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Feeding strategies during natural calamities

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Abstract
India is one among worst disaster prone countries of the planet. The natural calamities are within the sort of tsunamis, famines, cyclones, earthquakes, flood, and avalanches are mainly thanks to heating. Thanks to natural calamities there are acute shortages of food, feed and fodder and beverage which adversely affect human and livestock health and nutrition which can depress productive and reproductive performance. During natural calamities, the most aim should be to save lots of the animals from starvation therefore the feedstuff should be diverted from lactating animals that survived to the extent possible. Restricted feeding should be opted. Thanks to restricted feeding there's loss in weight and milk yield in lactating animals but ensures animals survivability. Restricted feeding, conserved fodders in transportable silage bags, fodder produced in low-cost hydroponic systems, unconventional feed resources including propagation of thornless cactus, urea molasses multinutrient blocks are a number of the measures to stop livestock mortality and morbidity in emergency situations.

Keywords: feeding, livestock, natural calamities

Introduction
India is one of the ten worst countries in the world. The Disaster Management Act, 2005 [16] defines a disaster as' disaster, misery, disaster or disaster in any place, resulting from natural or man-made causes, or accidental or negligent resulting in serious loss of life or suffering or injury, and destruction of property, injury or environmental degradation, and it is natural or of such magnitude that it is beyond the control of the affected community '. Among the various natural disasters, the flood is the greatest natural disaster that results in the massive loss of vegetation Livestock is the easiest insurance to combat the unforeseen natural disaster due to drought, famine and other natural disasters. Extreme shortages of food, feed, fodder and beverages are a major result of natural disasters. Examples of natural disasters are floods, droughts, and earthquakes. Man-made disasters do not harm animals but can exacerbate conditions such as bombings, industrial accidents, pollution or environmental degradation or transport hazards and political unrest (Anonymous, 2011) [2]. During a natural disaster, food security should be considered as important as food security, because keeping animals alive ensures family survival after a drought or disaster. Therefore, there is a need to develop a diet plan for animal care to ensure that it survives during and after a natural disaster.

Feeding strategies during natural calamities
In the event of a natural disaster, animal food safety should be considered as important as human food safety. The biggest challenge is to reverse the severe food shortages to avoid the negative effects of moderate diet / malnutrition. In the event of a natural disaster, the first priority should be to save the animals from starvation and the next should be to keep the product alive. Therefore, animals should be fed to maintain a critical weight gain or by choosing to feed on productive stock such as pregnant and lactating cows (Thole *et al*., 1993) [24]. Weight loss> 20% of critical body fat will die while sheep and camels can tolerate weight loss up to 30% of critical body weight (Young and Scrimshaw, 1971) [28]. Drought deaths in animals are mainly caused by a decrease in body fat. If the animal has good fat, it will use this as a source of energy during weight loss. Feeding food with moderate energy levels and meeting healthy eating requirements (Table 1) reduces the risk of illness. In areas where leafy such as alfalfa hay is frequently applied it can provide a sufficient amount of nutrients under emergency conditions. In some cases, 25% of the energy should be given from oats and 75% from fodder.

The need for water

The availability of water during a drought is important as water helps to regulate body temperature and it is necessary to move nutrients among other activities. The water requirement for mammals is in the feed range of 2.5–4.5 L / kg of DM (Patil, 2006) [22]. Irrigation waves for large cattle should be reduced once every 2-3 days during a water shortage. This has the advantage of reducing total nutrition and water consumption by potentially improving the benefits of healthy eating in terms of increased food intake and efficiency of feed conversion (Leng, 1986) [20]. Body reserves were unaffected by reducing the water supply once every 3 days compared to the daily supply (Leng, 1986) [20]. Reduced urination and reduced food intake are the result of the acquisition of water restriction.

Reduction of waste by husks

Shukla *et al*. (1988) [23] reported that 15-20% of donated grass was rejected when supplied without inclusion. The husks are common in the Punjab and Haryana regions. The use of suitable feeding troughs and grass donations also helps to reduce waste.

Limited food

During a dietary restriction, basal metabolism is reduced mainly due to decreased volume and metabolic activity of the viscera (Ortigues and Durand, 1995) [21]. When supply inhibition is severe, significant nitrogen transfer occurs between the liver and kidneys associated with increased liver glutamine synthesis (Heitmann and Bergman, 1980) [18]. This reaction is caused by a sharp decrease in the rate of protein synthesis / degradation due to a decrease in plasma levels of anabolic hormones and increased levels of catabolic hormones. It is found that in response to dietary stress, thyroxine concentration, 3, 5, 3'-triiodothyronine, insulin, plasma IGF-I, glucose and α-amino-acid nitrogen were reduced and that of growth hormone and NEFA are reduced. Suggested Feeding restrictions have increased the level of negative energy balance and resulted in a temporary increase in concentration of NEFA, acetate and ß-hydroxybutyrate in plasma. Prohibition of feed supply by donating only 75% of the normal NRC (2001) feed intake led to a diet low in DM and N without affecting the digestion of buffalo nutrients (Bhardwaj *et al*., 2011a) [10]. Low N-excretion observed in animals fed on a limited diet showed improved performance on nutrient utilization or preservation as N-excretion was shown to be similar to that observed in animals fed a normal diet. The total levels of fatty acid produced in rumen were lower in animals that ate a limited diet. Animals that are under limited diet have shown low blood sugar levels. Protein serum, globulin, urea nitrogen and creatinine, plasma growth rates increased while T3 and T4 levels decreased in dietary rats. Animals under limited diets showed less urine output of complete purine intake, purine absorption of nutrients and microbial-N synthesis compared to those given in standard diets. The final weight of the animals under the restricted diet was less than that observed for predators. On average, animals in the control group gained 482 g / d compared to a loss of 138 g/d in animals eating a limited diet.

Table 1: Short term dietary requirements of farm animals during calamities

Animal	Water (L/d)	Feed (kg/d)
Dairy cows		
In production	26.5-34.0	9.1 hay
Cow with calf	30.3-34.0	5.4-8.2 legume hay
Calf (180 kg)	15.0-22.7	3.6-5.4 legume hay
Swine		
Brood sow with litter	15	3.6 grain
Brood sow (Pregnant)	11.4	0.9 grain
Gilt or boar	3.8	1.4 grain
Sheep		
Ewe with lamb	3.8	2.3 hay
Ewe (Dry)	2.8	1.4 hay
Weanling lamb	1.89	1.4 hay
Poultry		
Layers/100bird	19.0	7.7
Broilers/100bird	18.9	4.5
Turkeys/100bird	45.4	18.1

(FEMA, 1998) [16]

Complete feed block (CFB)

A complete feed system for feeding concentrates and roughages together in a combined form. Complete the feed block made of fodder, concentrate and other additional nutrients in the required amounts to meet the animal's nutritional requirement. Reducing the cost of supply and labor costs and increasing productivity is time consuming and can be achieved through a complete supply system. The system is economical and efficient as it allows for the introduction of low-grade agricultural products, local crop residues and unusual feeds for their efficient use. Untreated or untreated rice stalks can be used as basal roughage supplemented with ingredients such as mustard cake, rice bran, molasses and binder, with or without fodder. Complete the provision of prepared, balanced, and low-cost feed for the benefit of landless workers and smallholder farmers. Blocks can be repaired during the remainder and can be fed in times of scarcity and or easily moved to a deficient district to feed animals to save significant livestock loss.

Liquid urea-molasses feeding

Liquid molasses containing 2 to 3 % uniformly mixed urea and fortified with minerals and vitamins is referred to as liquid feed.

Composition

Sugarcane molasses	92.0 part
Urea	2.5 part
Fresh water	2.5 part
Mineral mixture	2.0 part
Common salt	1.0 part

Urea molasses multi-nutrient blocks (UMMBs)

It is a combination of energy, protein and minerals that strategically adds to the level of regenerative animals so that the animals can survive until the veld conditions improve during natural disasters. UMMB is a simple and inexpensive way to provide a range of nutrients to animals. It can improve the use of low-quality roughages by satisfying the nutritional needs of small rumen elements, creating a better environment for the fermentation of fiber and increasing the production of less protein and fatty acid. Powerful block making machines for 2-8 UMMB at a time are available in the market. This can be used by hand (small dairy / side / landowner) or used for electricity to produce for sale (Wadhwa and Bakshi, 2011a) [25]. UMMBs can also be improved by replacing: a) wheat flour with waste bread; b) grated mustard cake with tomato pomace and c) molasses replaced with used syrup found in the amla preparation industry (*Phyllanthus emblica*). UMMB prepared using non-standard feeds works just as well as those prepared using standard ingredients. Use of non-conservation resources to save production costs UMMB (Wadhwa and Bakshi, 2014; Choubey *et al*., 2015) [27, 12]. Using UMMB as a roughage feed supplement, farmers reported that animals were treated for pica (FAO, 2007) [13] and received a better overall body condition with shiny coats and healthier looks. Cattle that had not shown any signs of oestrus for a long time (due to malnutrition) resumed cycling when they were given UMMB. The increase in UMMB's milk production increased productivity and improved reproductive performance. Additional feeding of the newborn buffalo with the drug-treated UMMB - 'Replanta' (traditional herbal remedies) reduced the time of placental abruption (5.75 vs. 4.40 h) and the early days of oestrus (42.5 vs. 36 d) in the first controlled and controlled group, respectively (Brar *et al*., 2006) [11]. Variations of UMMB e.g. containing anthelmintic such as fenbendazole or apple pine leaves have been used successfully to control nematode parasites. Another exception is polyethylene glycol (PEG) which contains a block, which binds to tannins, does not work in the intestinal tract and improves the adverse effects of tannins leading to increased production. Phosphorus and selenium blocks were also prepared in Venezuela and Northwest China, respectively, to overcome the deficiency of these minerals in some parts of these countries. Their addition increases body fat and reproductive efficiency. UMMB maintenance should be avoided for young calves because their rumen are not well developed (FAO, 2007) [13]

Composition of UMMB

Molasses	45%
Urea	15%
Mineral mixture	15%
Salt	8%
Calcite powder	4%
Bentonite	3%
Any vegetable oil cake	10%

Uromin lick

This "uromin" lick also called "Pashu Chaat" contains besides urea, molasses and minerals, certain fillers like de-oiled rice bran, maida (sieved flour), mustard cake, common salt and a feed binder (bentonite or guar gum).

Composition of Uromin lick

Molasses	30
Urea	10
Deoiled mustard cake	10
Deoiled rice bran	10
Common salt	10
Mineral mix	15
Maida	15
Bentonite	3

Urea treated straws/stovers blocks or bales

The grass is moistened to 40% humidity by adding a 3.5% solution of urea. This is packaged in an open stack for 9 days. For each 400 kg batch, 14 kg of urea dissolved in 200 L water was sprayed with 386 kg thick grass and placed in the open or shed for 9 days. This process involves a combination of treatments (Bakshi and Wadhwa, 1999) [8] For example, physical activity (the use of thick grass and the rise of stack temperature to 55 °C during fermentation) of organisms (the release of ammonia by the hydrolysis of urea and its use by microbial proliferation thereby enhances grass with microbial proteins) and chemicals (infiltration-NH3 on the cell wall, which violates the alkaline bond of lignocellulose). More than 85% of the extra urea was injected hydrolysed by the 9th day, thus eliminating the chances of urea toxicism (Bakshi *et al*., 1986, 1987; Wadhwa and Bakshi, 2011b) [3, 4, 26]. 9-day fermented straw (FWS) or rice straw (FRS) daily supplemented with a mixture of minerals and vitamin A (or carotene) can meet the energy and protein requirements for keeping buffalo and older cattle (Bakshi *et al*., 1986; Bakshi *et al*., 1987) [3, 4]. Improved nutrient utilization has led to higher weight gain in FWS / FRS fed buffalo calves (Bakshi and Langar, 1990) [6] and improved the productive and reproductive function of mammals (Lamba *et al*., 2002) [19]. Strings / stoves / stoves that are considered if used wisely can save livestock that are suffering during a catastrophic natural disaster. This method has a global application in improving the nutritional value of many cereals (wheat, rice, barley, oat) corn stalks, sorghum and sorghum stalks (Bakshi and Langar, 1994) [7] Pathogenic microbes such as Salmonella or E.coli have never been found in any stack (Gangwar and Bakshi, 2000) [17]. The shelf life of the FWS / FRS was more than one year. After a set period of 9 days, the stack should not be demolished rather the required feed amount should be taken from the other side of the stack. If needed, it can be mixed with untreated grass and fed to animals. The fermentation process can be accelerated using the newly developed 9-day FWS / FRS as a natural raw inoculum (5% DM base) and the boiled grass was ready within 6 days with a much higher nutritional value than raw unripe grass (Bakshi and Langar, 1989 ; Bakshi and Wadhwa, 2001) [5, 9].

Densified complete feed pellets (DCFPs)

Wheat, soya, mustard and cotton straws can be used for the production of grass-fed feeds. Feeding pellets can contain 30-35% crushed grass, 10-12% molasses, 35-40% deoiled rice bran, 10-15% oily food, 1% of each urea and common salt, 1.5% calcite powder and 1% mineral mixture (FAO, 2012)

[14]. Feeding 6-8 kg / day of these pellets can support body retention and 3-4 kg of milk / day.

Silage technology for scarcity period

The procedure is very simple and involves spraying the urea solution evenly over the grass and storing it for some time. Most of the remaining fruit is extracted daily. These fruits by products are usually a rich source of soluble carbohydrate that contains a small amount of protein that makes bacterial fermentation. Therefore, these products that cause the biggest waste disposal problem can be incorporated into powdered grass and poultry waste. The paddy grass should be pressed and folded in the same way as the other two parts. Such a beast should be kept for at least 4 weeks; after that it is ready for animal feed. The paddy straw should be crushed and mixed in the same way as two other items namely fruit manure and poultry manure keeping the beast for 4 weeks after which it is ready to feed the animals. Ensiling paddy straws and chicken droppings: Paddy straw, chicken droppings, green grass and molasses on a 40:40 scale basis based on dry matter form excellent silage.

Tree leaves and vegetable leave

Green fodder is not available in short supply. But the leaves of the trees are easily accessible. Leaves with, mango, banyan, pipal, babul, subabul, mahuva, etc. It can be used as raw fodder. They are a good source of protein (6-20% CP), calcium (0.5-2.5%) and Vitamin A. Complete prepared meals using 50kg tree leaves, 5kg peanut cake, 25 kg babul pods, no molasses -15 kg, 1 kg urea and A 2 kg mineral mixture is good for animals and creates a good nutritional value.

Feeding of non-conventional feedstuffs

Some unconventional feed sources that can be used have been mentioned (Table 2). Some other unconventional feed resources e.g. Mahuva (Madhuca indica J.F. Gmel.) seed cake, Mahuva flowers, Salvadora oleoides Dane (Var. persica Linn.) deoiled cake, subabul (*Leucaena leucocephala*) seeds, sea weeds (Sargassum spp.), rain tree pods (Pithecolobium saman), tomato (Lycopersicon esculentum Mill.) waste, isabgul gala and isabgul lali (*Plantago ovata* Forsk.), neem cake (*Azadirachta indica*) kusum cake (Schleichera oleosa Willd.), palm (*Borassus flabellifer* Linn.) male flower, jowar gluten and jowar cake (Sorghum vulgare Pers.), Banana root bulbs (*Misa paradisiaca* Linn.) etc. can be used in the ration of livestock (Patil, 2006) [22].

Table 2: Unconventional feed

Unconventional feed	Botanical name
Rubber seed cake	*Ficus elastica* Linn
Spent annatto seeds	*Bixa orellana*
Tea waste	*Camellia sinensis*
Kuvadia seeds	*Cassia tora* Linn.
Vilayati babul pods	*Prosopis juliflora* Linn
Mango seed kernel	*Mangifera indica* Linn
Babul seeds	*Acacia nilotica* (L.) Del.
Tamarind seed powder	*Tamarindus indica* Linn

(AICRP, 1983) [1]

Health management sends natural disasters

Before discussing healthy food management to bring animals to normal, it is important to know how animals will respond to a normal feeding system. The main concern is whether the animals will be able to regain normal growth / production levels or not.

Feed and food banks

Due to floods and droughts, there is a need to establish food banks and fodder areas in the affected areas / districts near the affected districts for food and fodder in the short term. UMMB or green fodder carries to ensure the safety of the feed. In building livestock banks, the need for storage is also a major problem and as a result the roughages used to feed the animals require a large storage area.

Grains

At the international level, grain is also given to animals in emergencies because this is easier to get into trucks than roughages. Food grains, their nutrition can be avoided. If fed, they should be increased in animal feed in a sensible way (FAO, 2016) [15].

Feed should not be consumed only during such disasters

Freshly planted grass contains a lot of nitrite and nitrate and should be fed in small amounts with dry roughages such as paddy straw and straw. The leaves of the new medicine contain high levels of hydrocyanic acid. Because of their weakness, animals eat too much and sometimes suffer from poisoning. The leaves of such trees should not be eaten as a single piece and should be placed in containers to obtain low nutrients.

The conclusion

The advent of natural disasters is sudden and disruptive. Natural disasters cause severe shortages of food, feed and drinking water and damage healthy food and livestock. Nutritious food management in times of crisis should be given greater attention to prevent starvation. Feeding strategies such as UMMB in addition to roughages, complete block feed, rea treatment of rea, limited feeding, feeding hays and other stored fodder can meet the challenge. Unusual feeds and waste also have the potential to reduce the challenge. Once the situation is under control and food security develops after a natural disaster, affected animals should be provided with weight loss and productivity compensation.

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