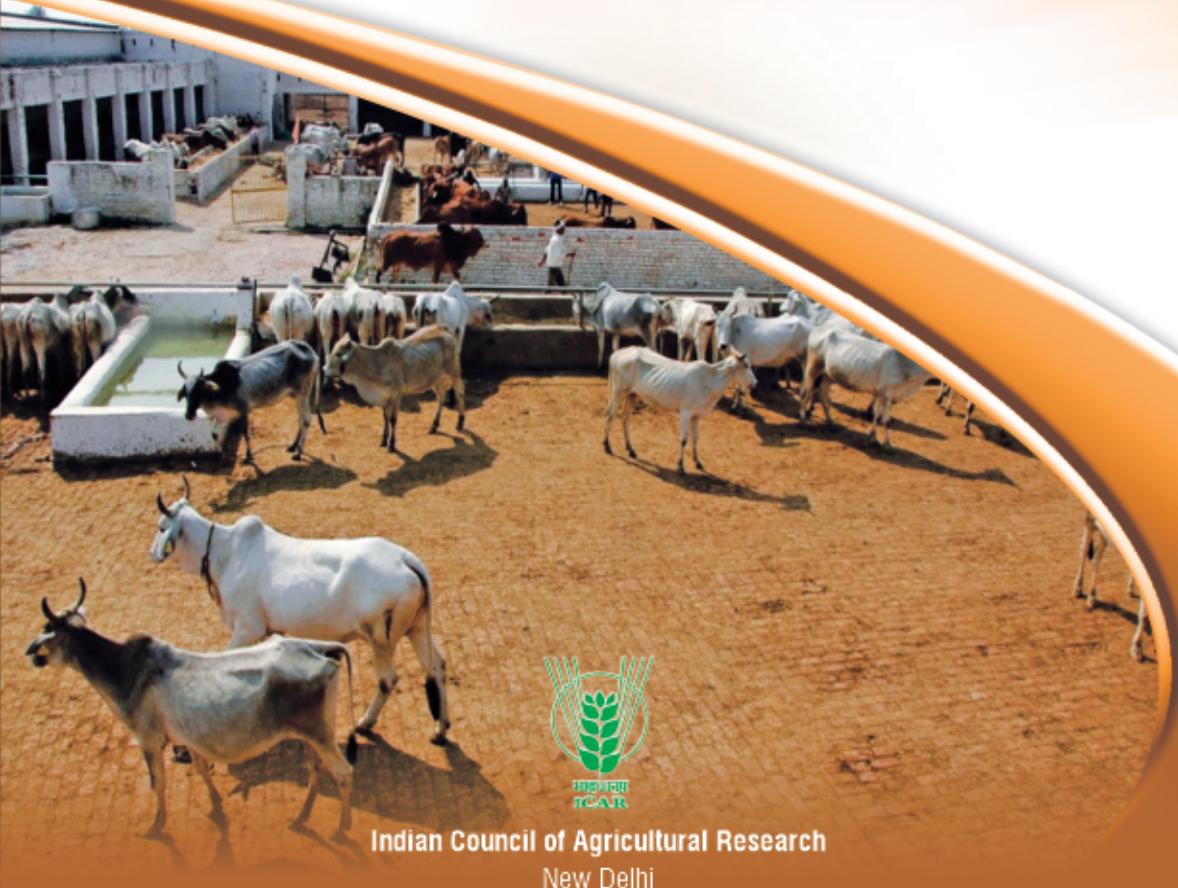


**MANUAL
ON
MANAGEMENT OF
*GAUSHALAS***



Indian Council of Agricultural Research
New Delhi

MANUAL
ON
MANAGEMENT OF
GAUSHALAS



Animal Science Division

Indian Council of Agricultural Research

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**Compiled and edited by a committee constituted
by ICAR vide letter No. AS/11/36/2016-ASR-II
Dated 03rd May 2016**

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Foreword

Cattle with the population of more than 190 million is a predominant species of farm animals in India. They produce 45% of total milk, a valuable draught power for Indian agriculture and rural transport as well as a good source of manure. The cow is treated as the most pious and sanctified animal in India. Slaughter of cows is banned under the provisions of Indian constitution due to which there are a large number of (around 5.3 million) unproductive and aged cows. Management of these cattle is a challenge and *gaushalas* have come forward to accept it. Presently, more than five thousand *gaushalas* are functioning as shelter for such cows. The management of these *gaushalas* is by and large on traditional lines rather than on scientific basis. It is imperative for these *gaushalas* to keep cows in such a way that they may be free from hunger, fear, distress and diseases.

The Animal Science Division of the Indian Council of Agricultural Research (ICAR) has prepared a *Manual on Management of Gaushalas*, which will significantly help in capacity building of *gaushala* staff for scientific rearing of cows. This manual provides information on housing, sanitation, feeding, breeding and health aspects of cattle management, which will certainly help in transforming *gaushalas* for better upkeep of cows and their progeny.

I appreciate the sincere efforts of Animal Science Division in preparation, compilation and editing of this manual, which will be valuable to all *gaushalas* and the livestock keepers.



28 December 2016

(T. Mohapatra)

Preface

In India, the cow has the apex position in the farm animal genetic resources and is treated as the most pious animal. Cows in India are mostly reared by small and marginal holder farmers and the average herd size is about three animals per household. Our country has more than 5 million cows which are unproductive, ill and old and more than 5,000 *gaushala* operating in the country are providing shelter for such animals. It has been seen that most of the *gaushalas* are not well aware of scientific rearing of cows.

The Indian Council of Agricultural Research has formulated a *Manual on Management of Gaushalas*. This manual provides information on minimum infrastructure required for *gaushalas* of different sizes, protocol for identification and record keeping of animals, segregation and isolation of animals, feeding of different types of animals (infant, infirm, pregnant, retired etc.), veterinary care including vaccination, maintaining hygiene as well as disposal of animal waste. Special needs of disabled infirm animals, emergency preparedness and management/handling along with staffing requirement, recruitment and training are also covered.

I appreciate the Scientists and Directors of ICAR-NDRI, Karnal and ICARIVRI, Izatnagar for their sincere efforts in providing information, compilation and editing of this manual by the committee constituted by the Indian Council of Agricultural Research.

I am hopeful that this document will benefit the staff of *gaushala* personnel in better management of cows and its sincere adoption by them will help addressing the important area of Animal Welfare.



(H. Rahman)

From the Editor's Desk

Cattle population of India, the second largest in the world, represent 37.28% of total livestock wealth of India. In India cattle is a religious as well as predominant farm livestock species. Owing to religious sentiments of Indian people, slaughter of cows and its progenies is banned in majority of states of India by Law. In such circumstances large number of cows, especially those who are aged, sick, disabled and non-productive, are sheltered in *gaushalas*. Presently more than 5,100 registered *gaushalas* are functioning in the country. Scientific management of cows at *gaushalas* is hardly followed, therefore, it is imperative to develop minimum protocols on different aspects of cattle management for the personnel managing the *gaushalas*. Such protocol would help in keeping cows healthy and hearty.

Keeping above in view, a manual on management of *gaushalas* was prepared by the Indian Council of Agricultural Research with the help of National Dairy Research Institute and Indian Veterinary Research Institute. The manual provides protocols on housing, feeding, breeding and health management at *gaushalas* along with emergency preparedness and emergency management. We thank the Directors and Scientists of these institutes for timely transmission of information required to prepare this manual. We are also grateful to the Director General, ICAR and Secretary DARE and Deputy Director General (AS), ICAR for their constant inspiration and encouragement for preparing this manual.

We hope and trust that this manual would help in sustainable and scientific management of cows and its progenies reared at different *gaushalas* in India.

Editors

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Minimum infrastructure required for *Gaushalas* of three herd sizes (100, 500 and 1,000 animals)

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Specification to include minimum space per animal for covered shelter, movement etc.

Housing systems

Housing system commonly in use for sheltering cows in India, is of two types: loose housing and the conventional closed housing system.

Loose housing: Animals are usually kept in an open paddock in groups of 40 to 50 throughout the day and night except during milking and for some other specific purposes like treatment and breeding when the animals are required to be tied. This housing system provides a continuous manger along with covered standing space, an open paddock which is enclosed by a brick wall or railing and a common water trough. Separate housing structure of calf pens, milking byres, calving pens, bull pens etc., are required for this system. This system is ideal for areas of low rainfall such as Punjab, Haryana, Rajasthan, Western Uttar Pradesh and parts of Gujarat, Madhya Pradesh and Maharashtra. In other places this system can be used with modifications to protect animals from excessive rains. Such houses are cheap to construct, easy to expand at short notice, congenial to efficient management and not prone to fire hazards. The loose system of housing is recommended for housing of cows in *Gaushala* in most parts of the country.

Close (tie) housing: Animals are tied in one place, and milking and other routine operations carried out at this place. This system provides greater protection during winter but the construction cost is high and the system compromises the welfare of animals. This system may not be suitable for *gaushala* in view of large number of animals and high cost of construction

Space allowances for cow sheds and other facilities

Floor space The accommodation for cattle should give them shelter and enough space to move around and interact with each other. The accommodation should provide enough space for a subordinate animal to move away from a dominant one. It is important to provide as comfortable an area as possible, so that the

animals can lie down for as long as they want and have enough space to stand up again. The lying area should be big enough to help keep the cows clean and comfortable and to keep them away from damaging their joints. The minimum floor space allowances for animals in loose housing (from Indian Standards Institution (BIS)) are presented in Table 1.

Table 1 Floor space requirements of dairy animals in loose housing (BIS: 1223 -1987)

Type of animal	Floor space per animal (m ²)	
	Covered area	Open area
Young calves (< 8 weeks)	1.0	2.0
Older calves (> 8 wks)	2.0	4.0
Heifers	2.0	4.0-5.0
Adult cows	3.5	7.0
Cows approaching calving	12.0	20-25
Bulls	12.0	120.0
Bullocks	3.5	7.0

In view of the variability of cattle size, among indigenous breeds and different grades of crossbred cattle, it may be more appropriate to allocate floor space according to FAO recommendations that take into account body weight (Table 2).

Table 2 Floor space requirements of cattle based on body weights (FAO 2011)

Animal category	Age (months)	Weight (kg)	Area per animal (m ²)	
			Fully covered shed	Exercise yard
Young stock	1.5 - 3	70 - 100	1.5	1.4
Young stock	3 - 6	100- 175	2.0	1.8
Young stock	6 - 12	175 - 250	2.5	2.1
Young stock	12 - 18	250 - 350	3.0	2.3

Contd...

Table 2 continued

Animal category	Age (months)	Weight (kg)	Area per animal (m ²)	
			Fully covered shed	Exercise yard
Bred heifers and small milking cows		400 - 500	3.5	2.5
Milking cows		500 - 600	4.0	3.0
Large milking cows		> 600	5.0	3.5

Feeding and watering space

In loose cattle houses the length of feeding space should enable all the animals in the shed to eat at the same time to avoid aggression during feeding. Feed and water troughs should be designed and located such that the animals cannot get into them and the troughs remain clean. Where feed and water troughs are provided in the loafing area, the access areas should be sufficiently wide to permit free movement of animals and prevent routes becoming wet and slippery. The feeding and watering space requirements according to BIS are given in Table 3 and the dimensions are presented in Table 4.

Table 3 Feeding manger and water trough requirements of cows (BIS IS 11799:2005)

Type of animal	Feeding manger length per animal (cm)	Water trough length per animal (cm)
Young calves (< 8 weeks)	40-50	10-15
Older calves (> 8 wks)	40-50	10-15
Heifers	45-60	30-45
Adult cows	60-75	45-60
Calving females	60-75	60-75
Bulls	60-75	60-75
Bullocks	60-75	60-75

Table 4 Dimensions of the mangers and water troughs (BIS IS 11799 : 2005, 2011)

Type of animal	Dimensions of manger/ water trough (cm)		
	Width	Depth	Height of inner wall
Adult cows	60	40	50
Calves	40	15	20

Elevated mangers and fence-line feeding

Elevated mangers made up of concrete or wood are predominantly used in India under traditional small-holder production. Research in the field has indicated that elevated mangers are not desirable with regard to the feeding behaviour of the cow or feed utilization. The fence-line feeding system which allows access to feed from ground level while preventing the animals from walking and defecating on the feed by using fencing is better for natural ingestive behaviour, economical to construct and saves labour. Standard dimensions for fence-line feed barriers for cattle are presented in Table 5.

Table 5 Dimensions of fence-line feed barriers

Age	Throat height (inches)	Height of neck rail (inches)
6 - 8 months	14	28
9 - 12 months	15.5	30
13 - 15 months	17	34
16 - 24 months	19	42
Adult cows	21	

Space for veterinary care

All *Gaushalas* should have a separate space for veterinary care. The bigger sized *Gaushalas* must have a veterinary clinic / dispensary attached to them. The veterinary facility should have minimum provision of an animal examination room, operating room and separate animal indoor accommodation along with an animal handling yard.

The animal examination room must be equipped with an examination table that is capable of being easily cleaned and disinfected, and suitable hand wash basin supplied with hot and cold water. This room should have instruments and equipment necessary to conduct thorough clinical examinations of animals.

The operating room must have a separate surgical room or enclosed area for large animals equipped with items necessary for carrying out surgical procedures.

The *Gaushala* must have an indoor animal accommodation facility adequate for the number and cows to be accommodated at the hospital.

The *Gaushala* must have accommodation to quarantine animals that are suffering from suspected infectious diseases. It should be separate from all other areas of the hospital so as to prevent the spread of disease to the other areas.

Handling yard

All *Gaushalas* should have a handling yard for collecting, filling and control of individual animals for weighing, vaccination, tagging, spraying etc. The size and numbers of different component pens of handling yards, depend on the number of cows to be handled.

Size of <i>Gaushala</i>	Length of handling yard (m)	Width of handling yard (m)
100 cows	10	5
500 cows	20	5
1,000 cows	30	10

Space for staff quarters, storage, growing fodder and other allied *gaushala* activities

Staff quarter

The number of staff required at different sizes of *Gaushala* is given under Section (9) protocol for staffing requirement. The *Gaushala* Manager and Supervisor and at least 10-25 % of the workers at the *Gaushala* should be accommodated at the *Gaushala* premises. The norms for space requirement for quarters for a manager, a supervisor and workers may be as per the Central Government Guidelines for various categories of Central Government employees.

Space required for stores

The stores will be required for concentrate feeds, straw and equipment at the *Gaushala*. The size and type of buildings for stores can be decided on the basis of quantity of feeds and fodders that are to be stored at the time on the *Gaushala*. Approximate storage space required for different types of feeds are given in Table 6. These figures may be helpful in determining the sizes of feed stores needed. The size of the concentrate store required is determined on the presumption that 0.2 m³ storage space is required per adult unit.

Table 6. Approximate storage space (m³) required per quintal of certain cattle feeds

Hay (loose)	1.60
Hay (baled)	0.70
Hay (chopped)	0.60
Straw (loose)	3.00
Straw (baled)	0.70
Bran	0.50
Grain & oil cakes	0.17

Space required for straw/ hay shed

Availability of common dry fodders or crop by-product is seasonal i.e., at the crop harvesting season, these have to be stored for use throughout the year. Space requirement shall depend upon the manner in which the dry fodder is stored. An adult cow consumes about 4-5 kg of dry fodder per day while young stock consumes about 2-3 kg (depending on age and body size) per day. Annual requirement of hay/straw needed can be worked out on the basis of number of days in a year when hay/straw is used. The size of shed needed to store this hay or straw can be calculated by referring to the Table 6 above.

Land required

i) Land required for setting up of *gaushalas*

The estimated total land required for setting up of *gaushala* premises including land required for housing of all animals, store, chaff cutter, milking parlour, sick animal unit, veterinary dispensary, manure storage etc. for different sizes of *gaushalas* is given in below.

ii) Land required for fodder cultivation

The land required for the cultivation of fodder depends on the climate, soil type, fertility and the availability and quality of irrigation water. On an average 4 to 5 cows animals along with their followers can be maintained on an acre of well fertile agricultural land with assured irrigation facilities. The *Gaushala* may be maintaining primarily indigenous cows and cows which may not be high milk producers. In this case one acre of land will be sufficient for producing enough fodder for 6-7 cows and their calves. Accordingly the land required for fodder cultivation for different categories of *Gaushala* is estimated as under:

Land required for setting up of *gaushalas and* fodder cultivation

Size of <i>gaushala</i>	Approximate land required for <i>gaushala</i> premises (in acres)	Approximate land required for fodder cultivation (in acres)
100 cows	1.0	15
500 cows	4.50	75
1000 cows	7.5	150

Machinery and equipments required

Item	Size of <i>gaushala</i>		
	100 cows	500 cows	1,000 cows
Animal ambulance	1	2	2
Tractor (35 HP) with trailer	1	1	2
High capacity chaff /fodder cutters	1	1	2
Bucket milking machine	5	10	20
Utility vehicle	1	1	2
Electricity generator set (20 KVA)	1	--	-
Electricity generator set (40 KVA)	--	1	1
Milk cans with mushroom lid (40 lt capacity)	10	10	10

Contd...

Table continued

Item	Size of <i>gaushala</i>		
	100 cows	500 cows	1,000 cows
Bulk milk chiller	-	-	1
Milking buckets, stainless steel, round and narrow mouthed (10 lt. capacity)	20	50	20
M.S wheel barrows	2	5	8
Tractor operated dung/slurry scraper	--	1	2
Personal computer with accessories	--	1	2



Identification and record keeping of animals

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Animal identification

Identification of all animals is necessary for maintaining animal records. It also helps in routine management of the animals. All animals brought from outside into the *Gaushala* or newly borne calves at the *Gaushala* itself have to be given a number by which it could be identified. The identification of newly borne calves should be done by tattooing in the ear. The grown up animals should be identified by ear tagging

Animal identification by tattooing

Outline of desired number or letter is pierced on the skin or inside ears and a black pigment is incorporated into these punctures. The various letters and figures are outlined by steel point and each of which carries a small amount of colored paste into the subcutaneous tissue and cartilage of ear. These pastes contain insoluble carbon (black) or green pigments that are inert to tissue. Tattooing is most suited for the identification of new born calves. The tattoo marks are permanent in nature although it becomes difficult to secure an adult animal so as to see its tattoo mark in the ear.

Animal identification by ear tagging

Tags are made of strong plastic with the number stamped on them. Tags are fixed generally to the ear with a special tagging forceps. Tags are two types – (a) self piercing type, and b) non piercing type. Farmer variety has sharp ends can be directly fixed to ear with a forceps while for the latter a hole must first be made with a tag punch or pen knife. Tagging is mostly used for marking young calf (6 month) and adult animals.

Record keeping

Keeping proper animal performance records is vital for the success of genetic improvement of the cows. The records are an essential guide for the scientific feeding, breeding and healthcare of the animals. A computer should be used for this purpose if possible, as it can play a crucial role in record management. The record keeping has tremendous advantages:

- Production performance of each animal can be known;
- Feeding and management can be done on the basis of the individual animal's productivity;
- Superior animals can be selected based on their actual performance;
- *Gaushalas* can participate in herd registration and breed registration programmes of the government;
- Performance data can be provided to the administration for better planning; to research organizations for processing and analysis; and to extension personnel.

Given below are the formats for various performance records and various business records/registers, which need to be maintained at any *gaushala*.

1. History sheet

Name of <i>gaushala</i>	Animal No.	Breed
	Sire No	
	Dam No	Dam's Yield
Address	Date of birth	
	Date of purchase	
	Value (Rs)	

Calving date	I	II	III	IV	V
Service	Date Bull No	Date Bull No	Date Bull No	Date Bull No.	Date Bull No.
First service					
Second service					
Third service					
Calving date					
Sex of calf					
Lactation order	I	II	III	IV	V
Days in milk					
Milk yield (kg)					
Days dry					
305 days yield (kg)					

2. Calving register

Cow No.	Due date of calving	Date of calving	Sire No.	Calf No.	Sex of calf	Birth weight of calf	Breed	Remarks

3. Calf register

Cow No.	Date of birth	Calf No.	Sire No.	Dam No.	Sex of calf	Birth weight	Disposal How	Date	Remarks

4. Growth record of young stock

Animal No.	Date of birth	Weight at birth	Weight at weeks 1 2 3 -----12	Weight at month 13 14 ----- 24	Weight at Ist Service	Weight at Ist calving	remarks

5. Daily feeding register

Month -----

Date	Number of animals	Concentrate			Green fodder			Dry fodder			Other feeds		
		Received	Issued	Balance	Received	Issued	Balance	Received	Issued	balance	Received	Issued	Balance

6. Herd health register

Date	Animal No.	When trouble started/ history	Symptoms	Diagnosis	Treatment	Result cured/ dead	Name of veterinarian	Cost of treatment (Rs)	Date of vaccination	Remarks

7. Cattle breeding register

Sr. No.	Cow No.	Date of calving	First service		Second service		Third service		Ist PD Date / Result	IInd PD Date/ result	Expected date of calving	Actual date of calving	Calf No.	Remarks
			Date	Time	Date	Time	Date	Time						

8. Dairy milk record

Month -----

Sr. No.	Cow No.	Date of calving	Day 1		2		3		4		30		31		Total
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	

9. Lactation record

Cow No.	Milk yield (give average fat % in brackets)												Lactation length	Dry period	Remarks	
	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec				

10. Daily livestock register

Date	Cows		Bulls	Calves	Heifers	Bullocks	Total livestock	Additions during the day		Deductions during day		Remarks
	Milch	Dry						No.	From where	No.	How	

Business records

1. **Gaushala inventory:** Statement of as *Gaushala* assets with values assigned to it on a particular date

2. **Financial transactions**

Year-----

Date/month	Loans (Rs)						Remarks
	Taken			Given			
	Source	Amount	Particulars	Particulars	Amount	Outstanding Interest	

3. **Farm supplies**

Date/month	Home produce			Purchased		Remarks	
	Particulars	Quantity	Value (Rs)	Particulars	Quantity		Value (Rs)

4. Expenditure on feeds and fodders

Year-----

Date/ month	Fodder and feeds										Remarks	
	Green fodder		Dry fodders		Concentrate		Silage		Total value (Rs)			
	Quantity	Value (Rs)	Quantity	Value (Rs)	Quantity	Value (Rs)	Quantity	Value (Rs)	Quantity	Value (Rs)		

5. Expenditure on labour

Year-----

Date/month	Permanent labour	Casual labour	Contract labour	Total labour	Wage rates (Rs/??)	Total wages (Rs)

6. Miscellaneous expenditure *Gaushala*

Year-----

Date/month	Servicing	Veterinary/health care (Rs)	Electricity (Rs)	Water (Rs)	Consumables (Rs)	Total (Rs)	Remarks

7. Expenditure on fodder production

Year-----

Date/ month	Value of seed (Rs)	Value of fertilizers/ manure (Rs)	Labour charges (Rs/??)	Expenditure on operation of tractor (Rs)	Irrigation charges (Rs)	Miscellaneous (Rs)	Total expenditure (Rs)

8. Production from Gaushala

Year-----

Month/date	Total milk		Value of dung/manure (Rs)	Value of surplus animals sold (Rs)	Total value (Rs)
	Quantity	Value (Rs)			

9. Sales from gaushala

Year-----

Date/month	Particulars of produce sold	Particulars of party	Value (Rs)		Remarks
			Cash	Credit	



Segregation and isolation of animals

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SEGREGATION AND ISOLATION OF ANIMALS

Isolation of animals

Isolation means segregation of affected animals and in-contact animals in the event of outbreak of a contagious disease from the apparently healthy ones. Preferably such segregated animals should be housed in a separate isolation ward far away from the normal animal houses. The following protocol may be followed in case of isolated animals

- i. Use separate housing and feeding areas
- ii. Prevent contact with other animals
- iii. Prevent manure movement from the isolation area to the rest of the herd
- iv. Isolate for 21-30 days
- v. Observe and examine for early disease detection
- vi. Milk the isolated cows last
- vii. Test for diseases prior to addition to the main herd

Quarantine

Quarantine means the segregation of apparently healthy animals (especially animals introduced into the *gaushala* for the first time), which have been exposed to the risk of infection from those animals, which are healthy and unexposed to risk. The idea is to allow sufficient time, for any contagious disease that quarantined animals may have in the incubation stage, to become active and obvious.

Elimination of carriers

Some animals carry disease producing organisms without any apparent symptoms and shed them in body secretions and excretions. They are known as 'carriers'. In a herd the carriers of disease should be detected and eliminated to keep the herd completely free from diseases. Certain diagnostic screening tests such as given below can be used in the herd to detect carriers. The test should be periodically conducted to detect carriers and remove them from herds.

Tuberculin test: This test is carried out to detect the toxic product released by *Mycobacterium tuberculosis*. This is the reliable test for diagnosing non-clinical cases of tuberculosis in cattle. Tuberculin test may be carried out half-yearly in the initial stage and later on annually. January is the ideal month for conducting this test.

Brucellosis test: *Brucella abortus* causes this disease leading to abortion in late pregnancy (last trimester) followed by high rate of infertility. This is a serological test based on the principle of antigen (dead bacteria) antibody (agglutination present in the serum or milk whey) reaction, resulting in agglutination of bacterial cells in positive cases.

Johnin test: This test is carried out for the toxic product released by *Mycobacterium paratuberculosis* (Jhone's bacterium). It is used to test bovines for Johne's disease.

California mastitis test (CMT): This test is used to detect the sub-clinical mastitis animals in a herd. CMT should be used to screen all the cows in a herd at least once in a month.



Feeding of different types of animals (Infant, Infirm, Pregnant, Retired etc.)

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All animals maintained at Gaushala should be provided feed in adequate quantities and of adequate nutritional quality to meet their requirements for good health and welfare.

Formulation of balanced ration

A ration is the feed for a given animal during a day of 24 hours whereas a balanced ration is a ration which provides the essential nutrients to the animal in such proportions and amounts that are required for the proper nourishment of the particular animal for 24 hours.

In the computation of ration for cattle, the first step is to ascertain and to meet up the total requirement in terms of dry matter (DM), digestible protein (DCP) and energy (TDN) for 24 hours from the cattle nutrient requirement (as per ICAR feeding standards).

The total requirement is arrived at by adding to that for maintenance an additional set of requirements for milk produced and its fat percentage. The cows in their first and second lactation will be still growing and need additional nutrients for growth. Cows also need extra nutrients during the last quarter of gestation for the growth of the fetus building body reserves for the next lactation.

Requirement of dry matter (DM)

The DM requirement depends on the body weight of the animal. The DM requirements of indigenous cows are generally 2.0 to 2.5 % of their body weight.. The animal's total nutrient requirement with respect to carbohydrates, proteins, fats, minerals and vitamins should be met within the DM that has been allotted.

Under Indian conditions it has been found worthwhile that two-thirds of the DM shall be supplied through feeding of roughages (both dry and green) and the rest one-third should come from the feeding of concentrates.

Two-thirds of the DM (or three-fourths if sufficient legumes available) to be supplied through the feeding of roughages shall be through the dry roughages and the remaining one-third through green roughages. In general the DM from roughages should not exceed 2 % of the cow's live weight nor should it be less than 1 %.

Requirement of digestible crude protein (DCP) and energy (TDN)

The requirement of DCP and TDN are obtained from the feeding standards separately for each physiological need of the animal i.e., whether the animal is just to maintain itself or the animal is in milk production or in advance stage of pregnancy. The next step is to add up the additional requirements on top of maintenance requirement as per the physiological condition.

Computing a ration as per the requirement of an animal

A suitable combination of locally available roughages and concentrates that meet the total requirements of the given animal can be selected from the available feeds and fodders from the locally available feedstuffs. From the various feedstuffs given the ration of a cow can be approximately worked out.

Thumb rule of feeding cattle

Knowledge of feeding standards and information on body weights of animals is required for computation of ration for dairy cattle by the conventional method. Many calculations are made before the quantity of each feed ingredient required is determined. In practice, however, this may prove cumbersome and impracticable. Keeping this in view the routine feeding of cattle can be simplified by following a thumb rule of feeding which is based on a sound practical experience rather than the scientific basis as in case of conventional method.

The feeding of mainly the straws and concentrates forms the basis of feeding by thumb rule method as these are the principle feed ingredients for feeding of cattle in most parts of India and the availability of green fodders is limited. The amounts of concentrate mixture and the straws that will provide optimum daily requirement for cattle by thumb rule are given here.

Amounts of concentrate mixture and straws required to provide optimum daily requirement for cattle

Category of <i>gaushala</i> animal	Green fodder (kg/day)	Dry fodder (kg/day)	Concentrate mixture (kg/day)
Young calves (up to 6 months)	5	1	0.5-1.0
Old calves (6-12 months)	10	2	1.0-1.5
Heifers	15-20	2-3	2-3
Milking cows (indigenous breed)	20-30	4	3-4
Crossbred milking cows	30-40	4-6	5-6
Dry and pregnant cows	20-30	4-5	2-3
Bullocks	30-40	4-5	4-5
Breeding bulls	40-50	4-5	4-5
Old cows/retired cows/retired bullocks	20-25	2-3	1-2
Old breeding bulls/ retired bulls	30-40	2-3	2-3

The maintenance, production and the gestation requirements of the dairy cows can be satisfactorily met by thumb rule feeding.

Formulation of concentrate mixture

The concentrate should be formulated as per BIS type II for a production level of up to 20 kg milk per day. It should be preferably BIS type I if production level of the cow is as high as 40 kg / day. Along with the concentrate mixture the ration shall include dry fodders such as wheat straw, paddy straw. The green fodder shall include both leguminous and non-leguminous season fodders. The composition of an ideal concentrate mixture for making 1 q of concentrate mixture should be as under.

Concentrate ingredient	Parts (in kg)
Maize grains	33
Groundnut cake (expeller)	21
Mustard cake (expeller)	12
Wheat bran	20
Deoiled rice polish	11
Mineral mixture	2
Common salt	1

For lactating cows provide 400 g concentrate mixture for every one kg milk produced to a cow along with 1.5 additional concentrate mixture for meeting the requirements of maintenance. For higher productivity the concentrate formulae should be having protein not less than 22 %. The ration should preferably be offered in the form of total mixed ration (TMR). In this case add concentrate mixture to wheat straw and required green fodders before feeding. This will result in higher nutrient utilization and higher animal productivity.

Practices for feeding of newborn calves and growing calves

- Calves should receive colostrum (about 10% of body weight, at least 2 and preferably 3 litre) as soon as possible after birth or at least within the first six hours for up to 4-5 days after birth. If colostrum is not available, a suitable substitute should be given to the calf as soon as possible and certainly within 24 hours of birth. The colostrum provides local immunity in the gut and is a highly digestible, high quality food.
- Where proper feeding management is possible, the young calf may not be separated from the mother and allowed to suckle from the dam, ensuring that the calf is getting the required quantity of milk.
- All weaned calves must have free access to a daily supply of drinking water sufficient for their needs. Troughs should be cleaned and maintained regularly. Water should be palatable.

- After colostrum feeding the calves should be fed as per following feeding schedule

Age of calf	Whole milk (kg)/day
6 - 30 days	3.50 (87.5)*
31 - 60 days	2.50 (75.0)
61 - 90 days	1.50 (45.0)
91 - 120 days	1.00 (30.0)
Total milk required for feeding one calf up to 4 months (kg)	(237.5)

[* Figure in brackets show the total requirement of milk.]

Practices for feeding of heifers and cows

- Feed according to recommended feeding standards (ICAR. 2013. *Nutrient Requirements of Cattle and Buffalo*). The nutritional management of heifers requires a systematic approach to meet growth targets as nutrition and growth rate affect age of first calving and lifetime productivity. Ensure the composition of diets reflects production level, reproductive stage, body size, housing and weather conditions.
- Test nutrient content of feed ingredients periodically by consulting an animal nutritionist/dairy expert from a local agricultural/veterinary university/ Krishi Vigyan Kendras (Farm science Centres at district level).
- Ensure all rations have been balanced and that all feed components used in the ration are of good quality and free of spoilage.
- Where a change of feed is needed it should be introduced gradually, e.g. over a 7 - 10 day period. Abrupt changes in diet should be avoided.
- When increasing concentrates, do so gradually (0.5 to 0.7 kg / head / day) according to appetite.
- Provide fresh feed to the cows daily. Keep a consistent feeding schedule, provide adequate feed manger access time, and ensure continuous access by pushing up feed in the feed manger.
- Ensure that feed surfaces are smooth and not more than approximately 4-6 inches higher than the standing area. Feed can be served at ground level also.
- Most feeding activity occurs around the time of fresh feed delivery and when cows return from milking. Provide adequate linear feeding space (60 cm / cow) to ensure that dominant cows cannot restrict access to feeding areas.



Veterinary care of animals including vaccination

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A good husbandry and animal care program on a gaushala is essential to the health of the cattle. One of the foundations for animal care is to prevent or minimize pain, injury and disease. Disease is prevented by adherence to herd health, nutrition and management programs that enhance well-being. If disease is present, rapid diagnosis and treatment should be instituted. A *gaushala* maintains the health of the cattle by providing appropriate nutrition, housing, and disease prevention and detection, along with well-designed treatment programs. These programs are developed through consultation with a qualified veterinarian.

Cow herd vaccination program, including calf vaccination, is an important component of a complete herd health management program because vaccination can reduce the incidence of disease in the herd. Vaccines contain antigens of disease-causing agents, and are used to stimulate cattle's immune systems and create an immune response before significant natural exposure to disease-causing agents. It is important to understand that vaccination does not equal immunization. Many factors influence the immune response to vaccinations, including stress, vitamin and mineral balance, nutrition, and overall health of the animal being vaccinated. Proper timing, proper vaccines for the time of year and geographic area, route of administration, and dosage are part of an effective vaccination program.

Shelter and equipment management

While cattle require minimum shelter, weaned calves and cows calving need at least an open shed. Animal crates may be needed for efficient maintenance and care, used when deworming, dehorning, palpating, or vaccinating. Crate size and style will vary based on needs and financial plan. The animals need to be protected during inclement weather, to avoid stress and subsequently precipitation of diseases.

Proper feeding and watering equipment is a must. A *gaushala* may need feed troughs for specific feed and supplements and always an adequate, reliable water source is needed.

Feed management

Cattle require a balance of protein, energy, water, minerals, and vitamins for optimal health and production, called a ration. Feed is separated into two classes:

- a. **Roughages**—Feeds high in fiber and low in total digestible nutrients, such as grazable pasture, alfalfa, grass hay, and straws.
- b. **Concentrates**—Feeds low in fiber and high in digestible nutrients, such as grains, cottonseed meal, wheat bran, and soybean meal.

Animals should have access to feed and water on a daily basis, in a consistent manner, on a regular schedule, and according to their specific requirements. Rations should provide the required nutrients for maintenance, growth, lactation, and pregnancy based on an animal's life stage, as found in references such as the National Research Council, 2001.

Wellness care and herd management

Veterinary wellness care and planning is the easiest and cheapest method of disease control. The following simple steps are recommended to begin wellness care regime:

Dehorn calves of horned breeds—Dehorning or disbudding is performed to avoid injury to herdmates and personnel, reduce feeder space requirements, and increase handling ease. Dehorning should be done at the earliest age practicable. Disbudding is the preferred method of dehorning calves.

Castrate male calves—Castration of young male calves is necessary as it reduces the chance of unplanned mating, venereal disease, and aggression against other animals and animal caretakers. Although various techniques are available, surgical castration prior to weaning is recommended. Castration should generally be done at the earliest age practicable, and certainly at less than four months of age.

Wean calves—Separating calves completely from their mothers promotes a cessation of milk production in cows and restores the heat cycle.

For cow health management, the most effective routine procedures which can be used are:

- Regular vaccination

- Screening of cows against diseases
- Promoting resistance in animals that might be exposed to potentially infectious agents through good nutrition
- Regular deworming
- Control of external and internal parasites
- Maintenance of health, production and reproduction records of all animals
- Regular examination of cows with breeding or calving problems
- Adoption of bio-security measures

Practices for minimizing disease incidence

- Provide an appropriate housing facility with adequate space for all animals.
- Avoid temperature extremes and fluctuations to keep it within animal's comfort zones.
- Practice good sanitation at all times. Manure should be removed as frequently as practical.
- New animals coming into the *gaushala* should be checked and vaccinated against endemic diseases.
- Isolate all new animals for a sufficient period (minimum 21 days) before allowing full entry into the *gaushala*
- Ensure that animals always have an adequate quantity of feed and fodder, appropriate to age and physiological stage.
- Provide ample, potable water, with space for at least 10% of housed cattle to drink at any one time.
- Protect feed and water from fecal and other environmental contamination.
- Do not mix different age groups of animals.
- Daily observe all animals for abnormal behaviour or other signs of disease.
- Begin treatment quickly whenever diseases are detected.

Cattle diseases prevalent in India

The following cattle diseases have been identified as important endemic diseases in India. Therefore a regular vaccination programme, parasite control programme and prophylactic measures are important against these diseases.

- Foot and mouth disease
- Haemorrhagic septicaemia
- Black quarter

- Anthrax
- Enterotoxaemia
- Cow pox
- Brucellosis
- Rabies
- Parasitic diseases (fascioliasis, amphistomiasis, schistosomiasis)
- Protozoan diseases (babesiosis, theileriosis, anaplasmosis, trypanosomiasis, coccidiosis)
- Tuberculosis
- Mange infestations
- Mastitis

Signs and symptoms of common cattle diseases

- Abnormal gait and posture of the animal
- Loss of appetite
- Stoppage of rumination
- Rough dry skin
- Dry muzzle and nostrils with sunken eyes
- Variations in body temperature
- Variation in pulse and respiration rate
- Incidence of diarrhoea or constipation
- Abnormal colour and odour of urine
- Reproductive problems
- Loss in body weight
- Presence of external and internal parasites
- Respiratory problems and coughing etc.

Vaccination protocol

A standard vaccination schedule appropriate for cows in India is given below. All these vaccines are commercially available.

Disease	Vaccine	Dose	Immunity	Time
Foot & mouth diseases (FMD)	Polyvalent FMD vaccine	3 ml. S/C	1 Year	1st vaccination at 3 months of age. Repeat as per vaccine used.
Hemorrhagic septicemia (HS)	HS vaccine	5 ml S/C	6 month to 1 Year	1st vaccination at 6 months of age. Repeat yearly in May-June
Black quarter (BQ)	BQ vaccine	5 ml S/C	6 month to 1 Year	1st vaccination at 6 months of age. Repeat yearly in May-June
Anthrax	Anthrax spore vaccine	1 ml S/C	1 Year	1st vaccination at 6 months of age. Repeat yearly in May-June
Brucella	S-19 vaccine	5 ml S/C	2 Years	Female cattle calf aged 4-8 months only
Rabies	Rabies post bite vaccine	1 ml S/C	1 Year	0, 3, 7, 14, 28 and 90 days (post bite vaccination)

Vaccination against rabies

For rabies, post exposure vaccination is recommended at 0, 3, 7, 14, 28 and 90 days. For example, if it is suspected that a cow has been bitten by a dog, this vaccination course can be started as a preventive approach. If a cow is bitten by a dog that is confirmed to have rabies (e.g. by physical symptoms), the post exposure vaccine course should be started immediately.

Parasite control

- External parasites can be controlled by using ectoparasiticides in the form of spray and injections. Protozoan diseases mostly occur during summer or rainy season when ticks have higher activity. Therefore, control of ectoparasites during that season is important.
- Young animals (up to 18 months) should be dewormed more frequently (at least 4 times in a year and if necessary monthly) than adult animals depending on the climate and management.
- Routine use of the same anthelmintic drugs should be avoided to prevent build-up of resistance.
- Correct dosage should be used to prevent formation of resistance.

Deworming schedule

- Deworming should be started from the first week of calf.
- A single oral dose of 10 g piperazine adepate/ albendazole is recommended for the calves preferably in the first week of life to control neonatal ascariasis.
- Deworming should be done every month for first six months, thereafter once in three months.
- The deworming drugs and dose should be consulted with qualified veterinary doctor time to time.

Disposal of carcasses

Dead animals should be disposed immediately after death. The dead animals should never be thrown into stream or river and should not remain long in the shed as biting insects and rodents can spread the disease. The carcass should never be opened unless approved by a veterinarian. The material like dung and bedding should be removed with much precaution otherwise there are chances of infection. The dead animal is either buried or burned. Deep burial is the most common method practiced while burning is the most sanitary method to dispose the carcass in the most effective manner.

Mastitis control

It is essential to regularly check the udders of milking cow for any injury, inflammation, pain, redness or mastitis to prevent the spread of mastitis in the herd. Strip-cup test and modified California mastitis test (MCMT) is used widely in field condition for early detection and prompt treatment. Teat dipping before and after milking, drying up therapy using suitable antibiotics and other hygienic practices while milking allows lesser incidence of udder problems.

Reproductive health

Problems of the reproductive tract with cloudy, blood tinge, foul odor mucous discharge following abortion or calving should be carefully examined and treated with antibiotics or hormonal therapy. In case of problems of retained placenta more than 24-72 hours of calving, manual removal of the placenta is not advised.

Protocol for calf care

- Have a comprehensive herd health program in place.
- At the time of calving, provide dry, sanitary maternity pens or paddocks.
- Provide an adequate volume of high-quality colostrum soon after birth.

- Feed a high-quality milk replacer or pasteurized milk to calves; do not use milk from cows that have been treated with antibiotics.
- If antibiotics are used for calves to be marketed, administer antibiotics with short or no withdrawal periods.
- Dip navels in disinfectant as soon as possible after birth.
- Avoid stressful procedures during weaning.
- Transport calves only if they are able to walk unassisted, are not wobbly, and have a dry navel.
- Transport calves safely and comfortably in appropriate vehicles with adequate ventilation, bedding, and protection; do not pull calves by limbs, ears, tails, or necks; do not throw calves onto trucks.
- Calves should spend as short a time as possible in the journey. Ideally, they should move directly from the origin to their final destination.
- Management should be prepared (and calf caretakers trained) for :
 - a) Handling cows having difficulties in calving.
 - b) Observing time elapsed after calving (e.g., important for colostrum management) and time elapsed between calvings in any calving pen.
 - c) Guaranteeing that calves have continual access to a source of freshwater or are watered at least twice a day or as necessary to maintain proper hydration.
 - d) Guaranteeing that calves receive high-quality colostrum or colostrum replacer in a timely manner (identify the person responsible for checking colostrum quality, feeding colostrum, and saving excess colostrum).
 - e) Guaranteeing that calves are given a palatable, high-quality starter ration offered within a week after birth.
 - f) Monitoring calves at least twice daily and recording their health status.
 - g) Maintaining daily records of the calves' health and any medication used (dosage, duration of treatment, route of administration, compatibility of medications, and withdrawal times) under supervision of a qualified veterinarian.
 - h) Handling calves gently and firmly.

Biosecurity

Biosecurity is an important tool for maintaining animal health. Biosecurity procedures are meant to control and avoid the introduction of new infectious

agents into the herd as well as to keep the spread of any diseases within the *gaushala* at a minimum level.

Protocol for ensuring biosecurity

- The *gaushala* should be enclosed by wall, fences or natural vegetation to limit the entry of disease carrying animals.
- Strictly control the entry of people and maintain an appropriate hygiene barrier around the *gaushala*, e.g. foot baths at entry/exit points, and clean clothes/overalls and boots/shoes for visitors.
- Strictly maintain a hygienic environment, for example by disinfecting vehicles and equipment as they enter the farm if they have been exposed to other farm animals, and when they leave.
- New animals should be checked for tuberculosis, Johne's disease and brucellosis.
- Isolate all new animals for a sufficient period (minimum 30 days) before allowing full entry into the herd and contact with other animals.
- Animals from different physiological stages or ages should be kept in separate paddocks or units and should have separate management strategies.
- Dead animals should be removed immediately and disposed of in a sanitary manner to avoid the risk of spreading infection.



Maintaining hygiene of animals as well as *Gaushalas* and disposal of waste

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A clean shelter increases the comfort level of animals and has a positive impact on the health of the animal. Proper hygienic conditions help to avoid bacterial, viral, and parasitic infections and related illnesses in animals. It is, therefore, of utmost importance that animals must be accommodated under most hygienic conditions.

Shelter sanitation protocol

The objective of sanitation is to properly clean and remove most of the germs and parasites along with dirt from animal houses so that remaining germs are less in number and possibly in a weak condition so as to be harmless under ordinary conditions. The presence of dung, urine, spilled milk, uterine and nasal discharge, feed residues etc. cause sanitation problems. Proper cleaning removes most of the germs and parasites along with the dirt. Abundant supply of water under pressure is the easiest and most effective means of cleaning animal sheds. Apart from that several sanitising solutions are also available commercially for use.

Disinfection

It means destroying the cause of infection. Since the causative agents of many diseases are extremely small and may remain indefinitely in dust, cracks and crevices of buildings, disinfection must be carried out carefully to eradicate common enemies of life such as bacteria, viruses, moulds and eggs of insects from contaminated premises. The nature of the surfaces will influence the efficacy of the disinfection. Rough, porous surfaces are harder to disinfect than smooth surfaces. Porous surfaces are also harder to clean than smooth surfaces. Porous surfaces will therefore have heavier soil loads after cleaning, which further increase the difficulty of disinfection. A broad spectrum disinfectant with penetration enhancers should be used to disinfect *gaushalas*.

Sunshine for disinfection: Direct rays from the sun are one of the most effective germ killers while being entirely safe and inexpensive. The farm buildings should be so oriented as to take full advantage of this natural resource. Under ordinary conditions a north-south orientation of the long axis of the building with open front and back can allow the entry of direct sunlight into the sheds in

the mornings and evenings. The dairy utensils should also be kept in the sun for drying and disinfection after cleaning.

Chemical disinfectants: Common disinfectants used in animal sheds are boric acid, quaternary ammonium compound, bleach (sodium hypochlorite), potassium peroxy-monosulfate, alcohol (usually in hand sanitizer), chlorhexidine, phenolic disinfectants etc. Disinfectants may be applied either by mopping or spraying. The effectiveness of chemical disinfectants is greatly reduced in the presence of organic matter. Therefore, a thorough cleaning of the area should be done before applying the disinfectant.

Disinfection protocol for cattle sheds

- Under normal circumstances, daily scrubbing and washing of the floors, water troughs and mangers and the action of sunlight falling in the houses are sufficient enough to keep them moderately germ free. This should be supplemented with periodic white washing of the walls, mangers and troughs.
- When there is a disease outbreak, a more elaborate procedure of disinfection should be followed. All floors, walls up to the height of 1.5 m, interior of water trough, mangers, other fittings and equipment coming in contact with animals should be disinfected.
- The first step is to remove all the filth and feed residue. All dung, litter, feed residue should be removed and stacked so that the heat generated inside kills the germs. The floors, walls up to 1.5 m height, interior of mangers and water trough etc. are thoroughly scrubbed and washed with water.
- In case of outbreak of anthrax, the dung, litter etc. should first be disinfected in situ by thorough sprinkling of suitable disinfectant. If the floor is of earth, the top 10 cm earth should be removed and disposed of along with litter. After removal of filth, the place should be scrubbed and washed with 4 % hot washing soda solution (i.e., 4 kg washing soda in 100 litre of boiling water). The approved disinfectant solution should be liberally sprinkled or sprayed and left so to act for 24 hours. After this, the shed should be washed with clean water and left to dry with wind and sunlight.
- The interiors of water troughs, mangers etc. should be white washed. The house is fit for moving in the animals.

Disinfestation protocol

Disinfestation comprises eliminating sources of parasitic infection, preventing animals from getting access to possible sources of infestations and elimination of

intermediate hosts. The following protocol may be followed for the disinfestation of *gaushal* premises.

- Prompt and proper disposal of manure and other filth from the *gaushala* premises.
- Regular scrubbing and cleaning of feed and water troughs as well as white washing their interior at least once in a week.
- Levelling up all ditches, low muddy areas, pits etc. in and around animal houses so that water may not stagnate in them.
- Filling up or fencing of all stagnant water pools, ponds etc. around the *gaushala* and on grazing areas so that animals may not get access to them.
- Housing animals in clean houses with paved floors. Animals of different ages should be housed separately. Younger animals should never be mixed with older ones. Animals of same age should be managed as a single, closed community.
- Proper deworming of all such animals before putting them in a shed or bringing them into the *gaushala*.
- If grazing is practised-division of pasture into several blocks and practising rotational grazing in these blocks.
- Preventing humans from defecating on grazing fields as this may cause contamination with tapeworm eggs. Care should be taken to see that dogs (intermediate hosts), crows and other birds (mechanical carriers) do not gain access to the *gaushala*.

Waste disposal from *gaushala*

Gaushala waste should be promptly and completely removed from sheds so that it may not cause any disease. It should be well conserved in the form of farm manure so that it may not lose plant nutrients and it should conveniently be applied to lands.

Manure can be

- (i) Solid dung, feed wastes, soiled bedding etc., and
- (ii) Liquid urine wash water.

Under ideal management conditions solid manure is usually collected and removed from shed twice daily. Provisions are to be made to carry off and store liquid as and when the same appears.

In loose cattle house, one of the two alternatives can be used for collection of manure:

- (i) Collecting solid and liquid manure separately, or

- (ii) Flushing out both manures together with plenty of water by means of hose pipes.
- The solid waste is collected using shovels and can be lifted into wheel barrows and then carried out of the shed. Bullock carts or tractor trolley can be used in big sheds.
 - The liquid manure and wash water run out of the shed by a shallow 'U' shaped channel located longitudinally to the sheds at the junction of open and closed areas.
 - The drains should be "U" shaped with a depth of 6 to 8 cm and their width may vary from 30-40 cm. A slop of 1 in 40 shall be provided to the drains.
 - The drains in a row of pens should be made continuous by routing it through holes in the intervening partition walls.
 - Outside the shed, liquid manure from each shed can be connected by means of drains (preferably closed or sub-surface drains) to a main farm drain. This main drain leads the liquid manure storage tank through an inspection chamber and setting chamber.
 - When facilities are available for supply of plenty of water under pressure both liquid and solid manures can be flushed off the floors of a loose house. However, for this purpose elaborate construction of an underground network of sufficiently wide drains is a prerequisite. The mix wash water can be directly led into fields of fodder grasses or can be fed as slurry into bio-gas plants.
 - When solid manure is collected separately, it should be stored properly in manure pits so that the same gets well decomposed and there is no fly menace.

Manure pits

- Manure pits should be located as far off as possible from animal habitation after duly considering the labour required in transporting manure from the sheds. Fresh manure lying near animal sheds is an ideal breeding ground for a variety of insects and flies. They pester cows physically as well as carry infectious diseases. Therefore, the manure pits should be at a minimum distance of 10 m from wells, rivers and tanks.
- The size and number of manure pits required depends on the production of manure on the farm, which on an average 30 to 40 kg/ day/ adult cow unit. Manure weighs about 4.5 q / m³. On an average a space of 2.2 m³/ cow and half of that per calf is required for the storage of manure in manure pit



Special needs of disabled infirm animals

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- Every gaushala should have a separate housing facility of housing disabled infirm animals. Separate wards should be constructed for keeping the disabled animals in *gaushala*. The wards should be beyond the reach of wild/stray animals and birds. All the disabled animals should be segregated in such wards for proper care and treatment and to avoid fight injuries from the healthy animals.
- The wards for the disabled infirm animals should be non-slippery with soft bedding. A kuchcha floor with 20 cm thick layer of sand or straw would be appropriate as laying on the hard surface even for 1-2 hours may damage skin and superficial nerves. The floors must have a good dry bedding of any locally available cow bedding material or should have rubber mats or mattresses for comfortable rest of these animals.
- The shelter for these animals shall have a special provision for comfortable microclimate inside the sheds and comfortable floors for rest. For this the shed should have provision of ceiling fan, exhaust fans, heating and cooling devices etc.
- The enclosures for disabled animals should also be made fly proof particularly those used for keeping the injured/wounded animals.
- The enclosures should be well ventilated with provision for clean potable water and protection from hot and cold weather.
- In case of recombinant animals, facility is to be created to shift their position periodically thrice or thrice a day.
- Special feeding and watering arrangement of the recumbent animals as per their need may be made inside the shed. Provide a balanced nutritive, but easily digestible feed based diet. The palatable green grasses should be preferred over the concentrate based diet. There must be availability of clean water ad lib. The water trough and feeding tray should be shallow with wide base.

- If the animal is unable to get up, it should be maintained in sternal recumbency with the support of sand bags/straw bale etc. Prolonged lateral recumbency may lead to development of bloat, regurgitation and aspiration, which may be fatal.
- The animal should be rolled from one side to other every 2-3 hours to minimize the tissue damage and development of decubital ulcers.
- Recumbent animal should be encouraged to get up. There should be provisions for sling and hip clamps. However if hip clamps are used to support the animal they should be well padded.
- Massaging and assisted locomotion will help to prevent ischemic myonecrosis.
- Regular grooming and mild exercise will help to make the animal remain healthy.
- Floating tanks should be available for disabled animals and animal should be allowed to swim in floating tank for 6-8 hrs daily.
- Animals should be inspected by the veterinarian for early diagnosis and treatment of primary cause of the disability to minimize secondary trauma and suffering as early as possible. Pain management should be given due importance.
- The animal should be assessed at 2-4 hour interval for improvement. If there is no improvement the diagnosis should be reassessed.
- The milk animals should be milched out regularly to prevent the development of mastitis.
- The ample space should be provided for the disabled animals which are able to walk.



Emergency preparedness and emergency management / handling

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Emergency situations such as floods, earthquakes, storms, cyclones, fires etc. can have a great impact on cattle in *gaushalas* owing to their size, and special shelter and transport requirements. Therefore, planning in advance for emergency situations is imperative.

Emergency preparedness

- Determine the hazards and risks in area where *gaushala* is situated
- Maintain an inventory
 - a) Maintain a list of all animals in *gaushala*
 - b) All animals should have a permanent identification (e.g., ear tags, tattoos).
- Identify alternate water or power sources
- Prepare an evacuation kit
 - a) Handling equipment (e.g., halters, nose leads)
 - b) Water, feed and buckets
 - c) Medications
 - d) Tools and supplies needed for sanitation
 - e) Cell phone, flashlights, portable radios and batteries
 - f) Basic first aid kit
 - g) Power generators
- Make evacuation arrangements
 - a) Locate and prearrange evacuation sites
 - b) Determine routes to these locations
 - c) Train animals to being loaded and transported
 - d) Plan how handling equipment and veterinary care will be obtained at the evacuation site.
 - e) Arrange for feed and water delivery for the evacuation site.
- Establish escape routes to safe locations (e.g., higher elevation)
 - a) Cows should be housed in loose system of housing and should not be tied. The loose cattle can escape to safety in the event of some emergency situation such as fire or sudden floods or earthquake etc. whereas tethered (tied) cows may be at greater risk.
 - b) Do not set up *gaushalas* in unsafe locations (cow sheds in flood prone area or in poorly drained and low lying areas)

- Establish a safe environment for animals
 - a) Assess the stability and safety of cow sheds and other structures.
 - b) Remove dead trees or other debris in fields or animal holding locations.
 - c) Secure any loose equipment or materials, such as feed troughs.
 - d) Make sure electrical wiring is safe and away from flammable materials

First-aid to injured /disabled animals received/maintained in gaushala in emergencies

Cows are prone to common accidents include injuries, fractures, poisoning, obstetrical troubles, burns and scalds, etc. The aim of the first aid is to render such skilled assistance to the affected animals that will alleviate suffering, preserve life, promote recovery or prevent aggravation of the abnormal condition until the provision of specialized treatment.

The first aid should aim at arresting of severe haemorrhage, if any, providing of plenty of free air to the patient, provision of warmth to check fall in temperature and shock, provision of rest by changing the position of the animal into an easy posture, covering all skin injuries with a clean dressing and keeping the animal still (especially in case of fractures) by drugging or by diverting its attention towards some food.

First aid kit

On all *gaushala*, a box containing the below mentioned items should be kept handy so that it can be reached quickly in emergencies.

First aid requisites

Cotton wool, bandages, surgical gauze, old cotton sheets

Rubber tubing

Surgical scissors--curved and made of stainless steel

Forceps, splints or split bamboos (for stainless steel)

Clinical thermometers – two or three

Disinfectants – potassium permagnate, Dettol, sulphanilamide power

Tannic acid – powder (for poisons) and jelly (for burns)

Antibiotic eye drops

Epsom salts, copper sulphate, Galuber's salt smelling salt

Oil of turpentine (for bloat)

Obstetric ropes, chains and hooks

Tincture of iodine, tincture Benzoin Co. (for wounds)

Cotton ropes, halters (for restraint)

Trocar and canula (for bloat)

Pocket knife (for cutting, strangulating ropes)



Staffing requirement, recruitment and training of staff

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ICAR- National Dairy Research Institute, Karnal

Technical and supportive manpower required

The manpower required for undertaking all *gaushala* activities shall depend on the level of mechanization and automation of routine cow management operations. However, it has been estimated that on an average one worker can look after all routine activities of 10-15 cows along with their followers excluding the work of harvesting of fodder. Some routine activities such as milking (machine as well as hand milking), heat detection, care of down-calvers and neonates etc. require experienced and dedicated workers. Two or three workers have to be trained for the specialized jobs such as AI, first aid, animal identification, de-worming etc. Besides, at large *Gaushalas* technically qualified persons will have to be hired such as the farm manager, veterinarian, stockmen and the ministerial staff. The estimated manpower required at different sizes of *Gaushalas* is given as under

Sr. No.	Name of staff position	Number of positions required at different sizes of <i>gaushalas</i>		
		100 cows	500 cows	1000 cows
1.	Gaushala Manager-cum-Veterinary officer	--	1	1
2.	Veterinary stock assistants-cum-supervisors	1	2	3
3.	Technicians for mechanical, plumbing and electrical works etc.	--	1	2
4.	Office clerk-cum-farm record keeper	1	1	2
5.	Unskilled workers	8	30	50
6.	Drivers	1	1	2
	Total	11	36	59

Recruitment

All above mentioned trained personnel for *gaushala* are available which may be hired by following standard recruitment procedure

Training of staff

The *Gaushala* Manager-cum-Veterinary office and the Veterinary Stock Assistants-cum-Supervisors after recruitment may be trained for a period of 2 weeks for a tailor made training programmes for the management of *gaushala* animals at NDRI, Karnal or at any nearby Veterinary and Animal Husbandry University.



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