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General coping strategies adopted for dairy animals during the 2018 floods in Kerala, India

L Arun

Assistant Professor, Department of Veterinary and Animal husbandry Extension Education, Veterinary College and Research Institute, Udumalpet, TANUVAS, Chennai, Tamil Nadu, India

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Corresponding Author: L Arun

Abstract

This study investigated the general coping strategies adopted by dairy farmers in the flood affected districts of Thrissur, Ernakulam, and Idukki in Kerala, India, following the severe 2018 floods. The research aimed to identify and rank the management practices employed by farmers to mitigate the disaster's impact on their dairy animals. Data was collected from a sample of 180 respondents across 12 panchayats, and the adoption of six key strategies was measured on a three point scale (Adoption Continued, Discontinued, or Never Adopted) to calculate an adoption index and rank. The results revealed that "Clearing the drainage channels in and around the farm before arrival of monsoon" and "Selling non productive, ailing and old animals before the rainy season" were the most consistently and highly-ranked coping mechanisms across the three districts. Conversely, "Preference of indigenous cattle breed over cross bred animals" and "Following proper breeding strategy to avoid pregnancy and birth during the monsoon" were the least adopted, highlighting a gap in the implementation of long-term preparatory measures.

Keywords: Floods, dairy farming, general coping strategies

1. Introduction

In India, livestock plays a significant role in the agricultural system. Since over 62% of marginal households are directly involved in livestock production, it is more prevalent among small and marginal farmers. It has the ability to eradicate poverty; households that are involved in livestock farming are less likely to fall into poverty (Das *et al.*, 2020) [3]. India boasts the world's largest livestock population at 535.78 million heads, including 192.49 million cattle, contributing about 4.5% to GDP and employing over 20 million rural households (Department of Animal Husbandry and Dairying, 2019). In Kerala, the sector includes 17.5 million animals—3.4 million cattle, 0.4 million buffaloes, 2.8 million goats, 0.3 million pigs, and over 10 million poultry—bolstering livelihoods in a state with high human development but acute climate vulnerability (Government of Kerala, 2020) [4].

Kerala saw its most severe flooding since 1924 in August of 2018. Over 400 people lost their lives as consequence of the disastrous flood and related landslides, which impacted 5.4 million people. According to the post-disaster report that the Keralan government commissioned, the economic loss exceeded \$3.8 million (Hunt and Menon, 2020) [6]. Livestock losses were devastating; over 200,000 animals affected across 14 districts, including 46,000 cattle deaths, widespread fodder destruction, and 25-30 per cent drop in milk procurement (Sasi & Satheesh, 2018) [11]; (Arun & Senthilkumar, 2025) [1].

Materials and Methods

The study was carried out in Thrissur, Ernakulam, and

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Idukki which were purposively selected based on the milk procurement data. These districts showed a sharp decline of 33.58%, 29.58%, and 16.92%, respectively. (Jayawardhana *et al.*, 2022) [8]. (United Nations, 2018) [13].

Based on the severity of the flood, four panchayats from each district were identified. A random sample of 15 affected farmers was chosen from each panchayat utilising secondary data from the Kerala State Animal Husbandry Department and the Department of Dairy Development. Thus, the final sample size consisted of 180 respondents from 12 panchayats.

Coping strategies are denoted as the behavioural and cognitive efforts employed by farmers to address environmental stressors, such as floods, impacting their agricultural livelihoods and livestock management. (Lazarus & Folkman, 1984) [9]. Following the transactional model of stress and coping, the study specifically focussed on the general management of dairy animals.

Measurement of general coping strategies

Coping strategies were derived from a comprehensive literature review and expert inputs from Kerala's Veterinary and Dairy extension experts. Adoption was measured on a three-point scale: continuously adopted (AC = 2 points), adopted but discontinued (AD = 1 point), or never adopted (NA = 0 points). This scoring enabled adoption indices and district-wise rankings, capturing practice dynamics under recurrent floods (Saravanan *et al.*, 2021) [10].

Results

The result of Table 1 revealed that in Thrissur district,

clearing the drainage channels in and around the farm before arrival of monsoon was followed by 90 per cent of respondents followed by resorting to practice of selling the non-productive, ailing and old animals before rainy season (80%), construction of open barn to leave the animal untethered during rainy season (70%), construction of

community shelter which could be used in case of flood disaster (60%), following proper breeding strategy to avoid pregnancy and birth during the monsoon (40%) and preference of indigenous cattle breed which could cope with flood fury over cross bred animals (30%).

Table 1: General coping mechanisms followed by respondents (Percentage)

Sl. No.	General management	Thrissur				Idukki				Ernakulam			
		AC	AD	NA	Total	AC	AD	NA	Total	AC	AD	NA	Total
1	Proper breeding strategy to avoid pregnancy and birth during the monsoon	40	43.33	16.67	100	30	40	30	100	40	36.67	23.33	100
2	Preferring indigenous breed over cross and exotic breed	30	23.33	46.67	100	24	20	56	100	31.7	15	53.33	100
3	Planning and construction of community shelter	60	0	40	100	80	0	20	100	70	0	30	100
4	Construction of open barn to leave the animal untethered during flood	70	25	5	100	50	26.7	23.3	100	75	15	10	100
5	Sell non-productive, ailing and old animals before the rainy season	80	15	5	100	88	11.7	0	100	78	21.67	0	100
6	Clear the drainage channels in and around the farm before arrival of monsoon	90	0	10	100	93.33	0	6.67	100	92	0	8.33	100
AC: Adoption Continued; AD: Adoption Discontinued; NA: Never Adopted													

In Idukki district, clearing the drainage channels in and around the farm before arrival of monsoon was followed by 93.33 per cent of respondents followed by resorting to practice of selling the non-productive, ailing and old animals before rainy season (88%), construction of community shelter which could be used in case of flood disaster (80%), construction of open barn to leave the animal untethered during rainy season (50%), following proper breeding strategy to avoid pregnancy and birth during the monsoon (30%) and preference of indigenous cattle breed which could cope with flood fury over cross bred animals

(24%).

In Ernakulam district, clearing the drainage channels in and around the farm before arrival of monsoon was followed by 92 per cent of respondents followed by resorting to practice of selling the non-productive, ailing and old animals before rainy season (78%), construction of open barn to leave the animal untethered during rainy season (75%), construction of community shelter which could be used in case of flood disaster (70%), following proper breeding strategy to avoid pregnancy and birth during the monsoon (40%) and preference of indigenous cattle breed which could cope with flood fury over cross bred animals (31.7%).

Table 2: Index score and ranking of general coping mechanism followed by respondents

Sl. No.	General management	Thrissur	Idukki	Ernakulam
1	Proper breeding strategy to avoid pregnancy and birth during the monsoon	0.62(iv)	0.50(v)	0.58(v)
2	Preferring indigenous breed over cross and exotic breed	0.42(vi)	0.34(vi)	0.39(vi)
3	Planning and construction of community shelter	0.60(v)	0.80(iii)	0.70(iv)
4	Construction of open barn to leave the animal untethered during flood	0.83(iii)	0.63(iv)	0.83(iii)
5	Sell non-productive, ailing and old animals before the rainy season	0.88(ii)	0.94(i)	0.89(ii)
6	Clear the drainage channels in and around the farm before arrival of monsoon	0.90(i)	0.93(ii)	0.92(i)
Values in parenthesis indicates the order of merit of preferences by the respondents column wise				

The result of Table 2 revealed that in Thrissur district, clearing the drainage channels in and around the farm before arrival of monsoon with an index score of 0.90 ranked first among general coping mechanism. This was followed by resorting to practice of selling the non-productive, ailing and old animals before rainy season (0.88), construction of open barn to leave the animal untethered during rainy season (0.83), following proper breeding strategy to avoid pregnancy and birth during the monsoon (0.62), construction of community shelter which could be used in case of flood disaster (0.60) and preference of indigenous cattle breed which could cope with flood fury over cross bred animals (0.42).

In Idukki district, resorting to practice of selling the non-productive, ailing and old animals before rainy season with an index score of 0.94 ranked first among general coping mechanism. This was followed by clearing the drainage channels in and around the farm before arrival of monsoon (0.93), construction of community shelter which could be

used in case of flood disaster (0.80), construction of open barn to leave the animal untethered during rainy season (0.63), following proper breeding strategy to avoid pregnancy and birth during the monsoon (0.50) and preference of indigenous cattle breed which could cope with flood fury over cross bred animals (0.34).

In Ernakulam district, clearing the drainage channels in and around the farm before arrival of monsoon with an index score of 0.92 ranked first among general coping mechanism. This was followed by resorting to practice of selling the non-productive, ailing and old animals before rainy season (0.89), construction of open barn to leave the animal untethered during rainy season (0.83), construction of community shelter which could be used in case of flood disaster (0.70), following proper breeding strategy to avoid pregnancy and birth during the monsoon (0.58) and preference of indigenous cattle breed which could cope with flood fury over cross bred animals (0.39).

Discussion

The results of the study depicted that all the flood affected dairy farmers in Thrissur, Idukki and Ernakulam districts coped with flood by clearing the drainage channels in and around the farm and by resorting to selling of non-productive, ailing and old animals before the flood. (Yadav *et al.*, 2023).^[14] Planning and construction of community shed for shelter which could be used in case of flood disaster was being mooted by two thirds of dairy farmers (Indarwan *et al.*, 2022) ^[7].

Construction of open barn to leave the animal untethered during flood season was being practiced by three fourth of farmers in Thrissur and Ernakulam district. In Idukki district only half of the farmers resort to construction of open barn to leave the animal untethered during flood season (Silambarasan *et al.*, 2025) ^[12]. The reason for low adoption of construction of open barn to leave cattle untethered might be due to undulating and mountainous landscape of Idukki makes it difficult to construct open barns. In all the three districts following proper breeding strategy to avoid pregnancy and birth during the peak flood season and preference of indigenous cattle breed which can cope with flood fury over cross bred animals were being followed by about one third of farmers only.

The results are in accordance with the conclusions of Hungerford *et al.* (2019) ^[5] who stated that people had built barriers using sand and gravel and created blockade to prevent floodwater entering and had dug trenches outside their home to divert water and Danso and Addo (2017) ^[2] remarked that flood affected people in order to prevent flood water entering their home they had resorted to building flood steps and had their gutters cleaned.

Conclusion

The findings demonstrate that dairy farmers in the study areas prioritised immediate and practical coping mechanisms against the recurring threat of floods. The widespread and high-ranking adoption of practices like clearing drainage channels and selling vulnerable animals indicates a strong focus on immediate risk reduction and structural management. However, the significantly lower adoption of strategies such as maintaining proper breeding schedules and preferring indigenous breeds suggests that long-term, genetic, and preparatory management remains underdeveloped. The observed regional variation, such as the lower use of open barns in the mountainous Idukki district, underscores how local topography and environmental factors influence the feasibility of certain coping methods. For enhanced flood resilience, future agricultural extension efforts should concentrate on bridging this gap by actively promoting and providing support for the less-adopted, yet vital, long-term preparatory and genetic strategies, ensuring they are practical and accessible within the specific environmental context of each district.

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