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Flood: Mitigation Measures Adopted by Livestock Farmer and Strategies Developed for Livestock Management

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ABSTRACT

India is the second most flood-affected country after Bangladesh. Karnataka has experienced severe floods earlier also during the last two decades. Keeping the above in view, the present study entitled "Mitigation measures adopted by livestock farmer and strategies developed for livestock management during flood" was taken up. The study was conducted purposively in Belagavi and Kalaburgi division of Karnataka. The data collection was done during the month of November and December 2021by personal interview method with the help of a pretested schedule in two divisions of north Karnataka with 160respondents each making a total of 320 respondents. The results indicated that the majority of the respondents had adopted high mitigation measures concerned with feeding management (48.44%) and health care management (55.63%), where as farmers adopted medium mitigation measures as far as housing was concerned (51.25%) and marketing management (38.44%). Among the overall respondents majority of the respondents had adopted medium rehabilitation measures (44.69%), followed by high (34.38%) and low (20.93%). The findings would help in arranging awareness camps in villages and training programmes to different stake holders for strengthening the managemental measures to be taken during the flood. The findings can be used by the national disaster management agency, the minister of home affairs and the Indian government to establish a national disaster management framework.

Keywords: Flood, Livestock Farmers, Mitigation, Strategies, Management

Livestock is one of the fastest growing agricultural subsectors in developing countries. It also provides employment to about 8.8 per cent of the population in India (Basic animal husbandry statistics, 2018-19). Livestock sector contributes to an extent of 4.11 per cent to the total GDP and 25.60 per cent of total Agriculture GDP (Livestock census 20th, 2019) of the country. India is prone to disasters due to natural and human induced factors like topographic features, geo-climatic conditions, environmental degradation, population growth, industrialization, urbanization, flawed development practices, etc. (Kumar, 2016). Over 40 million hectares (12 % of total land) are prone to flood and river erosion and 5700 km of 7,516 km long coastline is prone to cyclones and tsunamis while 68 % of the cultivable area is vulnerable to drought (NDMA, 2007; Das and Dey, 2011; Bhanja,

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1999). During 1980 to 2009, on an average about 50 million people in the country were affected by one or the other disasters every year (Sharma and Ashutosh, 2012).

India is one of the most disaster prone countries in the world which is mainly due to its high geo-climatic conditions as well as its higher degree of social vulnerability (Rasool *et al.* 2021). Livestock in particular have remained highly vulnerable to almost all sorts of natural disasters but the most frequent and vulnerable of all types is the occurrence of flood (IFRC, 2000). The principle reason for flood lies in natural ecological system which includes monsoons, highly silted river systems and steep and highly erodible mountains particularly seen in northern regions (IGWAID, 2008). Reduced feed quantity and quality, changes in pest and disease prevalence, and direct production degradation owing to physiological stress all contribute to have a major impact on livestock systems (Ashraf *et al.* 2013). The most significant losses in Asia were expressed after flood which when considered at country level showed that India was most affected by crop and livestock production losses after repeated floods between 2004 -2013 (Acharya, 2016). The annual flood damage increased nearly 40 times from the 1950s to the 1980 (Gupta *et al.* 2003). Each year, an average of 7.35 million hectares of land is affected, 1793 human lives are lost, 85,599 cattle are killed, and 1,452,904 houses damaged. The total loss caused by flood amounts to US $575 million (Dutta & Watts, 2010).

The impact of a disaster can be categorized as direct, indirect or tertiary. Apart from the public health consequences of disasters, such as zoonotic diseases and the threat to the food supply, disasters also have negative economic consequences, particularly in developing countries. In these countries, not only do livestock provide milk, meat, traction power for farming and transport, dung, hides, wool, fibre, etc., animals also provide a relatively safe investment option and give the owner social importance. Disasters affecting livestock can therefore have a negative impact on the infrastructure of a country, reducing an important source of income in rural areas and hindering the distribution of food and goods (Sen and Chander, 2003). The extent and level of flood-induced damage depends on the characteristics of the affected people and infrastructure condition of the area (Choudhury *et al.* 2015). Farmers consider the adoption of insurance policies too expensive to protect against losses of capital, production, machinery and plants in the case of natural calamities, such as flood events (ISMEA, 2018). Karnataka has experienced severe floods earlier also during the last two decades. Keeping the above in view, the present study entitled "Mitigation measures adopted by livestock farmer and strategies developed for livestock management during flood" was taken up.

METHODOLOGY

For this study, the state of Karnataka was purposively selected for the study because the researcher belonged to the state. The study was conducted purposively in Belagavi and Kalaburgi division of Karnataka. Belagavi division comprises the districts of Bagalkot, Belagavi, Bijapur, Dharvad, Gadag, Haveri and Uttara kannada. Kalaburgi division comprised the districts namely Ballary, Bidar, Kalaburgi, Koppal, Raichur, Yadgiri and Vijayanagar. Both purposive and random sampling techniques were followed for selecting the respondents for the study. The divisions, districts and *taluks* were selected purposively whereas random sampling technique was adopted in selection of villages and respondents. The data collection was done during the month of November and December 2021 by personal interview method with the help of a pretested schedule in two divisions of north Karnataka with 160 respondents each making a total of 320 respondents. The data were subjected to frequency and percentage analysis.

RESULTS AND DISCUSSION

1. Housing management

It was observed from the Table 1 that, in Belagavi division the livestock farmers adopt housing management as a mitigation measures in which majority used government building as a temporary shed (89.37%) followed by identification of high land place for moving the animals (86.25%), shifting the herd animal to high land during flood (73.75%), construction of animal shed in high land (63.12%) and making *pucca* shed for the animals (60.00%). Similarly in Kalaburgi division, majority were

Table 1: Housing management

Sl. No.	Housing management	Belagavi division (N=160)		Kalaburgi division (N=160)		Total (N=320)	
		Yes	No	Yes	No	Yes	No
		F%	F%	F%	F%	F%	F%
1	Construction of animal shed in high land	101 (63.12)	59 (36.88)	78 (48.75)	82 (51.25)	179 (55.94)	141 (44.06)
2	Identification of high land place for moving the animals	138 (86.25)	22 (13.75)	115 (71.87)	45 (28.13)	253 (79.06	67 (20.94)
3	Shifting the herd animal to high land during flood	118 (73.75)	42 (26.25)	98 (61.25)	62 (38.75)	216 (67.50	104 (32.50)
4	Making *pucca* shed for the animals	96 (60.00)	64 (40.00)	76 (47.50)	84 (52.50)	172 (53.75)	148 (46.25)
5	Using government building as a temporary shed	143 (89.37)	17 (10.63)	128 (80.00)	32 (20.00)	271 (84.68)	49 (15.32)

Figures in paranthesis indicates percentage.

using government building as a temporary shed (80.00%) followed by identification of high land place for moving the animals (71.87%), shifting the herd animal to high land during flood (61.25%), construction of animal shed in high land (48.75%) and making *pucca* shed for the animals (47.50%). Among the overall respondents, majority were using government building as temporary shed (84.68%) followed by identification of high land place for moving the animals (79.06%), shifting the herd animal to high land during flood (67.50%), construction of animal shed in high land (55.94%) and making *pucca* shed for the animals (53.75%).

It was observed from the Table 5 that, majority of the respondents adopted medium level of housing management (53.75% & 48.75%) respectively from both Belagavi and Kalaburgi divisions, followed by low (28.75% & 40.00%) level and high level housing mitigation measures (17.50% & 11.25%). Among the total respondents, majority of the respondents adopted medium housing management (51.25%), followed by low (34.38%) and high housing mitigation measures (14.37%). This was because the livestock farmers were using government building as a temporary shelter place, and the farmers were shifting their animal to high land during the flood. Similar findings were observed Gyana (2016) and Rasool *et al.* (2020).

Feeding management

It was observed from the Table 2 that, in Belagavi division the livestock farmers adopt feeding management as a mitigation measure in which majority of the livestock farmers adopted feeding of locally available crop residues (86.25%) followed by sharing of feed and fodder among neighbours (73.75%) and reducing the frequency of feeding nonproductive animals (60.00%). Similarly, among Kalaburgi division majority were feeding of locally available crop residues (71.87%) followed by sharing of feed and fodder among neighbour (61.25%) and reducing the frequency of feeding nonproductive animals (47.50%). Among overall respondents majority of the livestock farmers adopt feeding of locally available crop residues (79.06%) followed by sharing of feed and fodder among neighbour (67.50%) and reducing the frequency of feeding nonproductive animals (53.75%).

It was observed from the Table 5 that, majority of the respondents adopted high level of feeding management measures (47.50% & 49.38%) from both Belagavi and Kalaburgi divisions respectively, followed by medium (28.75% & 34.37%) and low level feeding mitigation measures (23.75 &16.25%). Among the total respondents, majority of respondents adopted high level of feeding management measures

Table 2: Feeding management

Sl. No.	Feeding management	Belagavi division (N=80)		Kalaburgi division (N=80)		Total (N=320)	
		Yes	No	Yes	No	Yes	No
		F%	F%	F%	F%	F%	F%
1	Feeding of locally available crop residues	138 (86.25)	22 (13.75)	115 (71.87)	45 (28.13)	253 (79.06)	67 (20.94)
2	Reducing the frequency of feeding to non productive animals	96 (60.00)	64 (40.00)	76 (47.50)	84 (52.50)	172 (53.75)	148 (46.25)
3	Sharing of feed and fodder among neighbor	118 (73.75)	42 (26.25)	98 (61.25)	62 (38.75)	216 (67.50)	104 (32.50)

Figures in paranthesis indicates percentages.

Table 3: Health care management

Sl. No.	Health care management	Belagavi division (N=160)		Kalaburgi division (N=160)		Total (N=320)	
		Yes	No	Yes	No	Yes	No
		F%	F%	F%	F%	F%	F%
1	Preferring indigenous breed over others	78 (48.75)	82 (51.25)	56 (35.00)	104 (65.00)	134 (41.88)	186 (58.12)
2	Using traditional methods for treating of animals	95 (59.38)	65 (40.62)	79 (49.37)	81 (50.63)	174 (54.37)	146 (45.63)
3	Vaccinating animals regularly	125 (78.12)	35 (21.88)	118 (73.75)	42 (26.25)	243 (75.94)	77 (24.06)
4	Selling of disease affected animals	108 (67.50)	52 (32.50)	115 (71.88)	45 (28.12)	223 (69.68)	97 (30.32)

Figures in paranthesis indicates percentages.

(48.44%), followed by medium (31.56%) and low level feeding mitigation measures (20.00%). The livestock farmers used locally available crop residues to feed their animals and they were sharing the feed and fodder among neighbours. Government also supported by opening the *ghoshalas* and also many NGOs pitched in to supply feed and fodder during flood. These observations are in consonance with Gyana (2016) and Mishra *et al.* (2017).

Health care management

It was observed from Table 3 that, among Belagavi division the respondents adopted health care management as a mitigation measure where in the majority of the livestock farmers vaccinated animals regularly (78.12%) followed by selling of disease affected animals (67.50%), using traditional methods for treating of animals (59.38%) and preferring indigenous breed over others (48.75%). Similarly among Kalaburgi division vaccinated animals regularly (73.75%) followed by selling of disease affected animals (71.88%), using traditional methods for treating of animals (49.37%) and Preferring indigenous breed over others (35.00%). Among the total respondents vaccinating animals regularly (75.94%) followed by selling of disease affected animals (69.68%), using traditional methods for treating of animals (54.37%) and preferring indigenous breed over others (41.88%).

It was observed from the Table 5 that, majority of the respondents adopted high health care mitigation measures (51.25% & 60.00%) from both Belagavi and Kalaburgi divisions respectively followed by, medium (35.00% & 30.00%) and low level health care mitigation measures (13.75% & 10.00%). Among the total respondents, majority of the respondents adopted high health care management (55.63%), followed by medium (32.50%) and low

Table 4: Marketing management

Sl. No.	Marketing management	Belagavi division(N=80)		Kalaburgi division(N=80)		Total (N=320)	
		Yes	No	Yes	No	Yes	No
		F%	F%	F%	F%	F%	F%
1	Selling the animal well ahead of occurrence of flood	96 (60.00)	64 (40.00)	76 (47.50)	84 (52.50)	172 (53.75)	148 (46.25)
2	Lending the animals to friends and relatives living in upland	108 (67.50)	52 (32.50)	78 (48.75)	82 (51.25)	186 (58.13)	134 (41.87)
3	Mortgaging the animals to local land in exchange of money	78 (48.75)	82 (51.25)	56 (35.00)	104 (65.00)	134 (41.88)	186 (58.12)
4	Purchase of draught breed over milch breeds	81 (50.62)	79 (49.38)	99 (61.87)	61 (38.13)	180 (56.25)	140 (43.75)
5	Value addition of the product for long preservation	56 (35.00)	104 (65.00)	61 (38.130	99 (61.87)	117 (36.56)	203 (63.44)

Figures in paranthesis indicates percentages.

Table 5: Mitigation measures adopted by livestock farmers

Sl. No.	Category		Belagavi division (N=160)		Kalburgi division (N=160)		Total (N=320)	
			F	%	F	%	F	%
1	Housing management	Low (5-8)	46	28.75	64	40.00	110	34.38
		Medium (9-12)	86	53.75	78	48.75	164	51.25
		High >12	28	17.50	18	11.25	46	14.37
2	Feeding management	Low (3-4)	38	23.75	26	16.25	64	20.00
		Medium (5-6)	46	28.75	55	34.37	101	31.56
		High >6	76	47.50	79	49.38	155	48.44
3	Health care management	Low (4-6)	22	13.75	16	10.00	38	11.87
		Medium (7-9)	56	35.00	48	30.00	104	32.50
		High >9	82	51.25	96	60.00	178	55.63
4	Marketing management	Low (5-8)	42	26.25	38	23.75	80	25
		Medium (9-12)	64	40.00	59	36.88	123	38.44
		High >12	54	33.75	63	39.37	117	36.56

level health care mitigation measures (11.87%). The farmers regularly vaccinate their animals through department of AH & VS to reduce the outbreak of diseases. These observations are not in consistent with Gyana (2016).

Marketing management

It was observed from Table 4, that among Belagavi division livestock farmers adopt marketing management as mitigation measures where in majority of the respondents lending the animals to friends and relatives living in upland (67.50%) followed by selling the animal well ahead of occurrence of flood (60.00%), purchase of draught breed over milch breeds (50.62%), mortgaging the animals to local land in exchange of money (48.75%) and Value addition of the product for long preservation (35.00%). Similarly in Kalaburgi division majority of the respondents purchase of draught breed over milch breeds (61.87%) followed by lending the animals to friends and relatives living in upland (48.75%), selling the animal well ahead of occurrence of flood (47.50%), value addition of

Table 6: Rehabilitation measures adopted by livestock farmers

Sl. No.	Rehabilitation measures	Belagavi division (N=160)		Kalaburgi division (N=160)		Total (N=320)	
		F	%	F	%	F	%
1	Low (6-8)	28	17.50	39	24.38	67	20.93
2	Medium (9-11)	44	27.50	66	41.25	143	44.69
3	High (>11)	88	55.00	55	34.37	110	34.38

the product for long preservation (38.13%) and mortgaging the animals to local land in exchange of money (35.00%).

Among overall respondents majority were lending the animals to friends and relatives living in upland (58.13%) followed by purchase of draught breed over milch breeds (56.25%), selling the animal well ahead of occurrence of flood (53.75%), mortgaging the animals to local land in exchange of money (41.88%) and value addition of the product for long preservation (36.56%).

It was observed from the Table 5 that, majority of the respondents adopted medium mitigation measures as far as marketing was concerned (40.00%) in Belagavi division and high in Kalaburgi division (39.37%) followed by in both Belagavi and Kalaburgi divisions respectively, followed by high (33.75%) in Belagaviand medium in Kalaburgi (36.88%) and low level marketing mitigation measures (26.25% & 23.25%). Among the total respondents, majority of respondents adopted medium level of mitigation measures as far as marketing is concerned (38.44%), followed by high (36.56%) and low level of marketing mitigation strategies (25.00%).

Strategies developed for livestock management

Short term strategies:

- Shifting the animals rapidly to higher ground
- Timely vaccination to be carried out against infectious diseases
- Creation of feed and fodder banks
- Identify the feed and fodder resource to meet extengency requirement
- Disinfection of animal shed by insecticidal spray
- Livestock health care by dept of Animal Husbandry and Veterinary Services

Long term strategies:

- Opening of permanent *ghoshlas* in flood vulnerable areas
- Large scale adoption of silage technology for reducing the scarcity of fodder
- Sanction of loans at subsidised rates for construction of *pucca* animal sheds

Rehabilitation Measures Adopted by Livestock Farmers

It was observed (Table 6), that from Belagavi division, majority of the livestock farmers had adopted high rehabilitation measures after the occurrence of flood (55%), followed by medium (27.50%) and low (17.50%). Similarly from Kalaburgi division, majority (41.25%) of the respondents had medium rehabilitation measures, followed by high (34.37%), and about 24.38 per cent of respondents were had low rehabilitation measures. Among the overall respondents majority of the respondents had medium rehabilitation measures (44.69%), followed by high (34.38%) and low (20.93%). This could be due to the fact that, the livestock farmers were restocking the herd animal after the flood and also following the feeding of urea mollassses to their animals for better improvement and some people got compensation for the lossess that occur during the flood.

CONCLUSION

The present study entitled " Mitigation measures adopted by livestock farmer and strategies developed for livestock management during flood" revealed that the majority of the respondents had adopted high mitigation measures concerned with feeding management (48.44%) and health care management (55.63%), where as farmers adopted medium mitigation measures as far as housing was concerned (51.25%) and marketing management (38.44%). Among the overall respondents majority of the

respondents had adopted medium rehabilitation measures (44.69%), followed by high (34.38%) and low (20.93%). The findings would help in arranging awareness camps in villages and training programmes to different stake holders for strengthening the managemental measures to be taken during the flood. The findings can be used by the national disaster management agency, the minister of home affairs and the Indian government to establish a national disaster management framework.

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