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Original Research

Crisis Management Practices Employed by Sheep Farmers to Overcome the Crisis in Sheep Farming in Erode District of Tamil Nadu

K. P. Saravanan[1*], C. Manivannan[2], N. K. Sudeep Kumar[3] and G. Kathiravan[4]

[1]Assistant Professor, Department of Veterinary and Animal Husbandry Extension Education, Veterinary College and Research Institute, Orathanadu, Thanjavur District, Tamil Nadu, INDIA
[2]Professor, University Publication Division, Tamil Nadu Veterinary and Animal Sciences University, Chennai, Tamil Nadu, INDIA
[3]The Director, Director of Extension Education, Tamil Nadu Veterinary and Animal Sciences University, Chennai, Tamil Nadu, INDIA
[4]Professor, Department of Animal Husbandry Statistics and Computer Applications Madras Veterinary College Chennai, Tamil Nadu, INDIA

*Corresponding Author: k.p.saravananvet@gmail.com

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Abstract

To ascertain the crisis management practices employed by sheep farmers to overcome the crisis in sheep farming, a study was undertaken in Perundurai and Dharapuram taluks of Erode district in Tamil Nadu. Data were collected by pre-tested interview schedule from 100 farmers selected from 10 villages in each of the two taluks, using multi-stage random sampling procedure. Most of respondents were found provided safe shelter, stall-feeding and adopted recommended vaccination and deworming schedule to combat the crisis due to heavy rainfall. In order to overcome the crisis situations arising due to occurrence of blue tongue, sheep pox, gastro-intestinal parasitism, predators attack, liver fluke infestation, PPR, high lamb mortality, FMD, enterotoxaemia, coccidial infection and anthrax, most of the respondents consulted a veterinarian and followed his / her advice.

Keywords: Crisis Management, Farm Crisis, Sheep Farming, Sheep Management

Introduction

Livestock sector plays an important role in the socio-economic development of rural households. It contributes about three per cent to the total GDP and thirty per cent to the Agricultural GDP of our country (Bairwa *et al.*, 2013). The importance of livestock goes beyond its food production function (Birthal *et al.*, 2002) as it plays a significant role in the welfare of 63 per cent of rural population in India. The small farmers, marginal farmers and landless labourers, who constitute a major proportion of the rural population of India, depends mostly on supplementary sources of income for their livelihood as the income from agriculture is often uncertain and insufficient. Among the supplementary sources of income, sheep husbandry occupies an unique place in the farming systems of the areas with limited land or water resources due to their ability to convert resources unusable by man or by the larger livestock categories into highly nutritious food and by providing 'year round employment' and 'sustainable income'. Sheep with their inherent qualities of early maturity, ability to thrive even under harsh environment and low capital investment, act as an insurance coverage to farmers during crop failure (Selvam and Safiullah, 2002).

The success of any enterprise depends mainly on its efficient management in achieving higher production and productivity. However, the frequent occurrences of natural calamities such as cyclones, flood, drought and disease outbreaks etc. causes sudden disturbances in economic equilibrium and threaten the existence of the enterprise. Sheep enterprise is no exception to this and the sheep farmers often face severe crisis on successfully managing their enterprise due to several unforeseen factors. A comprehensive knowledge on the crisis management practices by which these are tackled by the sheep farmers is of paramount importance in formulating suitable crisis management strategies for enabling sustainability in sheep production. Considering this in view, a study was carried out with the objective to identify the crisis management practices employed by the sheep farmers to overcome the crisis in sheep farming

Materials and Methods

The study was carried out in Erode district of Tamil Nadu state, which was selected on the basis of highest sheep population among all the districts in Tamil Nadu. Out of the seven taluks in Erode district, two taluks namely Perundurai and Dharapuram were randomly selected for the study. From these two taluks, 10 villages were selected in each by applying simple random sampling method. Thus, a total of 20 villages were selected for the study. A complete list of sheep farmers from the 10 villages selected in each of the two taluks were prepared with the help of the State Department of Animal Husbandry Officials and progressive sheep farmers of the respective areas. From this list, 50 sheep farmers were selected from the 10 villages in each taluk, by applying proportionate random sampling technique. Thus, a total of 100 sheep farmers constituted the sample for the study.

A total of 25 crisis situations faced by the sheep farmers were identified using the crisis index developed for the study. Based on an exhaust review of literature and in consultation with expert extension personnel in the field of veterinary and animal sciences, all possible crisis management practices that can be employed to overcome each of the crisis situations identified were listed and the respondents were asked to check and rank the crisis management practices employed by them to overcome the perceived crisis situation in the order of having followed it more rigorously.

Statistical Methods

The orders of merit given by the respondents were converted in to rank by using the formula. Garett's ranking technique was used to find out most significant crisis management practice followed by the farmers to overcome crisis in sheep farming. (Garett and Woodworth, 1969).

$$\text{Percent Position} = \frac{100\ (\text{Rij} - 0.50)}{\text{Nj}}$$

Where,

Rij - Rank given for the ith variable by the jth individual

Nj - Number of crisis management ranked by the jth individual. The ranked were analyzed using Garrett's ranking technique and results were interpreted.

Results and Discussion

Among the 25 crisis situations included for the study, heavy rainfall during monsoon, occurrence of bluetongue and occurrence of sheep pox were perceived to be the most important crisis by vast majority of the respondents. The crisis situations such as gastro-intestinal parasitism, exploitation by middlemen, tick infestation, and absence of organized marketing in that order were perceived to threaten the existence of the sheep enterprise to a major extent (Saravanan and Manivannan, 2017). This was followed by acute shortage of green fodder, prolonged period of drought, wound myiasis and non-availability of grazing land. The other crisis situations perceived to some extent were extreme hotness, frequent attack of predators, indebtedness, liver fluke infestation, coccidial infection, PPR, high lamb mortality, FMD, enterotoxaemia, anthrax and high cost of concentrate feed in that order of importance.

Crisis Management Practices Employed to Overcome the Heavy Rainfall During Monsoon

It could be observed from Figure 1 that the respondents' foremost priority at times of heavy rainfall during monsoon was to provide safe shelter to sheep, followed by stall-feeding to compensate the absence of grazing, vaccination and deworming to protect against infectious and contagious diseases. Building multipurpose livestock shelters in flood or cyclone prone areas will go a long way in protecting animals during disasters (Sastry,1994).

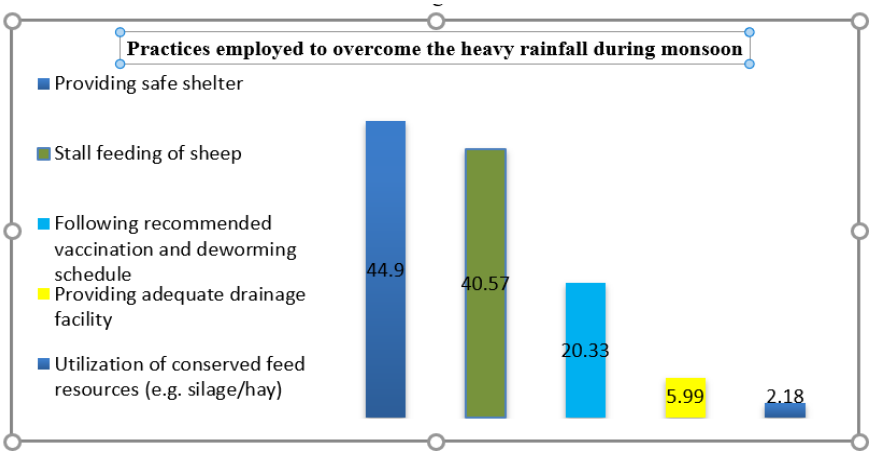

Figure 1: Practices employed to overcome the heavy rainfall during monsoon

Means Employed to Overcome the Crisis of Bluetongue and Sheep Pox

Immediately consulting a veterinarian and following his/her advice ranked first as the crisis management practices employed, application of fly repellents and insecticides in sheep pen at night and isolating affected sheep from the unaffected ones were ranked second and third respectively to overcome the outbreak of Bluetongue.

Table 1: Crisis management practices

Management practices	Mean score	Rank
Occurrence of bluetongue		
Immediately consulted a veterinarian and followed his / her advice	51.1	I
Applying repellants and insecticides in and around sheep pen at night	44.14	II
Isolation of sick animal	16.87	III
Avoiding stagnation of sewage water in and around sheep farm	14.62	IV
Following recommended vaccination schedule	2.3	V
Insuring the sheep flock	1.16	VI
Occurrence of sheep pox		
Immediately consulted a veterinarian and followed his / her advice	60.41	I
Maintaining good hygienic measures to reduce its incidence	49.55	II
Isolation of sick animal	17.68	III
Following recommended vaccination schedule	5.23	IV
Insuring the sheep flock	2.53	V
Destroying contaminated materials (feed, water, bedding materials *etc*.) to avoid further spread	0.62	VI

Table 1 reveals that, to overcome sheep pox incidence, immediately consulting a veterinarian and following his/ her advice (Rank I), maintaining good hygienic measures (Rank II) and isolation of affected sheep from the healthy stock (Rank III) were the important crisis management practices employed by the sheep farmers.

Management Practices Followed for Gastro-Intestinal Parasitism and Exploitation of Middlemen

To avoid the ill-effects of gastro-intestinal parasitism, immediately consulting a veterinarian and following his/her advice and maintaining proper hygiene in and around the sheep flock and lack of awareness about the necessity of following recommended deworming schedule as the important crisis prevention measure might be the reason for the third rank achieved by this mean. Sheep ranchers' ways utilized to the stay away from misuse by mediators were found to gather data about different promoting outlets accessible for selling sheep and chose the one where serious cost was guaranteed. To obtain higher margin of profit, few of them were found to sell mutton directly to consumers, hotels and households and live sheep to local butchers, retail shops and shandies.

Table 2: Crisis management practices

Management practices	Mean score	Rank
Gastro-intestinal parasitism		
Immediately consulted a veterinarian and followed his / her advice	47.29	I
Maintaining proper hygiene in and around the sheep flock	31.14	II
Following recommended deworming schedule	11.11	III
Segregation of young stock from older ones	6.44	IV
Providing proper care to improve weaker stock	0.89	V
Exploitation by middlemen		
Collected information about various marketing outlets for sheep and selected an outlet where competitive price was ensured	3.37	I
Direct sale to consumers, hotels and house holds	3.04	II
Direct sale to butchers and retail shops	2.66	III

Management of Tick Infestation, Absence of Organized Marketing and Green Fodder Shortage

At times of tick infestation of the sheep flock, the respondents were found to apply acaricide as per recommendations as the first course of action to combat the crisis. Sheep farmers were found to sell sheep directly to butchers, retail shops, shandies (Rank I) and also to consumers, hotels and neighbors in their locality (Rank II) to overcome the crisis due to absence of organized marketing. Only few of the respondents showed much interest in collecting information about various marketing outlets to select the one where competitive price was ensured. The other crisis management practices viz., steps to organize sheep marketing co-operatives and making representation to authorities for regulating sheep marketing were not followed by the respondents.

Utilization of non-conventional feed resources, allowing the sheep to take their chance in the field and supplementary feeding with concentrate or bran mixture were the management practices commonly engaged to face the acute shortage of green fodder that ranked first, second and third respectively.

Crisis Management Practices for Prolonged Period of Drought and Wound Myiasis

The sheep farmers in the study area during extended period of drought allowing the sheep to take their chance in field, utilize of non-conventional feed resources, feeding edible scrubs and selling part or entire the flock were the other crisis management practices followed. Small ruminant farmers in Rajasthan and Nagpur sold their animals, migration with cattle, soil conservation and water management important strategies practiced during drought (Rathore, 2004, Saroja, 2003).

Table 3: Crisis management practices

Management practices	Mean score	Rank
Tick infestation		
Deticking of sheep by applying acaricide as per the recommendation	19.87	I
Immediately consulted a veterinarian and followed his / her advice	17.13	II
Following recommended feeding schedule to improve health of the flock	0.5	III
Absence of organized marketing		
Direct sale to butchers, retail shops and shandy	13.17	I
Direct sale to consumers, hotels and neighbours *etc*.	10.96	II
Collected information about various marketing outlets for sheep and selected an outlet where competitive price was ensured	1.5	III
Acute shortage of green fodder		
Utilization of non-conventional feed resources	44.95	I
Allowing sheep to take their chance in the field	33.29	II
Supplementary feeding with concentrate or bran mixture	31.44	III
Utilization of tree products such as leaves, seeds *etc*.	16.56	IV
Utilization of edible scrubs	9.99	V
Utilization of waste land for cultivation	9.75	VI
Use of failed crops as animal feed	6.52	VII
Reducing stock density	6.23	VIII
Cultivation of perennial crops	3.29	IX
Conservation of green fodder	2.04	X
Arrangement with relatives/neighbours/friends to utilize fodder available with them	0.75	XI

Table 4: Crisis management practices

Prolonged period of drought	**Mean score**	**Rank**
Allowing the sheep to take their chance in the field	44.88	I
Utilization of non-conventional feed resources	31.52	II
Selling part or all of the flock	15. 07	V
Feeding edible scrub	20.04	III
Reducing the quantity of feed to sheep	15.68	IV
Purchase of fodder	13.22	VI
Tree fodder supplementation	9.2	VII
Utilization of conserved fodder resources (*eg.* silage, haymaking *etc.*)	9.04	VIII
Hand feeding	6.89	IX
Migrating sheep to reserve pasture	3.85	X
Wound myiasis		
Application of insecticides / fly repellants	32.59	I
Immediately consulted a veterinarian and followed his / her advice	19.27	II
Disinfecting fly breeding places / materials	4.29	III
Providing immediate treatment to traumatic wound	0.63	IV

Table 4 shows that application of insecticides / fly repellants was the crisis management practice followed to control wound myiasis followed by immediately consulting a veterinarian and following his / her advice. The other crisis management practices such as crutching and dehorning of sheep included in the list were not found to be followed.

Management Practices Followed for Non-Availability of Grazing Land, Extreme Hotness and Predators Attack

Sheep farmers arranged for grazing sheep on common grazing land such as community land, roadside areas and sorghum / millet cultivated fields that are available in their locality to overcome non-availability of grazing land and it was ranked first. Few respondents were followed intensive cultivation of high yielding fodder crops to manage the non-availability of grazing land. The other crisis management practices viz., community grazing land, creating fodder banks and utilization of forestland were not followed by the respondents. To safeguard the sheep against the effects of extreme hotness, the respondents of the study area preferred early morning grazing of their sheep that

ranked first among the five crisis management practices listed followed by splashing, wetting, sprinkling and bathing the sheep with comfortable cool water that ranked second.

Immediately after the attack of the sheep flock by predators, the consulted veterinarian and followed his / her advice as the best course of action available to them. As a precautionary measure, they were also found to provide safe shelters to their sheep flock against the attack by the predators. It could be inferred from Table 5 that paying the debt by the sale of property was the mean that ranked first followed by getting assistance from relatives / neighbors / friends due to unexpected medical expenses, failed crop etc. Majority of the respondents preferred to overcome indebtedness through sale of property like land, livestock, jewels etc., to get rid of their debt burden at once.

Table 5: Crisis management practices

Management practices	Mean score	Rank
Non-availability of grazing land		
Arranging for grazing of sheep on common grazing land	38.39	I
Intensive cultivation of high yielding fodder crops	0.56	II
Extreme hotness/heatstroke		
Following early morning grazing	38.34	I
Splashing, wetting, sprinkling, bathing with comfortable cool water	18.92	II
Taking measures to overcome direct heat with the use of fan, cobbler, wet panel or such other means	3.47	III
Following night grazing	2.5	IV
Providing adequate shade in the open (*eg*. tree shade)	1.74	V
Predators attack		
Immediately consulted a veterinarian and followed his / her advice	19.93	I
Providing safe shelters	10.7	II
Maintaining watch dogs and use them for herding	0.63	III
Controlling carnivores by informing local body / forest officials	0.5	IV
Indebtedness		
Paying the debt by sale of property (land, livestock, jewellery, *etc*.)	31.86	I
Getting assistance from relatives / neighbours / friends	15.36	II
Approaching concerned authorities for availing subsidies if any by the government	4.73	III
Tapping sources for getting loan at lower interest rates	2.31	IV

Means Employed for Liver Fluke Infestation and Coccicidial Infection

Veterinarian was the important information source consulted to overcome the crisis due to liver fluke infestation in sheep. Following recommended deworming schedule was the other mean that ranked second in this regard. The other crisis management practices like restricted grazing on low lying areas and controlling snail population were not practiced by the respondents.

Table 6: Crisis management practices

Management practices	Mean score	Rank
Liver fluke infestation		
Immediately consulted a veterinarian and followed his / her advice	8.13	I
Following recommended deworming schedule regularly	4.11	II
Rotational grazing of sheep	1.95	III
Coccicidial infection		
Following hygienic management practices	32.56	I
Immediately consulted veterinarian and followed his / her advice	22.73	II
Changed feed immediately	4.51	III
Isolation of affected sheep	2.6	IV
Keeping the sheep in a sunny dry place	2.1	V

Following hygienic management practice was the mean that was employed to control coccidial infection in sheep by most of the respondents and it was ranked first among the various possible crisis management practices listed. Besides this, the respondents were also found to consult a veterinarian and follow his / her advice to control the

coccidial infection in their sheep flock and it was ranked second. Although use of feed additives was important management practices but not followed as a mean to overcome the coccidial infection by the respondents (Table 6).

Management Practices for Occurrence of PPR, FMD, Anthrax, Lamb Mortality and High Cost of Concentrate Feed

To overcome the occurrence of PPR and lamb mortality sheep farmers practiced consulting a veterinarian and following his / her advice and maintaining better hygiene in and around the sheep farm premises as mean, which ranked first and second respectively. The other crisis management practices such as avoiding over feeding, overcrowding, flushing of ewes, additional feeding to ewes nearing lambing and newly lambed ewes were not found to be practiced. During outbreak of FMD in sheep flock, immediate veterinary attention is required the sheep farmers were left with no option but to consult a veterinarian immediately in this regard and hence it ranked first as the mean employed. To control the occurrence of the disease and to prevent contamination of the sheep pen, water, equipments etc., the respondents were found to follow good hygienic measures to some extent (Table 7).

Table 7: Crisis management practices

Management practices	Mean score	Rank
Occurrence of PPR		
Immediately consulted a veterinarian and followed his / her advice	19.52	I
Following good hygienic measures to reduce the incidence	10.74	II
Isolation of sick animal	3.02	III
Following recommended vaccination schedule regularly	2.74	IV
Insuring the sheep flock	0.62	V
High lamb mortality		
Immediately consulted a veterinarian and followed his / her advice	10.08	I
Maintaining good hygiene in the shelter and its surroundings	3.11	II
Early feeding of colostrum	2.51	III
Providing extra care to newborn lambs	0.31	IV
Occurrence of FMD		
Immediately consulted a veterinarian and followed his / her advice	17.38	I
Following good hygienic measures	10.14	II
Isolation of affected animals	4.68	III
Following recommended vaccination schedule regularly	0.62	IV
Insuring the sheep flock	0.56	V
Occurrence of Enterotoxaemia		
Immediately consulted veterinarian and followed his / her advice	8.78	I
By limiting the grazing time	5.43	II
Avoiding grazing in the early morning	3.79	III
Avoiding excess carbohydrate (grain) feeding	0.5	IV
Occurrence of Anthrax		
Following good hygienic measures to reduce the incidence	2	I
Immediately consulted a veterinarian and followed his / her advice	1.86	II
High cost of concentrate feed		
Utilization of tree products such as leaves, seeds and pods	3.13	I
Utilization of non-conventional feed resources	2.52	II
Collection of information about various outlets for concentrate supply and purchasing concentrate from the outlets selling it at lower rates	1.85	III

The respondents were not aware of the importance of preventing unauthorized movement of people, animal and

their products in and around the flock during outbreak. The veterinarian was the important information source consulted to overcome the crisis due to the occurrence of enterotoxaemia likewise in other diseases discussed previously. To reduce the susceptibility of the sheep to the disease, limiting the grazing time and avoiding early morning grazing were the other crisis management practices followed to a little extent. Following good hygienic measures to reduce the incidence was ranked first as the mean to overcome the crisis due to the occurrence of anthrax. However other crisis management practices viz., proper disposal of infected materials and vaccination were not followed by the farmers due to the sporadic incidence of disease in the study area. To overcome the crisis of high cost of concentrate feed farmers practiced utilization of tree fodders and non-conventional feed resources as means.

Conclusion

The results of the study revealed that to prevent inundation, frequent desilting of drainage channels and construction of flood water drainage system are of paramount importance in overcoming the crisis and creating awareness on important fodder cultivation methods such as silage making and hay making will go a long way in meeting the fodder requirements during the heavy rainfall season. Insisting community participated animal disease surveillance and monitoring system is in urgent demand to combat the ill-effects of the various diseases affecting the livestock in general and the sheep in particular.

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Conflict of Interests

There is no conflict of interest.

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