



ISSN (E): 2277-7695

ISSN (P): 2349-8242

NAAS Rating: 5.23

TPI 2022; SP-11(8): 2046-2049

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www.thepharmajournal.com

Received: 15-05-2022

Accepted: 19-06-2022

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A study on the mortality of livestock and poultry during flood disaster in Cuddalore district

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Abstract

Occurrence of flood disaster in Cuddalore district has become a routine event with loss of agricultural crops, livestock and its infrastructure and sometimes loss of human life. However, loss of livestock and poultry has not been analyzed systematically so far. In this study, a detailed investigation was carried out on the mortality of livestock and poultry, their distribution in various blocks of Cuddalore district and causes of death for the period from 2018 to 2021. On year wise comparison, highest mortality of 1,926 animals was recorded in the year 2018 followed 1330 and 1198 animals in the year 2020 and 2021 respectively and lowest mortality of 81 animals was recorded in the year 2019. On studying the cumulative distribution of livestock mortality in various blocks of Cuddalore district, highest mortality of 721 animal was recorded in Bhuvangiri block followed by 705 in Kurinjipadi, 671 in Cuddalore, 501 in Keerapalayam, 447 in Panruti, 432 in Parangipettai, 351 in Kattumannarkoil, 309 in Kumaratchi and 290 in Vriddhachalam blocks. Least mortality of 108 animals was recorded in Kammapuram block during the study period.

The species-wise mortality revealed a highest mortality of 2,432 was recorded among goat, followed by calf 1,368, cow 841, buffalo 4, pig 15 and Bullocks 2 numbers were recorded. On analyzing the causes of mortality, highest mortality of 27.5% (1,250) animals found to be due to pneumonia followed by drowning (22.36%), hypothermia (19.22%), debility (17.85%), bloat (7.59%), enteritis (5.02%) and electrocution (0.15%); whereas, the least mortality of 0.11% was due to lightening. The mortality pattern was discussed in correlation with occurrence of flood and other managemental practices.

Keywords: Mortality of livestock and poultry, disaster, flood

1. Introduction

Occurrence of flood hazard is one of the most frequent disasters in coastal areas causing various damages including structural and erosion damage, contamination of food and water, disruption on socioeconomic activity including transport and communication, as well as loss of life and property (Nithya and Priyanka, 2019) [8]. In India, flood is a regular annual event causing extensive damage to agricultural production, loss of livestock, human life and properties (Messner *et al.*, 2007) [6]. According to FAO (2008) [3], floods account for 17 per cent of total losses due to natural calamities across the world and loss in livestock sector accounted for 34 per cent next to crop damage with 49 per cent. Livestock population was reported to be first affected in the precarious situation due to natural disaster like flood, drought, cyclone, volcanic eruption, earth quake, tsunami etc. (Heath *et al.*, 1995) [5]. In all flood disasters livestock and poultry were mostly affected than human beings because they are not properly sheltered during disaster and poorly managed due to lack of knowledge in its management and mitigation measures. After disaster strikes, the animals were often displaced or abandoned in disaster zones or suffered terribly from injuries, diseases, hunger and dehydration which may lead to death of animals. Moreover, during any disaster for human beings, supply of essential commodities is being restored even with great difficulty. In such situations, saving of human life is being considered on top priority basis and thus rescue, relief and rehabilitation is more directed for the people with meagre attention to livestock and their sufferings (Pyne *et al.*, 2009) [9]. The main impact for animals in disaster are loss of production, death of animals, psychological impact on livestock owners and feeling of guilt, bereavement and anger due to loss (Sen and Chander, 2003) [11]. This clearly indicates the urgent need to study causes of animal death during flood disaster and to evolve appropriate strategies for livestock and Poultry to overcome flood disaster. Though mortality of livestock and poultry are reported sporadically, no systematic study was undertaken to analyze the

causes of livestock mortality. In this context, the present study was undertaken to analyse the distribution of livestock mortality and their causes and to forecast suitable mitigation measures.

2. Materials and Method

Frequent field visits were made to record mortality of livestock in flood affected villages of Cuddalore district during flood hazard period. The details were collected for the period from 2018 to 2021. Attempts were also made to conduct post mortem examination as and when required along with local Veterinary Assistant Surgeon. The collected data was verified with the records available in the local veterinary dispensaries. The mortality of animals in each block was grouped and tabulated to study the intensity of damage in different geographical locations. Similarly, the mortality was also grouped for each year and tabulated for comparison. In addition, the causes for mortality of animals was also recorded and tabulated.

3. Result and Discussion

During the study period of four years, a total mortality of 4,535 animals and 45,660 poultry was recorded. On year-wise comparison, highest mortality of 1,926 animals was recorded in the year 2018 followed 1,330 and 1,198 animals in 2020 and 2021 respectively and lowest mortality of 81 animals in 2019. Similarly, highest mortality of 38,764 birds was recorded in the year 2020 followed 6,996 in 2021 and 300 in 2018. No mortality of poultry was recorded in the year 2029.

The highest mortality of 1,926 animals recorded in the year 2018 might be due to heavy rainfall followed by respiratory illness and drowning. Though the rainfall and incidence of flood occurrence is less than the average rainfall and average flood incidence, the mortality recorded was on the higher side, which was found to be due to continuous heavy precipitation during Gaja cyclone, which hit Cuddalore district heavily in the year 2018. The occurrence of cyclone lead to damages to animal shed and exposed the animal to wet conditions in continuous rainfall and chilled weather. Similarly, in the year 2020 the mortality of 1,330 animals was associated with Burevi and Niravi cyclones, which hit during December 2020 with a rainfall of 4 1233.98 mm. In the year 2021 a total livestock mortality of 1,198 was recorded, which was associated with highest rainfall of 1,732.92 mm occurred

during the month of November 2021, which was the highest monthly rainfall recorded during the study period. The lowest livestock mortality of 81 was recorded in the year 2019 is associated with lower than the average annual rainfall and nonoccurrence of major cyclone near Cuddalore district.

On block-wise comparison of livestock mortality, the highest mortality of 721 animals was recorded in Bhuvanagiri block followed by 705 in Kurinjipadi, 671 in Cuddalore, 501 in Keerapalayam, 447 in Panruti, 432 in Parangipettai, 351 in Kattumannarkoil, 309 in Kumaratchi, 290 in Vriddhachalam blocks, whereas, least mortality of 108 animals was recorded in Kammapuram block.

During the year 2018, Bhuvanagiri block recorded highest mortality of livestock and Kammapuram block recorded lowest mortality. In case of poultry, Kurinjipadi block recorded highest mortality, while; there was no mortality in Keerapalayam, Kammapuram, Kumaratchi, Panruti and Parangipettai blocks. During the year 2019, Parangipettai block was recorded highest mortality in livestock and lowest mortality in Vriddhachalam and Kammapuram blocks (3 each). In poultry, there was no mortality recorded in all the selected blocks under study.

During the year 2020, Bhuvanagiri block recorded highest mortality of livestock and Kammapuram block recorded lowest mortality. In case of poultry, Bhuvanagiri block recorded highest mortality (18,220), while; there was no mortality in Keerapalayam, Kattumannarkoil and Kumaratchi blocks. During the year 2021, Cuddalore block recorded highest mortality of livestock and Kammapuram block recorded lowest mortality. In case of poultry, Kurinjipadi block recorded highest mortality and there was no mortality recorded in Keerapalayam, Kattumannarkoil, Kumaratchi, Vriddhachalam and Kammapuram blocks.

The highest mortality recorded in the Bhuvanagiri block is associated with low altitude with mean sea level (MSL) of less than 10 meter which lead to water stagnation and in addition, the soil type is clay loam which lack water absorption capacity. Similarly, the Kurinjipadi block is associated with low altitude of less than 11 MSL. In addition, the villages in Kurinjipadi frequently affected by draining canals of Veeranam tank. The incidence of flood occurrence and associated mortality was due to location of Cuddalore block along the course of Gadilam river.

Table 1: Year wise mortality of livestock in different blocks of Cuddalore district

Sl. No.	Name of the Block	Year & per cent mortality (n)				Total
		2018	2019	2020	2021	
1	Cuddalore	10.85(209)	13.58 (11)	14.44 (192)	21.62 (259)	671
2	Keerapalayam	12.41 (239)	16.05 (13)	12.78 (170)	06.59 (79)	501
3	Kattumannarkoil	07.36 (149)	14.81 (12)	08.87 (118)	06.01 (72)	351
4	Panruti	07.11 (137)	07.41 (6)	14.89 (198)	08.85 (106)	447
5	Kumaratchi	06.13 (118)	13.58 (11)	08.87 (118)	05.18 (62)	309
6	Vriddhachalam	06.85 (132)	03.70 (3)	08.42 (112)	03.59 (43)	290
7	Parangipettai	11.99 (231)	17.28 (14)	02.2 (6 30)	13.11 (157)	432
8	Kurinjipadi	16.40 (316)	04.94 (4)	12.93 (172)	17.78 (213)	705
9	Kammapuram	03.79 (73)	03.70 (30)	00.30 (4)	02.34 (28)	108
10	Bhuvanagiri	16.72 (322)	04.94 (4)	16.24 (216)	14.94 (179)	721
	Total	100 (1,926)	100 (81)	100 (1,330)	100 (1,198)	4,535

The occurrence of flood and animal mortality in villages of Keerapalayam block was associated with heavy rain and lack of drainage facility. Similarly, the villages of Panruti block is situated along the side of Thenpennai river with frequent damage of river bunds leading flood and loss of livestock and

poultry. The Parangipettai block is on the seashore with frequent occurrence of backflow of draining water from sea, leading to flood and livestock mortality. The occurrence of flood associated damages in Kattumannarkoil and Kumaratchi was found to be due the villages located along the draining

canal of Veeranam lake. The least mortality recorded in Vridhachalam was found to be associated with its location in the high altitude within Cuddalore district

Cotton and McBride (2013) ^[2] explored the occurrence of flash floods followed by damages to livelihood in areas where the landscape cannot absorb all the water during excessive precipitation events. Similarly, Sanyal and Lu (2004) ^[12] reported the occurrence of flood hazard due to heavy discharge from rivers and poor drainage in low-lying area during monsoon. In the present study, the flood occurrence was found to be due to heavy rainfall and location of villages along the river and draining canal of major water tanks.

The species wise mortality revealed that, highest mortality of 2,432 was recorded among goat, followed by calf (1,368), cow (841), pig (15), buffalo (4) and Bullocks (2). Agarwal *et al.* (2014) ^[1] documented the mortality of thousands of livestock associated with super cyclone in Jammu and Kashmir, which happened in the year 1999 affecting almost all the species of animals. The mortality of animals reported included 19.04% cow, 2.78% bullocks, 4.07% calves, 4.08% buffaloes, 12.70% sheep, 8.65% Goat, 6.43% pigs and 24.37% poultry, similar to the observations made by Mishra *et al.* (2017) ^[7] where there was loss of 7,000 large animals and death of 65,000 sheep in Jammu and Kashmir during a devastating flood occurred on 6th September 2014. Subsequently, Rasool *et al.* (2020) ^[10], conducted a detailed study on the impact of Nilam cyclone (2012) ^[13] and associated flood. They reported the occurrence of huge damage to milch and draught animals, poultry birds etc. They also reported a mortality of 1,858 animals, which included 505 large animals and 1,353 small animals and 98, 757 poultry in Andhra Pradesh and Baramati (2020) reported damages to by heavy rains, which resulted in 40-60% decline in milk production in Maharashtra.

Table 2: Species-wise mortality of livestock and poultry in Cuddalore district

S. No.	Animal sp.	2018	2019	2020	2021	Total
01	Cow	361	3	176	274	841
02	Buffalo	0	0	4	0	4
03	Bullock	0	0	2	0	2
04	Calf	534	21	332	481	1,368
05.	Goat	1,031	30	714	530	2,305
06.	Pig	0		2	13	15
07.	Poultry	300	0	38,764	6,996	45,660

French *et al.* (1983) ^[4] reported flash floods are the main cause of death among weather related disasters and most flood-related deaths was attributed to flash floods. They reported that a total of 1,185 human deaths were associated with 32 flash floods with an average death of 37 per flash flood in the present study, the mortality of livestock was recorded every year of the study period and all the mortality recorded were associated with cyclone and heavy precipitation followed by flood simulating the reports of previous authors.

The study on the causes of mortality revealed that highest mortality of 27.5% (1,250) animals found to be due to pneumonia followed by drowning (22.36%), hypothermia (19.22%), debility (17.85%), bloat (7.59%), enteritis (5.02%), electrocution (0.15%) and least mortality of 0.11% was due to lightening. The causes of mortality in livestock during flood disaster found that major cause for death due to pneumonia followed by drowning and hypothermia. This must be due to heavy rainfall in selected blocks. The other causes of debility, bloat and enteritis might be due to scarcity and quality of fodder. The least mortality of animals was attributed to electrocution and lightening.

Table 3: Causes of death of animals during flood hazard

Sl. No.	Cause of death	Year & per cent mortality (n)									
		2018		2019		2020		2021		Grand total	
		No of deaths	% death	No of deaths	% death	No of deaths	% death	No of deaths	% death	No of deaths	% death
1	Hypothermia	50	2.61	5	06.17	498	37.41	320	26.73	873	19.22
2	Bloat	35	1.82	4	04.93	190	14.29	116	09.68	345	07.59
3	Drowning	786	40.81	25	30.88	45	03.38	160	13.35	1,016	22.36
4	Pneumonia	981	50.91	33	40.75	67	05.05	169	14.10	1,250	27.5
5	Electrocution	4	00.21	2	02.47	0	0	1	00.08	7	00.15
6	Lightning	3	00.16	0	0	0	0	2	00.17	5	00.11
7	Enteritis	24	01.25	4	04.93	112	08.43	88	07.34	228	05.02
8	Debility	43	02.23	8	09.87	418	31.44	342	28.53	811	17.85
9	Total	1926	100.00	81	100.00	1330	100.00	1198	100.00	4535	100.00

Though various authors documented death of animals during flood, the cause of death was not identified and documented. However, French *et al.* (1983) ^[4] classified the causes of death among human during flood and found that ninety three percent of human deaths was due to drowning and 42 per cent of these drownings were car related. The other drownings occurred in homes, at campsites, or when persons were crossing bridges and streams. Though, animal death certificates were being issued for availing compensation, published documents were not available. In the present study, cause of mortality of individual animal was recorded for documentation purpose. As far as poultry mortality is concerned, all the recorded mortality during flood found to be due to drowning and hence causes of mortality was not categorized in detail.

4. Conclusion

From the present study, it is concluded that the occurrence of flood hazard is unavoidable in Cuddalore district because of its geographical location and rivers and tanks draining through this district. All the mortality recorded in this study are associated with flood and continuous rainfall, damage to draining canal bunds and poor drainage. In addition, the non-availability of proper shed for animals and erection of animal shed in low-lying area and non-availability of feed and fodder for livestock during and after flood disaster. Hence, the farmers need to be enlightened on the importance of animal shed during rainy season and restraining animal in elevated places and storage of minimum essential feed and fodder during monsoon.

5. Future scope of the study

The pattern and intensity of mortality of different livestock and poultry has been studied in this study. In the light of findings of the study, further research needs to be planned to assess the level of adoptability of short and long-term mitigation measures by farmers so as to plan scientific interventions to mitigate the losses effectively. In future, in addition to extending mitigation support by government agencies, much effort had to be put on creating awareness on mitigation procedures.

6. Conflict of interest

The authors declare that there is no conflict of interest.

7. Acknowledgements

The authors are grateful to the Tamil Nadu Veterinary and Animal Sciences University, Madhavaram Milk Colony, Chennai – 51 for erudition and providing facilities for carrying out the study.

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