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Coping strategies pertaining to health care adopted for dairy animals during the 2018 floods in Kerala, India

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Abstract

This study investigates the specific health care and vaccination coping strategies employed by dairy farmers in the three most severely flood-affected districts of Kerala, India—Thrissur, Ernakulam, and Idukki—following the destructive 2018 floods. The research aimed to assess the extent of adoption for various coping mechanisms related to animal health management. A total of 180 flood-affected dairy farmers were sampled from 12 selected panchayats, and data was collected using a three-point continuum (Adoption Continued, Discontinued, or Never Adopted) to compute adoption indices and rank the strategies. The findings consistently ranked vaccination of cattle with Foot and Mouth Disease (FMD) vaccine as the most highly adopted coping mechanism across all three districts, with an index score of 0.98. This was closely followed by the strategy of selling diseased animals before the monsoon. Other important coping strategies included keeping a first aid kit handy and practising ethno-veterinary medicine for emergency treatment. The results underscore the farmers' high reliance on both institutionalized veterinary interventions and traditional knowledge for immediate preparedness against flood-related animal health crises.

Keywords: Floods, dairy farming, health care coping strategies

Introduction

The state of Kerala has faced an unprecedented rainfall followed by severe floods in August 2018 with a death toll for 504. According to the Central Water Commission (CWC), (2018) ^[2] the state received 2346.6 mm of rain from June to 19th of August, which is 42% more than the average rainfall. The state received a tremendous rainfall of 758.6 mm in the first 20 days of August which is 164% more than the actual rainfall, resulting in the massive flood throughout the state affecting 13 of the 14 districts leading to the evacuation of about 3.4 million people to the 12,300 relief camp across the state making the worst flood in the century. (NIDM, 2020) ^[9]. 2018 Kerala flood caused extensive damage to the crops, building, and infrastructure; its associated aftermath of the flood resulted in a huge loss to its economic, social, and natural environment, accompanied by the 331 landslides across 10 districts. After ravaging by the flood, the state has faced communicable diseases leptospirosis, chicken pox, hepatitis A, malaria, and dengue resulting in a death toll for 180 (Parthasarathy *et al.*, 2021) ^[10] (Varughese and Purushothaman. 2021) ^[12].

Livestock and poultry are vulnerable to common infectious diseases like Rinderpest, Foot & Mouth Disease (FMD), Rift Valley Fever (RVF), Bovine Spongiform Encephalopathy (BSE), Contagious Bovine Pleuro Pneumonia (CBPP), Classical Swine Fever (CSF), African Swine Fever, Highly Pathogenic Avian Influenza (HPAI), Peste de Petits Ruminants (PPR), New Castle Disease (NCD) during flood (Kumaravel, 2020) ^[5].

Materials and Methods

Study Area and Sampling Design

The study was conducted in Thrissur, Ernakulam, and Idukki districts of Kerala, India. These districts were purposively selected based on secondary milk procurement data, which indicated a substantial post-flood decline of 33.58 per cent, 29.58 per cent, and 16.92 per cent, respectively. The selection was intended to capture regions most severely affected in terms of dairy sector performance (Morton, 2007) ^[8].

Based on the intensity and severity of flood impacts, four panchayats were identified from each selected district. From each panchayat, a random sample of 15 flood-affected dairy farmers was drawn using secondary records obtained from the Kerala State Animal Husbandry Department and the Department of Dairy Development. Consequently, the final sample comprised 180 respondents representing 12 panchayats across the three districts.

Conceptual Framework

Coping strategies were conceptualised as the behavioural and cognitive efforts employed by farmers to manage and mitigate environmental stressors—specifically flood events—that adversely affect their agricultural livelihoods and livestock management systems. This conceptualisation is grounded in the transactional model of stress and coping proposed by Lazarus and Folkman (1984) ^[6], which views coping as a dynamic process shaped by both individual appraisal and environmental demands. Within this

framework, the present study focused on farmers' coping responses related to the Health care and vaccination management of dairy animals under recurrent flood conditions. (Scoones, 1998) ^[11].

Measurement of Health care and vaccination Coping Strategies

Coping strategies pertaining to Health care and vaccination in dairy animal management were identified through an extensive review of relevant literature and consultations with subject-matter experts, including veterinary scientists and dairy extension professionals in Kerala. The extent of adoption of each coping strategy was assessed using a three-point continuum: continuously adopted (AC = 2), adopted but later discontinued (AD = 1), and never adopted (NA = 0). This scoring procedure facilitated the computation of adoption indices and district-wise ranking of coping strategies, thereby enabling an assessment of the dynamics and sustainability of management practices adopted by farmers in response to repeated flood events (Deressa *et al.*, 2009 ^[3]; Adger *et al.*, 2005) ^[1].

Results

The result of Table 1 revealed that in Thrissur district, vaccination of cattle with FMD vaccine as per the direction of AHD was followed by 98.3 per cent of respondents followed by selling of the diseased animals before monsoon (93%), keeping first aid kit handy for emergency treatment (73.3%) and practising ethno- veterinary medicine for

emergency treatment of animals (60%).

In Idukki district, vaccination of cattle with FMD vaccine as per the direction of AHD was followed by 98 per cent of respondents followed by selling of the diseased animals before monsoon (93.3%), practising ethno- veterinary medicine for emergency treatment of animals (82%) and keeping first aid kit handy for emergency treatment (68%).

In Ernakulam district, vaccination of cattle with FMD vaccine as per the direction of AHD was followed by 98.3 per cent of respondents followed by selling of the diseased animals before monsoon (96.7%), keeping first aid kit handy for emergency treatment (71.7%) and practising ethno- veterinary medicine for emergency treatment of animals (70%).

The result of Table 2 revealed that in Thrissur district, vaccination of cattle with FMD vaccine as per the direction of AHD with an index score of 0.98 ranked first among health care coping mechanism. This was followed by selling of the diseased animals before monsoon (0.93), keeping first aid kit handy for emergency treatment (0.75) and practising ethno- veterinary medicine for emergency treatment of animals (0.63).

In Idukki district, vaccination of cattle with FMD vaccine as per the direction of AHD with an index score of 0.98 ranked first among health care coping mechanism. This was followed by selling of the diseased animals before monsoon (0.95), practising ethno- veterinary medicine for emergency treatment of animals (0.82) and keeping first aid kit handy for emergency treatment (0.70).

Table 1: Health care and vaccination coping mechanism followed by respondents (Percentage)

Sl. No.	Health care and Vaccination	Thrissur				Idukki				Ernakulam			
		AC	AD	NA	Total	AC	AD	NA	Total	AC	AD	NA	Total
1	Vaccination of cattle with FMD vaccine as per the direction of AHD	98.3	0	1.67	100	98	0	1.67	100	98.3	0	1.67	100
2	Keeping first- aid -kit for emergency treatment	73.3	3.33	23.33	100	68	3.33	28.3	100	71.7	3.33	25	100
3	Practicing ethno- veterinary medicine for emergency treatment of animals	60	6.67	33.33	100	82	0	18.3	100	70	0	30	100
4	Sell the diseased animals before monsoon	93	0	6.67	100	93.3	3.33	3.33	100	96.7	0	3.33	100

AC: Adoption Continued; AD: Adoption Discontinued; NA: Never Adopted

Table 2: Index score and ranking of health care and vaccination coping mechanism followed by respondents.

Sl. No.	Health care and vaccination	Thrissur	Idukki	Ernakulam
1	Vaccination of cattle with FMD vaccine before on set of rain and flood	0.98(i)	0.98(i)	0.98(i)
2	Keeping of first aid kit for emergency treatment	0.75(iii)	0.70(iv)	0.73(iii)
3	Study ethno- veterinary medicine for emergency treatment of animals	0.63(iv)	0.82(iii)	0.70(iv)
4	Sell the diseased animals before monsoon	0.93(ii)	0.95(ii)	0.97(ii)

Values in parentheses indicate the order of merit of preferences by the respondents column wise

In Ernakulam district, vaccination of cattle with FMD vaccine as per the direction of AHD with an index score of 0.98 ranked first among health care coping mechanism. This was followed by selling of the diseased animals before monsoon (0.97), keeping a first aid kit handy for emergency treatment (0.73) and practising ethno- veterinary medicine for emergency treatment of animals (0.70).

Discussion

An examination of study hinted that vaccination of cattle with FMD vaccine before on set of rain and flood is adopted by almost all the farmers in all the three districts. Selling of the diseased animals before flood is another coping method being followed by almost all the farmers of the study districts. Over two third of farmer disclosed that keeping of

first aid kit for emergency treatment as a coping strategy. Two third of farmers in Thrissur and Ernakulam districts had knowledge of ethno- veterinary medicine for emergency treatment of animals during flood disaster, whereas in Idukki district, 82 per cent of farmers have been using ethno- veterinary medicine for emergency treatment of animals as coping strategy. Similar results were obtained by Jahan *et al.* (2014) ^[4] who reported that farmers had their livestock and poultry vaccinated before floods in Bangladesh and Mishra *et al.* (2017) ^[7] who reported that in Odhisha, as a coping strategy 57.5 per cent of dairy farmers envisaged that they get their animals vaccinated before the occurrence of flood and 35.8 per cent of respondents always, and 33.3 per cent sometimes provide veterinary first-aid treatment to their animals.

Conclusion

The study successfully identified and ranked the most prevalent health care and vaccination coping strategies among dairy farmers in the three examined districts of Kerala, affirming a strong focus on crucial preventative measures. The near-universal adoption of FMD vaccination and the high adoption rate for the pre-monsoon selling of diseased animals demonstrates that farmers prioritize two major, immediately effective risk-reduction practices: institutional disease prevention and herd vulnerability management. Notably, the relative importance of ethno-veterinary medicine varied regionally, ranking higher in Idukki than in Thrissur and Ernakulam, suggesting an influence of local practices and resource availability. The data clearly shows a proactive approach to health crises among the farming community. For future disaster preparedness and sustainable dairy farming, extension services should leverage these high adoption rates while also reinforcing community knowledge and training on first-aid and regional specific ethno-veterinary practices to build a more comprehensive and resilient animal health management system against recurrent floods.

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