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## Article:

### **NATURAL DISASTERS AND LIVESTOCK-EFFECTS AND MITIGATION**

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#### **INTRODUCTION:**

Livestock sector is an indispensable component of human living contributing both to low income as well as high income (developed) economies. Livestock systems occupy 45% of the global surface area and are a significant global asset with a value of at least US\$1.4 trillion (Reid *et al.*, 2008). A large number of people especially the rural mass are directly or indirectly involved with this sector and it has been estimated that this sector supports the livelihood of 70% of the rural poor globally (Ali, 2007). Livestock & livestock products are estimated to make up over 40% of total agricultural output in industrialized nations and about 30% in developing nations (World bank, 2009). Various types of natural disasters like earthquakes, volcanic eruptions, floods etc. affect humans globally and agriculture in general and livestock in particular have remained highly vulnerable to almost all sorts of natural disasters. Livestock in particular are at a greater risk because they are either left to the mercy of God or are the last ones attended to in the event of any such disaster. However, the economic value of losing livestock in disasters is little considered or undervalued in general awareness. Although specialists working in the fields of disaster recovery and livestock development have long understood these issues but they have rarely expressed these in economic terms.

## Disasters

Disasters refer to undesirable events which result from forces largely beyond human control, strike quickly with little or no warning, Cause or threaten serious destruction of life and property including deaths and injury to large number of people and require mobilization of efforts in excess of which are normally provided by statutory emergency services. However an empirical approach has been developed to decide if an event qualifies as a disaster. To qualify as a disaster, one of the following must have occurred:-

- 10 or more people reported killed
- 100 or more people reported affected
- The declaration of a state of emergency
- A call for international assistance

(Source Guha-Sapir *et al*, 2011)

The disasters have broadly been classified into natural and artificial disasters. Natural disasters have further been classified into:-

- i. **Geophysical disasters:** originate from solid earth and include events like earthquakes and volcanoes
- ii. **Hydrological disasters :** Events caused by deviations in the normal water cycle and/or overflow of bodies of water caused by wind set-up floods
- iii. **Climatological disasters:** Events caused by long-lived/meso to macro scale processes (in the spectrum from intra-seasonal to multi-decadal climate variability).These Include extreme temperature, Drought and Wildfires.
- iv. **Metrological disasters:** Events caused by short-lived/small to meso scale atmospheric processes (in the spectrum from minutes to days).e.g storms
- v. **Biological disasters:** Disaster caused by the exposure of living organisms to germs and toxic substances .e.g epidemics

## Natural disasters-a global perspective

EM-DAT represents the global disaster database which is being maintained in Brussels (Belgium) by centre for research on epidemiology of disasters (CRED) which publishes its report at regular intervals. The review of the world's disaster in the year 2012 reveals that 310 natural disasters were recorded in EM-DAT database in 2012 affecting 115 countries and Claiming 9,930 lives. As per the report, the disasters collectively affected 106 million people and resulted in causing economic damages worth US \$ 138 billion (CRED CRUNCH, 2013). Asian continent was the most affected by natural disasters, in terms of occurrence, persons killed and persons affected. As per EM-DAT, 2013, 42% of the natural disasters occurred in Asia and 64% disaster mortality was in Asia in the year 2012.

### Natural disasters worldwide 2010-2011

	2009	2010	2011
No. of disasters	335	385	302
Fatalities	1,0655	297,000	29782
Persons affected (Millions)	119	217	206
Damage (billion dollars)	41.3	123.9	366

(Sources: CRED, 2010., Guha-Sapir *et al*, 2011)

### Disasters in Indian context

India, because of its unique geoclimatic features has been witnessing varied types of disasters since ages. A large land mass of india (about 60%) is prone to earthquakes, Over 40 million hectares is prone to floods, about 8% of the total area is prone to cyclones and 68% of the area is susceptible to drought (Madhu *et al*, 2012). Among all the types of disasters the country has witnessed during the last few decades, hydrometrological disasters have been of most common occurrence.

In the year 2012 EM-DAT annual disaster report, India appeared fourth rank among the 10 most affected countries from the Human Impact point of view with 483 deaths and Philippines topping the list with 2360 deaths. India also stands fifth on the list of number of people affected with 4.3 million people being affected due to disasters (CRED CRUNCH, 2013).

### Natural disasters-a threat to livestock

Although a large number of natural disasters have been witnessed worldwide in near past, a brief account of some of such disasters inflicting a heavy loss of livestock has been presented below:

**Pakistan Floods (2010):** Pakistan witnessed severe monsoonal flooding in the year 2010 killing 1700 people and affecting 14 million more. Livestock sector suffered severe losses and about 1.2 million ruminants besides 6 million poultry were lost (world food programme, 2010) which represented a total asset of US \$562 million (U.S. Department of State, 2011). In the aftermath, a further 14 million animals were at risk due to fodder shortages and heightened risk of diseases (FAO, 2010).

**Table-I: Livestock owned before and after floods in 2010 in Pakistan**

Animal	Before(animals/ household)	After(animals/ household)	Change
Cows	2.2	1.4	-38%
Buffaloes	1.5	0.9	-40%
Sheep/goats	3.1	1.9	-39%
poultry	4.5	1.3	-72%
Horses	0.1	0.0	NA
Oxen	0.1	0.1	NA
Donkey/mules	0.2	0.1	NA
camels	0.1	0.1	NA
total	11.8	5.8	-51%

(Source :World Food Programme, 2010)

**Myanmar cyclone (Nargis):** In may 2008, cyclone Nargis struck Myanmar, causing nearly 140,000 deaths (CRED, 2011). The scale of this disaster can be assessed from the fact that only the direct damages were estimated at USD \$4 billion. Its impact on livestock was on a very large scale and amounting to livestock deaths to the tune of over two million livestock. In addition to this, stored food, animal feed, boats and equipment were also destroyed (Reed *et al*, 2009). Some coastal areas were severely hit wherein upto 94% of livestock were killed.

**Table-II: Number of livestock reported killed in cyclone Nargis**

Category of livestock	No. of deaths
Poultry( other than ducks)	1,134,000
Ducks	498,000
Large ruminants	227,000
Draft animals	123,000
Goats	7000
Pigs	66000

Source: (Reed *et al*, 2009)

**Nilam cyclone:** Nilam cyclone hit the southern state of Andhra Pradesh in India in 2012. The Cyclone brought heavy rains resulting in floods and affected 19 districts of the state. This unprecedented rainfall during the above period resulted in large damage to agricultural and horticultural crops, milch and draught animals and poultry birds, in addition to extensive loss to the infrastructure of the fisherman. The rain also caused extensive damages to public and private properties including roads, bridges and buildings. This resulted in death of 61 human lives. Losses to agriculture and livestock are given the table below:

**Table-III: Losses to agriculture and livestock in Nilam cyclone**

Category	Losses
Large animal deaths	505
Small animal deaths	1353
Poultry deaths	98757
Loss of cattle sheds	1286
Loss of vety. community health centres	128
Losses to fisheries(boats/equipments)	6260 units
Agricultural land affected completely	8.91 lakh hectares
Agricultural land affected (50% damage)	5.23 lakh hectares

(India disaster report, 2012)

**J&K floods-2014:** A massive and unprecedented flood struck the state of Jammu and Kashmir in September 2014 taking a heavy toll on the livestock of the state in addition to human deaths to the tune of 280. As per the official statistics (wani, 2014) around 12.5 lakh families were affected incurring a total loss of 1 trillion INR. Large animal losses above 7000 were recorded besides 65000 sheep which perished in the disaster. In addition to this, nearly 500,000 sheep and goats have been severely affected due to lack of fodder. Besides this, 99305 huts and cowsheds were destroyed (wani,

2014). Damage to the agricultural crops was approximately 4,043 crores and horticulture suffered losses amounting to Rs 1568 crore. A total of 6.51 lakh hectares of land were affected.

The devastating influence of the natural disasters on livestock can clearly be judged from the above few mentioned disasters although there are a lot more such incidents occurring every year worldwide.

### **Disaster management**

Disaster management aims to reduce, or avoid the potential losses from hazards, assure prompt and appropriate assistance to victims of disaster, and achieve rapid and effective recovery (Warfield, 2008). Disaster Risk Management includes sum total of all activities, programmes and measures which can be taken up before, during and after a disaster with the purpose to avoid a disaster, reduce its impact or recover from its losses. Often phases of the cycle overlap and the length of each phase greatly depends on the severity of the disaster.

**Mitigation:** Minimizing the effects of disaster. Examples: vulnerability analyses, public education.

**Preparedness:** Advance planning of the response before the disaster has actually struck. Examples are preparedness plans; emergency exercises/training; warning systems.

**Response:** The activities/efforts taken to minimize the hazards created by a disaster. e.g search and rescue, emergency and relief.

**Recovery:** This involves steps undertaken to return the community to normal and follows the response phase. Examples: temporary housing; grants; medical care etc.

### **Mitigation**

In the event of any disaster, it is a natural instinct to protect one's own life first followed by the property. The normal pattern is humans first followed by the pets and then the livestock. In such a scenario, livestock are most likely to be at a greater risk. Following are some of the considerations for reducing the risk and hence decreasing the impacts of disasters on livestock:

- I. Risk assessment of the area where the farm is planned to be constructed is the first step towards reducing the impact of the disasters on animals. In flood prone areas, it must be kept in mind that the animals have access to a highland areas in the event of flooding.
- II. For advance disaster preparedness, pasture for animals should preferably have native tree species only because the exotic trees uproot easily. Such areas should not have any overhead power lines or poles besides no barbed wire fencing. If the pasture does not meet these criteria, evacuation of animals to safer areas may be considered.
- III. Evacuation of animals, if required, should be planned in such a way that animal safe shelters are established in advance wherein sufficient feed and medical supplies are available.

- IV. In the event of animals of different areas being evacuated to a common location, animals should have proper identification and efforts should be made to proper disposal of dead animals and proper veterinary help should be sought if an outbreak is suspected.
- V. It should be a general practice to turn off the water and electricity of the farm before evacuating to avoid any hazard thereof.
- VI. Chemicals/hazardous materials should be stored in secured areas, preferably on high ground to prevent and emergency management authorities should be well informed their location.
- VII. Emergency equipments like flashlights, first aid kit should be kept ready well in advance and the farm manager should remain constantly updated by the directions/information being provided by disaster management authorities through radio/TV etc. whichever may be accessible.

### **Feeding options for livestock during disasters**

Scarcity of feeds and fodders following a disaster poses a serious threat to the livestock as an indirect effect. Following are some of the feeding options which have the potential of meeting up the challenge to a large extent:

**Fortification of straws with Urea:** For processing of one tone straw, 40 kg Urea dissolved in 350-500 litres of water should be spread on the straws (Kumar and Paswan, 2012). Such urea treated straws can be utilized during the disasters to reduce the burden on the already scarce feed resources without compromising the production performance.

**Urea molasses mineral block (UMMB)** The bulk of the diet for ruminants available commonly in scarcity as in drought in India consists of fibrous feeds mainly crop residues (straws and stovers) and dried grasses (Kumar and Paswan, 2012). These feeds are deficient in protein and other essential nutrients. Owing to excessive lignification, the digestibility and intake of crop residues is low. UMMB can easily be stored, transported and distributed as against the common bulky diets available in scarcity and can serve as a viable feeding option during disasters.

**Use of sugarcane crop residue as animal feed:** The by-products of sugarcane i.e. sugarcane tops, sugarcane bagasse, molasses can be fed to animals during scarcity period. Urea when used for treatment of bagasse enhances its nutritional quality however its digestibility can be increased by steam treatment. (Singh and Chandramoni, 2010).

**Tree leaves and vegetable leaves:** Leaves of neem, mango, banyan, pipal, babul, subabul, mahuva, etc. can be used as green fodder during disasters. The vegetable leaves and creepers like cabbage, cauliflower, and potato can also be used as animal feed during scarcity. They are rich source of crude protein and fair source of soluble sugars (Kumar and Paswan, 2012).

## CONCLUSION:

Natural disasters can create a very stressful situation for livestock farming and take a heavy toll on this sector worldwide. It is always preferable to prepare, plan and organize in advance than to merely respond when the disaster strikes. Feeding management during disaster has to be given utmost care to prevent starvation. Technology applications like urea treatment, urea molasses liquid feeding, and urea molasses mineral block has the capacity to meet the challenge. Co-ordinated efforts are required at individual/state/national/global levels to minimize the impacts.

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