



सत्यमेव जयते

GOVERNMENT OF MEGHALAYA

A.H & VETERINARY DEPARTMENT



A MANUAL ON DAIRY CATTLE REARING & FODDER PRODUCTION



INTRODUCTION

Meghalaya is primarily an agrarian state and agriculture is subsistence in nature where livestock has its own role in the mixed farming system. As of 2013-14 the state milk production stands at 82.16 thousand tonnes. Dairy cattle rearing in Meghalaya is a new concept and most dairy farmers of the state are the first-generation farmers. As per livestock census 2012, Meghalaya has about a million cattle. Out of this only about 30,000 are milch cattle (Cross breed) and are mostly reared among dairy cattle co-operatives and small holding farmers. These cows contribute almost 90% of the total milk production in the state. Meghalaya has very favourable climate and excellent environmental conditions and as such has a huge potential in dairy cattle rearing. The dairy sub sector is very dynamic and therefore the constant need for relevant information at the right time can never be over emphasised. *Fodder production being an integral part of dairy farm knowledge of different types of nutritious fodder and fodder grass needs to be highlighted.* This manual has been developed with a concept of guiding our farmers and educated youths who are into dairy farming to enhance their knowledge and skills in a more scientific manner so as to enable them to run their farms efficiently and more economically. Dairy farming in Meghalaya, apart from providing milk for consumption also helps in improving the nutritional status of the rural population.

Despite the fact that most dairy farmers have good quality exotic cows, milk production is far below their potential. This low productivity has been attributed to:

1. Poor management especially inadequate feeding.
2. Poor health management.
3. Poor breeding management that leads to long inter calving periods.
4. Lack of knowledge on common disease and their control.

CONTENTS

1. SYSTEM OF DAIRY CATTLE REARING
2. SITE SELECTION
3. SHED CONSTRUCTION/HOUSING AND LAYOUT OF A DAIRY CATTLE FARM
4. DAIRY CATTLE BREEDS
5. SELECTION OF DAIRY COWS
6. CARE AND MANAGEMENT OF CALVES, HEIFERS AND DAIRY COWS
7. COMMON DISEASES THEIR CONTROL AND PREVENTION
8. VACCINATION SCHEDULES
9. RECORD KEEPING
10. ANNEXURE

CHAPTER I SYSTEM OF DAIRY CATTLE REARING

Dairy cattle in Meghalaya are commonly reared under three production systems:

- i) **ZERO-GRAZING:** The animals are housed and the farmers bring all the feed and water to the animals. The zero grazing results in higher milk yields per cow (15-30) litres/cow.



- ii) **SEMI ZERO-GRAZING:** the animals are confined but released to graze at least for a few hours per day.



iii) **OPEN RANGE:** Here the animals are grazed in open fields throughout the day and given water and minerals in the gazing field.



Majority of the smallholder farmers practice open range grazing. Whatever system a farmer chooses it is important to plan properly for feeding.

CHAPTER II

Site selection:

Site election is very important because a proper site allows for good housing and proper management in every aspect:

A good site should bear the following points in mind:

1. A dairy building should be at a higher elevation than the surrounding ground to offer a good slope for rainfall and drainage.
2. Foundation soil should not be too dehydrated as such soil would be susceptible to considerable swelling during the rainy season and thus exhibit cracks and fissures.
3. The long axis of the barn should be place in **north-south direction** to have maximum benefit of the sun.
4. A dairy farm should be located not to close near the main road.
5. Water should be available in abundance.
6. Availability of honest, economic and regular labour.
7. Dairy farms should be in those areas where the owner can sell his products profitably and regularly.
8. Availability of electricity and good approach roads.

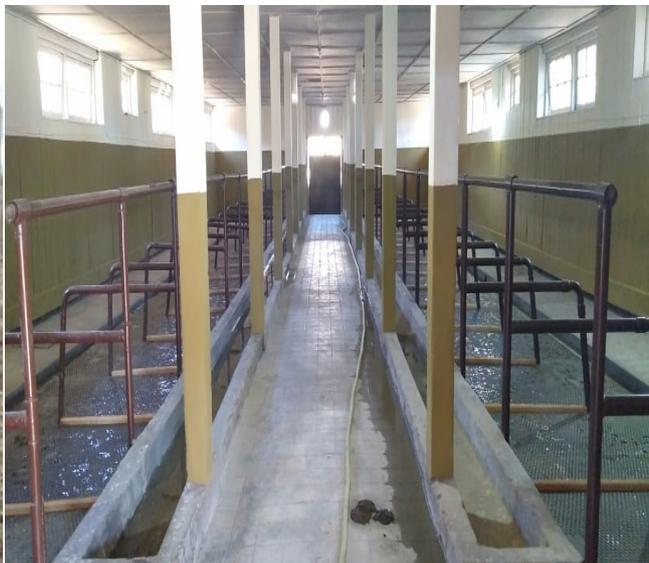
HOUSING AND LAYOUT PLANS FOR DAIRY FARMS

Types of modern day cattle housing:

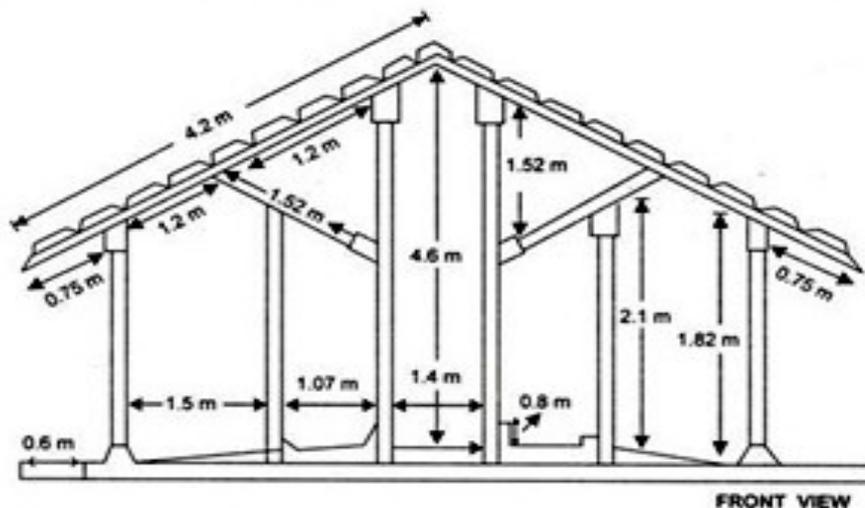
1. Loose housing
2. Conventional housing
 - a) Head to head
 - b) Tail to tail



LOOSE SYSTEM OF HOUSING



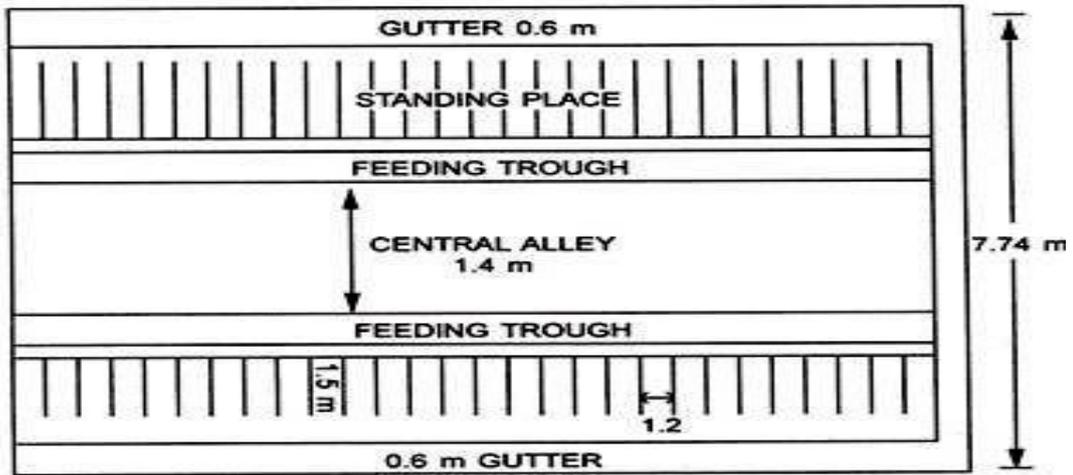
HEAD-TO-HEAD SYSTEM OF HOUSING



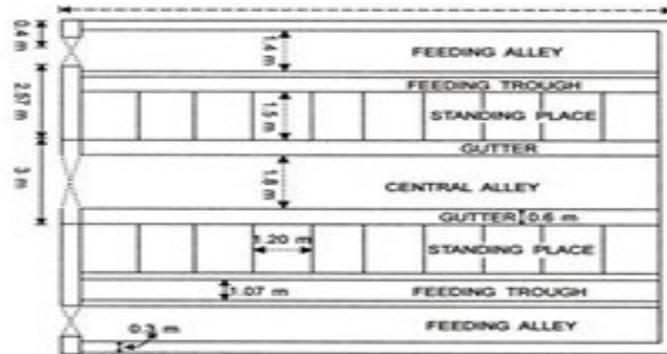
SECTIONAL VIEW OF HEAD-TO-HEAD SYSTEM OF HOUSING

Advantages of Head-to-head system of housing:

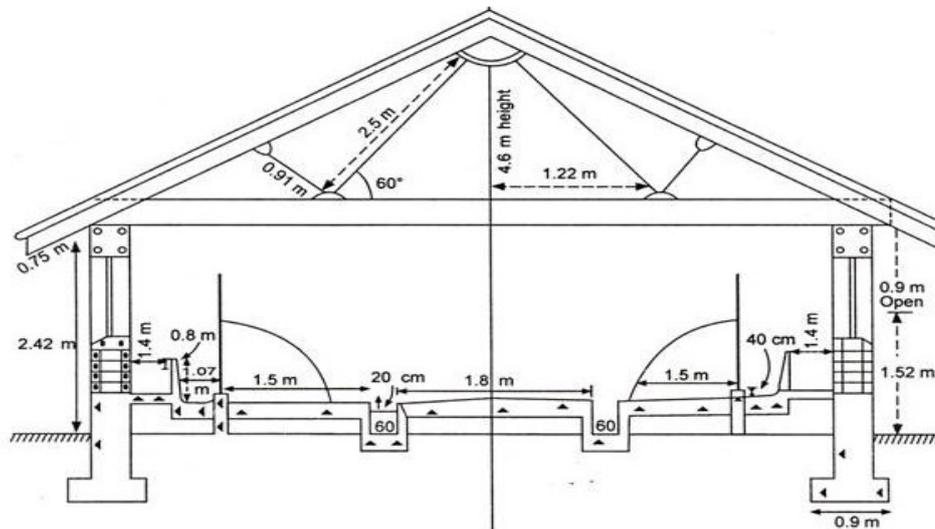
1. More suitable for narrow barns
2. Availability of light is more on the rear side
3. Feeding is easier



FLOOR PLAN OF HEAD-TO-HEAD SYSTEM OF HOUSING



Floor plan of tail to tail system of housing



Sectional view of tail-to-tail system of housing

Advantages of Tail-to-tail system of housing

1. In cleaning and milking the cows the wide alley is of great advantage.
2. Lesser danger of spread of disease from animal to animal.
3. Animal can get more fresh air from the outside.

FLOOR SPACE REQUIREMENT FOR CATTLE:

AGE GROUP	MANGER SPACE (m ²)	COVERED AREA (m ²)	OPEN PADDOCK (m ²)
4-6 MONTHS	0.1-0.3	0.8-1.0	1.6-2.0
7-12 MONTHS	0.3-0.4	1.2-1.6	2.4-3.2
1-2 YEARS	0.4-0.5	1.6-1.8	3.2-3.6
COW	0.8-1.0	4.0	8.0
PREGNANT COW	1.0-1.2	10-12	20-24

IDEAL FARM OPERATIONS

TIMING	ACTIVITIES
4:00-4:30 AM	CLEANING OF DUNG/FEEDING OF CONCENTRATES AND WATER
5:00-6:00 AM	WASHING OF UDDER AND TEETS/MILKING AND TESTING OF MILK FAT % (MORNING)
6:00 – 6.30 AM	DISPOSAL OF MILK AND MILK PRODUCTS
7:00-9:00 AM	GROOMING, DETECTION OF HEAT, TREATMENT
9:00-11:00 AM	FEEDING OF GRASSES/GRAZING OF ANIMALS/ FODDER PLANTATION
11:00-1:00 PM	BREAK
1:00-2:00 PM	CONCENTRATE/ WATER FEEDING AND TREATMENT
3:00-4:00 PM	MILKING AND TESTING OF MILK FAT % (EVENING)
4:00-5:00 PM	DISPOSAL OF MILK/ FEEDING OF GRASSES/A.I

CHAPTER III

DAIRY CATTLE BREEDS

The common dairy cattle breeds include the following:

THE HOLSTEIN FRIESIAN



Purpose: Milk production Lactation yield: 7000 litres for 305 days with a butter fat of 3.5 % and 8 to 8.5% snf. Average body size: Large (500-550kg) Description: Black and white in appearance, short haired coat, short horns.

THE JERSEY

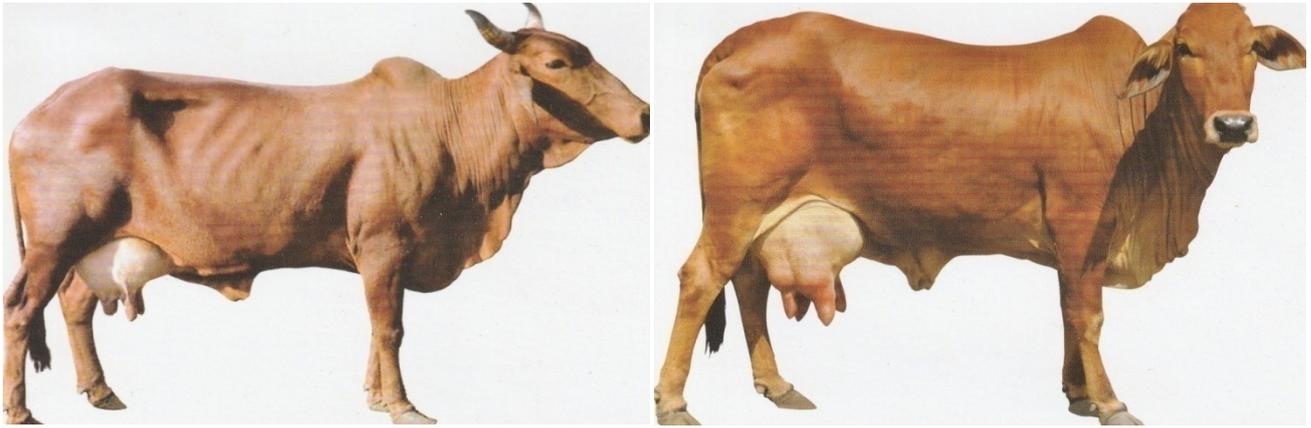


Purpose: Milk production. Lactation yield: 5000 litres for 305 days and about 4% butter fat.

INDIGENOUS DAIRY CATTLE BREEDS INCLUDE GIR, THARPARKAR, SAHIWAL, RED SINDHI etc. They have a modest milk yield averaging 5-10 litres and the milk is of excellent quality in terms of nutritional status. Their fodder requirement is comparatively low 15-20 kg/day and have resistance against many metabolic disorders as well tick borne diseases. Their age of maturity is 3 years and inter calving period of 1.5 years.



BREED	GIR	BREED	THARPARKAR
Origin	Saurashtra, Gujarat	Origin	Tharparkar, Pakistan
Appearance	Dark brown skin with white patches and half moon shaped horns, pendulous ears	Appearance	White to light grey skin and compact body
Milk Yield	1250-1800 kg	Milk Yield	1800-2500 kg
Age at first calving	45-54 Months	Age at first calving	38-42 Months



BREED	RED SINDHI	BREED	SAHIWAL
Origin	Karachi, Pakistan	Origin	Sahiwal, Punjab
Appearance	Pale red uniform skin with upwardly curved horns and drooping ears	Appearance	Dark brown loose skin with symmetrical body
Milk Yield	1250-1800 kg	Milk Yield	1400-2500 kg
Age at first calving	39-50 Months	Age at first calving	37-48 Months

CHAPTER IV

SELECTION OF DAIRY COWS:

Selection criteria of a good dairy cow includes the following:

- a) On basis of records like pedigree records, self records, progeny records etc.
- b) A good dairy cow should have all functional teat with symmetrical shape and structure.
- c) The udder must be above the hock and well attached to the abdomen..
- d) It should possess a good body coat and wedge shape body.
- e) It should be alert with no swellings over the limbs.
- f) It should have bright eyes with lean neck.
- g) The skin of the udder should have a good network of vessels.



CHAPTER V

CALF REARING

SYSTEM OF RAISING DAIRY CALVES:

1. Keeping calf with its dam
2. Weaning system:
 - a. Weaning immediately after birth.
 - b. Calf remain with the dam for 2-3 days and removed to calf pen

MANAGEMENT AT CALVING

1. After the calf is born, ensure that calf is breathing. Should breathing not commence, the calf should be assisted (remove mucus from nostrils and if breathing does not start hold calf by hind legs upside down and swing several times).
2. The umbilical cord should be disinfected using disinfectant (iodine or copper sulphate solution).
3. If the calf is unable to suckle, it should be assisted and be allowed to suckle colostrums from the dam at will during the first week. Any excess colostrum should be milked and stored or fed fresh to other calves.
4. **The calf should be dewormed against neonatal ascariasis by using a single dose of suitable anthelmintic drugs.**
5. The calf should be fed colostrums within half a hour of its birth
6. The new born calf should be housed in individual pen for the first 3-4 weeks.

FEEDING OF THE CALF:

The primary concern in rearing the newborn calf is to ensure it remains healthy. Feeding schedule of calves is as follows:

Age	Milk (Kg)	Skimmed milk (kg)	Calf Starter (Kg)
1 – 3 days	Adlib colostrum		
Upto 2 weeks	5 – 6 lits	Adlib	
Upto 3 weeks	6 lits	“	Adlib
Upto 4 weeks	5 lits	“	“
Upto 5 weeks	4 lits	“	“
Upto 6 weeks	3 lits	“	“
7 – 8 weeks	2 lits	“	0.5 kg
3 Months	-	“	0.75 kg
4 – 5 Months	-	“	1 kg
6 – 7 Months	-	“	1.25 kg
8 – 16 Months	-	“	2 kgs

CALF STARTER INGREDIENTS:

INGREDIENTS	PARTS
• BARLEY/MAIZE/GRAM/OAT GRAINS (Crushed)	40
• GNC/MOC/TNC	25
• SOYABEAN MEAL	25
• DRIED SKIM MILK	8
• MINERAL MIXTURE	1.25
• SALT	0.5
• YEAST	0.25



CALVES PADDOCK



CALF PEN



OPEN & COVERED AREA FOR CALVES

CALF HOUSING

A calf pen should be constructed where possible from locally available materials. It should be constructed to:

- i) Allow approximately 2 m² (1.2 X 1.5m) space per calf
- ii) well drained or bedded
- iii) well lighted (artificial or natural).
- iv) well ventilated
- v) strong to stand predator invasion.
- vi) Calves can be housed permanently indoor with ample time in the paddock
- vii) The calf house can be permanent or temporary and movable.
- viii) Permanent houses should be constructed such that they are easy to clean when a new calf is introduced.
- ix) A paddock beside the calf shed allows the calves to get sunlight and exercise.

DEHORNING AND DISBUDDING:

Horned cows are not only dangerous to people working with them, but dehorning also improves the animal looks. Dehorning can be done by several methods.

HOT IRON: Heated iron is the most common in calves (4 to 6 weeks). When using this method, ensure that the killing of horn bud is effective otherwise the horn will grow again. Hot iron dehorning can be done with ease up to the age 3 months (while the dehorning iron still fits over the bud comfortably).

CHEMICAL METHOD: Usage of caustic soda or caustic potash

IDENTIFICATION: Identification of calves should be done immediately after birth to allow efficient and proper recording. Identification can be through various methods:



EAR NOTCHING



EAR TAGGING

- a) Ear notching - cut part of ear using an agreed code. This mark is permanent.
- b) Ear tagging - use an applicator, easy to read.

CHAPTER VI

HEIFER REARING



INTRODUCTION:

Raising a high number of replacement heifers allows a dairy farmer to:

1. Obtain the best replacement heifers through strict selection criteria from wide selection.
2. Expand the dairy herd at low cost (without buying heifers or cows)
3. Sell excess heifers to earn income. Heifers represent the future of the herd. At the same time, they are non-productive animals incurring expenditure in terms of feed, labour and veterinary services without immediate returns.
4. Raising heifers is a financial investment that begins to bring dividends after the first calving; therefore the goal should be to make ensure proper growth rate at minimum costs to be inseminated on time in order to realize full lactation potential later in life.
5. Feeding Heifer raising is the second largest expenditure in a farm after the milking herd, with feed costs takes the largest share. The aim should be to rear heifers to reach the desired body weight early so that they initiate puberty, establish pregnancy, and calve easily.

BREEDING OF HEIFERS:

Regardless of age, puberty is reached when a heifer weighs approximately 40% of her mature body weight. Breeding however, is recommended when a heifer has reached 60% of her expected mature body weight. This is normally achieved when the heifer is 14 to 16 months old. Smaller breeds may be bred one or two months earlier than large breeds because they mature faster. Heifers in good condition and gaining weight at breeding time generally show more definite signs of estrus and have improved conception rates over heifers in poor condition and/or losing weight. Over-conditioned or fat heifers have been reported to require more services per conception than heifers of normal size and weight.

Feeding schedule of Heifers: 2Kg Conc Feed

Green fodder 10-15 Kg per day, Dry Fodder 5 kg per day

CHAPTER VII

FEEDING AND MANAGEMENT OF DAIRY COWS



CONCENTRATE FEEDING



DAIRY COWS LET LOOSE FOR GRAZING

TYPE OF NUTRIENTS IN CATTLE DIETS:

- 1. Macro ingredients:** These include Carbohydrates and protein sources. Energy supplies the body's fuel allowing the animal to move, keep warm, stay alive and be productive. Energy feeds are the main part of the diet. Protein helps young animals to grow and develop strong muscles and enables cows to produce healthy calves and adequate milk.
- 2. Micro ingredients:** Minerals and vitamins are required in small amounts and fulfil a variety of functions, including forming strong bones and maintaining the reproductive system. Nutrient requirements of a dairy cow, like all other animals requires energy, protein, minerals and vitamins which must be provided in the diet.

Energy Bulk forages and pastures – grass, hay, straw Cereal by-products (maize, maize bran, Wheat, wheat bran, rice bran and rice polishing)

Plant by-products: Mostly include Mustard Oil cake, groundnut cake, Till Oil Cake etc.

Animal origin: Fish meal etc

1. The feed intake meets energy requirements for milk production, restoration of body reserves and body weight increases. The body weight increase is due to replenishment of body reserves and, towards the end of lactation, due to increased growth of foetus.
2. It is more efficient to replenish body weight during late lactation than during the dry period, during this phase the cow continues to gain weight primarily due to weight of foetus.
- 3. Proper feeding of cow during this stage will help realise the cow's potential during next lactation and minimise health problems at calving time (milk fever and ketosis).**
4. At the time of drying, cows should be fed a ration to cater for maintenance and pregnancy but two weeks before calving, the cow should be fed on concentrates in preparation for next lactation.
5. The amount of calcium and phosphorous fed should be restricted during the dry period to 0.4% and 0.25% to minimise incidences of milk fever.

FEEDING SCHEDULE OF DAIRY COWS:

Concentrate feed : 1.5 kg maintenance+ 1kg of concentrate feed for every 2.5 litres of milk produced

Green Fodder: 20-25 kg

Dry fodder : 10-15 kg

Silage : 5-10 kg

CHAPTER VIII

FODDER: ITS CULTIVATION AND PRESERVATION

Fodder cultivation is one of the most essential activity in Dairy farming .before planning a Dairy Farm one should always keep in mind the availability of good fodder and that too in abundance.

Fodder refers to forages/grasses used for feeding livestock and cattle in particular.

(A) Fodder cultivation: The plantation of good quality fodder is of utmost importance in order to ensure its supply all year round. The different types of fodder that can be planted in our region includes the following:

1. **Maize:** It is a highly nutritious fodder plant and grows well in this region. Due to its high moisture content it serves as the ideal fodder for silage preparation.

Time of plantation: February-May

Seed Rate: 40 kg/acre

Time of harvest: 3 months post plantation

Irrigation: Rain water

2. **Oats:** It is a winter fodder and grows well during the winter months

Time of plantation: September-November

Seed Rate: 50kg/acre

Time of harvest: 2-3 months post plantation

No of cuttings: 2-3 cuttings at 1 month apart

Irrigation: Whenever possible irrigation helps in attaining full growth of the fodder plant

3. **Perennial fodder:** These include those grasses that are available throughout the year. They include the following:

a) **Congo grass:** It is a perennial grass which is characterised by a dense system of bunched, quickly growing roots that can go to a depth of 1.8m.

b) **Guinea grass:** It is a well known perennial grass which thrives well in tropical regions and has a high yielding attaining a height of over 2m.

c) **Napier Grass:** It is a very important tropical forage crop. It can be planted by root slips.

d) **Para grass:** It is a rapid growing summer perennial forage and is propagated by root slips or stem cuttings.

e) Others also include Broom grass etc

4. **Fodder trees:** These include those fodder trees whose leaves can be fed to cattle in times of scarcity. Notably Exbuclandia (locally known as diengdoh), Cherry blossom leaves etc.

(A) **FODDER PRESERVATION:**

Hay making: Hay is fodder conserved by drying to reduce the water content so that it can be stored without rotting or becoming mouldy (reducing moisture content stops microbial growth). The moisture content should be reduced to about 15%

Harvesting and curing:

1. Harvest the fodder for haymaking when flowering is 50%. At this stage protein and digestibility are at maximum, after which they decline with age.

2. The fodder should be harvested after 2 to 3 days of dry weather so that drying will be possible. Where possible, drying should be done under shade so that the dried fodder retains its green colour, which is an indicator of quality.

3. Turn the fodder using farm fork to ensure even drying. Check the dryness by trying to break the stem. If it bends too much without breaking, there is still much water.

4. A good estimate of the amount stored makes feed budgeting easier.

CHAPTER IX

SILAGE

Silage is high-moisture fodder preserved through fermentation in the absence of air. These are fodders that would deteriorate in quality if allowed to dry. Silage can be made from green oats, **green maize** or Napier grass.

An ideal crop for silage making should:

- i) contain an adequate level of fermentable sugars in the form of water-soluble carbohydrates
- ii) have dry matter content in the fresh crop above 20%
- iii) Possess a physical structure that will allow it to compact readily in the silo after harvesting.

SILAGE PREPARATION

Crop used for silage preparation : Maize prior to flowering stage at 90 days harvest/Oats/Kikuyu grass.

Specifications of an ideal silo pit : Height = 10 ft Breadth = 12 ft Length = 12 ft

capacity: 160tonnes

Steps of silage preparation in silo pit:

1. Maize plant harvested at 90 days is placed in same alignment one on top of another and tightly packed
2. Molasses is added at half the height of the silo pit, $\frac{3}{4}$ and on top of the silo pit filled with packed maize plant
3. The silo pit is then tightly packed
4. It is then closed and kept for a minimum of 60 days
5. Finally can be fed to the cows at times of scarcity.



MAIZE PLANT ARRANGED IN PROPER ALIGNMENT FOR SILAGE PREPARATION

CHAPTER X

BREEDING

MATING: Once heat has been detected, cows should be mated.

WHEN TO SERVE: Present the cow for insemination at the right time to increase the chances of conception. Below is a guide as to the best time to present the cow for insemination:

HOW TO IMPROVE BREEDING PERFORMANCE

Serve cows 50 to 75 days after calving. AM – PM Rule

Standing heat if observed should be present for insemination

Before 9 am standing heat then AI/Breeding should be done on late evening the same day, Late afternoon or early next morning

ARTIFICIAL INSEMINATION

Artificial Insemination popularly referred to as AI is one of the breeding methods that has contributed to the development of the dairy sector in the last sixty years in Kenya and also worldwide. The process of artificial insemination starts with a healthy bull, that is disease free and producing ample quantities of high quality semen. The fertility of the cow is also important, the competency of the inseminator and a clean environment. Farmers are encouraged to use semen from proven bulls which is obtained from AI centres and registered service providers.

BENEFITS OF ARTIFICIAL INSEMINATION

1. Prevention of venereal diseases
2. Indefinite preservation of genetic materials of low cost enabling wide testing and selection of bulls
3. Enhances genetic progress as best bulls are used widely nationally and internationally
4. Small scale farmers through AI can access good bulls cheaply
5. One is able to select the bull of interest.
6. When handled properly, there is no chance of spread of breeding diseases.
7. It is easy to control inbreeding.
8. A.I. is the best method of improving the genetic make-up of local breeds because it enables semen from the very best bulls to be widely available.
9. It is cost effective since the farmer does not have to rear a bull.

GESTATION PERIOD- from successful conception to calving 281 ± 2 days.

LACTATION PERIOD – from calving to when the cow is dried: 305 days

LENGTH OF DRY PERIOD- A short dry period i.e 60 days.

CHAPTER XI

CLEAN MILK PRODUCTION



REMOVAL OF MANURE PRIOR TO MILKING



HAND MILKING

MILK CAN

1. THE MILKER SHOULD:

- be healthy and clean
- Maintain short nails and hair (for ladies, cover the head when milking)
- Never smoke during milking time
- Milk quickly and completely without interruptions
- A milking shed (parlor) which can be permanent or movable should be constructed. It should be located away from any smells.
- The floor of shed should be clean and dry and if possible have a cement floor for ease of cleaning.
- The shed should be cleaned after every milking and animals kept off outside milking time. Equipment
- Use seamless aluminium or stainless steel cans for milking and storing milk. Plastic container is difficult to clean.
- Clean utensils immediately after milking or after emptying milk: rinse with cold water, scrub with a brush using hot water with detergent then rinse with cold water. Place upside down on a rack and dry in the sun.
- Store utensils in a safe, clean and well ventilated room
- Hand milking is an art, which is improved with practice.

STEPS: in hand milking

1. Feed the cow its production ration (this is optional depending on the feeding system) - This calms the animal and stimulates milk letdown.
2. Restrain animal - tie hind legs above hock joint.

A loose knot should be used to safeguard both animal and man (applicable only for hand milking).

Wash hands with soap and clean water before milking. Dry hands with towel.

1. Test for mastitis using a strip cup - strip first few rays of milk into strip cup from each quarter and observe for any abnormalities. If mastitis is detected, the cow should be milked last
2. Wash udder with warm clean water with disinfectant using a clean towel. Warm water also stimulates milk let down. Dry udder using a dry towel.
3. Apply milking jelly - prevents cracking of teats and eases milking (for hand milking only)
4. Milk quickly and completely by squeezing the teat, do not pull.
5. Milking each cow should take 7–10 minutes at most.
6. Use clean containers for milking.
7. After milking: getting last drops of milk from udder to avoid incomplete milking (can lead to mastitis).
8. After milking dip the teats in a teat dip (disinfectant to ensure that bacteria do not gain entry through the teat sphincter which is loose immediately after milking).
9. It is recommended that the animal remain in a standing position for at least one hour to ensure the teat does not come into contact with the ground while the sphincter is still loose.

CHAPTER XII

MILK PRESERVATION Milk is highly perishable hence it should be preserved to ensure it is safe for human consumption at the home and that it reaches the processor and/or final consumer in good condition. The success of any preservation method is highly dependent on hygiene conditions under which the milk was produced. Hence milk produced from a healthy cow, milked by a healthy milker using clean equipment will be clean and more likely to keep long.



DISPOSAL OF MILK

MILK CAN BE PRESERVED USING THE FOLLOWING SIMPLE METHODS:

Cooling milk slows down the growth and activity of germs and hence prevents spoilage. Milk can be cooled through:

- Keeping under a shade
- Dipping the containers with milk in a cold water bath, flowing stream of cooling tank
- Keeping the milk in a refrigerator.

Heating kills many bacteria and heated milk will keep longer. It also gets rid of harmful micro-organisms that could transfer diseases from the cow to humans. The best method of heating milk (to retain the taste and avoiding off-flavours) is to immerse the milk can in boiling water for at least 30 minutes.

BASIC MILK QUALITY TESTS There are four simple milk quality tests that may be carried out routinely both at the farm and milk collection centre:

- Sight-and-smell (organoleptic) test
- Clot-on-boiling test
- Lactometer test
- Fat Test

LACTOMETER TEST

This test is used to determine if the milk has been adulterated with water or solids. Addition of anything to milk can introduce bacteria that will make it spoil quickly, is dishonest and is therefore illegal. The lactometer test is based on the fact that milk has a heavier weight or density (1.026–1.032 g/ml) compared to water (1.000 g/ml).

FAT TESTING USING A BUTYROMETER: To determine the fat content of milk



CHAPTER XIII

VACCINATION AND DEWORMING SCHEDULE

Sl no.	Name of the Disease	Age group of cattle for vaccination	Duration of immunity	Site of administration
1.	Foot and Mouth Disease	1 st vaccination- 4 months of age Booster- one month apart Repeat every 6 months	One season	Intramuscular
2.	H.S and B.Q	1 st vaccination- 3 months of age Repeat yearly	One season	Sub-cutaneous
3.	Brucellosis	All female calves between 4-8 months of age	Life long	Intramuscular

DEWORMING SCHEDULE: 1st deworming at 3 months of age and repeat after every 3 months.

CHAPTER XIV

COMMON DISEASES: THEIR CONTROL AND PREVENTION

1. **MASTITIS:** It refers to inflammation of the udder
Causes: Unclean udder prior to milking
Prevention:
 - a) Hygienic teat management which includes cleaning of udder before and after milking using clean water with an added disinfectant such as sodium hypochlorite.
 - b) Prompt identification and timely treatment.
 - c) Dry cow management which includes using teat end sealant prior to drying of pregnant cow.
 - d) Regular testing of milk to detect sub-clinical mastitis.

FMD: Foot and Mouth disease is a viral infection which affects cattle of all ages and dairy cows in particular because they leads to drastic reduction in milk production

Control: Proper disinfection of sheds from time to time
Isolation of affected animals
Treat the affected cattle
Prevention:
Vaccination using FMD polyvalent vaccine twice a year at 6 months apart
2. **H.S:** Haemorrhagic septicaemia is a contagious infection of bacterial origin and affected cows exhibit respiratory symptoms with nasal discharge and profuse diarrhoea with high degree of mortality if left untreated.
Control: Proper disinfection of sheds from time to time.
Isolation of affected animals with appropriate treatment.
Prevention: Vaccination once a year.
3. **Brucellosis:** It is a bacterial infection which is also zoonotic. It affects dairy cattle and the main symptoms include abortion and thus incurs a huge economic losses the farm.
Prevention and Control: Vaccination of all female calves between 4-8 months of age.
4. **B.Q:** Black Quarter mostly affects unvaccinated young calves below 1 year of age. It is a bacterial origin infection and affects the large muscles of the limbs and mortality is very high.
Control:
Proper disinfection of sheds from time to time
Isolation of affected animals
Prevention: Vaccination once a year.
5. **Anthrax:** It is a deadly disease of bacterial origin with 100 % mortality. Due to zoonotic nature of this disease proper disposal is a must and the carcass must never be open for post mortem.
Control: Proper disinfection of sheds from time to time
Prevention: Vaccination once a year.
6. **Parasitic infection:** Parasites in the gastrointestinal tract cause a great deal of harm to cattle of all ages. They mostly include roundworm and tapeworm as well. Affected cattle shows poor body condition and reduced milk yield and poor growth in young animals. Deworming should be carried out once in every 3 months. Tick infestation also causes a great deal of harm as ticks act as vector to many diseases including babesiosis, lumpy skin disease etc and they also leads to anaemia.
Tick can be controlled using proper acaricide.
7. **Metabolic disorders:** They include those diseases whose major cause is due to deficiency in certain minerals and nutrients in the body. Milk fever, ketosis, hypomagnesaemia etc.
Proper feeding is a must to prevent all metabolic disorders with timely supplementation of calcium, phosphorus etc especially 2 months prior to calving to avoid any complications.

CHAPTER XV

RECORDS

The purposes of record keeping are as follows:

Record provides basis of evaluation

1. Helps in the selection and culling of the animals for the breeding programme to be followed
2. Helps in preparing a complete pedigree and history records of animals
3. Helps to ascertain the income and expenditure of the farm
4. Helps in economic feeding of animals
5. Helps in comparing the efficiency of labour and herd with other neighbouring farm.

Types of records: Technical records & Financial records

- **Technical records:** These records deal with the performance of the animals. They include the following:

1. Cattle breeding register
2. Calving register
3. Herd book of calves, Heifers and cows
4. Daily concentrate Feeding register
5. Milk production and disposal register
6. General labour register
7. Animal Day book

- **Financial record:** It deals with Purchases, disposal, accounts and death register etc and include the following:

1. Cash book
2. Store inventory book
3. Daily accounts and credit register.

ANNEXURE I

DAILY FEEDING REGISTER FOR THE MONTH OF

Date and number of animals	Concentrate (Kg)			Green fodder (quintal)			Dry fodder (quintal)			Other feeds		
	Received	Issued	Balance	Received	Issued	Balance	Received	Issued	Balance	Received	Issued	Balance

ANNEXURE II

CALF REGISTER

Sl no	Date of Birth	Date of numbering	Calf number (ear)	Sire	Dam Calf	Sex birth of weight	Disposal		
							How	Date	

ANNEXURE III

CATTLE BREEDING REGISTER

Sl No	Date of Calving	First Service			Second Service			Third Service			First pregnancy Diagnosis (date/ result)	Second pregnancy Diagnosis (date/ result)	Expected of calving	Date of which to be dried off	Actual date of calving	Weight of calf	Sex of calf	Number of calf	REMARKS
		Date of Service	Time of Service	Bull no.	Date of Service	Time of Service	Bull no.	Date of Service	Time of Service	Bull no.									

ANNEXURE IV

DAILY MILK RECORD

Sl No.	Cow No. calving	1 st		2 nd		3 rd , 4 th etc		30 th		31 st		Total
		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	

Note: This manual is solely prepared considering the ecological-climatic conditions of the state of Meghalaya with the main aim of imparting knowledge on modern dairy cattle rearing to the farmers of the state.

***** END*****