

Dairy Worker

(Job Role)

Qualification Pack: Ref. Id. Agr/Q4102
Sector: Agriculture

Textbook for Class X



171009

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NCERT

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171009 – DAIRY WORKER

Vocational Textbook for Class X

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FOREWORD

The National Curriculum Framework (NCF)–2005 recommends bringing work and education into the domain of the curricula, infusing it in all areas of learning while giving it an identity of its own at relevant stages. It explains that work transforms knowledge into experience and generates important personal and social values, such as self-reliance, creativity and cooperation. Through work, one learns to find one's place in society. It is an educational activity with an inherent potential for inclusion. Therefore, an experience of involvement in productive work in an educational setting will make one appreciate the worth of social life and what is valued and appreciated in the society. Work involves interaction with material or people (mostly both), thus, creating a deeper comprehension and increased practical knowledge of natural substances and social relationships.

Through work and education, school knowledge can be easily linked to learners' life outside the school. This also makes a departure from the legacy of bookish learning and bridges the gap between the school, home, community and workplace. The NCF–2005 also emphasises on Vocational Education and Training (VET) for all those children, who wish to acquire additional skills and seek livelihood through vocational education after either discontinuing or completing school education. VET is expected to provide a 'preferred and dignified' choice rather than a terminal or last resort option.

As a follow-up of this, NCERT has attempted to infuse work across subject areas and contributed in the development of the National Skill Qualification Framework (NSQF) for the country, which was notified on 27 December 2013. It is a quality assurance framework that organises all qualifications according to the levels of knowledge, skills and attitude. These levels, graded from one to ten, are defined in terms of learning outcomes, which the learners must possess regardless of whether they are obtained through formal, non-formal or informal learning. The NSQF sets common principles and guidelines for a nationally recognised qualification system, covering schools, vocational education and training institutions, technical education institutions, colleges, and universities.

It is under this backdrop that Pandit Sunderlal Sharma Central Institute of Vocational Education (PSSCIVE), Bhopal, a constituent of NCERT, has developed learning outcomes based modular curricula for vocational subjects from Classes IX to XII. This has been developed under the Centrally Sponsored Scheme of Vocationalisation of Secondary and Higher Secondary Education of the Ministry of Education, erstwhile Ministry of Human Resource Development.

This textbook has been developed as per the learning outcomes based curriculum, keeping in view the National Occupational Standards (NOSs) for the job role and to promote experiential learning related to the vocation. This will enable the students to acquire necessary skills, knowledge and attitude.

I acknowledge the contribution of the development team, reviewers and all institutions and organisations, which have supported in the development of this textbook. NCERT welcomes suggestions from students, teachers and parents, which would help us to further improve the quality of the material in subsequent editions.

New Delhi
September 2020

HRUSHIKESH SENAPATY
Director
National Council of Educational
Research and Training

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ABOUT THE TEXTBOOK

A Dairy Worker performs various activities, such as caring, feeding and milking the livestock in a dairy farm, which consumes approximately two-third of the person's work time daily. Taking care of dairy animals involves keeping the animal areas clean, and free from manure and other contaminating material. The job is to be performed efficiently in order to promote clean milk production, and animal well-being and comfort. The Dairy Worker is expected to work independently and must have the ability to make operational decisions pertaining to one's area of work. The person must have clarity and be result oriented. One must also be able to demonstrate skills to use various tools at the dairy farm.

The succession course from the job role of Dairy Worker is that of Dairy Farmer. A Dairy Farmer is responsible for profitably managing various activities in the dairy farm like production and marketing of milk and milk products, and maintaining the health and productivity of cattle. The person is expected to demonstrate the ability to make various strategic and operational decisions to ensure profitability of the farm.

A comparison of the National Occupational Standards (NOSs) of the two job roles shows that seven out of eight NOSs are similar. Therefore, a conscious effort has been made in the textbooks of Dairy Worker to impart only elementary knowledge to students on the topics covered.

The textbook covers key aspects on animal health and safety, milk production and hygiene, and animal welfare legislations. The practices recommended in the textbook have been drawn from practical experiences at the Nanaji Deshmukh Veterinary Science University, Jabalpur (Madhya Pradesh), and Department of Livestock Production and Management at the Indian Veterinary Research Institute, Izatnagar (Uttar Pradesh).

The students are encouraged to select and implement guidelines relevant to their situation. The textbook has been developed with the contributions of subject and industry experts, and academicians. Care has been taken to align the content of the textbook with the National Occupational Standards (NOSs) for the job role of a Dairy Worker. This will enable the students acquire knowledge and skills as per the performance criteria mentioned in the Qualification Pack (QP) by the Agriculture Skill Council. The NOSs for the job role of a Dairy Worker covered in the textbook are as follows.

- AGR/ N4103: providing feed and water to livestock
- AGR/ N4104: maintaining the healthy performance of livestock
- AGR/N4105: performing hand and machine milking
- AGR/N9903: maintaining health and safety standards at the workplace

Besides these NOSs, the importance of maintaining records in a dairy farm is explained in the textbook as the Dairy Worker is expected to maintain various types of record on a regular basis.

The textbook is divided into six Units. In Unit 1, common infectious and non-infectious diseases, parasitic infections and other disorders that affect dairy animals are discussed. Unit 2 talks about guidelines for the prevention of diseases, as well as, vaccination in dairy animals. The topic of 'One Health' is also discussed in this Unit. The different pre-milking and post-milking activities required for clean milk production are detailed in Unit 3. Unit 4 discusses the various types of record maintained in a dairy farm. Unit 5 describes measures for maintaining hygiene and biosecurity at the dairy farm along with disposal of farm wastes. Unit 6 impresses upon students the need for having compassion towards animals and throws an insight into the existing legal welfare provisions for animals.

We hope this textbook will serve as a useful resource material for students who opt for the job role of a Dairy Worker. Suggestions for improving the textbook are welcome.

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The photographs used in the textbook have been selected with care and diligence for providing a better understanding to students. Care has been taken not to violate any copyright issue. The images are meant for educational purpose only and are being provided for the personal use of the students and teachers.

Biswajit Roy, *Associate Professor*, Department of Livestock Production Management, NDVSV, Jabalpur, is appreciated for providing photographs of animals and preparing other visuals included in the textbook. The Council is thankful to the Indian Veterinary Research Institute, Izatnagar (Uttar Pradesh), and its faculty members in the Livestock Production Management Department for reviewing the textbook and providing relevant photographs.

Jeetender Kumar, *DTP Operator*, PSSCIVE, Bhopal, is acknowledged for typing out the manuscript.

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Unit

1



Maintaining the Healthy Performance of Animals

Like human beings, animals, too, are susceptible to diseases and infections. Therefore, maintaining the health of animals is important for optimum livestock productivity. Diseases affect the productivity of dairy animals through lowered milk yield, reduced fertility, delayed maturity, reduced feed conversion ratio, etc.

A healthy animal eats and drinks normally, is active, alert and aware of its surroundings. It stays in a herd, has bright eyes with pink eye membrane, moist muzzle with no mucus discharge and a sleek coat. It has a steady gait, walks on all four feet and does not limp. In case of mild or moderate infection, the animal stands on all four feet but looks dull, depressed and lethargic. There is discomfort and reluctance in its walk. But in case of severe infection, disease or wound, the animal keeps lying on the ground for the maximum time of the day and limps while walking.

Different breeds of cow and buffalo have different yielding capacity. The quality and quantity of milk yielded by animals of the same breed may vary at different stages. A healthy animal has an increased productivity, in terms of milk yield. Diseases and infections in animals lead to medical expenses, causing losses in the dairy business. If an animal is sick, there is



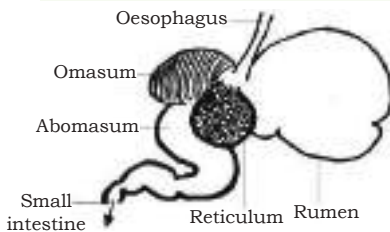
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Did you know?

A sick animal stays away from other animals in a herd. It is not interested in its surroundings and does not want to move.

Did you know?

Ruminants are animals with a four-compartment stomach, including the rumen (largest compartment), reticulum (honeycomb lining), omasum (manifolds) and abomasum (gastric compartment). Microorganisms, living in the rumen, allow ruminants to digest fibrous components of the feed. The rumen functions in coordination with the reticulum to support contractions of the musculature that create functions of rumination (cud chewing and rumen contractions) and eructation (gas release). The structure of a ruminant's stomach is shown below.



a drop in its productivity and it becomes susceptible to infections. Moreover, an infection may get transmitted to other animals on the farm and a farmer may have to spend money on the treatment of animals. The dairy farmer, therefore, must always take care of the animals on a farm.

Several factors like genes, climatic conditions, feeding habits and age of the animal determine its overall performance. Any alteration in these factors may lower the animal's yield and productivity.

This Unit focuses on the effect of some common diseases and physical injuries on the overall performance of dairy animals. Fig. 1.1 illustrates some of the common diseases and disorders that affect dairy animals.

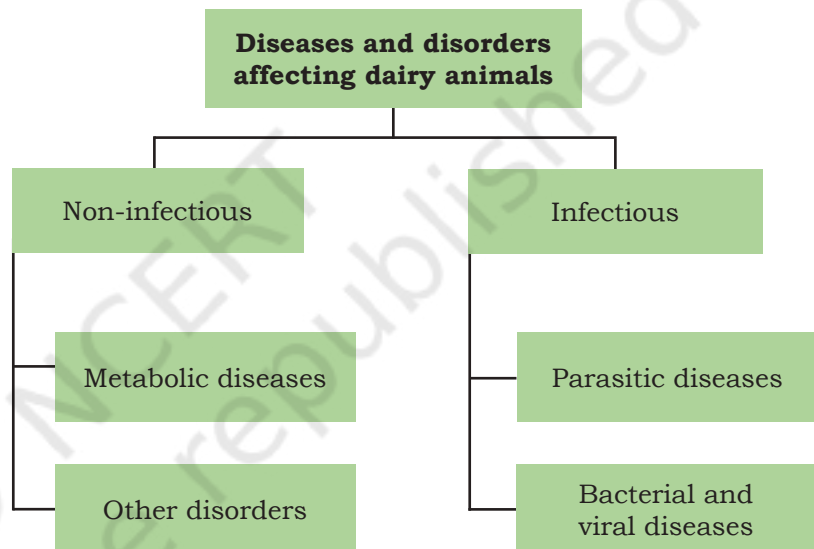


Fig. 1.1: Common diseases and disorders in dairy animals and their classification

SESSION 1: COMMON NON-INFECTIOUS DISEASES AND OTHER DISORDERS IN DAIRY ANIMALS

Non-infectious diseases are not caused by pathogen, and hence, are non-communicable in nature. This means such diseases cannot be transmitted from animal-to-animal or animal to humans. They may be caused by hereditary and environmental factors, i. e., aerosol, direct contact and oral. Metabolic diseases and other disorders, such as physical injuries like burns and wounds, etc., come under non-infectious category. Examples of metabolic diseases include hormonal




disorders, nutritional deficiencies and poisoning. Some common non-infectious diseases and other disorders in dairy animals are depicted in Table 1.1.

Table 1.1: Common non-infectious diseases and other disorders in dairy animals

S. No.	Disease	Symptoms	Prevention and treatment
1.	Milk fever A metabolic disease in high yielding animals caused by calcium deficiency that causes reduced milk yield	<ul style="list-style-type: none"> • Dullness • Cold ears • Stiff legs and limping • Weakness and loss of appetite • Reduced milk yield • If not treated in time, the animal may enter stage-II of the disease with a drop in its body temperature and increased heart rate. It may not be even able to stand. 	<ul style="list-style-type: none"> • Give balanced diet to the affected animal. • Ensure timely detection of the disease and try restoring the animal's blood calcium level to normal.
2.	Mastitis Inflammation in the mammary glands and bacterial or fungal infection in the animal's teats	<ul style="list-style-type: none"> • Swollen and stiff udder and painful teats • Watery milk with flakes and clots 	<ul style="list-style-type: none"> • Ensure no injury to the animal's teats and udder. • Follow hygiene practices during milking and in the animal shed.
3.	Wounds Injuries on the skin caused by cuts, burns and blows	<ul style="list-style-type: none"> • Torn tissues • Bleeding • Pus formation and secretion 	<ul style="list-style-type: none"> • Most wounds heal on their own. However, provide timely treatment for regeneration of damaged tissues. • Apply pressure on the affected area to control bleeding. • Bandage the affected area tightly with a piece of clean cotton cloth. Before bandaging, the area needs to be covered with sterile absorbent cotton, dusted with an antiseptic powder, such as boric acid. However, Potassium permanganate is the most commonly used antiseptic. Fig. 1.2 shows a cow with a wound, which is healing.



Fig. 1.2: A healing wound

4.	<p>Tympany Observed when the animal eats a large amount of easily fermentable plants or grains; it is characterised by abnormal distension of the rumen and reticulum caused by accumulation of gases in the rumen.</p>	<ul style="list-style-type: none"> • Distended left abdomen • Abnormal distension of the rumen and reticulum • Pain and discomfort in the rumen • The animal refuses to graze • Strenuous for the animal to urinate and defecate • Rapid and difficult breathing (in case of severe distension, breathing gets impaired due to pressure on the lungs and heart) • The animal can die within hours, if not provided timely veterinary treatment 	<ul style="list-style-type: none"> • Traditionally, vegetable oil (250–500 ml) or paraffin oil (100–200 ml) is used to relieve the affected animal. • In mild cases, anti-bloat medicines that are easily available in market need to be administered to the animal orally. • In moderate cases, a tube is passed through the animal's stomach to release the rumen gases. The procedure must always be done under veterinary supervision. • In severe cases, a trochar and cannula is passed through the rumen to release the gases. This, too, must be done under veterinary supervision.
5.	<p>Diarrhoea Characterised by frequent passage of loose and watery faeces (Fig. 1.3) because of infections caused by parasites, viruses or bacteria; dietary factors, such as excess consumption of grains or green fodder and mineral deficiency also lead to this disorder</p>  <p><i>Fig. 1.3: A buffalo calf suffering from diarrhoea</i></p>	<ul style="list-style-type: none"> • Dehydration • Dullness • Sunken eyes • Lethargy and weakness • Depression 	<ul style="list-style-type: none"> • The animal must be made to drink plenty of water, and administered glucose and electrolyte solution orally. • If the disease is related to the animal's diet, then the diet must be corrected immediately as per the veterinarian's advice. • Withhold food or offer light and easily digestible food for 24 hours to the animal as advised by the veterinarian so as to give rest to its digestive system. • The disease can be cured or its effects minimised by reviewing the animal's ration, grazing pattern, biosecurity practices and carrying out parasite control measures in the farm. • If caused by infections, medicines as advised by the veterinarian are given to the animal. • In case the animal gets no relief in few hours, it must be admitted to a veterinary hospital without delay. • The animal must be observed from time-to-time for signs of improvement.



6.	<p>Constipation A signal at other diseases, characterised by difficulty in defecating</p>	<ul style="list-style-type: none"> • Difficulty in passing faeces • Indigestion 	<ul style="list-style-type: none"> • Offer plenty of drinking water to the animal. • Administer enema (passing medicine or warm soapy water into the rectum through the anus) to the animal.
7.	<p>Indigestion and anorexia Minor disturbances in the animal's digestive function; indigestion, caused by abrupt change in the quality and quantity of diet, is the failure of normal rumen movement; anorexia refers to loss of appetite and can occur because of infections, toxicity or prolonged use of antibiotics.</p>	<ul style="list-style-type: none"> • Loss of appetite • Rumen contents become stiff causing mild bloating or swelling on the animal's left flank. 	<ul style="list-style-type: none"> • The treatment aims at correcting the animal's diet. • Feed roughage for spontaneous recovery of the animal. • Oral administration of about 20 litres of warm water or saline can help restore normal rumen function in an adult animal. • Indigestion and anorexia can be prevented by giving a balanced diet to the animal under veterinary supervision.
8.	<p>Burns Injuries caused by fire and hot solids; injuries caused by hot fluids or steam are called 'scald'</p>	<ul style="list-style-type: none"> • Swelling, redness and blisters in the affected area (Fig. 1.4) • Pain • Thirst • Anaemia • Loss of necessary salts from the animal's body 	<ul style="list-style-type: none"> • Recovery and chances of survival depends on the body area affected rather than the degree of the burn. • Immediate first aid must be provided to the animal by pouring cold water on the affected area. • Dress the burn injury after applying antiseptic. • To prevent contamination, the wound must be covered with a clean and sterile cotton cloth. • Sufficient water and glucose solution must be given to the animal. • In severe cases, intensive fluid resuscitation is provided to the animal.



Fig. 1.4: A buffalo with a burn injury

9.	<p>Retention of placenta in cows and buffaloes</p> <p>The placenta is expelled within 12 hours after the animal gives birth. In case it does not, then it is a case of placental retention.</p>	<ul style="list-style-type: none"> • Hanging and foul smelling discharge from the vulva is observed. 	<ul style="list-style-type: none"> • Take the animal immediately to a veterinarian for manual or surgical removal of the retained placenta. • If not treated in time, then it may affect the animal's health and reproductive function.
10.	<p>Abscess</p> <p>Swollen, enlarged and painful area on the skin or body filled with pus, usually, caused by bacterial infection</p>	<ul style="list-style-type: none"> • The affected area is pink to deep red in colour. 	<ul style="list-style-type: none"> • Within four to eight days, the centre or tip of the abscess becomes soft. At this stage, the abscess is considered 'ripe'. It can be treated by a veterinarian by draining out the pus.
11.	<p>Broken horn</p> <p>A horn may break completely or partially by a blow or after being hit by a hard object like a wall or other structure. It may break at the base, from the middle or at the tip.</p>	<ul style="list-style-type: none"> • Painful • Bleeding (in case of injury to the horn core as it contains blood vessels and nerves) 	<ul style="list-style-type: none"> • Take the animal to a veterinarian immediately to stop bleeding and relieve its pain.

Practical Exercise

Activity

Visit a dairy farm in your area and identify healthy and sick animals. Jot down the following information in your notebook.

- Signs of a healthy animal
- Symptoms in a sick animal
- Visible diseases in the animals, if any

Material required: writing material, chart with a list of symptoms in healthy and sick animals

Procedure

- Visit a nearby dairy farm.
- Identify healthy and sick animals in the farm.
- Identify diseases in the animals, if any, with the help of farm workers.
- Make a chart based on your observations and present it before the class.



Check Your Progress

NOTES

A. Multiple Choice Questions

1. Passage of loose and watery faeces in increased frequency is known as _____.
 - (a) diarrhoea
 - (b) tympany
 - (c) anorexia
 - (d) None of the above
2. Impaction is caused due to ingestion of a large amount of _____.
 - (a) highly fermentable carbohydrate-rich food
 - (b) leftover food from parties and marriages
 - (c) Both (a) and (b)
 - (d) None of the above
3. The main routes of disease transmission are _____.
 - (a) aerosol
 - (b) direct contact
 - (c) oral
 - (d) All of the above
4. Abnormal distension of the rumen caused by the accumulation of gases is known as _____.
 - (a) tympany
 - (b) impaction
 - (c) indigestion
 - (d) None of the above

B. Fill in the Blanks

1. _____ is a metabolic disease in high-yielding animals caused by calcium deficiency.
2. Diarrhoea leads to _____ in affected animals.
3. The most commonly used antiseptic is _____ solution.
4. _____ is characterised by inflammation in the mammary glands.

C. Mark True (T) or False (F)

1. Simple indigestion is a minor disturbance in an animal's digestive function.
2. Enema is the administration of a medicine or warm soapy water through the anus.
3. Anorexia can occur because of infections.
4. Constipation occurs when an animal can easily defecate.



SESSION 2: PARASITIC INFECTIONS IN DAIRY ANIMALS

Parasites are organisms that live on or in a 'host' organism and derive nutrients from it. Young animals are more susceptible to parasites than adults. Besides, animals reared under poor living conditions are highly susceptible to parasitic attack. Animals, generally, contract parasitic infections from water, soil and grass. There are two types of parasite — internal (endoparasite) and external (ectoparasite) as shown in Fig. 1.5.

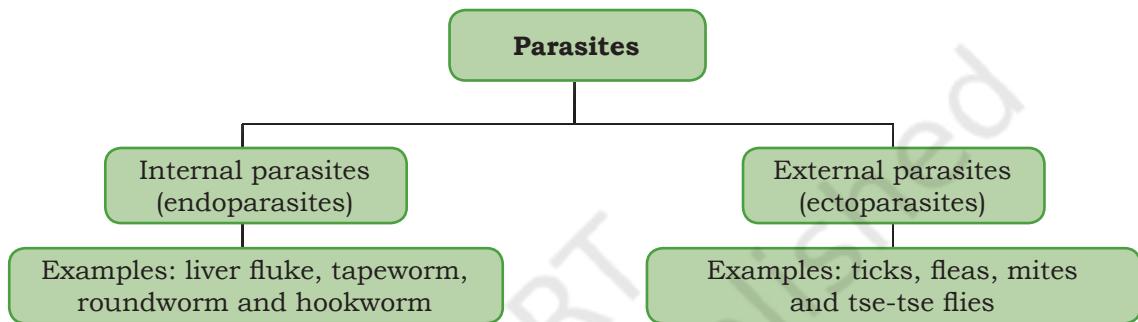


Fig. 1.5: Types of parasite

Internal parasites (endoparasites)

These are a major problem affecting farm animals. Endoparasites, also called internal parasites or worms, live in the body of the host animal and derive nutrients from it. They, generally, enter the animal's body through contaminated water or feed or through the skin. After entering the animal's body, they target a specific area to mature and reproduce.

These parasites lay eggs in the intestine of the infected animal. When the animal defecates, the eggs of the parasites also come along with the faeces. As a result, the field, where the animal is grazing and defecating, gets contaminated, leading to the spread of infection(s) in other animals, who ingest these harmful parasites while grazing. Due to their grazing behaviour, farm animals are prone to parasitic infections.

Worms cause various subclinical and clinical effects in farm animals, which may lead to significant losses to a dairy farmer. Subclinical effects include reduced milk



yield, drop in the animal's reproductive potential and weight loss. Clinical effects include roughness of the skin, anaemia and diarrhoea. Some of the principal internal parasites affecting farm animals are roundworms, tapeworms, flukes and protozoa. Internal roundworms are diagnosed by faecal eggs or larval counts.

De-worming

As worms feed on nutrients and blood of the host animal, eliminating or lowering their rate in the animal is an important animal husbandry practice. It can be achieved by regular de-worming of the animals. De-worming is a practice of administering medicines to the infected animals in order to help them get rid of internal parasites or worms. These medicines are administered either orally or through injections. However, it is difficult to completely eradicate worms from a farm. The aim of de-worming is to improve the immunity of the animals and protect them from catching chronic parasitic infections.

External parasites (ectoparasites)

Ectoparasites harm livestock through the year. But they are most prevalent during the summer and rainy seasons. These organisms live on the skin or external surface of an animal but not in the body. They cause damage to the animal's skin, and adversely affect its overall health, growth and productivity (milk, meat and wool yield).

External parasites or ectoparasites annoy the host by biting, thereby, causing itching and irritation. Ectoparasites are responsible for direct, as well as, indirect losses to farm animals.

Direct losses occur because of discomfort and damage caused by the parasites to the animal on which they thrive. Discomfort causes drop in milk production and retarded growth. In some cases, ectoparasites damage the skin of the animals as they constantly scratch or rub themselves against rough surfaces because of itching.

Indirect losses are transmission of diseases. Ectoparasites serve as carriers for transmission of diseases in animals and humans.



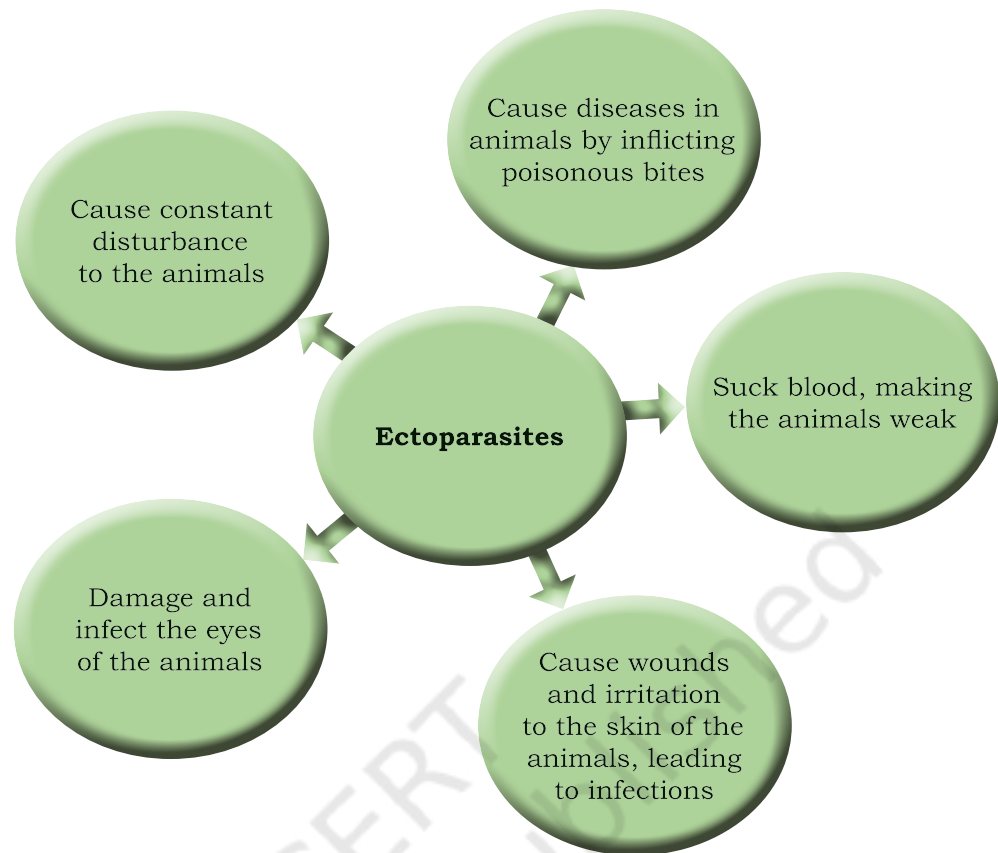


Fig. 1.6: Harmful effects of ectoparasites on animals



Fig. 1.7: Heavy infestation of ticks on a cow

Common ectoparasites

Some of the common external parasites that attack farm animals are lice, ticks, mites and flies.

Ticks

They thrive on an animal's body till treated or controlled. Ticks live on the animal's body for a short period (Fig. 1.7). They feed on its blood. Their bites cause swelling, redness and itching in the affected area. They transmit several diseases to the animal.

Flies

These feed on the blood, sweat, skin secretions, tears, saliva, urine and faeces of the animal (Fig. 1.8). They puncture its skin or infest on wounds. Flies serve as carriers of various diseases. They transmit diseases from infected to healthy animals. They also cause irritation and disturbance to the animal, which result in weight gain and reduced milk yield.



Fig. 1.8: Flies puncture the skin of an animal or infest on wounds



Mites and lice

They live on the animal's hair and body surface (Fig. 1.9). Lice and mites are permanent residents on the animal's body, and feed on its skin tissues and blood.

Prevention and control

Heavy infestation of ectoparasites causes poor health of the animals on a farm. Several medicines for external application are available to check the spread of ectoparasites. But it is difficult to completely eradicate ectoparasites from the farm. There are several practices directed towards controlling the population of ectoparasites and reducing it to tolerable levels.

Ectoparasite population can be controlled only by adhering to an integrated approach, in which preventive measures are followed in the farm, which include the animals and their sheds. Farmers need to follow effective farm management practices to reduce and check the spread of ectoparasite population. It includes maintaining farm hygiene and health of the animals, trimming grass around the sheds, reducing moisture content in and around the sheds by covering the drains, controlling water run-offs and guttering, and ensuring the maintenance and upkeep of sewer lines. Also, the farm's pasture must be treated with appropriate chemicals and disinfectants at the onset of the grazing season.

Immediately upon arrival to a farm, all new animals must be treated with ectoparasiticides to check the spread of new parasites in existing animals. If not effective and ectoparasites still manage to sneak into the farm and infect the animals, treat them immediately as per the veterinarian's advice to check their spread. A single dose of ectoparasiticide treatment may not be enough to control the spread of ectoparasites. The first treatment will only kill the active parasites present on the animals' body. A second treatment is required after 15–21 days to kill ectoparasites that might have hatched from the eggs since the first treatment. Besides treating the affected animals, it is necessary to clean and disinfect the sheds, paddocks and barns with disinfectants so as to kill the parasites and their eggs.



Fig. 1.9: Lice lodged in the skin of a buffalo



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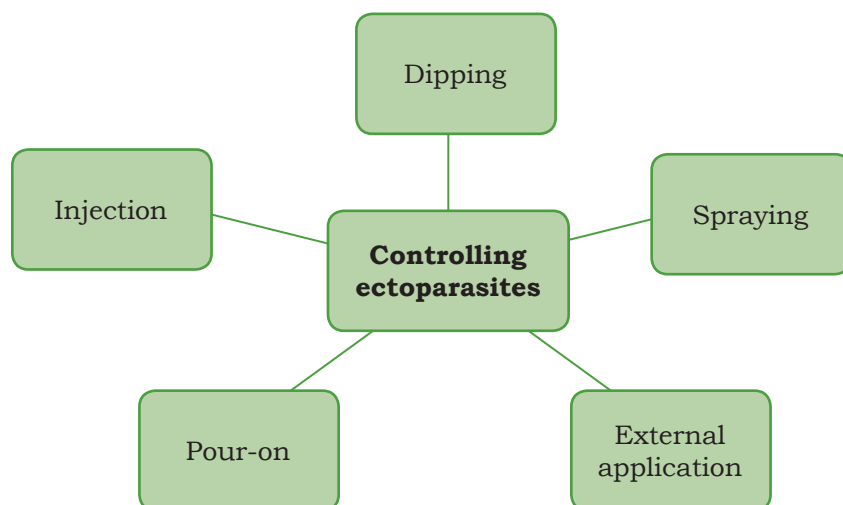


Fig. 1.10: Various methods to control ectoparasites

Despite all these efforts, some active ectoparasites and their eggs may still be found on the floor and walls of animal sheds. Ectoparasites can live on the surfaces for days without nutrition. Therefore, insecticides must be sprayed on buildings, paddocks, barns, etc., every two weeks.

Ectoparasiticides are chemicals used to kill parasites. One must always wear a mask, an eye shield and gloves while applying ectoparasiticides.

Methods to check ectoparasites

Fig. 1.10 shows some of the commonly used method for administering or applying ectoparasiticides.

Dipping

It is preferable for small-sized animals like sheep and goats. It is effective if a large number of animals is to be treated. An affected animal is lifted and dipped into a tank filled with an ectoparasiticide solution, ensuring that its head is not submerged. Dipping must be carried out early in the morning, so that the animal is not immediately exposed to the hot Sun. Dipping is not recommended if heavy rain is expected as the medicine may get washed off.



Spraying or external application

Using sprays is the most common method of applying ectoparasiticides. It is effective, especially, if a small number of animals is to be treated. If a sprayer is not available, then a recommended medicine may be applied on to the animal with a paint brush or cloth. The affected animal must be tied securely before the medicine is applied. The medicine must be applied from the head to the tail, covering all areas of the body. While applying the medicine, the eyes, nostrils and mouth of the animal must not be exposed

Injection

Some ectoparasiticides can be injected into the animal through the subcutaneous route. These ectoparasiticides act against both internal and external parasites. These compounds are, generally, more expensive than other medicines. Fig. 1.11 shows a medicine being injected into an affected animal through the subcutaneous route.

Pour-on medicine

This is an effective method of controlling ectoparasites. A small volume of a recommended medicine available as pour-on preparation for treating ectoparasite infection is poured along the backline of the animal (Fig. 1.12).

Various management measures adopted for the prevention and control of parasitic infections in animals in a farm are depicted in Fig. 1.13.

Provide adequate nutrition to animals

Avoid overstocking or crowding

Maintain cleanliness

Carry out regular de-worming

Ensure rotation of pasture

Isolate new animals

Fig. 1.13: Measures to prevent parasitic infections in animals on a farm



Fig. 1.11: A medicine being injected into a calf through the subcutaneous route



Fig. 1.12: Medicine being poured along the backline of a cow



Practical Exercise

Activity 1

Discuss with your teacher if ectoparasites like ticks on a cow's body can be removed manually. Visit a nearby dairy farm and identify a cow infected with ticks. Try to remove the ticks from the animal manually. Share your experience with your friends in class.

Material required: small utensil like a cup half filled with water and writing material

Procedure

- Visit a nearby dairy farm.
- Spot a cow infected with ticks.
- Gently approach the animal.
- Gently remove the ticks (ectoparasites) from the animal's body. Put them immediately in a cup containing water.
- Repeat the process till the animal is free from ticks.
- Now, take the utensil to a far-off place and with the help of a small stick push the ticks into water till all of them are submerged.
- The ticks will die in few hours.
- Note down the procedure that you followed to remove ticks and share your experience with your classmates.

Activity 2

Visit a nearby dairy farm and practise the pour-on method of ectoparasiticide application on a calf. Present your learning and observations before the class.

Material required: writing material

Procedure

- Visit a nearby dairy farm.
- Observe a dairy worker performing the pour-on method of ectoparasiticide application on an infected animal.
- Now, practise it on a calf under the supervision of the dairy worker.
- Write the step-by-step procedure of how you performed the task.
- Note if you observe any behavioural change in the animal.
- Present your observations before the class.

Check Your Progress

A. Multiple Choice Questions

1. A method(s) of controlling ectoparasites is/are _____.
 (a) dipping (b) spraying
 (c) injection (d) All of the above



2. Insecticides must be sprayed on to buildings, paddocks and barns, where animals live, every _____.
 - (a) two weeks
 - (b) two months
 - (c) three months
 - (d) four months
3. Dipping should be done in the _____.
 - (a) afternoon
 - (b) early morning
 - (c) evening
 - (d) any time of the day
4. For effective control of ectoparasites, second treatment is, usually, required after _____ of the first treatment.
 - (a) 7–9 days
 - (b) 15–21 days
 - (c) 1–2 months
 - (d) 3–4 months
5. A person applying ectoparasiticides to animals must wear _____.
 - (a) only gloves
 - (b) only eye shield
 - (c) only mask
 - (d) All of the above

B. Fill in the Blanks

1. _____ are organisms that live on the skin of animals.
2. Ticks feed on the _____ of the animal on which it lives.
3. Ectoparasites are responsible for the transmission of _____.
4. For pour-on method, a recommended medicine must be poured along the _____ of an infected animal.
5. Some ectoparasiticides can be injected into the animal through the _____ route.

C. Mark True (T) or False (F)

1. Dipping of an animal can be done in all seasons.
2. Ectoparasiticides must not be administered to sick animals.
3. Heavy infestation of ectoparasites is, usually, associated with the poor health of animals.
4. A single ectoparasiticide treatment may be sufficient for controlling the spread of ectoparasites.
5. Ectoparasite control cannot be achieved by integrated approach.



SESSION 3: COMMON INFECTIOUS DISEASES IN DAIRY ANIMALS

A dairy worker must have knowledge of common diseases and infections that may affect farm animals. Timely diagnosis and treatment slow the incidence and spread of diseases in the animals. Besides, it must be ensured that there are regular health care programmes for animals in order to promote animal health. These help check diseases in animals and also reduce the cost of treatment. Some of the common diseases affecting farm animals and their symptoms are discussed in this Session.

Foot and Mouth Disease (FMD)

A contagious viral disease, this is characterised by high fever, low appetite, reduced milk yield, and formation of vesicles and blisters in an affected animal's mouth, udder, teats, centre of the toes and above the hoofs. There is excessive salivation and the animal becomes lame.

The disease spreads by direct contact or indirectly through infected water, manure, hay, pasture and even air. It can also occur in an animal if it comes in direct contact with infected equipment or vehicles in the farm. It causes severe production losses. The affected animal recovers but it becomes weak and the milk yield reduces considerably. The disease can be prevented by regular vaccination, isolation and disinfection of the affected animal.

It does not cause death in case of adult animals. But there may be few casualties in case of calves.

Anthrax

It is a rare but highly infectious and fatal disease in cattle. Often, the affected animal dies within two to three hours of apparently being normal. In some cases, animals may show high temperature, difficulty in breathing and convulsions (sudden, violent and irregular movement of the body) before death. Bloody discharge from the nose, mouth and other openings is visible after the death of an animal. The carcass



suspected of having anthrax must be disposed immediately and buried deep in the soil. The soil must be covered with lime as anthrax spores can remain viable in the soil for years.

Black quarter

It is an infectious fatal disease that affects cattle. Black quarter is characterised by gaseous oedema of the skeletal muscle and toxæmia (toxins produced by bacteria in the blood). The disease mostly affects healthy cattle aged 6 to 24 months. Clinical signs of the disease include high fever, loss of appetite, dullness, and crepitating swelling (crackling or rattling sound on pressing the swollen area) over the hip, back and shoulders. It can be cured with the administration of antibiotics as advised by a veterinarian. But the treatment is ineffective at an advanced septicaemia stage (when bacteria enter the blood stream).

Haemorrhagic septicaemia

Bacteria, causing haemorrhagic septicaemia, may be present in healthy animals. But when an animal is weaker and stressed, the bacteria multiply and cause haemorrhagic septicaemia. This is a serious infectious disease affecting cows and buffaloes. It is characterised by high fever, watery discharge from the nostril and loss of appetite. There is swelling under the affected animal's neck. Besides, there is infection in the upper respiratory tract of the animal, causing difficulty in breathing. If not treated in time, the animal may die within three to four days. The disease can be prevented by vaccination.

Brucellosis

This disease affects adult animals and causes abortion in pregnant cows and buffaloes, rendering economic losses to a dairy farmer or owner. It causes swelling of testicles in bulls. This disease has zoonotic importance, i. e., it can also spread in humans. A human gets infected by brucellosis on consuming the milk or meat of an infected animal. Bacteria in the animal's blood, semen or placenta can also infect humans through cuts and wounds. The disease is characterised by abortion,



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retained placenta, lowered milk yield and inflammation in the male reproductive organ. Brucellosis can spread from animal-to-animal on contact with infected aborted foetus or placenta, infected semen, vehicles and equipment and consumption of contaminated fodder or milk. It can be prevented by vaccination of cows, buffaloes and bulls.

Tuberculosis

It is a chronic zoonotic disease, affecting both animals and humans. An animal may contract the infection by inhalation, causing the formation of lesions in the lungs, intestine and udder. The disease can be confirmed by laboratory test and post-mortem examination of the infected animal. It can be prevented by vaccination and isolation of the infected animal.

Mastitis

Bacterial agents lead to mastitis in dairy animals. Bacterial organisms invade the udder, multiply and produce harmful substances, causing inflammation. It causes reduction in the yield and alters the milk composition. Mastitis causes maximum losses to dairy farmers. In mastitis, the udder of the animal is hot and swollen. The most obvious abnormalities in the milk are flakes and clots. Mastitis can be classified into clinical and sub-clinical. Clinical mastitis is characterised by abnormalities in the milk or udder. In sub-clinical mastitis, there is no visible change in the appearance of the udder. There is inflammation in the mammary gland.



Fig. 1.14: Mastitis in a cow's udder



Practical Exercise

Activity

Visit a nearby dairy farm. Talk to the caretaker and find out diseases that have have recurred in the farm in the past one year.

Material required: writing material

Procedure

- Visit a nearby dairy farm.
- Talk to the caretaker and find out the diseases that have recurred in the farm in the past one year.
- Record your findings.
- Present your findings before the class.

Check Your Progress

A. Multiple Choice Questions

1. Which of the following is a symptom of FMD?
 - (a) High fever
 - (b) Vesicles and blisters in the mouth
 - (c) Excessive salivation
 - (d) All of the above
2. In male animals, brucellosis causes _____.
 - (a) abortion
 - (b) swelling of the testicles
 - (c) Both (a) and (b)
 - (d) None of the above
3. In black quarter disease, there is crepitating swelling over the _____.
 - (a) hip
 - (b) back
 - (c) shoulders
 - (d) All of the above
4. In mastitis, the udder becomes _____.
 - (a) swollen
 - (b) hard
 - (c) painful
 - (d) All of the above
5. Indirect losses in animal husbandry are due to _____.
 - (a) abortion
 - (b) infertility
 - (c) sterility
 - (d) All of the above

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B. Fill in the Blanks

1. Brucellosis causes _____ in pregnant animals.
2. Mastitis is the most common and expensive disease in _____ animals.
3. In mastitis, the milk appears _____ and _____.
4. FMD is a highly _____ disease in farm animals.

C. Mark True (T) or False (F)

1. In anthrax, small amount of bloody discharge from the nose, mouth and other openings is noticed in an animal after death.
2. Timely reporting does not help in better management of diseases.
3. Brucellosis has zoonotic implications.
4. In haemorrhagic septicaemia, infection occurs in an animal's upper respiratory tract.
5. FMD is not a communicable disease.



Dairy Worker - Class 10

Unit 1: Maintaining the Healthy Performance of Animals

Session 1: Common Non-infectious Diseases and Other Disorders in Dairy Animals

Check Your Progress

A. Multiple Choice Questions

1. Passage of loose and watery faeces in increased frequency is known as _____.
(a) diarrhoea
(b) tympany
(c) anorexia
(d) None of the above
2. Impaction is caused due to ingestion of a large amount of _____.
(a) highly fermentable carbohydrate-rich food
(b) leftover food from parties and marriages
(c) Both (a) and (b)
(d) None of the above
3. The main routes of disease transmission are _____.
(a) aerosol
(b) direct contact
(c) oral
(d) All of the above
4. Abnormal distension of the rumen caused by the accumulation of gases is known as _____.
(a) tympany
(b) impaction
(c) indigestion
(d) None of the above

B. Fill in the Blanks

1. _____ is a metabolic disease in high-yielding animals caused by calcium deficiency.
2. Diarrhoea leads to _____ in affected animals.
3. The most commonly used antiseptic is _____ solution.
4. _____ is characterised by inflammation in the mammary glands.

C. Mark True (T) or False (F)

1. Simple indigestion is a minor disturbance in an animal's digestive function.
2. Enema is the administration of a medicine or warm soapy water through the anus.
3. Anorexia can occur because of infections.
4. Constipation occurs when an animal can easily defecate.

Dairy Worker - Class 10

Unit 1: Maintaining the Healthy Performance of Animals

Session 2: Parasitic Infections in Dairy Animal

Check Your Progress

A. Multiple Choice Questions

1. A method(s) of controlling ectoparasites is/are _____.
(a) dipping (b) spraying
(c) injection (d) All of the above
2. Insecticides must be sprayed on to buildings, paddocks and barns, where animals live, every _____.
(a) two weeks
(b) two months
(c) three months
(d) four months
3. Dipping should be done in the _____.
(a) afternoon
(b) early morning
(c) evening
(d) any time of the day
4. For effective control of ectoparasites, second treatment is, usually, required after _____ of the first treatment.
(a) 7–9 days
(b) 15–21 days
(c) 1–2 months
(d) 3–4 months
5. A person applying ectoparasiticides to animals must wear _____.
(a) only gloves
(b) only eye shield
(c) only mask
(d) All of the above

B. Fill in the Blanks

1. _____ are organisms that live on the skin of animals.
2. Ticks feed on the _____ of the animal on which it lives.
3. Ectoparasites are responsible for the transmission of _____.
4. For pour-on method, a recommended medicine must be poured along the _____ of an infected animal.
5. Some ectoparasiticides can be injected into the animal through the _____ route.

C. Mark True (T) or False (F)

1. Dipping of an animal can be done in all seasons.
2. Ectoparasiticides must not be administered to sick animals.
3. Heavy infestation of ectoparasites is, usually, associated with the poor health of animals.
4. A single ectoparasiticide treatment may be sufficient for controlling the spread of ectoparasites.
5. Ectoparasite control cannot be achieved by integrated approach.

Dairy Worker - Class 10

Unit 1: Maintaining the Healthy Performance of Animals

Session 3: Common Infectious Diseases in Dairy Animals

Check Your Progress

A. Multiple Choice Questions

1. Which of the following is a symptom of FMD?
 - (a) High fever
 - (b) Vesicles and blisters in the mouth
 - (c) Excessive salivation
 - (d) All of the above
2. In male animals, brucellosis causes _____.
 - (a) abortion
 - (b) swelling of the testicles
 - (c) Both (a) and (b)
 - (d) None of the above
3. In black quarter disease, there is crepitating swelling over the _____.
 - (a) hip
 - (b) back
 - (c) shoulders
 - (d) All of the above
4. In mastitis, the udder becomes _____.
 - (a) swollen
 - (b) hard
 - (c) painful
 - (d) All of the above
5. Indirect losses in animal husbandry are due to _____.
 - (a) abortion
 - (b) infertility
 - (c) sterility
 - (d) All of the above

B. Fill in the Blanks

1. Brucellosis causes _____ in pregnant animals.
2. Mastitis is the most common and expensive disease in _____ animals.
3. In mastitis, the milk appears _____ and _____.
4. FMD is a highly _____ disease in farm animals.

C. Mark True (T) or False (F)

1. In anthrax, small amount of bloody discharge from the nose, mouth and other openings is noticed in an animal after death.
2. Timely reporting does not help in better management of diseases.
3. Brucellosis has zoonotic implications.
4. In haemorrhagic septicaemia, infection occurs in an animal's upper respiratory tract.
5. FMD is not a communicable disease.

Unit

2



Prevention of Diseases

The adage, 'prevention is better than cure', is applicable in case of farm animals as well. Farm animals are afflicted by a number of diseases, and sometimes, the treatment may turn out to be quite expensive. Therefore, it becomes imperative that appropriate and timely measures are taken to prevent the occurrence of diseases. This Unit discusses the guidelines that need to be followed to prevent various diseases in dairy animals, vaccination schedule of animals and 'one health' approach.



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SESSION 1: GUIDELINES FOR PREVENTION OF DISEASES IN DAIRY ANIMALS

A disease in an animal in a dairy farm poses a risk to healthy animals, as well as, humans. Diseases lead to reduced productivity in terms of milk yield, wool, meat and reproduction in the affected animals, causing heavy losses to a dairy farmer. Dairy farmers, therefore, need to follow the precautions as given in Fig. 2.1 to prevent the occurrence and spread of various diseases in cattle.

Optimum nutrition

Like humans, animals, too, need a balanced diet laced with all essential nutrients. A balanced nutrition helps

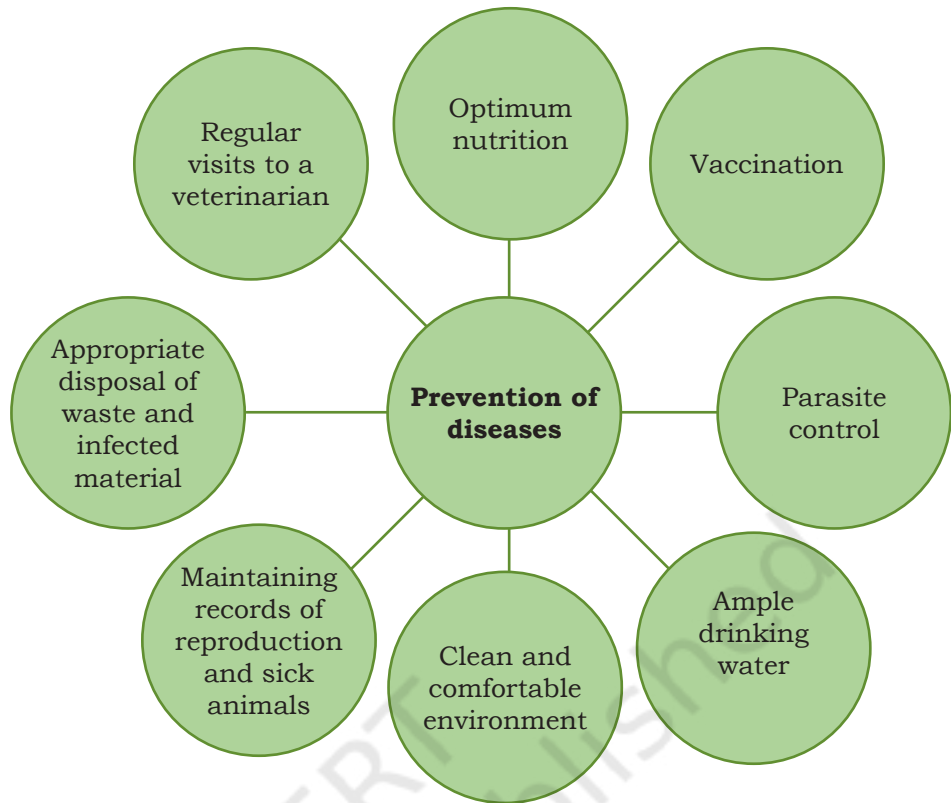


Fig. 2.1: Measures for prevention of diseases

the animals grow, increase their vigour, milk yielding and reproduction capacity, apart from giving them the immunity to fight against infections and diseases. Offering optimum nutrition to the animals prevents them from nutrition related metabolic diseases, such as milk fever, acidosis, etc.

Vaccination

Vaccinating animals, as recommended by a veterinarian, prevents them from various diseases. It is important to vaccinate the animals on a regular basis as advised by the veterinarian. The guidelines and schedule as regards to the vaccination of animals have been discussed in the next Session.

Parasite control

It is important to check parasitic infestation in dairy animals. We have already studied about the different types of parasite that may inflict dairy animals and the diseases they can cause in Unit 1. To prevent parasitic



infections and diseases, one must ensure animal hygiene, and maintain cleanliness and hygiene in the sheds, as well as, the farm.

Providing ample clean drinking water

Lack of clean drinking water facilities at a dairy farm may cause severe dehydration and other diseases in the animals like heatstroke (which may even prove fatal), leading to a drop in the milk yield. Therefore, it must be ensured that the animals are made to drink ample water and kept hydrated at all times.

Clean and comfortable environment

Cleanliness is of paramount importance, especially, when the animals are reared in confinement. One must ensure that the floor and walls of a shed, milking equipment and containers used to store milk are clean. A clean and comfortable environment improves the health of the animals.

Appropriate disposal of waste

Prompt and appropriate disposal of different types of waste generated in a dairy farm is important to prevent the occurrence and spread of diseases and infections in animals.

Maintaining records of reproduction and sick animals

Farm records help keep a track of the health of animals, apart from providing information like birth, calving, lactation, feed, daily milk yield, vaccination, health check-up, etc. They also help trace sick animals, origin and spread of diseases. Records of production hint at the likelihood of the occurrence of diseases in certain animals.

Regular visits to a veterinarian

Some farmers try to save money by avoiding regular visits to a veterinarian, and instead, adopt traditional ways to treat certain diseases in animals, which may not be effective. A dairy farmer must ensure that the animals are taken for regular veterinary check-ups to prevent the occurrence and spread of certain diseases and infections.



Check Your Progress

A. Multiple Choice Questions

- Milk fever is a _____.
 - nutrition related metabolic disorder
 - symptom of fever in an animal
 - disease caused due to vaccination
 - None of the above
- Feeding optimum nutrition to dairy animals leads to _____.
 - increased milk production
 - prevention of diseases like milk fever
 - Both (a) and (b)
 - None of the above
- Vaccination of dairy animals is _____.
 - routinely required
 - seldom required
 - required as per the needs of the animals
 - None of the above
- Various types of animal parasite can be controlled by _____.
 - maintaining hygiene in a farm
 - applying parasitocides
 - Both (a) and (b)
 - None of the above
- Farm records can help _____.
 - trace the origin and spread of diseases
 - get indications as regards to the occurrence of diseases
 - Both (a) and (b)
 - None of the above

B. Fill in the Blanks

- A dairy farmer must ensure that the animals are taken for regular _____ check-ups.
- _____ and _____ are of paramount importance in a dairy farm.
- Shortage of clean drinking water can lead to _____ and _____.
- Prompt disposal of _____ is important to prevent the occurrence and spread of diseases in animals in a dairy farm.
- Vaccines are administered to animals as per the recommended _____ and _____.

C. Mark True (T) or False (F)

- Farm animals are affected by prolonged hunger.
- Prolonged water shortage does not affect farm animals.



3. Most farm animals are not affected by diseases.
4. Disease in a dairy animal poses a threat to both animals and humans.
5. Some animal diseases can be prevented if timely preventive steps are taken.

SESSION 2: VACCINATION OF DAIRY ANIMALS

Like humans, cattle, too, suffer from a number of diseases. Preventing diseases is cheaper than treating them. Therefore, an animal needs to be administered timely vaccination so as to check the occurrence of major diseases, including Foot and Mouth Disease (FMD) and others.

Vaccine

A vaccine is used to protect animals from diseases. It is a medicine that provides immunity to an animal or human to combat certain infectious diseases and diseases caused by germs and microorganisms. A vaccine works by training the immune system to recognise and combat pathogens, either viruses or bacteria. It contains a harmless part of a germ or deactivated toxin that the germ produces. A vaccine must produce resistance in the herd to prevent the spread of an infectious disease and minimise economic losses to the farmer due to its treatment. As a thumb rule, vaccines are administered only to healthy animals.

Vaccination schedule in farm animals

Appropriate storage, dosage and timing of vaccination are important to prevent animals from catching infections or diseases, and their recurrence. A vaccination schedule includes primary vaccination, booster vaccination and re-vaccination. Booster doses and re-vaccination are required for maintaining immunity in the animals.

Major diseases for which cattle require vaccination are FMD, black quarter, haemorrhagic septicaemia, anthrax and brucellosis. The recommended vaccination schedule for common diseases in cows and buffaloes is shown in Table 2.1.



Table 2.1: Recommended vaccination schedule for cows and buffaloes

S. No.	Vaccine	Primary vaccination (age of the animals)	Booster	Re-vaccination
1.	FMD vaccine	6–8 weeks	6 months after first dose	Annually
2.	Haemorrhagic septicaemia vaccine	6 months and above	Not required	Annually
3.	Brucellosis vaccine	4–10 months in female calf	Not required	Given once in a lifetime
4.	Black quarter vaccine	6 months and above	Not required	Annually
5.	Anthrax vaccine	6 months and above	Not required	Annually in endemic areas

Precautions during vaccination

Following precautions must be taken while administering vaccines to farm animals.

- A vaccine must be administered through the subcutaneous, intradermal or intramuscular route. Standard instructions as regards to the route of administration of a vaccine are prescribed by the manufacturer, which need to be followed strictly. If the instructions are not followed correctly, it may result in inactivation of the vaccine and diseases may persist in the animals, causing severe organ damage and even death.
- Do not clean the skin of the animal with an alcohol swab prior to vaccination. Alcohol can inactivate microorganisms present in the vaccine.
- Clean vaccine spillages (on an animal's body, or a table or floor) immediately with a disinfectant as most vaccines used in farm animals are infectious or 'live' biological products. If a vaccine spills onto an animal health worker's clothing, then one must change one's clothes immediately and wash them with detergent and water. If the spillage is not cleaned immediately, it may cause illness in animals and lead to the spread of infectious diseases in the farm.
- If an animal shows local or systemic reaction after vaccination, it needs to be documented for subsequent booster vaccinations. If the animal



has a history of reaction to a vaccine, then subsequent vaccination is administered only under veterinary supervision. In such cases, a change in the vaccine and pre-medication with anti-inflammatory drugs is recommended.

- Vaccination must be avoided in case of adverse weather conditions, nutritional imbalances or in the last months of pregnancy.
- Documenting the vaccination programme is important as it is a legal proof of the vaccination status. It also helps monitor adverse reactions in the animals after vaccination.

Different routes of administering vaccines

As already discussed, vaccines are administered through the subcutaneous, intradermal and intramuscular route. The angle of needle insertion describes the route of administration (Fig. 2.2).

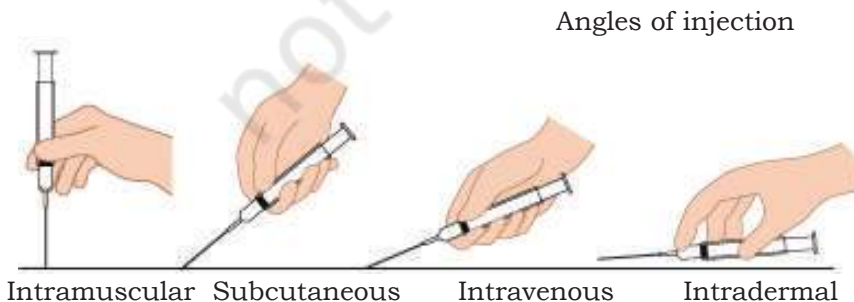
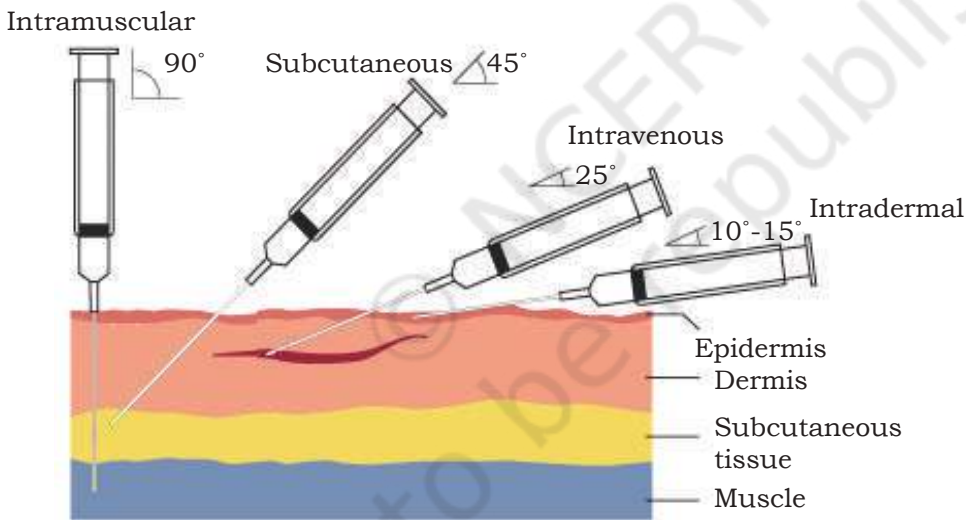


Fig. 2.2: Different angles of infection



Fig. 2.3: Vaccine being administered in a cow through the subcutaneous route



Fig. 2.4: Vaccine being administered in a cow through the intramuscular route

Components of vaccination documentation

The following information is recorded in the vaccination record for each animal.

- Name of the vaccine administered
- Manufacturer's details like lot or serial number, expiry date of the vaccine, etc.
- Date of administration
- Route of administration

The manufacturer's label is removed from the vaccine bottle and pasted on the record register. It is easier to maintain computerised record. The different components of vaccination documentation are illustrated in Fig. 2.5.

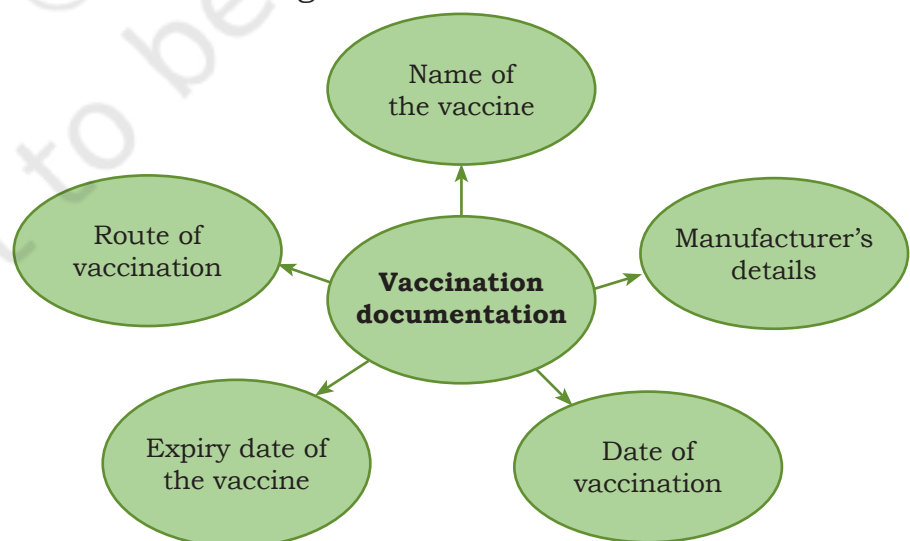


Fig. 2.5: Components of vaccination documentation



Check Your Progress

NOTES

A. Multiple Choice Questions

1. Common side-effects observed after vaccination include _____.
(a) redness, mild swelling and tenderness at the vaccination site
(b) decreased activity levels (fatigue)
(c) loss of appetite
(d) All of the above
2. Vaccines can be administered through the _____ route(s) in an animal.
(a) subcutaneous
(b) intradermal
(c) intramuscular
(d) All of the above
3. Vaccination must be avoided during _____.
(a) adverse weather conditions
(b) nutritional imbalances
(c) in the last months of pregnancy
(d) All of the above
4. FMD vaccination cannot be done at an age of _____.
(a) 6–8 months
(b) one year
(c) two years
(d) less than three months
5. Re-vaccination is required in case of _____.
(a) FMD
(b) haemorrhagic septicaemia
(c) black quarter
(d) All of the above

B. Fill in the Blanks

1. Once a vaccine has been reconstituted, it is administered within _____.
2. An angle of _____ is the angle of administering a vaccine through the subcutaneous route in a dairy animal.
3. _____ is required to control diseases in animals.
4. All animals must be _____ before vaccination.

C. Mark True (T) or False (F)

1. Vaccine is not administered in weak animals.
2. The date and route of vaccine administration must be documented.
3. A vaccine does not require appropriate disposal.
4. Mildly sick animals can be vaccinated.
5. Vaccination makes an animal sick.



SESSION 3: ONE HEALTH APPROACH

Animals, humans and environment are interlinked. This has its benefits but is also responsible for the spread of chronic diseases via 'zoonosis'. Zoonosis refers to diseases transferable from animals to humans and vice-versa. The 'one health' approach is illustrated in Fig. 2.6.

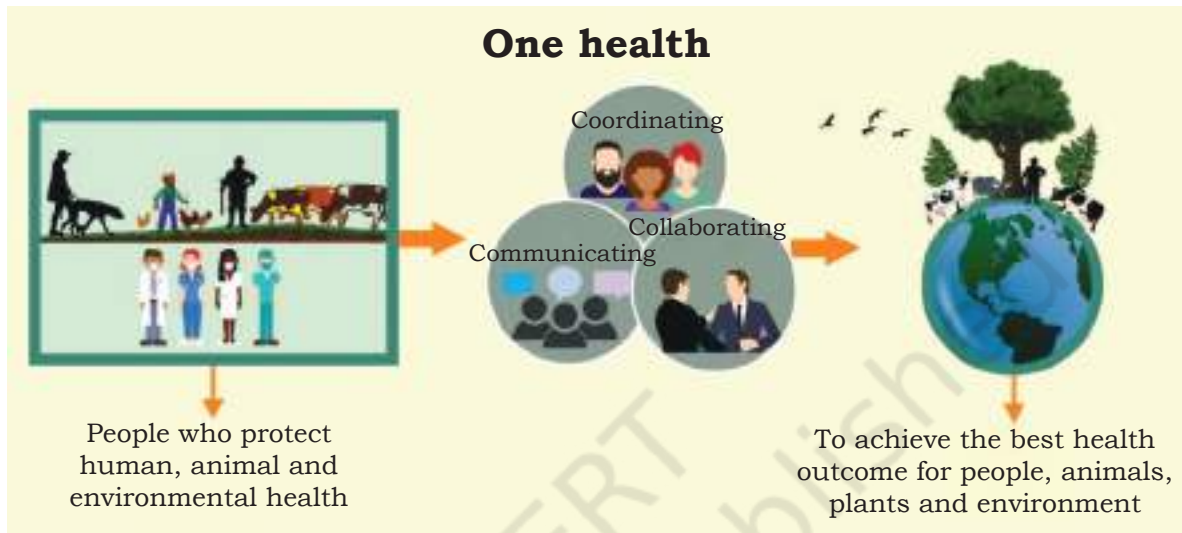


Fig. 2.6: The health of animals, humans and environment are interlinked.

Animals carry harmful germs and microorganisms, such as bacteria, fungi, parasites and viruses. These are transmitted to humans and cause various diseases. Corona virus, which has been causing a large number of deaths since the year 2020 and has also wreaked havoc on the global economy, is zoonotic in nature. Corona virus was transmitted from wild animals to humans.

Antimicrobial resistance coupled with environmental pollution has aggravated the zoonosis scenario. We need an interdisciplinary and intersectoral expertise to tackle this problem, which has given birth to the 'one health approach'. 'One health' refers to the collaborative efforts put in by local, national and global experts from public health, health care, forestry, veterinary, environment and other related disciplines to attain optimum health for humans, animals and the environment. The concept of 'one health approach' is illustrated in Fig. 2.7.

As already mentioned, the health of human beings, animals, plants and environment is interdependent.



'One health' means taking care of the health of all in totality. If animals happen to carry an infection, it may get transmitted to humans, as well as, the environment. Similarly, if the environment is polluted, it may adversely affect the health of all living beings. Approximately, 75 per cent of new diseases in humans are known to have originated from animals. Thus, the health of humans and livestock or wildlife cannot be discussed in isolation.

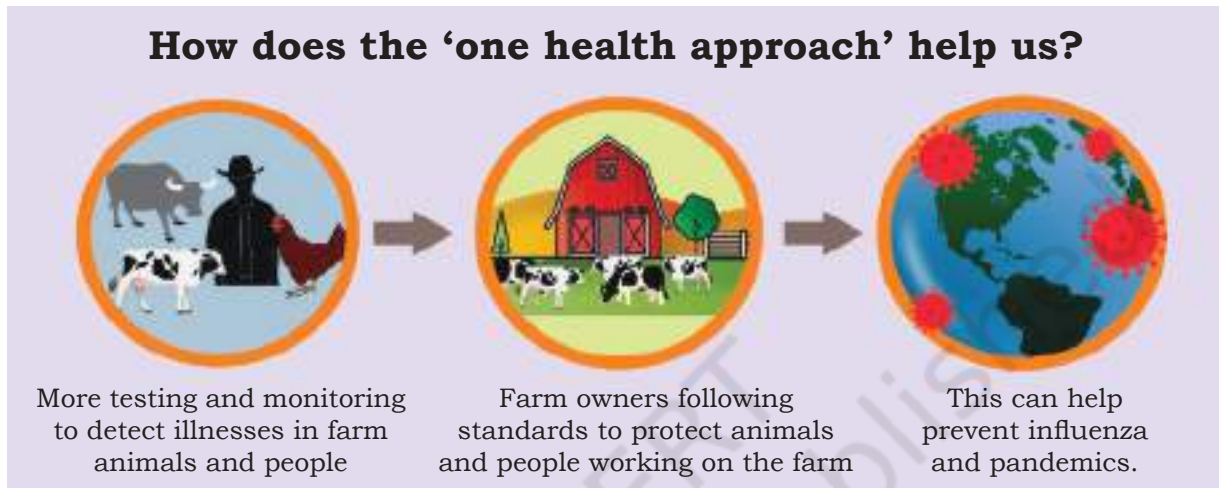


Fig. 2.7: One health approach

What is 'one health' approach?

Under the one health approach, veterinary experts, environmentalists and agriculturalists work together towards the production of healthy food and controlling diseases, thereby, leading to healthy humans and animals, and clean environment. Major zoonotic diseases, such as rabies, anthrax, tuberculosis and brucellosis get aggravated because of increase in population levels, climate change and encroachment of territories of wild animals by humans.

Zoonosis and its control

Zoonosis has many modes of transmission. In direct zoonosis, a disease is transmitted directly through the bites and saliva of animals (for example, rabies). In indirect zoonosis, contaminated foods of animal origin (meat, eggs and milk) can infect human beings. Parasitic zoonosis is also common. Thus, the one health approach is followed for the prevention and



control of zoonotic diseases in animals, human beings, plants and environment.

Consuming fresh lettuce may make some people sick and even cause death in some cases. E. Coli is a common bacteria infecting humans, which causes food poisoning. But it is harmless in case of cows. If cows feed in a pasture close to a lettuce field, there is a possibility of transmission of E. Coli bacteria to the lettuce via their urine or dung. If a healthy person consumes such lettuce, one may easily get infected. This is an example of zoonotic infection through cows. The sequence of the events is explained in Fig. 2.8.

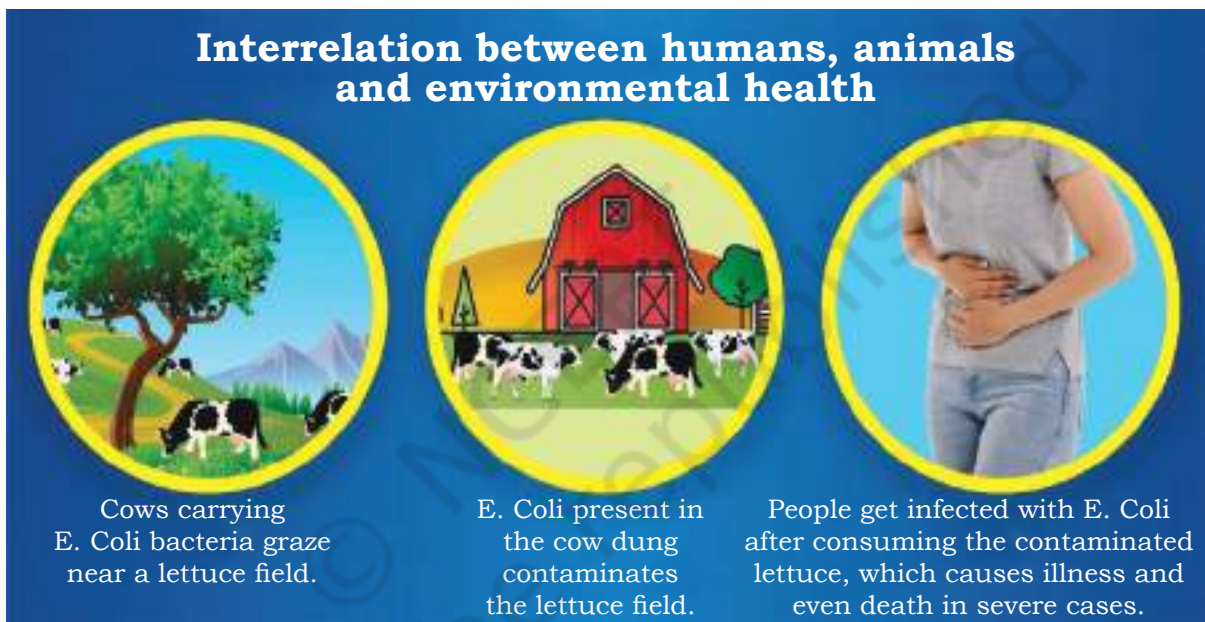


Fig. 2.8: Zoonotic infection by the transmission of E. Coli

Aims of one health approach

The following are the aims of the one health approach.

- Integration, cooperation and collaboration between humans, veterinary and environmental science
- Expansion of scientific knowledge
- Accelerated drug discoveries
- Improved human or animal medical education
- Improved human and animal health
- Effective utilisation of resources and infrastructure
- Better understanding of diseases and their prevention



Check your Progress

NOTES

A. Multiple Choice Questions

1. One health approach means collaborative efforts by _____.
(a) local experts
(b) national experts
(c) global experts
(d) All of the above
2. Carona virus is an example of _____.
(a) zoonotic disease
(b) bacterial disease
(c) Both (a) and (b)
(d) None of the above
3. Under the one health approach, we take the help of experts from the field of _____.
(a) public health
(b) environmental and forest sciences
(c) veterinary sciences
(d) All of the above
4. The main aim of the one health approach is to take care of the health of _____.
(a) human beings
(b) animals and plants
(c) environment
(d) All of the above
5. E. Coli is harmful for _____.
(a) cattle
(b) humans
(c) Both (a) and (b)
(d) None of the above

B. Fill in the Blanks

1. _____ is an example of a zoonotic disease caused by dog bite.
2. _____ drug discovery is one of the aims of the one health approach.
3. Environmental pollution can further _____ zoonotic diseases.
4. Many diseases from animals can be _____ to humans.
5. Anthrax and brucellosis are examples of _____ diseases.

C. Mark True (T) or False (F)

1. Expansion of scientific knowledge is not an aim of one health approach.
2. The one health approach is not useful for prevention and control of zoonotic diseases.
3. Approximately, 75 per cent of newly traced human diseases are zoonotic in nature.
4. Human, animal and environmental health are not interrelated.
5. Contaminated meat, eggs and milk can spread zoonotic diseases.



Check Your Progress

A. Multiple Choice Questions

1. Milk fever is a _____.
(a) nutrition related metabolic disorder
(b) symptom of fever in an animal
(c) disease caused due to vaccination
(d) None of the above
2. Feeding optimum nutrition to dairy animals leads to _____.
(a) increased milk production
(b) prevention of diseases like milk fever
(c) Both (a) and (b)
(d) None of the above
3. Vaccination of dairy animals is _____.
(a) routinely required
(b) seldom required
(c) required as per the needs of the animals
(d) None of the above
4. Various types of animal parasite can be controlled by _____.
(a) maintaining hygiene in a farm
(b) applying parasitocides
(c) Both (a) and (b)
(d) None of the above
5. Farm records can help _____.
(a) trace the origin and spread of diseases
(b) get indications as regards to the occurrence of diseases
(c) Both (a) and (b)
(d) None of the above

B. Fill in the Blanks

1. A dairy farmer must ensure that the animals are taken for regular _____ check-ups.
2. _____ and _____ are of paramount importance in a dairy farm.
3. Shortage of clean drinking water can lead to _____ and _____.
4. Prompt disposal of _____ is important to prevent the occurrence and spread of diseases in animals in a dairy farm.
5. Vaccines are administered to animals as per the recommended _____ and _____.

C. Mark True (T) or False (F)

1. Farm animals are affected by prolonged hunger.
2. Prolonged water shortage does not affect farm animals.

3. Most farm animals are not affected by diseases.
4. Disease in a dairy animal poses a threat to both animals and humans.
5. Some animal diseases can be prevented if timely preventive steps are taken.

Dairy Worker - Class 10

Unit 2: Prevention of Diseases, Session 2: Vaccination of Dairy Animals

Check Your Progress

A. Multiple Choice Questions

1. Common side-effects observed after vaccination include _____.
 - (a) redness, mild swelling and tenderness at the vaccination site
 - (b) decreased activity levels (fatigue)
 - (c) loss of appetite
 - (d) All of the above
2. Vaccines can be administered through the _____ route(s) in an animal.
 - (a) subcutaneous
 - (b) intradermal
 - (c) intramuscular
 - (d) All of the above
3. Vaccination must be avoided during _____.
 - (a) adverse weather conditions
 - (b) nutritional imbalances
 - (c) in the last months of pregnancy
 - (d) All of the above
4. FMD vaccination cannot be done at an age of _____.
 - (a) 6–8 months
 - (b) one year
 - (c) two years
 - (d) less than three months
5. Re-vaccination is required in case of _____.
 - (a) FMD
 - (b) haemorrhagic septicaemia
 - (c) black quarter
 - (d) All of the above

B. Fill in the Blanks

1. Once a vaccine has been reconstituted, it is administered within _____.
2. An angle of _____ is the angle of administering a vaccine through the subcutaneous route in a dairy animal.
3. _____ is required to control diseases in animals.
4. All animals must be _____ before vaccination.

C. Mark True (T) or False (F)

1. Vaccine is not administered in weak animals.
2. The date and route of vaccine administration must be documented.
3. A vaccine does not require appropriate disposal.
4. Mildly sick animals can be vaccinated.
5. Vaccination makes an animal sick.

Dairy Worker - Class 10

Unit 2: Prevention of Diseases, Session 3: One Health Approach

Check your Progress

A. Multiple Choice Questions

1. One health approach means collaborative efforts by _____.
(a) local experts
(b) national experts
(c) global experts
(d) All of the above
2. Carona virus is an example of _____.
(a) zoonotic disease
(b) bacterial disease
(c) Both (a) and (b)
(d) None of the above
3. Under the one health approach, we take the help of experts from the field of _____.
(a) public health
(b) environmental and forest sciences
(c) veterinary sciences
(d) All of the above
4. The main aim of the one health approach is to take care of the health of _____.
(a) human beings
(b) animals and plants
(c) environment
(d) All of the above
5. E. Coli is harmful for _____.
(a) cattle
(b) humans
(c) Both (a) and (b)
(d) None of the above

B. Fill in the Blanks

1. _____ is an example of a zoonotic disease caused by dog bite.
2. _____ drug discovery is one of the aims of the one health approach.
3. Environmental pollution can further _____ zoonotic diseases.
4. Many diseases from animals can be _____ to humans.
5. Anthrax and brucellosis are examples of _____ diseases.

C. Mark True (T) or False (F)

1. Expansion of scientific knowledge is not an aim of one health approach.
2. The one health approach is not useful for prevention and control of zoonotic diseases.
3. Approximately, 75 per cent of newly traced human diseases are zoonotic in nature.
4. Human, animal and environmental health are not interrelated.
5. Contaminated meat, eggs and milk can spread zoonotic diseases.

Unit

3



Process of Milk Production



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Milking is the process of drawing milk from the teats (mammary glands) of a dairy animal either manually or mechanically. During milking, dairy animals need to be handled gently and milked carefully at regular intervals. It must be ensured that milking is a pleasant experience for the animal so that it is able to eject all milk.

SESSION 1: PRE- AND POST-MILKING ACTIVITIES

Milk is highly perishable in nature. It is, usually, harvested under unhygienic conditions, without following the practice of cleaning and sterilising the containers used for its storage and transportation, which may lead to its spoilage. This Unit throws an insight into different pre- and post-milking activities that need to be performed to check spoilage.

Pre-milking activities

The milking schedule must be followed strictly. Pre-milking activities include preparation of the milking area or parlour and preparation of an animal for milking. Before the actual process begins, the shed must be cleaned and the animal brushed or bathed so that all dirt is removed from its body [Fig. 3.1 (a and b)]. The milking equipment must be cleaned and dried before use.

The udder and teats of the animal must be washed with lukewarm water (Fig 3.2) and dried with a paper towel or cotton cloth (Fig. 3.3). Offer concentrate feed to the animal at the time of milking. Kicking of the animal at the time of milking can be prevented by using a milkman's knot or rope (Fig. 3.4). Ensure that the nails of the person, who is to milk is the animal, i. e., the milker, are trimmed and hands cleaned with an antiseptic soap and water before performing milking. Incorrect milking and unhygienic conditions lead to low quality milk.



(a) (b)
Fig. 3.1 (a and b): Wash the animals before milking.



Fig. 3.2: Wash the animal's udder and teats with lukewarm water before milking.

Fig. 3.3: Dry the animal's udder and teats with a cotton cloth or paper towel.



Fig. 3.4: Use a milkman's knot or rope to tie the hind legs of the animal at the time of milking.

Fig. 3.5: A milk chilling tank of 1000 litre capacity

After the pre-milking steps are completed, the 'milking procedure' is followed. The steps which are followed subsequently come under post-milking activities.

Post-milking

Teat dipping

One of the most effective ways of controlling mastitis in a dairy animals is by dipping the teats of an animal in a germicide solution after milking. The purpose of post-milking teat dipping is to remove milk residue and prevent the entry of organisms through the teat ends. Teat dipping does not reduce the existing infections. However, the rate of occurrence of new infections can be reduced by up to 50 per cent. Chemicals like iodine and chlorine are used for teat dipping.

Storage and transportation of milk

Milk is stored in clean steel or aluminum containers covered with a lid and kept in a cool (4° C) and shady place. The milking area and utensils are cleaned to avoid contamination of milk.

Methods of milking

Milking can be done manually with hands or with the help of a milking machine. Milking by hands is the traditional way of drawing milk from lactating dairy animals for human consumption. Hand milking is suitable for low to medium yielding animals. In hand milking, two methods are, generally, practised — full hand milking (Fig. 3.6) and stripping (Fig. 3.7).

Hand Milking



Fig. 3.6: Full hand milking

Full hand milking

It is the best method of milking and most suited for animals having large teats. It starts with holding the animal's teats in the hand and fingers encircling them. The base of the teat is blocked by the fore finger and thumb, forming a ring. Alternate compression and relaxation of two teats (using both the hands) is done in quick succession to draw milk at a fast pace so that it comes out in the form of a continuous stream.



Stripping

This method is preferred, where the teats of an animal are small in size. In this method, a teat is squeezed firmly at the base with the thumb and fore finger. Then, the teat is pulled down the entire length and pressed simultaneously to cause the milk to flow down in a stream. Both the hands are used to milk two teats at the same time but they, usually, strip alternate ways. The process is repeated in quick succession.



Fig. 3.7: Stripping

Knuckling

There is another method of milking called 'knuckling' (Fig. 3.8), which is not advisable. It is a faulty method of milking, and hence, considered inappropriate. It must not be practised as it may cause injury to the animal's teats.



Fig. 3.8: Knuckling

Machine milking

It is the process of harvesting milk from the udder of dairy animals using a milking machine (Fig. 3.9). Machine milking is faster than hand milking and requires less labour (Fig. 3.10). The underlying principle of machine milking is drawing milk from the teats through the application of negative pressure at the teat ends and applying periodic massage to the teats, which prevents congestion of blood and lymph in the teats. The major parts of a milking machine are vacuum pump, pulsator, teat cups and connecting tubes.



Fig. 3.9: Milking machine is suitable for medium size dairy farms.



Fig. 3.10: Cattle being milked by a milking machine

Practical Exercise

Activity

Visit a nearby dairy farm and record the milking methods being followed there. Also, observe the milking process.

Material required: notebook and writing material

Procedure

- Visit a nearby dairy farm.
- Talk to the caretaker and find out the milking methods being followed there.
- Observe the milking process and record your observations.
- Now, give a presentation before the class.

Check Your Progress

A. Multiple Choice Questions

1. In machine milking, what kind of pressure is applied at the teat end?
 - (a) Positive pressure
 - (b) Negative pressure
 - (c) Both (a) and (b)
 - (d) None of the above
2. Milk must be stored in a clean container with its lid on. It must be kept at a temperature of _____.
 - (a) -4°C
 - (b) 0°C
 - (c) 4°C
 - (d) 10°C
3. Which of the following stimuli initiate milk let down reflex?
 - (a) Washing of the udder
 - (b) Sight of a calf
 - (c) Smell of a calf
 - (d) All of the above
4. An efficient milking method must ensure _____.
 - (a) removal of maximum milk
 - (b) production of dirt-free milk
 - (c) efficient use of labour and equipment
 - (d) All of the above
5. Which of the following statement(s) about knuckling is false?
 - (a) Fast milking method
 - (b) Milker bends one's hand against the teat
 - (c) Chances of injury to the teats are high
 - (d) Faulty method of milking



B. Fill in the Blanks

1. Dairy animals need to be milked at _____ intervals.
2. A milch animal is washed or brushed to remove _____ stuck to its body.
3. The udder of a dairy animal is washed with _____ water before milking.
4. A milkman's rope is used to _____ kicking by a dairy animal.
5. After milking, the teats of a dairy animal are dipped in a germicide solution to prevent _____.

C. Mark True (T) or False (F)

1. Kicking by an animal at the time of milking can be prevented by using a milkman's rope.
2. Iodine and chlorine are commonly used for teat dipping after milking a dairy animal.
3. The basic principle of machine milking is to draw milk from an animal's teats by the application of positive pressure at the teat end.
4. Knuckling is an advisable method of milking.
5. Teat dipping does not reduce an existing infection.

SESSION 2: CLEAN MILK PRODUCTION

Milk is considered to be the most nutritious food but it is highly perishable in nature. It remains in sterile condition while in the udder of a healthy animal. It becomes contaminated only during milking, cooling, storage, transportation and processing. Clean milk production implies milking healthy animals in hygienic conditions. Therefore, it is free from dust, dirt, flies, manure, etc. Clean milk has a normal composition, possesses a natural flavour, contains only a small amount of harmless bacteria, is free from hazardous chemical residues, and therefore, fit for consumption. Utmost caution is observed to prevent contamination of milk during various stages of handling and processing.

Essential components of clean milk production

The animal itself is one of the most important sources of milk contamination. Therefore, a healthy animal



Clean animal shed and surroundings

Healthy and clean animals

Clean udder and teats

Healthy and clean milker

Clean utensils

Correct milking practices

Straining and prompt cooling of the milk

Fig. 3.11: Essential components for clean milk production

is a must to ensure clean milk production. Following appropriate hygiene and sanitation practices in the milking area help keep the animal free from infections, and hence, aids clean milk production. It is important to keep animals clean and maintain hygiene in their sheds. Their dung must be disposed immediately, and arrangements for the drainage of dung, urine and wastewater be made. Besides, the udder and teats of the animals must be checked for swelling, lumps, tenderness or cracks before milking. It is advisable to test the foremilk at each milking with a strip cup to identify cows with mastitis.

Milkers and milk handlers need to be healthy. Their hands must be clean, and free from cuts and sores. Their nails should be cut as long nails can injure the teats of the animals.

Sick animals must always be milked towards the end. Then, the milking system (consisting of a milking machine, bucket or container used for storing milk) must be washed and sterilised.

Milking pails having a dome-shaped top instead of open buckets or vessels must be used for milking (Fig. 3.12). It must be ensured that after milking, the utensils used in the process are washed with detergent and water.

The milk must be strained with the help of a strainer (Fig. 3.13) and stored in a container with its lid on (Fig. 3.14). A clean aluminum container is commonly used for this purpose. The milk must always be stored at 4° C soon after milking to suppress bacterial growth and kept at this temperature till transported or processed. So, the milk needs to be transported at the earliest in clean containers in minimum transport time.



Fig. 3.12: Dome-shaped milking pail



Fig. 3.13: Strainer



Fig. 3.14: Aluminum containers for storing milk



Advantages of clean milk production

Some of the advantages of clean milk production are as follows (Fig. 3.15).

- The milk is free from disease causing organisms.
- Better quality of processed milk products can be made with clean milk.
- Raw milk can be stored unprocessed for three to four hours at room temperature.
- The milk is safe for long distance transportation.
- It is suitable for human consumption.
- It provides protection against diseases, such as typhoid, dysentery, septic, sore throat, etc., in humans.

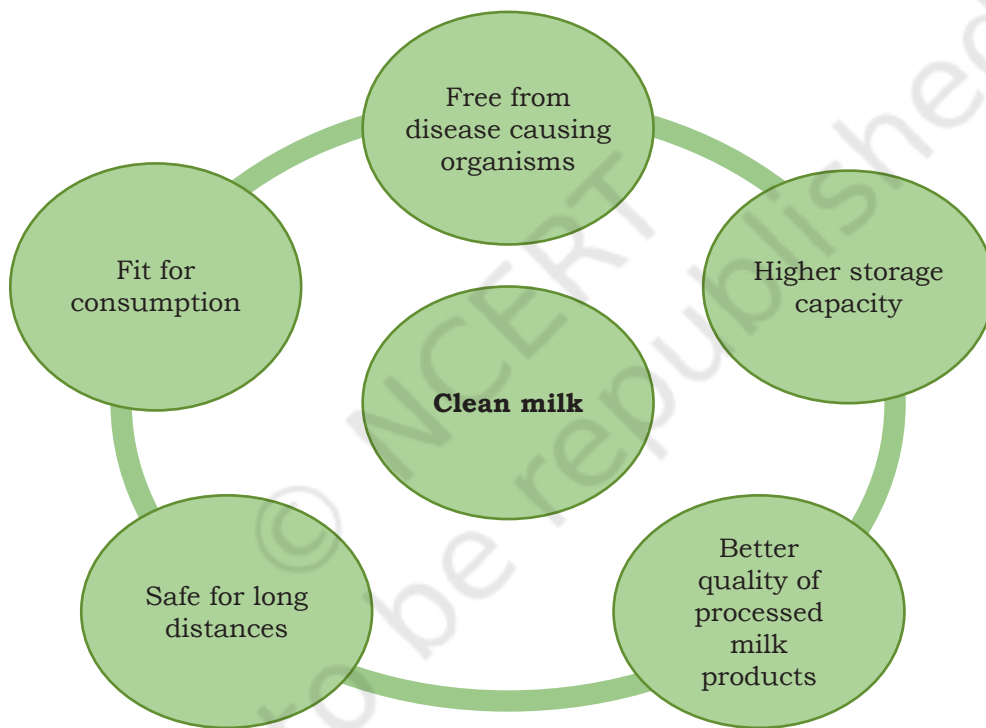


Fig. 3.15: Advantages of clean milk

Practical Exercise

Activity

Visit a nearby dairy farm and observe the process of milk production being followed there. Point out if clean milk production practices are being followed or not.

Material required: notebook and writing material

NOTES

Procedure

- Visit a nearby dairy farm.
- Observe the milk production practices being followed there.
- Identify if the farm is practising clean milk production method. If not, point out the loopholes that you observe.
- Also, mention how can one overcome such drawbacks.
- Prepare a note based on your observations.
- Present it before the class.

Check Your Progress

A. Multiple Choice Questions

1. Milk is not contaminated during the _____ stage.
(a) milking
(b) transportation and processing
(c) cooling
(d) None of the above
2. Which of the following about clean milk is true?
(a) Normal composition
(b) Possesses a natural flavour
(c) Contains only a small amount of harmless bacteria
(d) All of the above
3. Clean milk is _____.
(a) safe for long distance transportation
(b) fit for consumption
(c) Both (a) and (b)
(d) None of the above
4. The essential components for clean milk production are _____.
(a) clean utensils
(b) clean animal shed
(c) Both (a) and (b)
(d) None of the above
5. _____ is an advantage of clean milk production.
(a) Free from disease causing organisms
(b) Suitable for human consumption
(c) Both (a) and (b)
(d) None of the above

B. Fill in the Blanks

1. _____ cows must be milked towards the end.
2. Clean milk is fit for _____ consumption.
3. After milking, the utensils used for the purpose must be washed with _____ and _____.



4. Better quality of milk products can be manufactured with _____.
5. The foremost requirement for clean milk production is a _____ animal.

C. Mark True (T) or False (F)

1. A milking pail should have a dome-shaped top.
2. Milk is in sterile condition while in the udder of a healthy animal.
3. Clean milk is free from dust, dirt, flies, manure, etc.
4. It is advisable to test the foremilk at each milking with a strip cup to identify cows suffering from mastitis.
5. Raw milk can be stored unprocessed up to 10 hours at room temperature.

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Dairy Worker - Class 10

Unit 3: Process of Milk Production, Session 1: Pre- and Post-milking Activities

Check Your Progress

A. Multiple Choice Questions

1. In machine milking, what kind of pressure is applied at the teat end?
 - (a) Positive pressure
 - (b) Negative pressure
 - (c) Both (a) and (b)
 - (d) None of the above
2. Milk must be stored in a clean container with its lid on. It must be kept at a temperature of _____.
 - (a) -4°C
 - (b) 0°C
 - (c) 4°C
 - (d) 10°C
3. Which of the following stimuli initiate milk let down reflex?
 - (a) Washing of the udder
 - (b) Sight of a calf
 - (c) Smell of a calf
 - (d) All of the above
4. An efficient milking method must ensure _____.
 - (a) removal of maximum milk
 - (b) production of dirt-free milk
 - (c) efficient use of labour and equipment
 - (d) All of the above
5. Which of the following statement(s) about knuckling is false?
 - (a) Fast milking method
 - (b) Milker bends one's hand against the teat
 - (c) Chances of injury to the teats are high
 - (d) Faulty method of milking

B. Fill in the Blanks

1. Dairy animals need to be milked at _____ intervals.
2. A milch animal is washed or brushed to remove _____ stuck to its body.
3. The udder of a dairy animal is washed with _____ water before milking.
4. A milkman's rope is used to _____ kicking by a dairy animal.
5. After milking, the teats of a dairy animal are dipped in a germicide solution to prevent _____.

C. Mark True (T) or False (F)

1. Kicking by an animal at the time of milking can be prevented by using a milkman's rope.
2. Iodine and chlorine are commonly used for teat dipping after milking a dairy animal.
3. The basic principle of machine milking is to draw milk from an animal's teats by the application of positive pressure at the teat end.
4. Knuckling is an advisable method of milking.
5. Teat dipping does not reduce an existing infection.

Check Your Progress

A. Multiple Choice Questions

- Milk is not contaminated during the _____ stage.
 - milking
 - transportation and processing
 - cooling
 - None of the above
- Which of the following about clean milk is true?
 - Normal composition
 - Possesses a natural flavour
 - Contains only a small amount of harmless bacteria
 - All of the above
- Clean milk is _____.
 - safe for long distance transportation
 - fit for consumption
 - Both (a) and (b)
 - None of the above
- The essential components for clean milk production are _____.
 - clean utensils
 - clean animal shed
 - Both (a) and (b)
 - None of the above
- _____ is an advantage of clean milk production.
 - Free from disease causing organisms
 - Suitable for human consumption
 - Both (a) and (b)
 - None of the above

B. Fill in the Blanks

- _____ cows must be milked towards the end.
- Clean milk is fit for _____ consumption.
- After milking, the utensils used for the purpose must be washed with _____ and _____.
- Better quality of milk products can be manufactured with _____.
- The foremost requirement for clean milk production is a _____ animal.

C. Mark True (T) or False (F)

- A milking pail should have a dome-shaped top.
- Milk is in sterile condition while in the udder of a healthy animal.
- Clean milk is free from dust, dirt, flies, manure, etc.
- It is advisable to test the foremilk at each milking with a strip cup to identify cows suffering from mastitis.
- Raw milk can be stored unprocessed up to 10 hours at room temperature.

Unit

4



Record Keeping in a Dairy Farm



Maintaining records or record keeping is an essential part of livestock management. It can be done easily if animals have some form of identification mark. Thus, animal records and identification are inseparable. Maintaining records in a dairy farm helps make decisions about various activities related to the farm. It also helps reduce expenses and increase profits by making decisions about feed, pasture, animal sale and purchase, etc. Based on the records, profit and loss can be calculated for a given period. Farm records make it easy to extract information that may be required about the farm and animals.

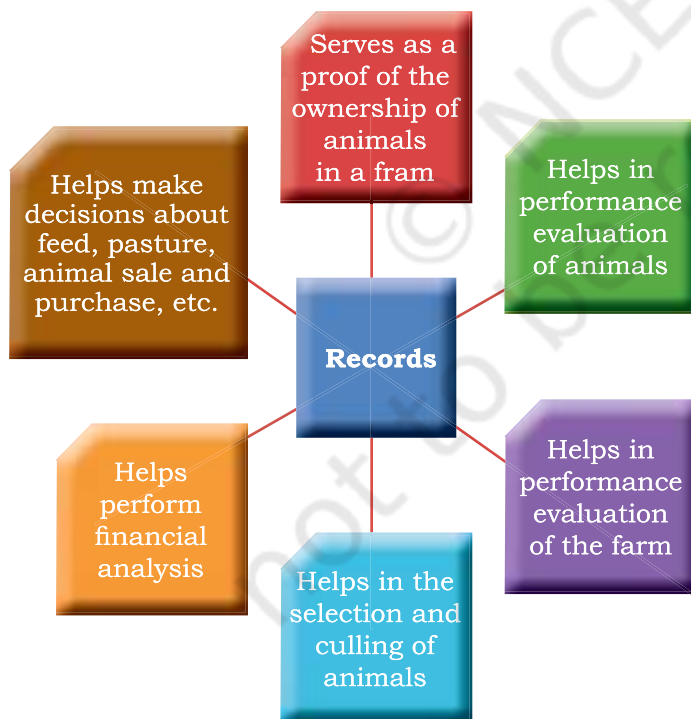


Fig. 4.1: Purposes of record keeping

NEED FOR RECORD KEEPING

The major purposes of record keeping in a dairy farm are depicted in the Fig. 4.1.

CHARACTERISTICS OF FARM RECORDS

A farm record must:

- be maintained in a simple format.
- be easy to keep.
- provide necessary information.
- avoid duplication.

TYPES OF FARM RECORD

There are different types of record that need to be maintained in a livestock farm. A farmer must maintain records relevant to a particular livestock farm. Records of a farm can broadly be classified into three categories (Fig. 4.2).

Technical records	Farm section records	Financial records
<ul style="list-style-type: none">• Daily report register• Artificial insemination or service register• Calving register• Daily milk yield register• Feed stock register• Feeding record• Health record	<ul style="list-style-type: none">• Fodder cultivation register• Field register• Labour register• Muster roll• Tractor logbook• Machinery and equipment book	<ul style="list-style-type: none">• Store stock book• Attendance and pay record• Feed cost record• Veterinary expenses• Record on cost of fodder seeds• Equipment purchases

Fig. 4.2: Types of farm record

WAYS TO MAINTAIN FARM RECORDS

In a livestock farm, records can be maintained in two ways — manually and electronically.

Manual record keeping

In this system, various forms are used, varying from pocket size cards to data register.

Electronic record keeping

Here, the farm data are maintained on a computer. Data compilation and retrieval are easy in electronically maintained records.

SPECIMEN OF COMMON DAIRY RECORDS

Some of the specimen of different kinds of record, usually, maintained in a dairy farm are given in Table 4.1 (a to j). Farms may develop other records as and when required.

Table 4.1(a): Breeding record

S. No.	Cow tag number	Date of calving	Date of first heat after calving	First service			Second service			Third service			First pregnancy diagnosis	Second pregnancy diagnosis	Date on which cow stopped milking	Expected date of calving	Actual date of calving	Remark, if any
				Date of service	Time of service	Bull tag number	Date of service	Time of service	Bull tag number	Date of service	Time of service	Bull tag number						
1.																		
2.																		
3.																		
4.																		
5.																		

Table 4.1(b): Calving record

S. No.	Cow tag number	Date of calving	Bull tag number	Calf tag number	Sex of the calf (M/F)	Weight at birth (kg)	Remark, if any
1.							
2.							
3.							
4.							
5.							

Table 4.1(c): Growth record of young animals

S. No.	Animal tag number	Date of birth	Weight at birth (kg)	Monthly body weight (kg)									Weight at first service (kg)	Weight at first calving (kg)	Remark, if any
				1	2	3	...	22	23	24					
1.															
2.															
3.															
4.															
5.															



Table 4.1(d): Lactation record

S. No.	Cow tag number	Number of total calvings	Date of calving	Date of drying	Lactation yield (litres)	Peak yield (litres)	Date of peak yield	Lactation length (days)	Dry period (days)	Remark, if any
1.										
2.										
3.										
4.										
5.										

Table 4.1(e): Daily feed record for a month

S. No.	Date	Number of animals	Concentrate			Green fodder			Dry fodder			Others		
			Received	Issued	Balance	Received	Issued	Balance	Received	Issued	Balance	Received	Issued	Balance
1.														
2.														
3.														
4.														
5.														

Table 4.1(f): Herd strength record on a daily basis

S. No.	Date	Cows		Heifer	Young male	Bulls	Calves		Total number of animals	Addition of animals		Deduction of animals		Remark, if any
		Milch	Dry			Male	Female	Number of animals		From where	Number of animals	From where		
1.														
2.														
3.														
4.														
5.														

Table 4.1(g): Record of daily milk yield for a month

S. No.	Cow tag Number	Date of calving	Dates														Monthly milk yield	Lactation yield						
			1		2		3		4		...		27		28				29		30		31	
			M	E	M	E	M	E	M	E	M	E	M	E	M	E			M	E	M	E	M	E
1.																								
2.																								
3.																								
4.																								
5.																								

Table 4.1(h): Vaccination record

S. No.	Date	Name of the vaccine	Route of vaccination	Number of animals vaccinated	Tag numbers of animals vaccinated	Next due date of vaccination	Remark, if any
1.							
2.							
3.							
4.							
5.							

Table 4.1(i): Health check-up record

S. No.	Date	Name of the test	Disease for which the test was performed	Number of animals tested	Animal tag numbers	Next due date for check-up	Remark, if any
1.							
2.							
3.							
4.							
5.							



Table 4.1(j): Herd health record

S. No.	Date	Animal tag number	History	Symptoms	Treatment	Result (cured/died)	Name of the veterinarian	Cost of treatment	Remark, if any
1.									
2.									
3.									
4.									
5.									

Practical Exercise

Activity

Form groups in class, consisting of three members each, and visit a nearby dairy farm. Record the following.

- Vaccination of the animals
- Daily feeding of the animals in a month
- Daily milk yield for a month

Material required: record book and writing material

Procedure

- Visit a nearby dairy farm.
- Talk to the manager and find out if any kind of record is maintained at the farm.
- Request the manager to show you the farm record, if any.
- Note down your observations.
- Prepare a presentation along with two of your friends and present it before the class.

Check Your Progress

A. Multiple Choice Questions

1. Which of the following information is required to maintain data at a farm?
 - (a) Information about animals
 - (b) Information about inputs
 - (c) Information about prices
 - (d) All of the above
2. Most farmers do not maintain farm records due to _____.
 - (a) lack of awareness
 - (b) illiteracy
 - (c) Both (a) and (b)
 - (d) None of the above



NOTES

3. Technical records include _____.
 - (a) daily milk yield register
 - (b) feed stock register
 - (c) health records
 - (d) All of the above
4. Farm section records include _____.
 - (a) field register
 - (b) labour register
 - (c) muster roll
 - (d) All of the above
5. Financial records include _____.
 - (a) feed cost record
 - (b) veterinary expenses
 - (c) cost of fodder seeds
 - (d) All of the above

B. Fill in the Blanks

1. _____ keeping is an essential part of livestock management.
2. Record keeping can be done easily if animals have some form of _____ mark.
3. In _____ record keeping system, various forms are used, varying from pocket size cards to data register.
4. In _____ record keeping, farm data are maintained on a computer.
5. Machinery and equipment book are maintained under _____ section records.

C. Mark True (T) or False (F)

1. Farm records should be maintained in a simple form.
2. No inference can be drawn from a farm record.
3. Farm records provide necessary information as and when required by a dairy farmer.
4. Duplication is essential in maintaining farm records.
5. Records are maintained in a farm for the selection and culling of animals.



Dairy Worker - Class 10

Unit 4: Record Keeping in a Record Keeping in a Dairy Farm

Check Your Progress

A. Multiple Choice Questions

1. Which of the following information is required to maintain data at a farm?
 - (a) Information about animals
 - (b) Information about inputs
 - (c) Information about prices
 - (d) All of the above
2. Most farmers do not maintain farm records due to _____.
 - (a) lack of awareness
 - (b) illiteracy
 - (c) Both (a) and (b)
 - (d) None of the above

3. Technical records include _____.
 - (a) daily milk yield register
 - (b) feed stock register
 - (c) health records
 - (d) All of the above
4. Farm section records include _____.
 - (a) field register
 - (b) labour register
 - (c) muster roll
 - (d) All of the above
5. Financial records include _____.
 - (a) feed cost record
 - (b) veterinary expenses
 - (c) cost of fodder seeds
 - (d) All of the above

B. Fill in the Blanks

1. _____ keeping is an essential part of livestock management.
2. Record keeping can be done easily if animals have some form of _____ mark.
3. In _____ record keeping system, various forms are used, varying from pocket size cards to data register.
4. In _____ record keeping, farm data are maintained on a computer.
5. Machinery and equipment book are maintained under _____ section records.

C. Mark True (T) or False (F)

1. Farm records should be maintained in a simple form.
2. No inference can be drawn from a farm record.
3. Farm records provide necessary information as and when required by a dairy farmer.
4. Duplication is essential in maintaining farm records.
5. Records are maintained in a farm for the selection and culling of animals.

Unit

5



Health and Safety Hazards in a Dairy Farm

Hazard and risk are different in nature and meaning. Anything that can be dangerous or cause harm or damage is a hazard, e.g., a dairy worker harmed by an animal. A risk has the potential to cause a hazard. It is the possibility of something harmful happening at some point of time in future, e.g., a dairy worker faces the risk of being harmed by an animal. Therefore, operations in a dairy farm are labour intensive, time-consuming, and in some cases, hazardous and risky. A number of risks is involved in routine farm operations. A dairy worker, therefore, needs to be careful and understand the biosecurity measures that must be adopted in the farm. Besides, farm animals suffer from various diseases. Before taking an animal to a veterinarian, the dairy worker must be able to administer first aid to reduce its pain, prevent the situation from deteriorating further, speed its recovery and save its life. This Unit deals with all these aspects.



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Fig. 5.1: A clean floor in a shed

SESSION 1: MAINTAINING HYGIENE AND BIOSECURITY IN A DAIRY FARM

Maintaining hygiene is the topmost priority in dairy farm operations. Lack of hygiene may cause a number of diseases in livestock, thereby, rendering economic losses to a dairy farmer and workers.

Maintaining hygiene in a dairy farm

Hygiene refers to the practice of keeping the animals, their sheds and milking area clean in order to prevent them from catching diseases and infections, thereby, leading to quality milk production. Such milk is free from substances that may cause contamination like straws, flies, microorganisms, etc.

In a dairy farm or shed, where livestock are raised in confinement, hygiene is of paramount importance. Cleanliness in a livestock building is not always assessed directly or evaluated quantitatively. Instead, the focus is on animals, especially, in case of dairy animals. But the cleanliness of a shed and dairy animals is interrelated. A clean surrounding prevents the animals from catching infections, and hence, keeps them healthy. Therefore, the milk yielded by an animal and its quality are directly affected by the hygienic conditions maintained in the shed and surrounding areas.

Safe handling of animals and equipment

Hazards and risks are related to the handling of animals, equipment and transmission of diseases from animal-to-animal, animals to humans and *vice versa*. During farm operations, various kinds of risk and hazard are involved as shown in Fig. 5.2.

Measures to check risks and hazards

Prior to performing a manual job, the dairy worker must assess the risks and hazards involved and follow safe work practices, some of these practices are as follows.

- Do not allow unnecessary visitors on the farm premises.
- Keep the housing and milking areas clean and dry to prevent tripping and slipping.



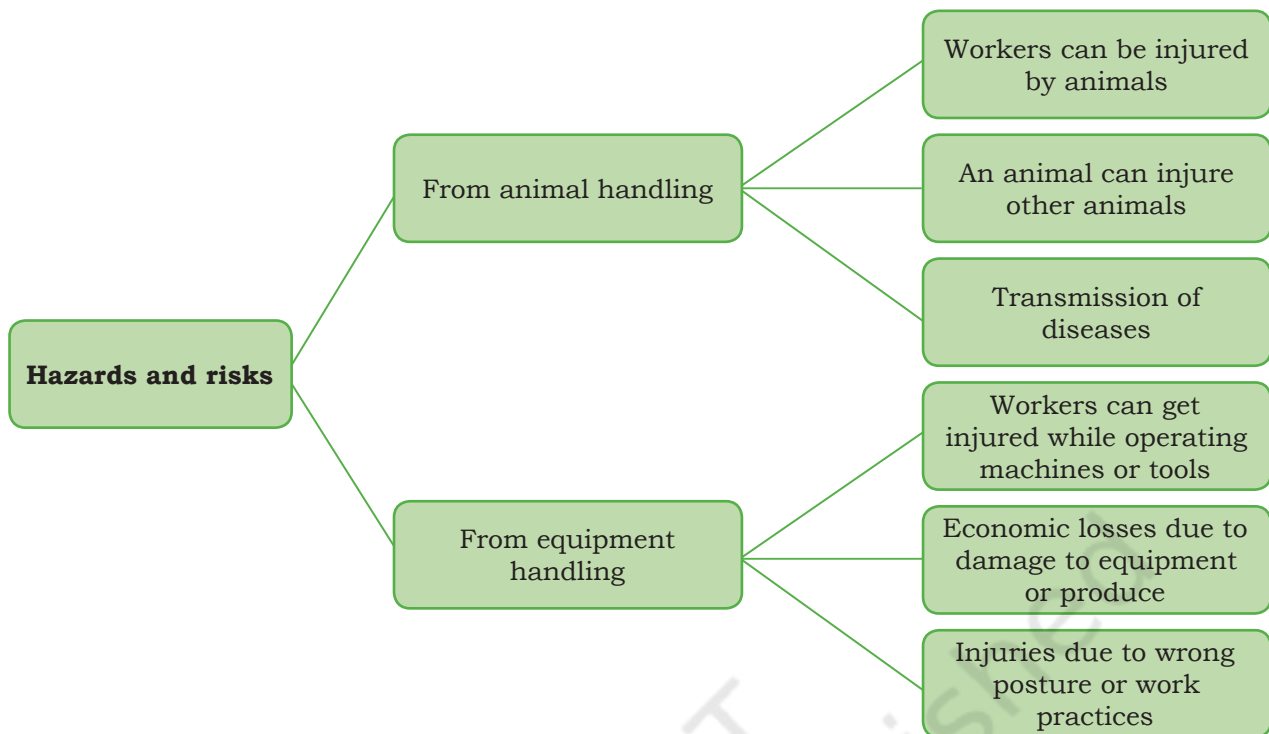


Fig. 5.2: Hazards and risks involved in dairy farm operations

- Avoid slippery surfaces while handling and moving animals.
- Wear footwear that is not slippery and appropriate for performing dairy farm work.
- Move large and heavy equipment carefully using lifts or trolleys.
- Ensure smooth opening of the farm gates.
- Keep the equipment and tools at their designated places after use.
- Do not leave tools and equipment unattended on the farm premises.
- Reduce risk to bystanders while operating machines or tractor, and while moving or handling animals.
- Use hand signals and communicate through signalling tools while working with noisy machines.
- Do not disturb the flora and fauna or cause any kind of damage to the environment.
- Check if the emergency equipment in the farm are functional.

- Keep yourself updated on government guidelines, regulations and schemes for efficient working and support.
- Follow all government rules and environment regulations.

Personal Protective Equipment

Dairy workers need to be protected from injuries that may occur due to accidents during animal handling or hazards at the workplace, such as absorption and inhalation of harmful chemicals, physical contact with an animal or machine, etc. Therefore, the dairy worker must always wear personal protective equipment (PPE) like head gear, mask, goggles, gloves and gumboots. PPE protect a person from accidents. However, it often protects the person only partially, reducing the severity of the effect(s).

The dairy worker must wear all necessary and prescribed PPE while operating machines as per the manufacturer's specifications. One must avoid loose clothing while operating machines, tractor, etc., as it may get entangled with their moving parts.

Some of the common PPE items that must be worn while performing dairy farm operations are as follows.



Fig. 5.3: Gloves

Gloves

These protect the hands from hazardous chemicals and substances, hot or cold surfaces, stings, rough textures or sharp tools. Single-use gloves are used when treating sick animals or assisting births. Such gloves must be disposed immediately after use (Fig. 5.3).



Fig. 5.4: Gumboots

Safety shoes or gumboots

Safety shoes or gumboots provide protection to the leg and feet from water, snake bites, weeds, slippery surfaces, and sharp objects like glass pieces or nails (Fig. 5.4).

Goggles

These protect the eyes from foreign particles and fumes. Goggles must be worn while welding, cutting and handling chemicals.



Earplugs and earmuffs

These protect the ears from high decibel sound or noise produced by machinery like chainsaws, etc.

Face shield

It protects the face — eyes, nose and mouth — from hazardous fumes, heat and stray metal. It must be worn while handling chemicals, grinding metal, cutting timber and welding.

Head gear

It protects the head from injuries that may be caused because of falling objects.

Breathing apparatus

It is used when working in confined spaces like silos.

Safety measures to be followed in a farm

Some of the safety measures that need to be followed in a dairy farm are as follows.

- Always read the instructions printed on the package of a chemical, pesticide, fumigant or disinfectant before use.
- Use chemicals as prescribed by the manufacturer.
- Wear protective clothing as specified by the manufacturer while handling chemicals.
- Dispose chemical containers and medical waste appropriately to minimise environmental damage.
- Take immediate medical help in case of accidents caused by chemicals.
- Keep necessary emergency equipment and first aid kit at an accessible place.
- Keep all chemicals away from the reach of children and animals.

Common risks and remedial measures

Risks associated with dairy farm operations can vary from problems related to transmission of diseases to handling of animals or the working environment. Some of the common risks encountered by a dairy worker in



a farm along with their remedial measures are depicted in Table 5.1.

Table 5.1: Common risks in a dairy farm and remedial measures

Risks	Remedial measures
Damage to the clothing and skin	Wear comfortable clothing without lengthy projections as they can get entangled with the moving parts of a machine or tool, leading to accidents and injuries. Wear PPE to avoid damage to the clothing.
Burns and scalds	Wear head gear, mask and gloves while handling hot items, toxicants, etc.
Dust and fume inhalations	Always wear a face mask.
Injury to the hand	Wear gloves to avoid injuries to the hand while working

Biosecurity

It refers to adopting strategic and integrated approach to minimise risks to animals and ensure their safety. Biosecurity in a dairy farm includes institutional and personal security measures and procedures to prevent loss, theft, misuse or intentional release of pathogens in the environment. Biosecurity is especially important for preventing the spread of infectious diseases. Apart from dairy workers wearing PPE like gloves, gumboots, face mask, etc., some of the biosecurity measures that need to be followed in the farm to check the spread of diseases in animals are as follows.

Restricted access to the farm

The livestock farm must be secured by fences, gates or a wall to avoid unauthorised entry of a person and wild animals (Fig. 5.5).

Provision of foot bath

Provision for foot bath, containing disinfectants like phenol or slake lime powder, must be ensured at the



Fig. 5.5: Restricted entry to a farm



Fig. 5.6: Foot bath at the entry of a farm



entry and exit of an animal shed or farm to prevent the entry of pathogens in the area (Fig. 5.6).

Washing the hands

The dairy workers must wash their hands with an antiseptic soap and water after cleaning animals and their sheds, and before and after milking. Besides, they must use a sanitiser at regular intervals.

Cleaning and disinfecting the farm

The following steps must be followed to clean and disinfect the farm premises.

- Remove used bedding and waste material from the farm immediately.
- Clean the surfaces (floor and walls) of the shed with detergent and water. Scrub the area to remove organic matter (Fig. 5.7).
- Spray disinfectants like phenol or bleaching powder on the surfaces of the farm (Fig. 5.8).
- Clean the equipment, feed tubs and buckets meant for animals with detergent and water.
- In case of a disease outbreak, the farm must be fumigated with formalin and Potassium permanganate crystals.
- Waste generated in the farm like manure, feed, debris, etc., must be disposed appropriately (buried or burnt).

Disposal of carcass

Death of an animal is normal in a farm. Dead animals and other wastes like placenta can pose a



Fig. 5.7: Cleaning a farm premises



Fig. 5.8: Cleaning a shed with water containing disinfectant

NOTES

risk to the biosecurity of the farm, and therefore, be hazardous to the environment. Putrefaction of carcass results in gradual dissolution of tissues into gases, liquids and salts due to the actions performed by bacteria and enzymes.

Avoid direct contact with the dead animal's blood. Keep safe distance from the carcass to avoid contact with parasites that may be present in it. The carcass needs to be disposed appropriately and promptly to minimise soil and water contamination in order to check the risk of outbreak of diseases.

Practical Exercise

Activity

Visit a nearby dairy farm and make a note on the biosecurity measures being followed there. Also, point out any loophole that you observe in the measures being adopted in the farm.

Material required: notebook and writing material

Procedure

- Visit a nearby dairy farm.
- Observe the biosecurity measures being followed there and record them in a notebook.
- Point out if you observe any loophole in the measures being adopted in the farm.
- Draw conclusions as to what can be done to improve the farm's biosecurity.
- Give a presentation based on your observations and experience before the class.

Check Your Progress

A. Multiple Choice Questions

1. Bleaching powder is a/an _____.
 - (a) disinfectant
 - (b) antibiotic
 - (c) antiseptic
 - (d) detergent
2. Steps involved in cleaning and disinfection of a farm premises involve _____.
 - (a) scrubbing and removal of waste from the area
 - (b) cleaning the area with detergent and water
 - (c) spraying disinfectant in the area
 - (d) All of the above



3. A carcass can be disposed by _____.
 - (a) burial
 - (b) burning
 - (c) Both (a) and (b)
 - (d) None of the above
4. Which of these points must be followed while disposing a carcass?
 - (a) Wear Personal Protective Equipment.
 - (b) Avoid direct contact with the animal's blood.
 - (c) Avoid contact with the animal's parasites.
 - (d) All of the above
5. Biosecurity means _____.
 - (a) security of the farm premises
 - (b) personal security
 - (c) preventing the release of pathogens in the environment
 - (d) All of the above

B. Fill in the Blanks

1. _____ is an institutional and personal security measure to prevent the release of pathogens and infections in the environment.
2. Wearing safety boots can help avoid _____.
3. _____ use gloves are worn while treating sick animals.
4. Animals should not be taken to _____ surfaces.
5. Always use _____ signals to communicate when working with noisy machines.

C. Mark True (T) or False (F)

1. Prompt and sanitary disposal of carcass is necessary.
2. A foot bath must be maintained at the entry and exit gates of a shed to prevent the spread of pathogens.
3. Management of an animal farm can allow many visitors.
4. An animal farm should not be secured by fences and gates.
5. In case of a disease outbreak, a farm must be fumigated with formalin and Potassium permanganate crystals.

SESSION 2: DISPOSAL OF FARM WASTES

Livestock rearing generates wastes in the form of solid, liquid and gases. If not managed appropriately, these may cause pollution and adversely affect the environment. Therefore, prompt and appropriate waste disposal is important. Following inappropriate and



delayed waste disposal practices may cause several diseases and infections in healthy animals, thereby, affecting their yield and productivity.

Collection of manure

Manure serves as a breeding ground for a number of pathogens and insects, having parasitic implications.

Solid manure is, usually, collected and removed from a shed twice a day. After removing the solid manure, the floor of the shed is washed and cleaned with water and a disinfectant. In other instances, both solid and liquid manure is removed from the shed by flushing with the help of hosepipes.

Solid waste collected from the livestock farm is dumped in a manure pit. After few months, this waste is converted into manure by bacterial activity. The manure pit must be located about 100 metre away from the animal shed and nearby buildings so that the stink emanating from the pit does not reach these areas. This prevents flies and insects from finding way to the shed or nearby buildings as manure serves as a breeding ground for them. It must be ensured that the manure pit is easily accessible from different parts of the farm and is located away from water sources to prevent contamination of water. There is a roof over the pit so that it is not washed away due to rains.



Fig. 5.9: Drain parallel to the long axis in a shed

Liquid manure and washings are made to flow through shallow drains located parallel to a long axis in the shed (Fig. 5.9). Each shallow drain in the shed is connected to a sub-drain, and subsequently, to the main drain. The main drain is connected to the liquid manure storage tank. The content in the main drain may even be treated in an effluent treatment plant. The treated water can be reused for agricultural purposes. There are several methods for handling and treating animal waste.

Methods of utilising manure

Some ways of handling and utilising animal waste is depicted in Fig. 5.10.

- Farm Yard Manure (FYM)
- Compost



- Vermicomposting
- Feed stock in biogas plants to produce gas and slurry manure
- Organic mulch

Farm Yard Manure (FYM)

It is the decomposed mixture of dung and urine of farm animals, and leftover feed and fodder fed to the animals. A well decomposed FYM contains 0.7–1.3 per cent Nitrogen, 0.3–0.8 per cent Phosphorous pentoxide and 0.4–1.0 per cent Potassium oxide on dry weight basis. However, the composition may vary depending on the type of animals, their ration, age, species, etc.

Composting

It is a natural process, in which organic matter is decomposed by microorganisms. The process of composting is being practised since time immemorial

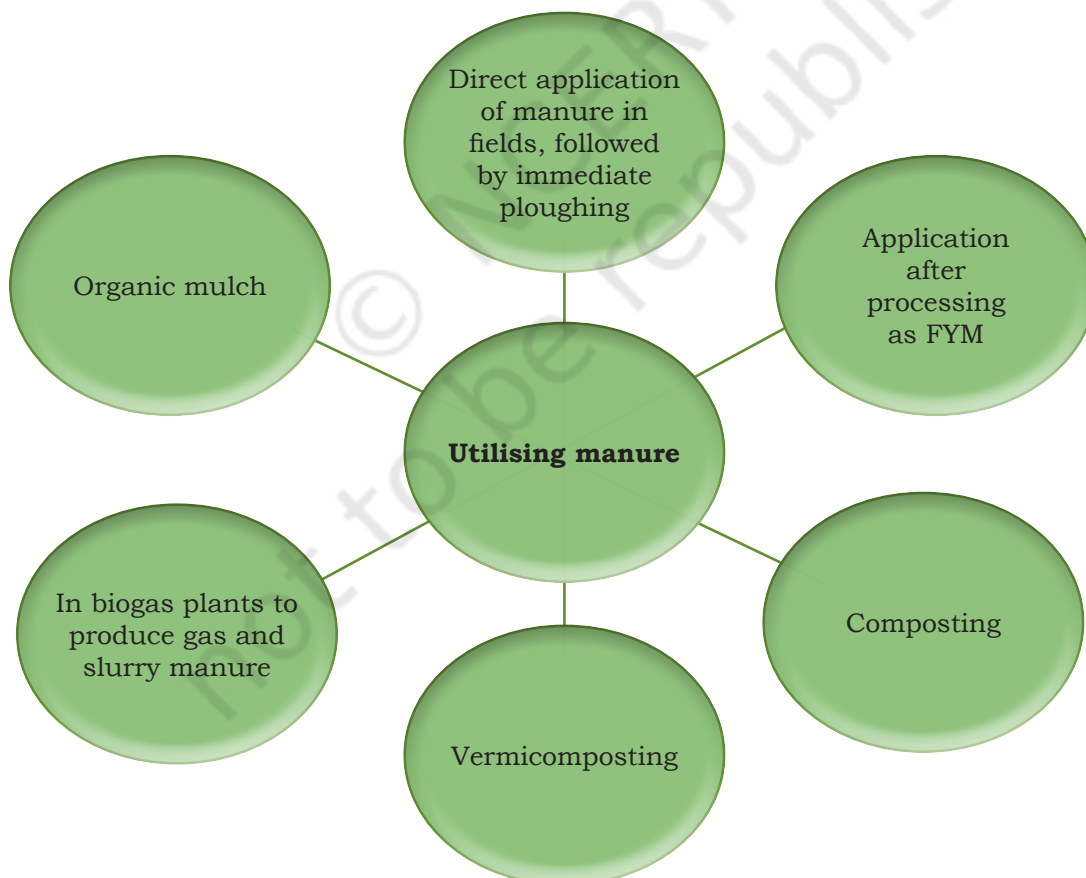


Fig. 5.10: Methods of handling animal waste



by farmers, who stock dung into piles or in pits (Fig. 5.11). Composting can be either 'aerobic' or 'anaerobic'. The advantages of aerobic composting are shorter stabilisation time, no foul smell, and destruction of weeds and pathogens. During composting, temperatures in the compost pit can reach above 500° C. Most pathogens that are harmful to human beings are destroyed at this temperature.

The compost in the pits must always be handled with caution. Immature compost has a high temperature and can damage plants. In some cases, immature composts can even lead to pest problems. Mature manure compost is the safest to use and best organic fertiliser available. Older composts are the best and can be judged by their colour and moisture content. Black and dry compost is mature, whereas, yellow and wet compost is recent, and therefore, not fit for use.

Vermicomposting

Earthworms not only convert garbage into valuable manure but keep the environment healthy. The term vermicomposting means the use of earthworms for composting organic residues. Vermicomposting is the process in which earthworms are used to convert organic waste material into humus-like material. The goal of vermicomposting is to process farm waste as quickly and efficiently as possible.

Earthworms can consume practically all kind of organic matter. One kg of earthworms can consume one kg of organic matter every day. The excreta of earthworms is called 'vermicompost'. This excreta



Fig. 5.11: Compost pit in a farm



Fig. 5.12: Earthworms used for vermicomposting



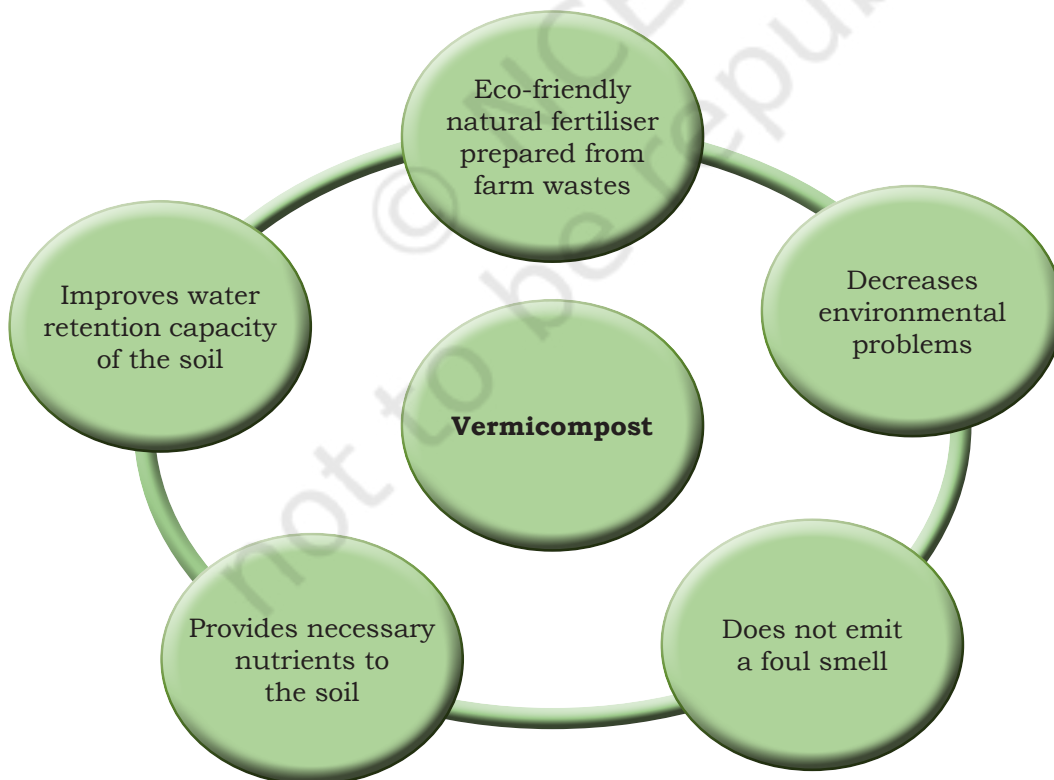
(castings) is rich in various soil nutrients like Nitrogen, Potassium, Phosphorus, Calcium and Magnesium. Vermicompost contains five times the available Nitrogen, seven times the available Potassium and one-and-a-half times more Calcium than fertile soil. *Eiseniafoetida* and *Lumbricusrubellus* (red worm) species of earthworm are commonly used for vermicomposting.

Advantages

Vermicomposting has many benefits in agricultural production. The various advantages of vermicomposting are shown in Fig. 5.13.

Feed stock in biogas plants to produce gas and slurry manure

A daily dung supply from at least five adult cows is needed for running a medium size biogas plant near a dairy farm. The plant is sufficient to meet the cooking and lighting needs of a family of four members. The plant supplies biogas and fermented slurry.



5.13: Advantages of vermicomposting



NOTES

'Biogas' is a non-poisonous gas with a distinct odour and burns easily. When mixed with air, it burns in a non-luminous blue flame without producing smoke. It has a low degree of inflammability. Biogas is used for household cooking, lighting and power. Special lamps are available for lighting where biogas can be used. Commonly available combustion engines can easily run on biogas. To do this, a special attachment is fitted to the combustion engine, which is readily available. Biogas slurry is better than FYM as it is high in nutrient content.

Organic mulch

Mulch is a layer of material applied to the soil surface. It reduces water loss by reducing evaporation from the soil. Mulch also keeps the soil cooler, reduces weed growth and run-offs. Manure can be used as mulch but works best when mixed with other mulches, especially, if the manure is fresh. Like compost, manure decomposes rapidly, so it needs frequent replenishment.

Practical Exercise

Activity 1

Prepare vermicompost using earthworms and biodegradable waste material.

Material required: soil, water, cow dung, thatched roof, gunny bags, earthworms, organic wastes (biodegradable wastes collected from fields and kitchen), a large bin (plastic or cemented tank), straws and leaves

Procedure

- Use a plastic or concrete tank, depending on the amount of raw material being used.
- Collect waste biodegradable material in the form of a heap and place it under direct sunlight for a week.
- Prepare cow dung slurry by adding adequate water to the dung and sprinkle it on the heap for faster degradation.
- Add soil or sand at the bottom of the tank up to a few inches.
- Then, prepare a fine bedding by adding partially decomposed cow dung, dried leaves and other biodegradable wastes. Distribute them evenly on the sand or soil layer-wise. Continue adding both the chopped



bio-waste and partially decomposed cow dung layer-wise into the tank up to a depth of 0.5–1.0 ft.

- After adding all the bio-waste, release earthworms over the compost mixture and cover it with a dry straw or gunny bag.
- Sprinkle water on regular basis on the compost to maintain its moisture content.
- Cover the tank with a thatched roof to prevent the entry of ants, lizards, mice, snakes, etc., and protect the compost from rainwater and direct sunlight.
- Conduct frequent checks to avoid the compost from overheating. Maintain adequate moisture level and temperature.

Check Your Progress

A. Multiple Choice Questions

1. *Eiseniafoetida* and *Lumbricusrubellus* are the species of _____.
 - (a) earthworms
 - (b) roundworms
 - (c) flatworms
 - (d) None of the above
2. Composting is done _____.
 - (a) aerobically
 - (b) anaerobically
 - (c) Both (a) and (b)
 - (d) None of the above
3. Biogas is used in _____.
 - (a) household cooking
 - (b) lighting
 - (c) power generation
 - (d) All of the above
4. Which of the following conditions is associated with risk to a dairy farm worker?
 - (a) Problem of transmission of diseases
 - (b) Problem related to handling of animals
 - (c) Problem related to the working environment
 - (d) All of the above
5. Mulch over the soil _____.
 - (a) helps as a soil coolant
 - (b) reduces weed growth
 - (c) reduces erosion
 - (d) All of the above

B. Fill in the Blanks

1. PPE stands for _____.
2. Manure is removed from a shed _____ times daily.



NOTES

3. A manure pit is, generally, dug on a dry and fairly elevated land about _____ metre away from a shed.
4. Vermicomposting is nothing but the excreta of _____.
5. _____ is the decomposed mixture of dung and urine of farm animals along with litter, leftover feed and fodder.

C. Mark True (T) or False (F)

1. Liquid waste generated from a livestock farm is dumped in a manure pit.
2. PPE only protect an individual and do not prevent an accident from happening.
3. Slurry is obtained from FYM.
4. Black and dry indicates immature compost.
5. Mulch is a layer of material applied to the soil surface.



Dairy Worker - Class 10

Unit 5: Health and Safety Hazards in a Dairy Farm

Session 1: Maintaining Hygiene and Biosecurity in a Dairy Farm

Check Your Progress

A. Multiple Choice Questions

1. Bleaching powder is a/an _____.
 - (a) disinfectant
 - (b) antibiotic
 - (c) antiseptic
 - (d) detergent
2. Steps involved in cleaning and disinfection of a farm premises involve _____.
 - (a) scrubbing and removal of waste from the area
 - (b) cleaning the area with detergent and water
 - (c) spraying disinfectant in the area
 - (d) All of the above
3. A carcass can be disposed by _____.
 - (a) burial
 - (b) burning
 - (c) Both (a) and (b)
 - (d) None of the above
4. Which of these points must be followed while disposing a carcass?
 - (a) Wear Personal Protective Equipment.
 - (b) Avoid direct contact with the animal's blood.
 - (c) Avoid contact with the animal's parasites.
 - (d) All of the above
5. Biosecurity means _____.
 - (a) security of the farm premises
 - (b) personal security
 - (c) preventing the release of pathogens in the environment
 - (d) All of the above

B. Fill in the Blanks

1. _____ is an institutional and personal security measure to prevent the release of pathogens and infections in the environment.
2. Wearing safety boots can help avoid _____.
3. _____ use gloves are worn while treating sick animals.
4. Animals should not be taken to _____ surfaces.
5. Always use _____ signals to communicate when working with noisy machines.

C. Mark True (T) or False (F)

1. Prompt and sanitary disposal of carcass is necessary.
2. A foot bath must be maintained at the entry and exit gates of a shed to prevent the spread of pathogens.
3. Management of an animal farm can allow many visitors.

4. An animal farm should not be secured by fences and gates.
5. In case of a disease outbreak, a farm must be fumigated with formalin and Potassium permanganate crystals.

Dairy Worker - Class 10

Unit 5: Health and Safety Hazards in a Dairy Farm, Session 2: Disposal of Farm Wastes

Check Your Progress

A. Multiple Choice Questions

1. *Eiseniafoetida* and *Lumbricusrubellus* are the species of _____.
(a) earthworms
(b) roundworms
(c) flatworms
(d) None of the above
2. Composting is done _____.
(a) aerobically
(b) anaerobically
(c) Both (a) and (b)
(d) None of the above
3. Biogas is used in _____.
(a) household cooking
(b) lighting
(c) power generation
(d) All of the above
4. Which of the following conditions is associated with risk to a dairy farm worker?
(a) Problem of transmission of diseases
(b) Problem related to handling of animals
(c) Problem related to the working environment
(d) All of the above
5. Mulch over the soil _____.
(a) helps as a soil coolant
(b) reduces weed growth
(c) reduces erosion
(d) All of the above

B. Fill in the Blanks

1. PPE stands for _____.
2. Manure is removed from a shed _____ times daily.

3. A manure pit is, generally, dug on a dry and fairly elevated land about _____ metre away from a shed.
4. Vermicomposting is nothing but the excreta of _____.
5. _____ is the decomposed mixture of dung and urine of farm animals along with litter, leftover feed and fodder.

C. Mark True (T) or False (F)

1. Liquid waste generated from a livestock farm is dumped in a manure pit.
2. PPE only protect an individual and do not prevent an accident from happening.
3. Slurry is obtained from FYM.
4. Black and dry indicates immature compost.
5. Mulch is a layer of material applied to the soil surface.

Unit

6



Animal Welfare Legislations

In this Unit, students shall learn about various forms of cruelty inflicted upon farm animals. This will help them identify instances of animal cruelty and report those to the authorities concerned. Animals are the worst sufferers during a natural disaster. Therefore, emphasis is laid on preparedness for disaster management to save their lives.

Animal welfare must take into consideration the health and well-being of animals. The signs of health in animals have been discussed in this Unit.

Signs of a healthy animal

The alertness of a farm animal indicates its health and that it is being taken care of. If the animal is healthy, it is active, holds its head up and keenly watches its surroundings (Fig. 6.1 and 6.3). A healthy animal stands on all four feet and does not limp. If an animal stays away from other animals in a herd, it signifies that it is unwell and needs attention. A sick animal (Fig. 6.2 and 6.4) is not interested in its surroundings and does not want to move.



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Table 6.1: Difference between a healthy and sick animal

Healthy animal	Sick animal
Alert	Lethargic
Chews cud	Does not chew cud
Sleek coat	Rough coat
Bright eyes with pink eye membrane	Dull eyes
Normal faeces and urine	Abnormal faeces and discoloured urine
Normal temperature	High temperature
Steady gait; does not limp	Limps
Normal respiration	Laboured breathing
Stays in a herd or flock	Isolates self from herd or flock
Eats and drinks normally	Loss of appetite
Normal pulse rate	Abnormal pulse rate



Fig. 6.1: A healthy Sahiwal cow



Fig. 6.2: A sick Sahiwal cow



Fig. 6.3: A healthy Murrah buffalo



Fig. 6.4: A sick Murrah buffalo



ANIMAL WELFARE

The concept of welfare is composed of an animal's health and well-being and reflects the quality of life it lives. Freedom is the basic need of every animal. The different types of freedom for animals and ways to achieve them are shown in Table 6.2.

Table 6.2: Types of animal freedom and ways to achieve them

S. No.	Freedom	Achieved by
1.	from hunger and thirst	providing access to drinking water and a balanced diet to maintain health and vigour
2.	from discomfort	providing a comfortable environment, including shelter
3.	from pain, injury or disease	preventing injuries and diseases, and rapid diagnosis and treatment
4.	to express normal behaviour	providing sufficient space, adequate facilities and companionship of other animals of the same kind
5.	from fear and distress	ensuring conditions and treatment that can avoid mental suffering

Besides these five types of freedom, a farm animal must enjoy four basic freedom as depicted in Fig. 6.5.

The evaluation of animal welfare must consider the scientific evidence available, concerning the feelings of animals derived from their behaviour. Animal welfare describes how an animal copes mentally and physically with the conditions where it lives. Signs that an animal is in a good state of welfare includes its longevity, reduced incidence of diseases, display of normal behaviour and reproduction.

Animal welfare regulations

The importance that India accords to the protection of animals and their rights is reflected in the Constitution, which recognises the need for their protection. Article 51A(g) of the Constitution enshrines and casts upon every citizen of the country the fundamental duty to have compassion for all living beings. India is also one of the first countries in the world to enact a law on animal cruelty, i.e., Prevention of Cruelty to Animals Act, 1960.

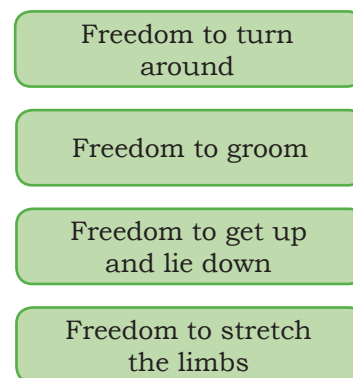


Fig. 6.5: Four more basic freedom for farm animals



Prevention of cruelty towards animals

Cruelty towards animals means willfully causing unnecessary pain or suffering to them. Major forms of cruelty committed on animals include the following.

- Beating, kicking, over-driving, over-loading, torturing, etc.
- Employing an animal for a work that it is unfit for
- Unreasonable administration of injurious substance(s) to an animal to artificially boost its performance
- Transporting animals in a manner that causes pain or suffering to them
- Keeping the animals in close confinement and crowded conditions
- Making the animals starve or keeping them thirsty for long
- Using animals for public entertainment

The Prevention of Cruelty to Animals Act was enacted in 1960 to prevent unnecessary pain or suffering on animals and to amend the laws relating to the prevention of cruelty to animals. After the enactment of this Act, the Animal Welfare Board of India was constituted for the promotion of animal welfare. The headquarters of the Animal Welfare Board of India is situated in Chennai. Various rules under the Prevention of Cruelty to Animals Act, 1960 have been framed from time-to-time on the following aspects.



(a)
Cattle being transported in an overcrowded truck



(b)
Cattle being transported in an inhumane manner



(c)
Bullocks carrying excess load

Fig. 6.6 (a to c): Various forms of cruelty animals are, usually, subjected to



- Birth control in dogs
- Control and supervision of experiments on animals
- Prevention of cruelty towards animals in slaughterhouses
- Welfare of draught animals
- Prevention of cruelty during transportation

Practical Exercise

Activity

Identify an injured animal in a nearby cow shed. Find out the cause of its injury and write the steps that can be taken to improve its health.

Material required: notebook and writing material

Procedure

- Visit a nearby cow shed.
- Identify an injured animal in the shed.
- Find out the cause of injury. You can talk to the shed's caretaker.
- Ask the caretaker about some of the steps that are being taken to improve its health.
- Make a note based on your findings
- Now, share your experience and findings with the class.

Check Your Progress

A. Multiple Choice Questions

1. Rules under the Prevention of Cruelty to Animals Act 1960 exist _____.
 - (a) for the welfare of draught animals
 - (b) against cruelty to animals in slaughterhouses
 - (c) for birth control in dogs
 - (d) All of the above
2. Animal welfare practices are based on _____.
 - (a) heresay
 - (b) religious opinions
 - (c) scientific evidence
 - (d) None of the above
3. A healthy animal is _____.
 - (a) active and alert
 - (b) aware of its surroundings
 - (c) holds its head up
 - (d) All of the above



NOTES

4. Article 51A(g) of the Constitution of India is about the _____.
 - (a) Fundamental Rights of citizens
 - (b) freedom of expression
 - (c) freedom to rear animals
 - (d) Fundamental Duties of being compassionate to all living creatures
5. A sick animal _____.
 - (a) eats and drinks normally
 - (b) has bright eyes
 - (c) has normal respiration
 - (d) None of the above

B. Fill in the Blanks

1. Freedom from hunger in case of animals means providing _____ and _____.
2. Ruminants not chewing cud is an indicator of _____.
3. The headquarters of the Animal Welfare Board of India is located in _____.
4. The four basic types of freedom of farm animals are freedom to _____, _____, _____ and _____.
5. Staying in a herd is a _____ sign for cows and buffaloes.

C. Mark True (T) or False (F)

1. Law allows using animals for public entertainment.
2. The Prevention of Cruelty to Animals Act was enacted in the year 1960.
3. Human beings can draw any work from all kind of animals for economic progress.
4. Animals do not experience fear and distress.
5. A dog has no freedom to bark at night if residents of a colony do not like it.



Dairy Worker - Class 10

Unit 6: Animal Welfare Legislations

Check Your Progress

A. Multiple Choice Questions

1. Rules under the Prevention of Cruelty to Animals Act 1960 exist _____.
(a) for the welfare of draught animals
(b) against cruelty to animals in slaughterhouses
(c) for birth control in dogs
(d) All of the above
2. Animal welfare practices are based on _____.
(a) heresay
(b) religious opinions
(c) scientific evidence
(d) None of the above
3. A healthy animal is _____.
(a) active and alert
(b) aware of its surroundings
(c) holds its head up
(d) All of the above
4. Article 51A(g) of the Constitution of India is about the _____.
(a) Fundamental Rights of citizens
(b) freedom of expression
(c) freedom to rear animals
(d) Fundamental Duties of being compassionate to all living creatures
5. A sick animal _____.
(a) eats and drinks normally
(b) has bright eyes
(c) has normal respiration
(d) None of the above

B. Fill in the Blanks

1. Freedom from hunger in case of animals means providing _____ and _____.
2. Ruminants not chewing cud is an indicator of _____.
3. The headquarters of the Animal Welfare Board of India is located in _____.
4. The four basic types of freedom of farm animals are freedom to _____, _____, _____ and _____.
5. Staying in a herd is a _____ sign for cows and buffaloes.

4. Article 51A(g) of the Constitution of India is about the _____.
- (a) Fundamental Rights of citizens
 - (b) freedom of expression
 - (c) freedom to rear animals
 - (d) Fundamental Duties of being compassionate to all living creatures
5. A sick animal _____.
- (a) eats and drinks normally
 - (b) has bright eyes
 - (c) has normal respiration
 - (d) None of the above

B. Fill in the Blanks

1. Freedom from hunger in case of animals means providing _____ and _____.
2. Ruminants not chewing cud is an indicator of _____.
3. The headquarters of the Animal Welfare Board of India is located in _____.
4. The four basic types of freedom of farm animals are freedom to _____, _____, _____ and _____.
5. Staying in a herd is a _____ sign for cows and buffaloes.

ANSWER KEY

Unit 1: Maintaining the Healthy Performance of Animals

Session 1: Common Non-infectious Diseases and Other Disorders in Dairy Animals

A. Multiple Choice Questions

1. (a) 2. (c) 3. (d) 4. (a)

B. Fill in the Blanks

1. Milk fever
2. dehydration
3. Potassium permanganate
4. Mastitis

C. Mark True (T) or False (F)

1. T 2. T 3. T 4. F

Session 2: Parasitic Infections in Dairy Animals

A. Multiple Choice Questions

1. (d) 2. (a) 3. (b) 4. (b) 5. (d)

B. Fill in the Blanks

1. Ectoparasites
2. blood
3. diseases
4. backline
5. subcutaneous

C. Mark True (T) or False (F)

1. F 2. T 3. T 4. F 5. F

Session 3: Common Infectious Diseases in Dairy Animals

A. Multiple Choice Questions

1. (d) 2. (c) 3. (d) 4. (d) 5. (d)

B. Fill in the Blanks

1. abortion
2. dairy
3. watery, flaky
4. contagious

C. Mark True (T) or False (F)

1. T 2. F 3. T 4. T 5. F

Unit 2: Prevention of Diseases

Session 1: Guidelines for Prevention of Diseases in Dairy Animals

A. Multiple Choice Questions

1. (a) 2. (c) 3. (a) 4. (c) 5. (c)

B. Fill in the Blanks

1. veterinary
2. Cleanliness, hygiene

3. dehydration, heatstroke
4. waste
5. schedule, guidelines

C. Mark True (T) or False (F)

1. T 2. F 3. F 4. T 5. T

Session 2: Vaccination of Dairy Animals

A. Multiple Choice Questions

1. (d) 2. (d) 3. (d) 4. (d) 5. (a)

B. Fill in the Blanks

1. 60 minutes
2. 45 degrees
3. Vaccination
4. de-wormed

C. Mark True (T) or False (F)

1. T 2. T 3. F 4. T 5. F

Session 3: One Health Approach

A. Multiple Choice Questions

1. (d) 2. (a) 3. (d) 4. (d) 5. (b)

B. Fill in the Blanks

1. Rabies
2. Accelerated
3. aggravate
4. transmitted
5. zoonotic

C. Mark True (T) or False (F)

1. F 2. F 3. T 4. F 5. T

Unit 3: Process of Milk Production

Session 1: Pre- and Post-milking Activities

A. Multiple Choice Questions

1. (b) 2. (c) 3. (d) 4. (d) 5. (d)

B. Fill in the Blanks

1. regular
2. dirt
3. lukewarm
4. prevent
5. mastitis

C. Mark True (T) or False (F)

1. T 2. T 3. F 4. F 5. F



Session 2: Clean Milk Production

A. Multiple Choice Questions

1. (d) 2. (d) 3. (c) 4. (c) 5. (c)

B. Fill in the Blanks

1. Sick
2. human
3. detergent, water
4. clean milk
5. healthy

C. Mark True (T) or False (F)

1. T 2. T 3. T 4. T 5. F

Unit 4: Record Keeping in a Dairy Farm

A. Multiple Choice Questions

1. (d) 2. (c) 3. (d) 4. (d) 5. (d)

B. Fill in the Blanks

1. Record
2. identification
3. manual
4. electronic
5. farm

C. Mark True (T) or False (F)

1. F 2. F 3. T 4. F 5. T

Unit 5: Health and Safety Hazards in a Dairy Farm

Session 1: Maintaining Hygiene and Biosecurity in a Dairy Farm

A. Multiple Choice Questions

1. (a) 2. (d) 3. (d) 4. (d) 5. (c)

B. Fill in the Blanks

1. Biosecurity
2. slips
3. Single
4. slippery
5. hand

C. Mark True (T) or False (F)

1. T 2. T 3. F 4. F 5. T

Session 2: Disposal of Farm Wastes

A. Multiple Choice Questions

1. (a) 2. (c) 3. (d) 4. (d) 5. (d)

B. Fill in the Blanks

1. Personal Protective Equipment
2. two
3. 100
4. earthworms
5. Farm Yard Manure

C. Mark True (T) or False (F)

1. F 2. T 3. F 4. F 5. T

Unit 6: Animal Welfare Legislations

A. Multiple Choice Questions

1. (d) 2. (c) 3. (d) 4. (d) 5. (d)

B. Fill in the Blanks

1. feed, water
2. sickness
3. Chennai
4. turn around, groom themselves, get up and lie down, stretch their limbs
5. healthy

C. Mark True (T) or False (F)

1. F 2. T 3. F 4. F 5. F



LIST OF CREDITS

Unit 1

- Fig 1.5 tinyurl.com/2syqsf3t
Fig 1.8 tinyurl.com/36y3jlya
Fig 1.14 Danveer Yadav, *Assistant Professor*, NDVSU,
Jabalpur, Madhya Pradesh

Unit 2

- Fig 2.16 tinyurl.com/2ndvwtrt
Fig 2.10 tinyurl.com/49bj6vet
Fig 2.12 <https://tinyurl.com/ys8yjey4>

Unit 4

- Fig 4.10 <https://tinyurl.com/17vabso8>
Fig 4.12 <https://tinyurl.com/2hs7ue6t>

Unit 5

- Fig 5.6 a <https://tinyurl.com/1v9rppgk>
Fig 5.6 b <https://tinyurl.com/3663stgx>
Fig 5.6 c <https://tinyurl.com/2oygd54s>

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