

**Livestock Feeding in Flood Affected
Area of
NORTH EASTERN REGION**

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The north eastern region of India comprises of seven states namely Assam, Meghalaya, Manipur, Tripura, Nagaland and two union territories of Mizoram and Arunachal Pradesh, except Assam, all are hill states. In Assam, - north Cachar and Karbi Anglong are the only hill districts, other eight districts are mostly of plain area. The total area of this region is 25,505 m ha comprising 7.76 percent of the total land area of the country. There are 7.429 m cattle and 0.613 m buffaloes in this region which account for only 4.18 and 1 percent respectively of the total cattle (177.834 m) and buffaloes (60.844 m) population in the country.

Assam is the largest among all the states of N. E. Region. The whole area of Assam comprises of Brahmaputra valley and Surma valley. There are seven districts in Brahmaputra valley namely Goalpara, Kamrup, Darrag, Nowgong, Sibsagar, Lakhimpur and Dibrugarh. The Surma valley consists of the Cachar district.

The climate of N.E. region is characterised by its extreme humidity. Its most distinguished feature is the copious rainfall between May and July. Mousinram having the world's highest rainfall of 1887 cm also falls in the Meghalaya state of this region.

Climatically the year may be divided into the cold season and the hot-humid season. The cold weather lasts from October to February and rest .of the year is rainy. The south welt monsoon begins from the middle of June. During the monsoon, the winds sweeping up through the Bay of Bengal strike the Arakan and Assam hills, the latter forcing the wind up to the altitude of 1524 m when all their moisture precipitates resulting in the heavy rainfall. At both ends of the Brahmaputra valley there are pockets of very heavy rainfall. Goalpara and Lakhimpur at the western and eastern extremity of the valley respectively recorded an annual rainfall of about 292 cm. There is something of a "rain shadow" effect along the southern flank of the Brahmaputra valley and the driest part is around Lanka where the average rainfall is about 109 cm. The rainfall in Kamrup, Nowgong and Darrang varies from 180 to 196 cm, at Sibsagar 216 cm and at Silchar 315 cm. The average rainfall in the Brahmaputra valley is 173 cm. The annual temperature and humidity of certain places of the region are as follows:

	Max	Min	Humidity
	(^oFah)	(^oFah)	(%)
Cherra	68.5	57.2	81
Dibrugarh	80.8	64.9	91

Gauhati	84.6	65.9	89
Shillong	70.1	53.3	74
Sibsagar	81.5	65.5	94
Tezpur	83.1	66.8	89

Due to heavy rainfall in the Himalayan and other water sheds of the eastern Indian region, Assam is endowed with extensive river system consisting of the Brahmaputra, the Kusiara and the Barak and their tributaries.

As there are heavy rainfall in the month of May, June and July, the river Brahmaputra and Barak and their tributaries rise even above the danger mark at many places of Brahmaputra valley and cause great panic to the people of locality. The flood water of river Brahmaputra and its tributaries submerged many roads, railway lines etc. Sometimes communication between upper and lower parts of Assam is also cut off. Flood water submerge most of the paddy fields and natural grazing pasture etc.

Due to heavy rainfall during the Bummer months, different rivers of Arunachal Pradesh and Meghalaya also flow above the danger mark and causes great loss to men, animals and materials. The hill rivers are more turbulent and submerge many areas of these states.

In the N. E. region some natural grasses and fodder tree plants are abundantly available. They are - arali, Aruna, Habi, Dhus, Joyjoha, Seru, Kuchiband, Kharika, Ulu, Nal, Lasi, Sarson, Seru, Bahpotia, Dal, Taraplant, Saura, Dimaru, Kanchan, Simalu etc. Besides these, natural herbage, some good quality fodders are also cultivated in organised Government dairy farms. These grasses are cow-pea, *penisetnm pedicellatum*, maize, Teosinte, Hybrid Napier, para etc. The nutrient content of some -commonly available natural grasses and fodder tree and cultivated grasses are given in table

1. From the persual of the table 1, it is seen that most of the naturally growing grasses are fairly rich in crude protein content.\

Table 1 : Chemical composition of some indigenous grasses and tree leaves on dry matter basis (in percent)

Grasses	Dry matter	Crude protein	Ether extract	Crude fibre	Nitrogen free extract	Ash	Calcium	Phosphorus	Reference
1	2	3	4	5	6	7	8	9	10
Arali (<i>Leesia hexandra</i>)	11.0	13.18	3.90	22.0	46.46	15.1	0.38	0.26	Baruah et al 1978
Para (<i>Brachiaria mutica</i>)	19.5	11.98	1.01	28.28	45.70	15.16	0.32	0.35	Sen, Ray and Ranjhan, 1978
Napier (<i>Pennisetum perpurcum</i>)	14.0	5.35	1.89	31.90	44.06	16.70	0.33	0.35	- do -
Napier hybrid	15.0	10.15	2.11	30.50	41.00	16.17	0.46	0.37	- do -
Guinea grass (<i>Panicum max.</i>)	13.0	7.97	0.66	32.26	43.89	12.32	0.39	0.31	- do -
Dal (<i>Hymenachene amplexicaulis</i>)	14.0	9.40	2.33	22.08	54.00	12.20	-	-	Talapatra, 1953
Ulu (<i>Imperata aurindinaee</i>)	9.50	5.25	3.25	32.25	51.00	8.25	-	-	- do -
Kharika (<i>Microstegium ciliatum</i>)	10.0	6.00	1.75	37.5	45.00	9.75	-	-	- do -
Nal (<i>Arundo donaxlium</i>)	11.0	13.10	1.87	28.48	38.32	14.97	-	-	- do -
Dhush (<i>Erianthus longisetus</i>)	12.0	8.0	2.40	32.31	48.09	9.20	-	-	- do -
Dhuri grass	94.26	5.53	0.44	26.28	62.01	5.74	0.29	0.18	Gupta, BM, 1981
Aruna (<i>sataria palmifolia</i>)	14.00	14.00	3.84	10.25	52.90	10.25	1.5	0.63	Baruah, 1979
Tree leaf Tara Plant (<i>streblus aperlour</i>)	92.45	11.25	4.90	28.50	47.12	7.57	0.32	0.13	Ali et al, 1980
Saura (<i>streblus aperlour</i>)	83.92	17.31	3.71	-	-	16.08			Baruah & Pathak, 1976
Khanim (<i>Ficus hitra</i>)	90.41	17.13	1.05	14.28	57.95	9.59	1.25	0.14	Gupta, 1981

Kurshimele	87.31	13.30	2.75	29.39	41.87	12.69	1.95	0.09	
Barahi (Aporosa roxburchi)	82.15	13.38	3.79	50.67	34.31	17.85	1.14	0.06	
Katra	90.93	19.43	3.27	27.67	40.56	9.07	2.07	0.15	
Lari (Eucenia cunata)	88.91	14.28	1.46	29.37	43.80	11.09	1.84	0.08	
Miri (Subia lanceolata)	79.48	9.84	0.99	20.15	48.85	20.52	1.90	0.11	
Wild Bamboo (Arundiraria bookeriana)	80.00	10.15	1.21	30.23	38.41	20.00	0.46	0.06	
Wild Bamboo (Arundiraria bookeriana)	81.70	7.79	1.45	26.48	45.98	18.20	0.64	0.14	
Centrosema pubiscens	87.64	22.64	2.78	16.14	46.08	12.36	1.30	0.16	
Penisetum pedicellatum (original strain)	89.40	8.55	1.84	35.61	43.40	10.60	0.19	0.18	
Penisetum pedicellatum (strain-35)	89.48	7.52	1.83	36.37	43.76	10.52	0.16	0.15	
Hybrid napier	83.13	10.15	2.01	30.50	41.07	16.17	0.46	0.37	
Para (Banchiaia mutica)	89.23	7.91	1.47	28.22	51.37	10.77	0.32	0.35	
Guinea (Panicum maxima)	89.55	8.97	1.77	36.38	42.43	10.45	0.88	0.24	
Teosinte	92.41	9.27	2.50	33.59	47.17	7.59	0.98	0.35	
Maize (zer maize)	91.85	6.74	2.09	35.95	47.07	8.15	4.89	0.52	
Cowpea (Vigna sinensis)	89.14	15.6	2.50	33.10	37.94	10.86	1.49	0.34	
Paddy straw	80.15	4.35	0.69	31.39	43.72	19.85	0.34	0.08	
Paddy straw	95.12	2.55	0.73	36.39	45.45	14.88	0.29	0.04	
Paddy straw	95.15	3.98	0.93	36.35	44.89	13.85	0.45	0.03	

Feeding stuffs :

The different kinds of conventional and unconventional feed stuffs for the preparation of rations of different categories of farm animals have been listed below -

1. Crop residue: Since rice is the staple food for the people, the farmers of all the state cultivate paddy as the main cereal crop. After harvesting the grain from the crop, the left portion is known as straw. These straws are collected from the field by the farmers and stored after drying in big stock for feeding of animals. Paddy straw constitutes the basal roughage of cattle and buffaloes in different northeastern states of India. It is usually stored on wooden or bamboo platform raised over the ground. This is required to minimize spoilage in the heavy rainfall areas.

2. Sugarcane crop residue: Sugarcane is generally cultivated in Nowgong, Goalpara, Darrang and Sibsagar district of Assam. After harvesting the sugar cane the green tops available as a waste can be used for the - feeding of cattle and buffaloes. Some quantity of cane tops is converted into hay at some places, while good quantity of it goes waste, which can be preserved by ensiling.

Sugarcane trash mostly used as fuel for the preparation of jaggery, may also be use to supply part of the roughage requirement after chaffing and enriching with more palatable and nutritious feeds.

Bagasse is available in sugar factories and crushers after extraction of juice. A small quantity is also available with farmer during the process of jaggari preparation. Parity large proportion of bagasse is used as source of energy in the form of fuel for boilers. The palatability and nutritional value of bagasse for the livestock (cattle and buffaloes) are much better than the rice hull available from the huller rice mills and the latter may be used as fuel saving the former for the feeding in need during scarcity period. The physical form of bagasse make its ball convenient.

3. Rice mill residues Huns, bran, polish and mixed rice mill residue are the by products available extensively in NE region as paddy are grown as the main crop. Rice bran, rice polish (as such/deoiled) and mixed rice mill residue (MRMR)

are fed in varying amounts by the farmers depending on their availability. With other good quality nutritious feeds rice hulls may be fed as a filler to satisfy the appetite of cattle and buffaloes.

4. Forest by products: Besides common fodder, shrubs and herbs like **pipal**, neem, **saura**, **tara**, mango, **kathal**, etc. other non-toxic tree leaves may also be fed to farm animals to supply part of their nutritional requirements. The availability of digestible protein for most of the green tree leaves is limited to 1-2% and energy equivalent to 10-15% of total digestible nutrients, on fresh basis containing about 15% dry matter. They are potential sources of much needed carotene, the source of vit a activity.

5. Aquatic plants: Several types of aquatic plants are available in river, pond and other water logging areas may be used for the feeding of farm animals. Although the palatability of most of the aquatic plants is not good but the voluntary intake often exceeds 1 kg dry matter per 100 kg body weight in cattle and buffaloes. Besides supplying protein and energy they are rich sources of carotenes. So far the common aquatic plants tested for the feeding of farm animals are water hyacinth, aquatic spinach, stalks and leaves of lotus plant (*Nymphaeaceae* sp. and *Neumbiull* sp.), hydrilla, pistia, aquatic weeds and jugali paddy etc. They are available readily at most of the places during floods

Chemical composition and nutritive value of water Hyacinth:

The chemical composition of water hyacinth varies widely and it is affected by the species of plants, climatic conditions, stage of maturity, source of water etc. In dry matter water hyacinth contains 10-15% crude protein, 1-2% ether extract, 15-25% crude fibre, 40-50% nitrogen-free-extract and 13-15% ash.

Processing of water hyacinth for the feeding of farm animals :

Cattle and buffaloes are frequently seen eating water hyacinth in the ponds, ditches etc. In order to increase voluntary intake, storage for longer period, different methods of processing have been developed. Most of the

methods of processing are very simple, economical and easily adoptable under the present conditions.

1. Drying and grinding: After harvesting water hyacinth is' dried in sun on the bank of ponds and rivers to increase the dry matter content from 6-7% to 90-95% so that it could be ground easily. After drying it is chaffed and ground in mill. The ground water hyacinth can be easily mixed in the concentrate mixture. But this method is time consuming and laborious and sun drying can be practised only in dry season. A few examples of concentrate mixtures suitable for the region are given below.

A. Concentrate mixture for paddy growing areas

Ingredients	Concentrate mixture			
	1	2	3	4
Broken rice/coarse grains	20	20	20	0
Deoiled rice polish	35	35	35	35
Mustard oil cake	20	20	-	-
Tin oil cake	-	-	20	20
Coarsely ground water hyacinth	20	25	20	25
Molasses	5	10	5	10
Calculated Nutritive value				
Crude protein	16	16	16	16
DOP	10	10	10	10
TDN	76	76	76	76

N.B. Mix in the above mixture 2 kg complex mineral mixture and 1 kg powdered salt uniformly. In all the former concentrate mixture either 5 or 10% molasses has been mixed. This reduces dustiness and increases palatability.

2. Hay making: Luxuriantly growing green leaves along with long and spongy pedicle are harvested and spread in hot sun for drying. The drying crop is turned

over at least once a day so that it does not spoil due to fermentation activities of micro-organism specially the moulds. Although water hyacinth contains 90-95% water, the rate of dehydration is very high and it takes about 7-10 days from the preparation of hay containing 82-85% dry matter during the dry hot climate of summer season and 15-20 days during the winter season.

3. Silage making: Due to very high moisture content satisfactory ensiling of water hyacinth has been found to be difficult. Mostly water hyacinth has been ensiled with poor quality dry roughages like paddy and wheat straws. It helps in increasing the voluntary intake of dry matter and nutrients concentration of silage. In addition of sugar cane molasses and other additives/ingredients rich in soluble carbohydrates enhances the process of ensiling through auto-fermentation and increases the palatability of the silage. A few suitable combinations of silage and calculated nutritive values of various silages are given in table 2.

B. Composition of Silage Mixes:

Ingredients	Silage mix			
	1	2	3	4
Chopper water hyacinth	20	20	20	0
Deoiled rice polish	35	35	35	35
Mustard oil cake	20	20	-	-
Tin oil cake	-	-	20	20
Coarsely ground water hyacinth	20	25	20	25
Molasses	5	10	5	10

4. Chopping and wilting: Wilting of water-hyacinth for a day under moderate climate almost doubles the dry matter content without much changes in its appearance. Partial wilting increasing dry matter content to 12-15% has supported higher intake of dry matter. Feeding water hyacinth after wilting for a

day or two has helped in 50-60% higher consumption of dry matter in pigs. This is perhaps due to reduced bulk of water hyacinth and increased content of dry matter in the feed. It is most easy, convenient and cheapest method of feeding water hyacinth. The other aquatic plants are also found to be available in the regions are:

(i) Water spinach (*Ipomoea reptans*):

It is fast growing aquatic plant and contains 90-92% water, 2-2.5% crude protein and 3-4% carbohydrates. The palatability of this plant is low and can be fed only as a part of ration to supply about 20-25% of dry matter. The digestibility of nutrients are quite encouraging.

(ii) Lotus (*Nelumbium speciosum*) :

In most of the big tanks lotus - flowers are found to be available. Green leaves with long stalk are fed to cattle and buffaloes after chopping and mixing with the straws.

6. Partly damaged crop left after flood: Partly damaged crop is mostly unfit for grain production. These damaged crops of flood affected areas are usually coated with a layer of mud silted during stagnation of flood water. This may be washed off, in clean water accumulated and settled in clean ditches after flood, before feeding the mud layer may be removed after sun drying the plants followed by mild beating of dried plants with a small piece of bamboo (*lathi*) manually.

7. Unconventional cakes, and seeds: The utilisation of deoiled salseed meal, treated neem seed cake, nahar seed meal, tapioca waste, extracted tea leaves have already been tested. These feeds may be incorporated to supply about 10-30% dry matter requirement of farm animals. These unconventional feeds can also be used for the feeding of simple stomached pig and poultry during scarcity

of costlier conventional feeds replacing limited proportion of conventional ingredients.

8. Fruit factory waste: In Assam and neighbouring states fruit factory processing plants are not uncommon. The waste materials like pine apple wastes, orange peel, tomato pomace are found to be abundantly available which are wasted due to lack of proper utilisation as animal feed. These can form a part of the diet of livestock after processing through ensiling.

9. Animal organic wastes: The north eastern region has a large potential of animal organic wastes contributed by excreta of farm animals and poultry, waste materials from slaughter houses, dead animal carcasses etc. The animal excreta are richer in crude protein content. But their use is limited due to the presence of pathogenic micro-organisms and ova of different parasites. So these can only be used through suitable methods. The recent proliferation of gobar gas plants and its projected expansion would be capable of utilizing huge quantity of animal organic wastes and other carbon wastes for the production of biogas. The residual slurry available regularly after 3-5 weeks of anaerobic fermentation has been found to be a moderately good source of microbial protein (Kamra and Pathak, 1980, P.C.). The feeding of digested slurry in the diets of ruminants and pigs has already been demonstrated as Indian Veterinary Research Institute (Pathak 1980, Pathak Boruah and Jakhmola, 1981).

Chemical composition and organic wastes:

Animal organic wastes are richer sources of nitrogen, calcium and phosphorus besides several micro-elements and vitamins but poor in energy content. Nutritive value of several animal organic wastes has been determined by feeding and digestion studies. The chemical composition of many animal organic wastes are given in table 2.

Various methods of processing and feeding of animal organic wastes

Since the feeding of adequate amount of unprocessed animal organic wastes to different categories of farm animals has been difficult because of flavours and were unpalatable, a few methods of processing have been evolved for making the animal organic wastes palatable and nutritious for different categories of farm animals:

1. (a) Feeding of dried and ground poultry excreta as an, ingredient of concentrate

The dried and ground droppings of caged birds as well as litter materials from deep litter houses can be used as an ingredient of concentrate mixture for supply of nitrogen and mineral requirements (Jayal and Mishra, 1971, Pathak et al. 1976, Chaturvedi et al., 1979, Malik et al., 1979). The sun dried poultry droppings of caged birds can be incorporated in the concentrate mixture at the level of 20-25%. Incorporation of 27 and 37% dried poultry litter in the concentrate mixture for dairy heifers has resulted in saving of 3.0 and 4.3 quintals of basal concentrate mixture in about one year feeding period (Malik et al., 1979).

Since high percentage of ash in poultry droppings and ash and fibre in poultry litter significantly reduces their energy content, the concentrate mixture should be balanced properly through the incorporation of high energy feed ingredients when prepared as feed for production purpose; like growth and milk production. Low energy concentrate mixture can also be prepared for the supply of maintenance, requirements, The protein content in droppings of caged birds is affected by (1) type of rations and (2) type of birds (starter, grower, chicks, broilers and layers), and that of deep litter is affected by (1) the basal material, (2) the density of birds, (3) the age of birds and (4) the age of Litter (Ranjhan, 1980).

Besides these above four factors, climatic conditions also influence the composition of excreta. The loss of nitrogen and other organic materials due to excessive fermentation in hot humid climate decrease their percentage and

increase inorganic components. Hot humid climatic conditions may also spoil the material favouring the growth of moulds and fungi.

(b) Feeding of poultry excreta ensiled with other poor quality roughage

In N. E. region paddy and wheat straw are abundantly available and farmers feed the poor quality roughages to their livestock. But these cereal straws are deficient in protein and mineral. Besides, it is rich in oxalate which interfere in mineral metabolism. On the other hand poultry excreta and poultry litter are also available in abundant which are waste material of organised poultry farms. So these two abundant sources of farm waste can be efficiently used as livestock feed through ensiling. Silage can be prepared by incorporating 40 parts poultry litter, 40 parts paddy straw, 10 parts chaffed green maize and 10% molasses (Pathak and Neog, 1976).

Two main objectives of preparing silage are follows:

1. Poultry excreta is ensiled for increased voluntary intake favoured by development of silage flavour due to anaerobic fermentation.
2. Nutritional values of low protein cereal straws, stovers and poor quality grass hay can be improved for feeding of ruminants.

2. Feeding of swine excreta:

Ex-creta of pigs reared at organised farms on feeding conventional grain based ration is a good source of organic nutrients. The difference from the initial feed is mainly the high percentage of crude fibre and ash. However, the composition is comparable with the wheat bran and rice bran. As the coprophagy is common in pigs, it is not difficult to feed dried swine faces to the pigs.

Pigs faeces may be -fed easily by the following methods -

a) As an ingredient of concentrate mixture:

Fresh faeces collected from the organised pig farms should be either (i) oven dried, ground and mixed with other components of concentrate mixture substituting 50 to 100 P. C. of brans in the mixture or (ii) sun dried and fed

replacing upto 50% wheat bran from the diets of adult pigs and ruminants (Pathak. 1976, PIC.).

(b) Ensiled with other roughages:

Pig faeces collected over a period of 5-7 days may be ensiled with wheat bhoosa, chaffed paddy straw, chaffed green forage and molasses in the ratio of 3:3:3:1 for a period of 8 weeks in a silo make anaerobic condition. Such silage has 3-3.5% DCP and 47-50% TDN (Pathak et at, 1980. Jakhmola et al.1981).

3. Feeding of digested gobar slurry (DOS) in bovine ration. For feeding of digested gobar slurry two methods can be followed:

- (i) DGS after drying in hot air over or sun drying can be incorporated in concentrate mixture replacing 30% of the wheat bran. Dry DGS have almost similar protein content with wheat bran.
- (ii) Fresh DGS is acceptable to cattle and buffaloes on feeding with a small quantity of wheat bran and molasses which they can consume to meet most of their protein requirement. Half of the maintenance requirement of protein in adult cattle and buffaloes can be supplied easily through the feeding of fresh DGS mixed with wheat bran. The following feeding schedule may be followed (Pathak et al., 1980) :-

Body weight of animal (kg)	Wheat bran (kg)	Fresh DGS (kg) 6-7% DM	Wheat bhoosa (kg)
300	1.0	25	3-4
400	1.5	30	4-5
500	1.75	40	5-6

10. Soaked straws/stovers submerged in flood: The straws/ stovers soaked in flood water may be fed when fresh after receding of flood water. However, to prevent its spoilage due to growth of moulds and fungi, it should be processed and preserved properly.

The following methods can be used for the preservation of flood soaked straws :

- 1) Common salt can be mixed at a rate of 0.5 to 1.0% in soaked straw after squeezing the water. This prevents substantially the growth of moulds and fungi, and helps in the preservation of soaked straw for quite sometime. However, soaked fodder should be fed as quickly as possible.
- 2) Sun drying: In bright sun light soaked straw should be spread in thin layer and turned out with rakes. The drying can be done on dry ground or abandoned roads of flood affected areas and collected for storage when moisture content reduces to less than 20%.
- 3) Ensiling: Straw can be ensiled with other ingredients in kuchha or pucca silos. Depending upon the availability of other ingredients straw may be either ensiled with (a) chaffed green fodder; (tree leaves/grasses/aquatic plants) and molasses with urea or (b) poultry litter, a little green fodders and molasses, (c) pig excreta, green fodders and molasses etc.

**Unconventional feeds and fodders and their nutritive value
(as DM basis)**

Feeds /fodders	DCP kg/100 kg	TDN dry matter
1	2	3
Fodder tree leaves		
Name	8	53
Saura	11	60
Tara	5	55
Aquatic plants		
Water hyacinth	7	50
Lotus plant	6	50
Non edible cakes		
Deoiled salseed cake	0	45
Neem cake	8	59

Crop residue		
Paddy straw	0	44
Wheat	0	40
Maize stover	1.5	48
Bagasse	0.5	40
Sugar cake tops	1.5	45
Rice husk	-	-
Other by products		
Tea waste	8	45
Topioca leaf meal	15	45

1	2	3
Mango seed kernel	6	70
Molasses	0	60
Animal organic wastes		
Rumen fill	6-12	40-45
Rovine excreta	10-20	35-45
Swine excreta	10-15	45-50
Digested gobar slurry	6-8	60-50

Feeds and nutrient requirements of farm animals :

Body weight (kg)	Dry matter (kg)	DCP (g)	TDN (g)
1	2	3	4
1. Growing calves over 6 months of age			
50 (6-9 months)	1.2	150	0.9
75 (8-12 months)	2.0	210	1.5
100 (9-15 months)	2.5	260	2.0
150 (12-18)	3.5	300	2.7

2. Maintenance of adult cattle and buffaloes			
150	3.0	100	1.3
200	3.5	150	1.7
250	4.0	170	2.1
300	5.0	200	2.4
350	5.5	225	2.7
400	6.0	250	3.1
500	6.5	270	3.3
3. Working bullocks and cow yielding 2-3 kg milk daily			
200	4.0	240	2.2
300	5.5	330	3.1
400	8.0	400	4.0
500	9.0	500	4.9

Formulation of cheap ration for different categories of Livestock

Roughage constitutes the major portion of ruminant diet. So during the flood or any natural calamity one should search for available sources of these feeds in that particular area. North eastern region may be distinguished in two types of areas for the identification of fodders.

1. Hilly areas covered with forest: In hills of N. R. region several types of fodder trees are available in abundance. Most of these fodder tree leaves contain 10-11% crude protein and 0.5 to 2.0 percent of calcium on dry matter basis and do not contain any toxic principles. So these fodder tree leaves should be supplied ad lib which will be sufficient to supply nutrient for maintenance of the animal. The following feeding schedule may be followed when tree leaves constitute the roughage portion of the diet.

(a) Ration for adult non-producing cattle (150-300 kg body weight)

Body weight (kg)	Mixed tree leaves (kg)	Paddy straw /wheat straw (kg)
100	5	1.0-1.5
150	6	1.5-2.0
200	7	2.0-2.5
250	8	2.0-2.5
300	9-10	2.5-3.0

In addition to above roughages –

- (i) Common salt 30 g/animal/day.
- (ii) Sterilized bone meal 20 g/animal/day.
- (iii) Trace element mixture 0.5 g/animal twice a week.

(b) Ration for growing animals (50-150 kg body weight)

Body weight (kg)	Mixed tree leaves (kg)	Paddy straw/ wheat straw (kg)
50	2	0.5
75	2.5	0.5
100	3.0	1.5
150	3.5	2.0

In addition to above roughages –

- (i) Common salt 20 g/animal/day.
- (ii) Sterilized bone meal 20 g/animal/day.
- (iii) Trace element mixture 0.5 g/animal twice a week.

(c) Ration of lactating animals (150-300 kg body weight) (Producing 2-4 kg milk)

Body weight (kg)	Concentrate mixture (kg)	Tree leaves (kg)	Paddy straw/ Wheat straw (kg)
150	1.0	4.0	1.0
200	1.0	5.0	1.0
250	1.5	6.0	2.0
300	1.5	8.0	2.0

Composition of concentrate mixture

Rice polish 34 parts

Wheat bran 34 parts

M.O. Cake/ Thin oil

Cake/G.N. cake 32 part

Mineral mixture 2 parts

Common salt 1 part

The tree leaves, tender shoots and twigs as fodder available in abundance during summer months can meet the nutritional requirement of growing of lactating animals.

The tree leaves are quite high in crude protein content. The dry matter of most tree leaves are 35-40%. The high content of calcium is the another unique feature of tree leaves. So these tree leaves can supply sufficient nutrients along with concentrate mixture to above categories of animals.

2. Plain arable areas : In Assam and other plain areas of neighbouring states flood water submerged most of the areas. In that case livestock should be immediately transferred to a high land for their safety. The following schedule may be followed -

(a) Ration of adult non-producing cattle (100-300 kg body weight)

Body weight (kg)	Mixed green grass (kg)	Water hyacinth (kg)	Paddy straw (kg)
100	10	ad lib	1.0
150	15	ad lib	1.0
200	20	ad lib	1.0
250	25	ad lib	1.0
300	30	ad lib	1.0

In addition to above ration.

- (i) Common salt 30 g/animal/day.
- (ii) Trace element mixture 0.5 g/animal twice a week.

Note : In a ration containing water hyacinth it is always advised to first offer the water hyacinth for voluntary eating for a period of 3-4 hours. This practice helps in the larger consumption of the water weed by hungry animals. Water hyacinth feeding should be followed by the feeding of paddy straw and mixed green grasses.

b) Ration on growing animals (50-150 kg body weight)

Body weight (kg)	Concentrate mixture (kg)	Mixed green grass (kg)
150	20	ad lib
200	25	ad lib
250	30	ad lib
300	35	ad lib

In addition to above ration

- (i) Common salt 30 g/animal/day.
- (ii) Sterilized bone meal 50 g/animal/day.
- (iii) Trace element mixture 0.5 g/animal twice a week.

When green fodder are not abundantly available and the milk yield of animal is above 2 lit/day/animal, in that case following feeding schedule may be followed. A cheap concentrate mixture should be prepared with the ingredients available in the region and should be fed as follows –

Cheap concentrate mixture

Rice polish	23 parts
Wheat bran	34 parts
M.O. cake/ Til Oil cake / G.N. Cake	32 parts
Mineral mixture	2 parts
Common salt	1 parts

Body weight (kg)	Conc. Mixture (kg)	Mixed green grass (kg)	Paddy stra (kg)
150	1.0	5	ad lib
200	1.0	7	ad lib
250	1.5	10	ad lib
300	2.0	15	ad lib

In addition to above ration –

- (i) Common salt 30 g/animal/day.
- (ii) Sterilized bone meal 50 g/animal/day.
- (iii) Trace mineral mixture 0.5 g/animal twice a week.

Post – flood feeding

It has been observed that there is acute shortage of feed stuffs for the feeding of animals just after recede of the flood. So during the flood the following arrangements should be made to meet the demands of feed just after flood.

In north eastern region paddy straw is available in abundance for the feeding of livestock. The main drawback in feeding straw alone is that it does not contain any digestible protein except supplying little amount of energy and satisfy the appetite of the animal. Experimentally, it has been shown that these paddy straw can be enriched by ensiling and it would form a very good maintenance diet for livestock. The silage should be prepared on the basis of availability of feeds. Silage should be prepared in high land areas or in a big drum walls made of aluminum or tin sheet (Fig. 1). The container used for preparation of silage is known as silo. The silo can be of two types e.g. cylindrical tower or trench or bunker silo. Based on the type of material used for the construction of silo, this can be brick silo, cemented silo. The kuccha silo is plastered with a mixture of cow dung and clay (1: 1) for making the walls and floor smooth. While selecting of site for construction of silo, one should keep the following points in mind:

- 1) The site should be easily approachable from temporary animal shed.
- 2) The area should not be low lying because such area is prone to water logging. It should have relative height.
- 3) The water table should not be high so that the soil does not contain high moisture.
- 4) The place where water table is high, the trench or bunker silos should be avoided, the tower silo can be erected on the ground with bricks and cement.

The chaffed straw and fodders and other ingredients of premix should be filled air tight in the silo. The well compressed packing of forage helps in the creation of anaerobic conditions at an early stage. If the silo is not efficiently sealed and made compact while filling, a lot of air is entrapped inside it and enhances the rate of respiration according to following reaction.



This result in decrease in the soluble sugar content and therefore the amounts of lactic acid produced *is* reduced and the material is not properly preserved. The rise in the inside temperature due to endogenous release of energy also further enhances the rate of respiration. After a period of 4-6 weeks

the silage is ready for feeding to the animals. The silo should be opened from the top in case of tower and trench silo and from the front side in case of bunker silo. The spoiled thick mass of upper layers should be discarded. Silage of golden yellow to greenish yellow colour, bright and moist in appearance and with a characteristic pleasant aroma of lactic acid should be taken for daily feeding. After removal of silage, the opening of the silo should be covered in such a way that the contact from the air is minimum. Once opened, the silage should be removed and fed daily till it is finished because exposure to open air results in spoilage of the silage.

1. Ensiling paddy straw, fruit factory, waste and poultry droppings.

In north eastern region there are numbers of fruit processing factories and large amount of fruit waste are going waste every day. These fruit by products are generally rich source of soluble carbohydrate and with little amount of protein. On the other hand for the preparation of silage, sufficient amount of soluble carbohydrate is essential to facilitate microbial fermentation. Therefore, these byproducts which cause a great disposal problem, can be ensiled with paddy straw and poultry droppings (50 parts paddy straw, 25 parts fruit waste, 25 parts poultry' droppings).

Paddy straw should be chaffed and mixed uniformly with other two components if silage and packed well in a silo. Such silo should be kept for 4 weeks atleast after that it is ready for feeding of animals.

2. Ensiling paddy straw and poultry droppings.

Paddy straw, poultry dropping, green grass and molasses in the ratio of 40:40:10:10: on dry matter basis form very good silage (Pathak and Neog, 1976).

The above silages may be fed to non-producing adult animal or growing animals for maintenance .and growth respectively.

Requirements of a Relief Camp

The estimated amounts of various feed stuffs required for the feeding of 1000 heads of cattle and buffaloes for one month period have been worked out for guidance:

(A) Ration based on unconventional feeds and fodders etc.

The estimated requirement of feed stuff for a relief camp housing 40% adult male, 40% adult female and 20% young stock has been given below:

Paddy straw/wheat straw/Bagasse	40 ton
Molasses	1 ton
Rice Polish	6 tons
Wheat bran	6 tons
M.O. cake/T.O cake/G.N. cake	5 tons
Damaged grains/cheap concentrate or grains	4 tons
Mineral mixture	0.4 tons
Common salt	0.2 tons
Any green fodder/aquatic weeds/tree leaves	30 tons

(B) Ration based on digested go bar slurry, wheat bran/deoiled rice polish and paddy straw:

A ration consisting of unprocessed digested gobar slurry from gobar gas plant, wheat bran/deoiled rice polish and chaffed paddy straw may be red to meet maintenance requirement as per the following schedule:

Feeds	Bony weight (kg)			
	150	200	300	400
Digested gobar slurry (kg)	10	15	20	25
Chaffed roughage (kg)	2	2.5	3.5	4.5
Wheat (kg)	0.5	0.5	0.5	0.5

Feeds not to be fed exclusively during such calamities

In the scarcity conditions animals do not get enough feeds for eating and they mostly pass through under fed conditions due to non-availability and scarce supply of feed-stuffs. At the end of such scarcity period, animals usually develop craving for food and eat uncontrolled en access to herbage. Thus, it is desired to be careful in feeding the farm animals after the flood water has receded.

1. Newly growing grasses contain high concentration of nitrite and nitrate and they should be fed in small quantity mixed with dry roughages like paddy straw and wheat straw.
2. New tree leaves contain high level of hydrocyanic acid. Due to its softness animals eat larger quantity and occasionally suffer from toxicity. Such tree leaves should not be fed as a sole ration and should be incorporated in straws for partial supply of nutrients.

Organisation of cattle camps

The bovine (cattle and buffaloes) should be housed in, different groups as (1) adult non-producing, (2) pregnant animals in advance stages (after 5th month of pregnancy), (3) working bullocks, (4) lactating cows and (5) young stock. The young stock should be further classified as (i) below 6 month of age and should be housed in the neighborhood of dams, (ii) 6-9 months or 50-74 kg body weight, (iii) 9-12 months or 75-100 kg body weight and (iv) 12-24 months or 100-200 kg body weight. Feeding should be organised in batches starting from the youngest batch. The number of animals in batches will depend upon the herd strength in the camp.

For the feeding of animals shallow kaccha trenches; abandoned metal road, any other packa floor, plastic sheet, corrugated tin sheet, wooden packing cases etc., may be used subject to their convenient availability.

Almost calculated quantity of feed stuffs using standardized measures (gunny bags, buckets, empty vegetable oil tins etc.) for preventing wastage in scarcity area should be used. Farmers should be encouraged for voluntary participation in the organisation of relief camps.

Veterinary aid camp

During the stress condition of natural calamities, animals usually suffer from several types of physiological disturbances. Infections and contagious diseases may also enter in the area due to uncontrolled movement of animals in search of food and shelter. It is, therefore, essential to maintain well equipped veterinary dispensaries on the relief camps. The dispensary should be manned by qualified veterinary doctor (s) and auxiliary staff depending on the expected number of animals likely to be housed at the relief camp. These veterinary dispensaries of relief camps should be linked with regional depots for regular supply of drugs and biological. Adequate number of mobile veterinary vans should be provided for efficiency in treatment of sick animals.

Ordinarily one to five thousand heads of cattle, buffaloes and other domestic animals are housed at a relief camp. One veterinary doctor would be able to take care of the sick animals from a composite herd of four to five thousand animals provided they are housed in one place. The minimum technical staff at a veterinary aid camp for 4-5 thousand animals may be as follows -

Veterinary Doctor	One
Stockman/Stock Assistant Compounded	Two
Veterinary field Assistant	One
Dresser	One
Animal Attendants	Four

A tentative list of essential equipment and drugs has been given below –

Portable stanchion	One
Rope for casting of animals	8-10 meters long
Enameled buckets	Two
G I. buckets	Two
Enameled tray	Four
Enameled jug	Two
Irrigator/ Enema jug with rubber tube	One
Drenching bottle	One

Abscess knife	Two
Foreceps 6"	Two
Scissors 6" and 9"	Two
Syringes 50 ml, 20 ml, 10 ml, 5 ml	Two each
Needles 15 or 16 guaze and 18 or 20 g	One pkt each
One	
Dettol/ Sevlon	5 L
Phenyl	50 L
Magnesium sulphate	50 kg
Antibiotics	100-200 injections
Dressing oil	20 L
Linseed oil	20 L
Caster oil	5 L
Coconut oil	5 L
Lime	5 L
Gauze cloth	10 m
Bandage cloth/light markin	20 m
Stomachic powder	5-10 kg
Astringent mixture	5-10 kg
Lorexene 100 g tubes	5-10
Broad spectrum antibiotic creams	5-10 tubes

Besides these local arrangements, there should be well equipped mobile vans located at an approachable places and manned with specialist for surgery and obstetrics. Mass vaccination of animals against suspected outbreaks should be organised by a specific team exclusively meant for this purpose under the charge of a responsible officer.

Inspite of all stress reproductive functions will continue. Therefore, care should be taken to provide facilities for the insemination of animals at the camp

by itself. It can be done one of the two stockmen provided at the camp. It would not be proper to maintain bulls at the camp and process semen for artificial insemination. The camps should be connected with various semen banks and extended semen and sterilized insemination tubes may be supplied daily through a carrier on motor cycle / cycle depending on the distance.

A senior officer should be given the responsibility for maintaining the regular supplies of drugs and other essential goods at various veterinary aid camps. Necessary modifications may be required in this suggested organizational plan, depending on the local conditions and other factors.
