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Milch Buffalo Keeping in the Kole Lands of Thrissur District, Kerala – An Analysis of its Strengths, Weaknesses, Opportunities and Threats

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ABSTRACT

This paper discusses the results of a study on strengths, weaknesses, opportunities and threats of the milch buffalo rearing system of the Kole lands of Thrissur district of Kerala state with a view to address significant issues as well as to understand potential threats that have to be mitigated in the long run. Kole lands are the wetlands coming under the Ramsar convention; Focus group discussions and personal interviews with Key Informants such as buffalo farmers from non-sampling areas and veterinarians working in the Kole lands paved the way for the generation of various strengths, weaknesses, opportunities and strengths of the milch buffalo rearing system. These items were then pretested in a non-sampling area before being administered to 50 milch buffalo farmers through personal interviews. The results of the study indicated that the higher adaptability and disease resistance of the animal coupled with its ability to convert low quality fibre into high quality protein, high fat percentage of buffalo milk and the medicinal property of buffalo ghee were perceived by respondents as being potential strengths of this system. Lack of opportunities for training on scientific buffalo rearing practices was perceived by the respondents as being the most important weaknesses of the milch buffalo rearing system along with the lack of a compulsory Haemorrhagic septicemia (H.S) vaccination policy for buffaloes. Perceived opportunities of the milch buffalo rearing system were centred on the factor associated with the market environment for current products. Significant threats to this system included the lack of policy measures to contain the disproportionate increase in feed cost when compared to milk price as well as lack of government incentive based schemes to promote buffalo farming and significant pollution of the Kole water bodies.

Keywords: *Milch buffalo rearing; Wetland; SWOT analysis; Kerala*

INTRODUCTION

The *Kole* lands of Thrissur district, Kerala have been described as wetlands coming under the purview of the Ramsar convention being 'areas of marshes, fen, peatland or water, whether natural or

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artificial, permanent or temporary, with water that is flowing or static, fresh, brackish or salty, including areas of marine water the depth of which at low tide does not exceed six metres". Wetlands perform a variety of functions and services that are crucial to human life that includes the replenishment and purification of ground water, production of food through the sustenance of livestock and fish and climate change mitigation. The domestic water buffalo, technically referred to as *Bubalus bubalis* (Abd El-Salam and El-Shibiny, 2011) is an invaluable asset for millions of smallholder farmers all over the world especially those who reside in marshy areas similar to the wetlands of the Thrissur *Kole* lands. This animal performs a multitude of functions and provides valuable products in terms of buffalo meat and milk, both of which are highly priced. In terms of its nutritional and organoleptic properties, buffalo meat has been reported to be quite similar to beef though some authors even argue that it is superior to beef (Kandeepan 2009).

The importance of the water buffalo in this context is on account of its natural qualities that makes it highly suitable for the *Kole* farming system. The traditional landscapes of the *Kole* land provide space for expression of the innate behaviour of the buffalo and also play an important role in minimizing thermal stress by ensuring natural wallowing areas which are important in ensuring thermoregulation which is very important for the buffalo. De Rosa et al (2009) observed that higher milk yields are obtained in systems that provide for free movement of buffaloes. Keeping in mind the necessity to promote sustainable vocations that are conducive to or that fit into the natural settings of the *Kole* lands, it is of utmost importance that these systems be explored so that measures to optimize them can be taken. The *Kole* lands are ecologically fragile areas with a delicately balanced system. Introduction of vocations that are detrimental to the balance of these systems must be viewed with caution. It is at this juncture that buffalo rearing assume significance in that it fits into the natural landscape of the *Kole* lands and provides valuable sources of income and employment to the community So also, buffalo keepers may encounter many constraints which have to be identified. Further, in the changing contexts of climate change and urbanisation there may be certain factors that are detrimental or beneficial to the *Kole* lands which need to be addressed. Hence a study was undertaken with an objective, to identify the strengths, weaknesses, opportunities and threats in milch buffalo rearing.

METHODOLOGY

Selection of the Locale and Sampling Procedure

The *Kole* lands of Kerala are situated in Thrissur and Malappuram districts of the state. The present study was undertaken in January to November, 2016. The Thrissur *Kole* lands were purposively selected for the study. The Thrissur *Kole* lands are geographically divided into two regions *viz*., the North and South *Kole* by the Karuvannur River. The North *Kole* spans an area of 8,072 ha and is spread over Peramangalam, Kechery, Chemeen, Puzhakkal Naduthodu, Chiyaram, Kokkalai, Puthenthode, Herbert Canal and Chirakkal basins while the South *Kole* comprises the Karalam fields, and both the Chemmanda and Muriyad *kayals*. The specific panchayats where the *Kole* lands are located include Kaiparambu, Tholur, Adat, Mullassery, Venkidangu, Manalur, Arimbur, Anthikad, Paralam, Avinissery, Cherpu, Vallachira, Chazhoor and Thanniyam in the North *Kole* and Kattur, Karalam, Parapukkara, Porathiserry, Irijalakuda, Muriyad, Poomangalam, Padiyur, Velookkara and Aloor in the South *Kole*.

The methodology of the SWOT analysis of the buffalo rearing system in the Thrissur *Kole* lands was under taken in three consecutive steps as follows:

1. The preliminary analysis of the milch buffalo rearing systems of Thrissur *Kole* lands

2. Identification of internal and external factors of the systems

3. The design of strategies for ensuring the sustainability of the systems.

The various steps are elaborated below:

Preliminary Analysis of the Milch Buffalo Rearing System of the Thrissur Kole lands

The milch buffalo rearing system of Thrissur *Kole* lands and the operational components of this system were identified and defined through triangulation and the use of multiple tools of data collection beginning first with focus group discussions with farmers and veterinary surgeons in the area of study and experts of Kerala Veterinary and Animal Sciences University. A total of five veterinary surgeons of the Department of Animal Husbandry, Government of Kerala, who had been working in the *Kole* lands as well as ten scientists with the Kerala Veterinary and Animal Sciences University with extensive research experience in buffalo husbandry were the respondents of the focus group discussions with experts. A total of three such focus group discussions were undertaken. Farmer respondents for the focus group discussions were selected based on their experience in rearing milch buffaloes on the *Kole* lands; they were identified through the key informant technique of sampling based on the expert opinion of the local veterinary surgeon. Two farmers each from Kaiparambu, Tholur, Adat, Venkidangu, and Anthikkad, areas of the North *Kole* and two each from Kattur, Karalam, Parapukkara,, Velookara and Muriyad areas of the South *Kole* were

selected, after consultation with local veterinary surgeons, for the focus group discussions. A total of four focus group discussions with batches of five farmers each were held in the local veterinary dispensary with the help of the veterinary surgeon. These samples of scientists, veterinarians and farmers were referred to for the collection of data on all preliminary information required for this study. A thorough review of available literature on various studies of the buffalo species was also undertaken to provide the structural frame work for these discussions. The buffalo rearing system thus identified was simplified in order to capture the important components of the system and the interaction between various components on the system. Various factors contributing to the effective functioning of the system were broadly categorized as internal and external factors.

Identification of Internal and External Factors

Attributes of the system that lend themselves to the control and manipulative efforts of farmers were conceptualized as the internal factor whereas those that did not were referred to as external factors. The internal factors were classified into six categories *viz;* features of animals, product related qualities, qualities of the production system, the marketing system, marketing environment features and policies and legislation. The external factors were classified into four categories which included those related to policies and legislation, social factor features, marketing environment features and production system features. Strengths, weaknesses, opportunities and threats pertaining to the milch buffalo rearing system of Thrissur *Kole* lands were identified through focus group discussions interviews with the buffalo keepers, veterinarians working in the Department of Animal Husbandry and scientists of Kerala Veterinary and Animal Sciences University referred to above. The statements generated through the above process were pretested in a non-sample area before being included in the final interview schedule. The non-sample area taken was part of Arimbur part of the *Kole* lands from where a snowball sample of 10 buffalo farmers formed the respondents for the pre-test. A total of 23, 22, 6 and 13 statements pertaining to the strengths, weaknesses, opportunities and threats of the milch buffalo rearing system were thus arrived at. These statements were then used in the final interview schedule where in the responses to each statement were scored on a three point continuum *viz;* agree, disagree and undecided.

As there are no official government lists of farmers rearing buffaloes on the *Kole* lands of Thrissur, a list of such farmers had to be prepared. This was done through the process of snowballing and identification of farmers by the local veterinary surgeons. A total of 50 Milch buffalo farmers were selected for the final study with 28 farmers from the North *Kole* and 22 from the South *Kole* of Thrissur district. Data were

collected by personal interviews on the premises of the farmers' homes by personal interviews using a structured interview schedule. From the data collected, the strengths, weaknesses, opportunities and threats listed in these schedules were then ranked based on the mean score of each statement such that the statement with highest mean score was ranked first. The mean of the mean scores of all statements in a factor category were then arrived at to analyse the perceived importance of each factor category under the strengths, weaknesses, opportunities and threats of each system.

Design of Strategies for ensuring Sustainability of the System

Suitable strategies for ensuring the sustainability of the system were arrived at by preparing the SWOT matrix as per Weihrich (1982). The matrix acts as an important tool in identifying interactions between internal and external factors. Strategies were designed so as to ensure that opportunities and strengths were exemplified while threats and weaknesses were minimized. Strategies that were arrived at were as follows:

a. SO strategies that use the advantages of strengths to exploit opportunities

b. ST strategies that manipulate strengths to diminish the chances and effects of threats

c. WO strategies that overcome weaknesses that prevent the pursuit of opportunities and to make use of the opportunities to overcome weaknesses.

d. WT strategies that make aware of limitations that emerge from the combination of weaknesses and threats.

FINDINGS AND DISCUSSION

Perceived Strengths of the Milch Buffalo Rearing System

The perceived strengths of the milch buffalo rearing system are presented in Table 1.

Table 1. Perceived strengths of the milch buffalo rearing system of the Thrissur *Kole* lands

Sl. No.	Statement	Category	Mean Score	Rank
1	Highly adapted to local climate	Animal features	3.00	I
2	High milk fat percentage	Product features	3.00	I
3	Increased demand for buffalo ghee	Product features	3.00	I
4	Natural wallowing facilities of *Kole* lands	Production system	3.00	I
5	Grazing facilities of the *Kole* landscapes	Production system	3.00	I
6	High demand for value added products	Marketing system	2.94	II
7	Disease resistance and innate immunity	Animal features	2.88	III
8	Docile nature, can be easily handled	Animal features	2.88	III
9	Good converters of low quality fibre	Animal features	2.88	III
10	Less care required when compared to cattle	Animal features	2.88	III
11	Good quality milk for families engaged in this vocation	Product features	2.88	III
12	Incidence of mastitis is very rare in buffaloes	Animal features	2.88	III
13	Curd from buffalo milk has good texture	Product features	2.88	III
14	Demand for buffalo milk by hotel/teashop	Marketing environment	2.88	III
15	Mixing buffalo milk to overcome fat deficiency in operative societies	Product features	2.81	IV
16	Buffalo milk flavor	Product features	2.38	V
17	High milk yield of buffaloes (6-7 liters)	Animal features	2.31	VI
18	Sale of buffaloes in any age results a three to four fold increase in the money spent for the initial purchase	Marketing environment	2.31	VI
19	High total solid content of buffalo milk makes it very good for paneer making	Product features	2.13	VII
20	opular whitening agent for value addition	Product features	2.06	VIII
21	Sustaining integrated *Kole* farming system	Production system	2.06	VIII
22	Free grazing spaces in the *Kole* landscapes makes heat detection easier	Production system	1.56	IX
23	Direct marketing of milk through societies	Marketing system	1.56	IX

It is evident from Table 1 that the higher adaptability and disease resistance of the animal coupled with its ability to convert low quality fibre into high quality protein, high fat percentage of buffalo milk and the medicinal property of buffalo ghee were perceived by respondents as being potential strengths of this system. The significant advantage of the *Kole* lands in providing wallowing facilities as well as grazing lands for animals were also perceived strengths of this system.

Table 2. Factor Category Matrix of the Strengths of the Milch Buffalo Rearing System

Factor category	Item no from Table 1								Factor category mean of means	Factor category rank
	1	7	8	9	10	12	17			
	Mean score	3.00	2.88	2.88	2.88	2.88	2.88	2.31		
Animal features	Within category rank	I	II	II	II	II	II	III	2.81	I
Factor category	Item no from Table 1	2	3	11	13	15	16	19 20		
Product features	Mean score	3.00	3.00	2.88	2.88	2.81	2.38	2.13 2.06	2.64	II
	Within category rank	I	I	II	II	III	IV	V VI		
Factor category	Item no from Table 1	14	18							
	Mean score	2.88	2.31							
Marketing environment features	Within category rank	I	II						2.60	III
Factor category	Item no from Table 1	4	5	21	22					
	Mean score	3.00	3.00	2.06	1.56					
Production system	Within category rank	I	I	II	III				2.41	IV
Factor category	Item no from Table 1	6	23							
	Mean score	2.94	1.56						2.25	V
Marketing system	Within category rank	I	II							

Table 2 reveals that among the various animal features, that on the adaptability of buffaloes to the local climatic conditions was the most important item but all other items were closely ranked. Product features were perceived as the second most important factor category and in this regard the high fat percentage of buffalo milk was significant in contributing to this. Equally important however, was the item on medical properties of ghee. Factor categories on marketing environment features and production system features were less but nearly equally ranked. Animal features dominated the strengths of this system, more specifically the higher adaptability and disease resistance of the animal as well as its ability to convert low.

Perceived Weaknesses of the Milch Buffalo Rearing System

The perceived weaknesses of the milch buffalo rearing system are given in Table 3 quality fibre into high quality protein. Similar observations were made by Collado et al (2010) who observed that the studied farmers in Europe were well aware of the significant edge of the Groningen white headed cattle over other breeds in low input and organic farming. Hiemstra et al (2010) also observed that the enhanced efficiency of the Lansisuomenkarja LSK (White Finn cattle) of Finland was an important strength of this breed. Sreelakshmi (2013) also made similar observations among the keepers of the Kasargod cattle in Kerala. Product attributes were also equally ranked alongside animal features especially the high fat percentage of buffalo milk and the perceived medicinal property of buffalo ghee. Collado et al (2010) observed that this traditional preference for local breed products could be a significant opportunity for developing appropriate strategies for promoting better pricing for breed products thus compensating the farmers.

Table 3. Perceived Weaknesses of the Milch Buffalo Rearing System

Sl.No	Statements	Category	Mean score	Rank
1	Lack of opportunities for training	Policies	3.00	I
2	Difficulty in maintaining bulls	Animal features	2.81	II
3	Lack of fixed market price for products	Marketing	2.63	III
4	Pungent smell of buffalo dung	Animal features	2.50	IV
5	No grazing facility during heavy rain	Production system	2.44	V
6	No compulsory vaccination for H.S	Policies	2.44	V
7	Aggressive behavior with strangers	Animal features	2.38	VI
8	Buffalo milk is not preferred for children	Product features	2.31	VII
9	Amphistomosis due to snails in *Kole* lands	Production system	2.19	VIII
10	Prolonged inter-calving interval	Animal features	2.13	IX

Sl. No	Statements	Category	Mean score	Rank
11	Incidence of Hemorrhagic septicemia	Animal features	2.13	IX
12	Lack of grazing lands in cultivation period	Production system	2.13	IX
13	Low growth rate of female buffalo calves	Animal features	2.06	X
14	High incidence of buffalo calf mortality	Animal features	2.00	XI
15	Buffalo milk not suitable for *khoa* based products	Product features	2.00	XI
16	Non availability of good germplasm	Policies	1.94	XII
17	Higher incidence of uterine prolapse	Animal features	1.81	XIII
18	High rate of artificial insemination failure	Animal features	1.69	XIV
19	Difficulty in weaning buffalo calves	Animal features	1.69	XIV
20	Difficulty in detecting heat in buffaloes	Animal features	1.50	XV
21	Low quality of grass on *Kole* fields	Production system	1.44	XVI
22	Lack of facility to transporting animals	Marketing	1.38	XVII

Lack of opportunities for training on scientific buffalo rearing practices were perceived by the respondents as being the most important weaknesses of the milch buffalo rearing system, while the difficulty in maintaining buffalo bull was ranked second. Coming third and fourth were the lack of a fixed market price for buffalo by-products and the pungent smell of buffalo dung which posed significant problems for milch buffalo farmers. Respondents also reported the difficulties they encountered in grazing these animals in the *Kole* lands during heavy rainfall due to raising the water levels in the fields. The lack of a compulsory Haemorrhagic septicemia (H.S) vaccination policy as buffaloes are animals that are highly susceptible to Haemorrhagic septicemia was perceived as a weakness of this system.

Table 4. Factor Category Matrix of the Weaknesses of the Milch Buffalo Rearing System

Factor category Policies and legislation	Item no from Table 3: 6, 7, 16 Mean score: 3.00, 2.44, 1.94 Within category rank: I, II, III	2.46	I
Factor category Product features	Item no from Table 3: 8, 15 Mean score: 2.31, 2.00 Within category rank: I, II	2.16	II
Factor category	Item no from Table 3: 5, 9, 12, 21 Mean score: 2.44, 2.19, 2.13, 1.44	2.05	III

Production system features	Within category rank I II III IV		
Factor category Animal features	Item no from Table 20 3 2 4 7 10 11 13 14 17 18 19 Mean score 2.81 2.50 2.38 2.13 2.06 2.00 1.81 1.69 1.69 1.69 1.50 Within category rank I II III IV V VI VII VIII VIII VIII IX	2.02	IV
Factor category Marketing environment features	Item no from Table 3 3 22 Mean score 2.63 1.38 Within category rank I II	2.01	V

that the higher adaptability and disease resistance of the animal coupled with its ability to convert low quality fibre into high quality protein, high fat percentage of buffalo milk and the medicinal property of buffalo ghee were perceived by respondents as being potential strengths of this system. The significant advantage of the *Kole* lands in providing wallowing facilities as well as grazing lands for animals were also perceived strengths of this system.

Lack of opportunities for training on scientific buffalo rearing practices were perceived by the respondents as being the most important weaknesses of the milch buffalo rearing system, while the difficulty in maintaining buffalo bull was ranked second. Coming third and fourth were the lack of a fixed market price for buffalo by-products and the pungent smell of buffalo dung which posed significant problems for milch buffalo farmers. Respondents also reported the difficulties they encountered in grazing these animals in the *Kole* lands during heavy rainfall due to raising the water levels in the fields.

The factor category matrix presented in Table 4 indicated the dominant presence of policies and legislation in the perceived weaknesses of the milch buffalo rearing system. Marketing environment features remained least conspicuous at the lowest rung of the list whereas product, animal and production system features remained towards the middle of the list in the said order. Significant weaknesses in the milch buffalo rearing system of the Thrissur *Kole* lands centred around the conspicuous absence of opportunities for training on scientific buffalo rearing practices. Perceived opportunities of the milch buffalo rearing system were centred on the factor associated with the market environment for

current products. Sreelakshmi (2013) also observed that market for current products was the second most important factor category in the perceived opportunities of the Kasargod cattle rearing system. More specifically, the high price offered for buffalo products emerged as a significant opportunity to be exploited in this system. The opportunities offered by the market environment coupled with the high price offered for buffalo products can be capitalized upon to overcome system inherent weaknesses such as lack of policy in buffalo promotion by the government.

Perceived Opportunities of the Milch Buffalo rearing system

Perceived opportunities of the milch buffalo rearing system of the Thrissur *Kole*s centred on the factor associated with the market environment for current products as well as policies and legislation. The high price offered for buffalo products emerged as a significant opportunity to be exploited in this system whereas possibility of policies that promote breeding of buffaloes was a less perceived opportunity of this system.

Factor category analysis revealed the predominance of the factor policies and legislation in the possible opportunities of this system. Market environment for the buffalo products were also well received while production system features had relatively less to offer in terms of opportunities.

Table 5. Perceived Opportunities of the Milch Buffalo Rearing System

Sl. No	Statements	Category	Mean score	Rank
1	High price for buffalo ghee, curd	Marketing environment	3.00	I
2	Mobile feed analyzing unit	Policies and legislation	2.88	II
3	Milk processing unit in every block	Policies and legislation	2.75	III
4	*Kole* area provides space for expression of social behavior which will improve conception rate	Production system features	1.56	IV
5	high demand for homogenized milk	Marketing environment	1.38	V
6	Breeding policies	Policies and legislation	1.38	V

Table 6. Factor Category Matrix of the Opportunities of Milch Buffalo Rearing System

Factor category	Item no from Table	5	2	3	6	Factor category mean of means	Factor category rank
	Mean score	2.88	2.75		1.38		
Policies and legislation	Within category rank	I	II		III	2.33	I

Factor category Marketing environment features	Item no from Table 5: 1 5 Mean score: 3.00 1.38 Within category rank: I II	2.19	II
Factor category Production system features	Item no from Table. 5: 6 Mean score: 1.56 Within category rank: I	1.56	III

Table 7. Perceived Threats of the Milch Buffalo Rearing System

Sl. No	Statements	Category	Mean score	Rank
1	Disproportionate increase in feed cost and milk price.	Policies and legislation	3.00	I
2	Lack of incentives for buffalo farming	Policies and legislation	3.00	I
3	Dislike for buffalo rearing by younger people	Social factors features	2.88	II
4	Climate change and drought in Kerala	Production system	2.81	III
5	Waste disposal in *Kole* polluting water	Production system	2.75	IV
6	Increased number of stray dogs	Production system	2.69	V
7	Labor shortage	Social factors features	2.56	VI
8	Growth of algae due to eutrophication	Production system	2.31	VII
9	Pollution due to hawkers on bunds	Social factors features	2.19	VIII
10	Less consumption of milk due to fear of life style diseases	Marketing environment features	2.13	IX
11	Lack of direct milk marketing facilities	Marketing environment	2.06	X
12	Chances of theft of buffalo calves	Social factors features	1.69	XI
13	Higher incidence of infertility issues	Policies and legislation	1.44	XII

Perceived Threats of the Milch Buffalo Rearing System

Perceived threats of the milch buffalo rearing system centered on the lack of policy and legislation to regulate the disproportionate increase in feed prices when compared to milk price and the lack of incentive based schemes for buffalo rearing as well as the tendency for younger people tend to disengage from this vocation due to difficulties in getting marriage proposals *etc.*

Factor category analysis of the threats on the milch buffalo rearing system revealed that production system features were dominant threats and policies and legislation issues were also important but to a lesser extent. Social factors and market environment features were also potential

areas of concern, though to a lesser extent. Production system issues such as increased drought due to climate change and pollution of water bodies were also potential threats to the system. Significant threats to this system included the lack of policy measures to contain the disproportionate increase in feed cost when compared to milk price as well as lack of government incentive based schemes to promote buffalo farming and significant pollution of the *Kole* water bodies. Wollny (2003) and Duclos and Hiemstra (2010) also opined that technical assistance and incentives were important measures in ensuring the survival of the breed. Policies and legislation was perceived as the most important threat of the Kasargod cattle keeping system by Sreelakshmi (2013).

Table 8. Factor Category Matrix of the Threats of Milch Buffalo Rearing System

Factor category	Item no from Table. 7	4	5	6	8	Factor category mean of means	Factor category rank
	Mean score	2.81	2.75	2.69	2.31		
Production system features	Within category rank	I	II	III	IV	2.64	I
Factor category	Item no from Table 7	1	2	13			
	Mean score	3.00	3.00	1.44			
Policies and legislation	Within category rank	I	I	II		2.48	II
Factor category	Item no from Table 7	3	7	9	12		
	Mean score	2.88	2.56	2.19	1.69		
Social factor features	Within category rank	I	II	III	IV	2.33	III
Factor category	Item no from Table. 7	10	11				
	Mean score	2.13	2.06				
Marketing environment features	Within category rank	I	II			2.09	IV

CONCLUSION

Analysis of the matched factor categories of the SWOT matrix of the milch buffalo rearing system sheds light on the need to fully exploit the strength of the animal by making use of opportunities available in the effective implementation of policy. Significant weaknesses in implementation of policy also represent a potential soft point in the possible opportunities offered by this sector. Potential threats to the production system have to be effectively thwarted in order to get the full benefits of the opportunities offered by the animal features and the products from buffalo rearing. The quantified SWOT matrix also illustrates the significant threats by way of inherent weaknesses in the policy implementation system which render it ineffective and pose crucial questions that may impede the development as well as the sustainability of this system.

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