pulikulam cattle owners housed their cattle near their cultivable land.

It could be inferred that majority of the respondents (47.50 %) had open type animal houses as animals were let free in open field round the year without restraining, whereas 45.83 per cent housed their animals in kutcha type sheds. This was in line with the findings of Thesinguraja (2017) but contrary to the findings of Vinothkumar (2014) who stated that majority of farmers provided kutcha type of roofing to their Nattukuttai cattle.

About 54.17 per cent of the respondents had the practice of collecting the cattle dung twice daily while the remaining 45.83 per cent of the Nattukuttai cattle owners collected the cattle dung only once. This was in contrast with the findings

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Table 2. Distribution of respondents based on herd size of Nattukuttai cattle.

Sr. No.	Housing management	Frequency (f)	Per cent (%)
A.	Location of house		
1.	Adjacent to home	75	62.50
2.	Cultivable land	10	8.33
3.	others	35	29.17
B.	Housing Structures		
4.	Kutchra	55	45.83
5.	Pucca	8	6.67
6.	Open type	57	47.50
C.	Frequency of dung collected/day		
7.	Once	55	45.83
8.	Twice	65	54.17
D.	Method of storage of manure		
9.	Heap method	120	100.00
10.	others	0	0
E.	Disposal of manure		
11.	Own farm use	35	29.17
12.	sold	69	57.50
13.	Both	16	13.33

of Thesinguraja (2017) who reported that majority of the farmers collected dung once a day. With regard to utilization of manure, about 57.50 per cent of the respondents sold the cattle manure to neighbouring agricultural farms, whereas 29.17 per cent used the cattle manure for their own farm use. This was partially in agreement with the study of Thesinguraja (2017) who reported that majority of the Pulikulam cattle owners stored the cattle farm manure by heap method and sold cattle manure on a weekly basis. Bhise *et al* (2018) divulged that majority of the dairy farmers in Maharashtra had knowledge about scientific disposal of manure with full adoption by 49.50 per cent respondents.

The feeding practices revealed that 85 per cent of the respondents had not adopted the practice of concentrate feeding to their cattle round the year. This was in accordance with the findings of Akila and Chander (2010), and Thesinguraja (2017) who stated that majority of the indigenous dairy farmers

did not provide concentrate feed and maintained animals on grazing. With respect to feeding of green fodder, only 6.67 per cent of the respondents provided green fodder to the Nattukuttai cattle, while 93.3 per cent of the farmers did not adopt the practice of feeding green fodder to their cattle.

Regarding feeding of dry fodder, about 77.5 per cent of the respondents provided dry fodder to their cattle while the remaining 22.5 per cent of the respondents did not provide dry fodder to the cattle. The findings indicated that majority of Nattukuttai cattle owners provided dry fodder to their cattle on a seasonal basis based on the availability of dry fodder. This was not in agreement with the findings of Vinothkumar (2014) who stated that only 5.56 per cent of Nattukuttai cattle owners provided dry fodder. Meena *et al* 2012 opined that 100 per cent of the tribal farmers in Udaipur district of Rajasthan fed dry fodder to their cattle.

It was observed that Nattukuttai farmers of Kancheepuram district who own cultivable land provided ad libitum green fodder and dry fodder to their cattle. The study results revealed that Nattukuttai cattle fed with balanced diet yielded 1.5-2.5 liters of milk daily, whereas the average milk yield of Nattukuttai cattle maintained on zero input farming was 0.5 -1.0 liter per day. Hence, it could be inferred that balanced feed ration will significantly improve the milk yield potential of Nattukuttai cattle.

Grazing system

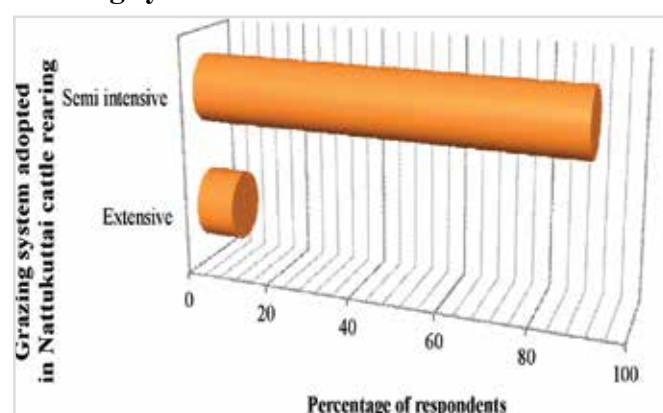


Fig.1. Distribution of respondents according to the grazing system followed in Nattukuttai cattle rearing.

Figure 1 indicates that 90.83 per cent of the respondents adopted semi-intensive system of grazing in community land, whereas 9.17 per cent of the respondents adopted extensive system of grazing. Interestingly, some of the respondents in Tiruvallur district had the practice of letting their animals to graze freely in community lands throughout the year without providing housing facilities. This finding is

in line with the findings of Sudhanshu *et al* (2019). On the contrary, Thesinguraja (2017) reported that nearly 80.0 per cent of Pulikulam owners followed extensive system of grazing.

Breeding practices

It was found that 86.67 per cent of the respondents adopted the practice of natural service in Nattukuttai cattle at their farm itself. Majority of respondents had their own bulls and followed uncontrolled system of mating. This was in line with the findings of Singh *et al* (2016), Sudeepkumar *et al* (2016), Thesinguraja (2017) who inferred that majority of the respondents preferred natural service in their cattle. Sathiadhas *et al* (2003) reported that majority of the dairy farmers in the coastal agro system of Kerala adopted the practice of Artificial insemination in cattle.

Common diseases encountered in Nattukuttai cattle

About 62 per cent of the respondents reported that Foot and Mouth disease (FMD) incidence was observed in their Nattukuttai cattle while 56.67 per cent of the respondents reported the incidence of Lumpy skin disease (Table 3). An equal number of respondents (56.67%) reported that worm infestation was observed in Nattukuttai cattle. Thesinguraja (2017) opined that 100 per cent of respondents reported incidence of FMD in their cattle. Majority of the respondents stated that the calf mortality was reported due to Lumpy Skin Disease during last year. It was observed that worm infestation was high in Nattukuttai cattle

Table 3. Common diseases encountered in Nattukuttai cattle.

Sr. No.	Commonly encountered diseases	Frequency*	Per cent
		(f)	(%)
1.	FMD	75	62.50
2.	LSD	68	56.67
3.	Worm infestation	68	56.67
4.	others	35	29.17

* Multiple responses

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due to poor scientific awareness among farmers on deworming of Nattukuttai cattle. Amphistomes were the common worm infestation reported in Nattukuttai cattle. The other endemic diseases like Black quarter and Haemorrhagic septicemia were also reported in Nattukuttai cattle.

It was highlighted that most of the farmers (65.83%) vaccinated their cattle against Foot and Mouth Disease. This was in line with the study of Sathiadhas *et al* (2003), Sudhanshu *et al* (2019) and Gupta (2020). On the contrary, Vinothkumar (2014) and Thesinguraja (2017) in their study stated that majority of the farmers did not vaccinate their cattle. With regard to deworming, majority of the respondents (81.67%) did not deworm the cattle while the remaining respondents (18.33%) practiced deworming in their cattle as and when needed. This was in agreement with the findings of Sathiadhas *et al* (2003), Vinothkumar (2014) and Jagdeep Gupta (2020). Majority of the respondents reported that restraining Nattukuttai cattle is a major issue in carrying out vaccination in cattle.

Constraints in rearing Nattukuttai cattle as perceived by the owners

It was observed (Table 5) that non availability of land to house the cattle was considered as the foremost common constraint faced by cattle owners as there was major shrinkage of land (93.40%) due to partition of land between siblings. Though some farmers were marginal farmers, the location of agricultural land was far away from the house and they also felt that it was not safe to house their cattle in agricultural lands due to theft. It was observed that most of the farmers had the practice of housing their cattle on road side. The second most constraint perceived by the respondents (76.41%) was limited breed conservation measures taken as there was a drastic reduction in the number of people rearing Nattukuttai cattle in last two decades. Anjali and Senthilkumar (2020) reported that lack of government support to encourage Vechur cattle farming as the prime most policy related constraints faced by dairy farmers rearing V cattle in Kerala.

The third rank constraint perceived by the farmers (66.47%) was low milk price. Since restraining Nattukuttai cattle was difficult, majority of the farmers depend on milk vendors, who used to milk the cattle and procure the same for lower price. It was reported that on an average, the milk vendor was fixing the price of milk as Rs.20-22/l. This was in agreement with the study of Sathiadhas *et al* (2003), Athilakshmy *et al* (2013) and Princejot Singh (2015). Shortage of grazing land was ranked as the fourth constraint (66.15%) and this might be due to the fact that most of the farmers were landless farmers and it was prohibited to graze the cattle near paddy and vegetable fields during harvest season and in addition urbanization also contributed to shrinkage of land. It was also reported that inadequate or shortage of grazing land during harvest season has lead to quarrel among the cattle farmers.

The fifth rank constraint was difficulty in milking cows (52.18%) as it was difficult to restrain the Nattukuttai breed of cattle. Majority of the farmers stated that they were milking the cows which were very cooperative and the other animals were let free for providing milk to its calves. Lack of motivation/willingness among younger generation in indigenous cattle rearing was ranked as the sixth constraint, which might be due to the fact that the younger generation are more attracted towards work in the organized industry sector. On the contrary, Thesinguraja (2017) divulged that lack of willingness among younger generation in Pulikulam cattle rearing as the least constraint faced by the farmers.

The next (seventh and eighth) constraints faced by the farmers were lack of knowledge on scientific breeding practices (39.17%) and non-availability of quality breeding bulls (25.58%) respectively. This was in contrary to the findings of Nisha (2019) who stated that lack of knowledge and skill in scientific animal husbandry practices as the fore-most constraint among Attappadi tribal farmers. Some farmers, who owned one or two cattle, reported non

Table 4. Constraints ranked by the farmer in Nattukuttai cattle rearing.

Sr. No.	Constraint	RBQ value	Rank
1.	Non availability of land adjacent to their home to house the cattle	93.40	I
2.	Limited breed conservation measures	76.41	II
3.	Low milk price	66.47	III
4.	Shortage of grazing land	66.15	IV
5.	Difficulty in milking cows	52.18	V
6.	Lack of willingness among younger generation in indigenous cattle rearing	44.81	VI
7.	Lack of knowledge about breeding practices	39.17	VII
8.	Non availability of quality breeding bulls	25.58	VIII
9.	Unavailability of Nattukuttai bull semen straws for AI	18.46	IX
10.	Middle man involvement	17.63	X
11.	Poor reproductive performance	16.86	XI
12.	High labour cost	13.21	XII
13.	Lack of drinking water	12.37	XIII

availability of breeding bulls as a constraint. Non-availability of Nattukuttai bull semen straws for AI was ranked as the ninth constraint (18.46%), as few farmers who were opting for AI in their Nattukuttai cattle able to inseminate with cross breed cattle semen straws. This was in line with the findings of Anjali and Senthilkumar (2020). Middle man involvement and poor reproductive performance were ranked as tenth constraint (17.63%) and eleventh constraint (16.86%) respectively. The farmers were entirely dependent on middlemen for sale of milk as well as male calves.

High labour cost was ranked as the twelfth constraint (13.21%) since, the family member's especially old aged people and women were assigned farm related activities. Lack of drinking water was ranked as the least constraint (12.37%). This was in contrary to the findings of Patil *et al* (2009) who reported that majority of the respondents in Nagpur district perceived lack of drinking water for animals as an important constraint.

CONCLUSION

Nattukuttai breed of cattle, indigenous to Tamil Nadu were reared under zero input system in Tiruvallur, Villupuram and Kancheepuram districts.

Majority of the Nattukuttai cattle owners housed their cattle adjacent to their homes under open type housing. The common diseases affecting Nattukuttai cattle were observed to be FMD, LSD and worm infestation. Majority of the farmers adopted natural service in breeding their Nattukuttai cattle and few farmers only were resorting to artificial insemination. The milk yield of Nattukuttai cattle during first three months of lactation period ranges from 0.5 liter to 1.5 liters/day and it reduces to less than half liter in subsequent month. Majority of the farmers were selling milk to local vendors. Nattukuttai cattle owners had limited awareness on scientific dairy farming. The scientific feeding practices and disease management has a direct impact on the productivity of the animal and hence capacity building programmes on scientific dairy management practices will encourage the farmers to continue rearing Nattukuttai cattle. Non availability of the land adjacent to their homes to house Nattukuttai cattle and limited breed conservation measures were the foremost most serious constraints faced by the Nattukuttai cattle owners. Hence, policy intervention on scientific selection and selective breeding of Nattukuttai cattle is recommended to conserve the genetic pool of Nattukuttai cattle in Tamil Nadu.

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