

Animal Health Worker

(Job Role)

Qualification Pack: Ref. Id. AGR/Q4804

Sector: Agriculture

Textbook for Class IX



17903

विद्यया ऽ मृतमश्नुते



एन सी ई आर टी
NCERT

राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

ISBN 978-93-5292-074-7

First Edition

June 2018 Jyestha 1940

PD 5T SU

© **National Council of Educational
Research and Training, 2018**

₹ 90.00

Printed on 80 GSM paper with NCERT
watermark

Published at the Publication Division
by the Secretary, National Council
of Educational Research and
Training, Sri Aurobindo Marg, New
Delhi 110 016 and printed at Chaar
Dishayen Printers (P.) Ltd., G-39-40,
Sector-3, Noida- 201 301 (U.P.)

ALL RIGHTS RESERVED

- ❑ No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior permission of the publisher.
- ❑ This book is sold subject to the condition that it shall not, by way of trade, be lent, re-sold, hired out or otherwise disposed of without the publisher's consent, in any form of binding or cover other than that in which it is published.
- ❑ The correct price of this publication is the price printed on this page, Any revised price indicated by a rubber stamp or by a sticker or by any other means is incorrect and should be unacceptable.

OFFICES OF THE PUBLICATION

DIVISION, NCERT

NCERT Campus
Sri Aurobindo Marg
New Delhi 110 016 Phone : 011-26562708

108, 100 Feet Road
Hosdakere Halli Extension
Banashankari III Stage
Bengaluru 560 085 Phone : 080-26725740

Navjivan Trust Building
P.O.Navjivan
Ahmedabad 380 014 Phone : 079-27541446

CWC Campus
Opp. Dhankal Bus Stop
Panihati
Kolkata 700 114 Phone : 033-25530454

CWC Complex
Maligaon
Guwahati 781 021 Phone : 0361-2674869

Publication Team

Head, Publication Division : *M. Siraj Anwar*

Chief Editor : *Shveta Uppal*

Chief Business Manager : *Gautam Ganguly*

Chief Production Officer : *Arun Chitkara*

Production Officer : *Abdul Naim*

Cover and Layout

DTP Cell, Publication Division

FOREWORD

The National Curriculum Framework–2005 (NCF–2005) recommends bringing work and education into the domain of the curricular, 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 the 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 society. Work involves interaction with material or other 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 the workplace. The NCF–2005 also emphasises on Vocational Education and Training (VET) for all those children who wish to acquire additional skills and/or seek livelihood through vocational education after either discontinuing or completing their 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 the subject areas and also 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 levels of knowledge, skills and attitude. These levels, graded from one to ten, are defined in terms of learning outcomes, which the learner 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 the 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 Human Resource Development.

This textbook has been developed as per the learning outcomes based curriculum, keeping in view the National Occupational Standards (NOS) 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 the institutions and organisations, which have supported in the development of this textbook.

NCERT would welcome suggestions from students, teachers and parents, which would help us to further improve the quality of the material in subsequent editions.

New Delhi
June 2018

HRUSHIKESH SENAPATY
Director
National Council of Educational
Research and Training

ABOUT THE TEXTBOOK

An Animal Health Worker under the legal provisions of Veterinary Council of India Act delivers services that are defined under Minor Veterinary Practices notifications of respective state governments. It is mandatory for all state governments to identify minor veterinary services like Animal Health Workers and to notify the same in the respective government gazettes. The need for partnership between practising veterinarians and animal health workers to ensure delivery of service to a large number of farmers in remote areas, needs no emphasis. The Animal Health Worker can offer services only under the supervision of veterinarians. For career progression under NSQF framework, the Animal Health Worker can study further to become a Dairy farmer/Entrepreneur (covered in Classes XI and XII). S/he can work anywhere in India or even seek employment outside the country.

Students of this course in Animal Health Worker have bright chances of seeking admission in Bachelor of Veterinary Science Course if they choose to go for higher education. In the B.V.Sc. degree course of Tamil Nadu Veterinary and Animal Sciences University five percent of the seats are reserved for the candidates of vocational stream. (Source: www.tanuvas.tn.nic.in)

To achieve these objectives, the textbook has been developed with the contribution of many experts. It is hoped that the textbook will be useful for students aspiring a career in veterinary field. Adequate care has been taken to align the contents of the textbook with the National Occupational Standards (NOS) for the job role of Animal Health Worker. This will enable the students to acquire necessary knowledge and skills as per the performance criteria mentioned in the Qualification Pack by Agriculture Skill Council of India.

The textbook has been reviewed by experts so as to make sure the content is not only aligned with the National Occupational Standards, but is also of high quality. The NOS for the job role of

Animal Health Worker covered through this textbook are as follows:

1. AGR/N4801—Restraining Farm Animals
2. AGR/N4802—Implementation of Preventive Animal Health Care
3. AGR/N4805—Veterinary First Aid
4. AGR/N4807—Prevention and Control of Infectious and Contagious Diseases

The textbook has been divided into four units. Unit 1 is about handling and restraining farm animals keeping the behaviour of various farm animals into consideration. Unit 2 discusses the implementation of preventive health care programmes, vaccination and deworming in farm animals. Preventive first aid measures in infectious diseases are covered in Unit 3. The prevention and control of infectious and contagious diseases along with the 'One Health' approach and bio-security are covered in Unit 4.

It is hoped that this textbook will prove to be useful for students and teachers who opt for this job role. Any further suggestions for improving this textbook are always welcome.

Kuldeep Singh
Associate Professor
Department of Agriculture
and Animal Husbandry
PSSCIVE, Bhopal

TEXTBOOK DEVELOPMENT TEAM

MEMBERS

Amita Dubey, *Assistant Professor*, Department of Veterinary Pathology, Nanaji Deshmukh Veterinary Science University (NDVSU), Jabalpur, Madhya Pradesh, India

Amita Tiwari, *Assistant Professor*, Department of Veterinary Medicine, NDVSU, Jabalpur, Madhya Pradesh, India

Anand Jain, *Assistant Professor*, Department of Veterinary Physiology and Biochemistry, NDVSU, Jabalpur, Madhya Pradesh, India

Biswajit Roy, *Associate Professor*, Department of Livestock Production Management, NDVSU, Jabalpur, Madhya Pradesh, India

Manish Shukla, *Assistant Professor*, Department of Veterinary Gynaecology and Obstetrics, NDVSU, Jabalpur, Madhya Pradesh, India

R.P.S. Baghel, *Professor and Dean*, College of Veterinary Sciences and Animal Husbandry, NDVSU, Jabalpur, Madhya Pradesh, India

MEMBER-COORDINATOR

Kuldeep Singh, *Associate Professor*, Department of Agriculture and Animal Husbandry, PSSCIVE, Bhopal, Madhya Pradesh, India

ACKNOWLEDGEMENT

The National Council of Educational Research and Training expresses its gratitude to all members of the Project Approval Board (PAB) and officials of the Ministry of Human Resource Development (MHRD), Government of India, for their cooperation in the development of this textbook. The Council also extends gratitude to all the contributors for sharing expertise and valuable time by positively responding to the request for the development of this textbook. The Council also acknowledges the contribution of the Review Committee members—Saroj Yadav, *Professor and Dean (Academic)*, NCERT, Ranjana Arora, *Professor and Head*, DCS, NCERT, Arum Khan, *Assistant Professor (Contractual)*, CIET, Pushplata, *Assistant Professor*, DESM, NCERT, Anita Nuna, *Professor*, DCS, NCERT for carefully evaluating and giving suggestions for the improvement of this book. The Council would also like to thank Rajesh Khambayat, *Joint Director*, PSS Central Institute of Vocational Education (PSSCIVE), Bhopal for providing support and guidance in the development of this textbook.

Special thanks are due to P.D. Juyal, *Vice Chancellor*, Nanaji Deshmukh Veterinary Science University (NDVSU), Jabalpur for constant encouragement and support during preparation of the textbook, and to Biswajit Roy, *Associate Professor*, Department of Livestock Production Management, NDVSU, Jabalpur for photographs of the animals and for preparing other visuals included in the textbook. The box item on Pg. 33, Fig. 3.8 (Pg. 56), images on Pg. 75 and Fig. 4.7 (Pg. 77) have been sourced from the Creative Commons license. They have been selected with care and diligence for clearer understanding of learners. Care has been taken to not violate any copyright. The images are meant for educational purpose and are being provided for the personal use of students and teachers.

The meticulous copyediting and valuable inputs by Madhavi Ratnaparkhi, *Assistant Editor (Contractual)* of the Publication Division are duly acknowledged. The efforts of Pawan Kumar Barriar, *DTP Operator*, Publication Division, NCERT and Sadiq Saeed, *DTP Operator (Contractual)* of Publication Division for flawless layout design are also acknowledged.

CONTENTS

<i>Foreword</i>	<i>iii</i>
<i>About the Textbook</i>	<i>v</i>
Unit 1: Restraining Farm Animals	1
Session 1: Body Parts of Cattle and Basics of Animal Handling	1
Session 2: Behavioural Considerations in Animal Handling	5
Session 3: Approaching and Handling farm Animals	11
Unit 2: Implementation of Preventive Animal Health Care	22
Session 1: Occurrence and Reporting of Endemic Diseases	22
Session 2: Vaccination in Farm Animals	27
Session 3: Deworming and Control of Ectoparasites	37
Unit 3: Veterinary First Aid	47
Session 1: Preventive First Aid Measures for Infectious Diseases	47
Session 2: First Aid Measures for Non-infectious Conditions	56
Session 3: First Aid Measures in Special Cases	60
Unit 4: Prevention and Control of Infectious and Contagious Diseases	68
Session 1: Factors Responsible for the Spread of Diseases in Farm Animals	68
Session 2: Diseases due to Movement of Animals	74
Session 3: 'One Health' Approach and Livestock Value Chain	79
Session 4: Bio-security and Disposal of Farm Animals	84
<i>Answers</i>	<i>89</i>



.....Ahimsa is the very definition of woman and there is no place for untruth in her heart. If she is true to herself she is no longer Abala - the weak, but she is Sabala - the strong.....

not to be published

Unit



Restraining Farm Animals

INTRODUCTION

In this Unit, we will learn about the common body parts of cattle and the purposes of restraining and handling of farm animals. You will also learn how to safeguard the animal handler when the animal becomes agitated. A good animal handler understands the basic behaviour of the farm animals to facilitate better handling, reduce stress, and improve the safety of the handler as well as welfare of the animals.



17903CH01

SESSION 1: BODY PARTS OF CATTLE AND BASICS OF ANIMAL HANDLING

Major body parts of cattle

First and foremost, the animal health worker must understand the various body parts of the animals. Fig. 1.1 illustrates the various body parts of cattle.

Purposes of handling the animals

There is no magic to having well-behaved and controlled animals, except a handler who is confident and willing to work with the animals. Farm animals are usually handled or restrained for various purposes, as given in Fig. 1.2.

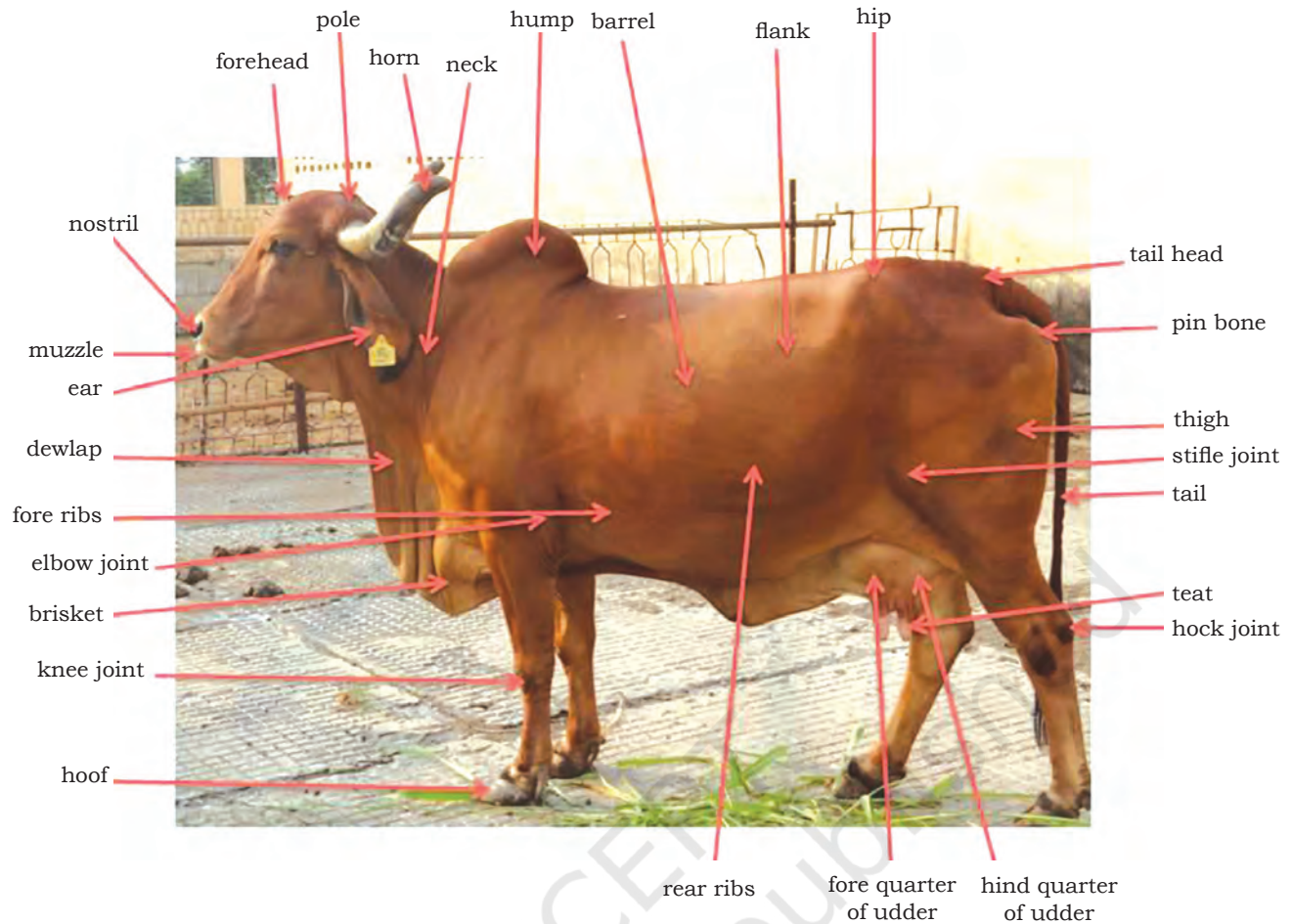


Fig. 1.1: Body parts of cattle

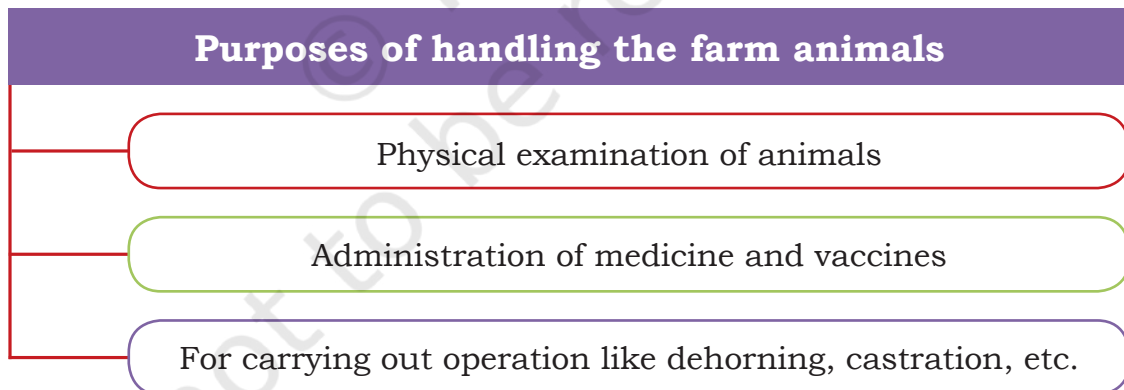


Fig.1.2: Purposes of handling the animals

General principles of animal handling

A general principle of animal handling is to avoid getting the animal excited (Fig. 1.3) and thus, maintaining safety of the animal handler. Working in close contact with dairy cattle is a necessary part of most of the dairy



operations. A good animal handler not only understands the psychology of his animals for better animal handling but also ensures his/her own safety.



Fig. 1.3: Instances of excited cattle in a farm

Herd instinct: Farm animals have a tendency to stay together in herds and this is called their herd instinct (Fig. 1.4). Therefore, farm animals become agitated when they are isolated from the herd. If an isolated animal becomes overexcited, it is allowed to go back to the herd.



Fig. 1.4: Herd instinct in cattle (a), buffaloes (b) and young calves (c)

Practical Exercises

Visit a nearby livestock farm.

1. Note down the important body parts of different livestock species.
2. Talk to the animal workers at the farm about day-to-day handling of animals and note down their practical feedback.

NOTES

Check Your Progress

A. Multiple choice questions

- Principles of animal handling involve
 - To avoid getting the animal excited
 - Reducing stress during handling
 - Improve productivity and performance of the animal
 - All of the above
- Muzzle is located in the
 - head region
 - neck region
 - leg region
 - tail region
- A good animal handler understands the basic behaviour of the farm animals to
 - facilitate better handling
 - reduce stress
 - improve both handler safety and animal welfare
 - All of the these
- Elbow joint is present in
 - fore leg
 - hind leg
 - head
 - tail

B. Fill in the blanks

- Never handle _____ animals.
- Total number of teats in a cow is _____.
- Total number of hoofs in a buffalo is _____.
- Hock joint is located in _____ leg.

C. Mark True or False

- Handling of animals is done for their physical examination.
- Pole region of a cow is located in its tail.
- Flank region of a buffalo is located in its head region.
- An isolated animal becomes overexcited.
- Farm animals have a tendency to live in herds.



SESSION 2: BEHAVIOURAL CONSIDERATIONS IN ANIMAL HANDLING

NOTES

Basics of animal behaviour in relation to handling

Reaction of animals to a stimulus is called behaviour. Different farm animals react to the same stimulus in different ways. The behaviour of animals determines their ability to survive in nature.

The study of animal behaviour is known as ethology. Ethology is the scientific and objective study of animal behaviour under natural conditions.

Study of farm animal behaviour is useful for health, welfare and training of animals. Understanding the behaviour of domestic animals and their relationship with humans has greatly contributed to easier handling of animals and increased economic benefits in animal husbandry. It is therefore important for the dairy farmer to have in-depth knowledge of behaviour of livestock as it helps in efficient breeding, feeding and management of farm animals.

The animal health worker must always bear in mind the following aspects of farm animals' behaviour in their day-to-day work.

- (i) *Fundamental animal instincts*: Animals experience hunger, thirst, fear, sickness, injury and strong maternal instincts. They also develop individual behaviour patterns such as kicking or biting. A good animal handler knows about such animal behaviour and takes necessary safety precautions, including use of personal protective equipment.
- (ii) *Sensitivity to contrasts*: Cattle and swine are generally colour-blind and have poor depth perception. This results in an extreme sensitivity to contrasts, which may cause an animal to stop at shadows or when the animal experiences sudden changes from light to dark. Sheep are also considered colour-blind, but they do have good depth perception.



NOTES

- (iii) *Kicking habit*: Horses and mules commonly kick-out their hind-legs, while cows kick-in forward and then kick-out outwards. Cows also have a tendency to kick sideways in case of pain, inflammation or injuries. For example, if a cow is suffering from Mastitis in one quarter of the udder, it should be approached from the side of the non-affected udder.
- (iv) *Maternal instinct*: Livestock with newly born offspring exhibit strong maternal instinct. Such animals are usually more defensive and difficult to handle. Wherever possible, the newly born calf should be allowed to stay close to its mother at the time of handling.
- (v) *Hesitation towards unfamiliar environment*: Farm animals usually develop a very characteristic comfortable attachment to areas such as pastures and buildings, water troughs and feedlots. Forcible removal from these areas can cause animals to react unexpectedly. Considering these characteristics, it is easier to understand why animals often hesitate while going through unfamiliar areas. Similar problems occur when animals are moved away from feedlots, separated from the herd or approached by an unfamiliar person.
- (vi) *Aversion to unnecessary movements*: Moving or flapping objects can also make the handling of animals difficult. A cloth or coat swinging in the wind or turning fan blades can cause animals to stop abruptly.
- (vii) *Other considerations in handling*: Animals that are blind or deaf on one side need to be dealt with cautiously. They favour that side and can suddenly swing around to investigate disturbances. If standing too close, a person could easily be knocked down and trampled. Animals respond to the way they are treated and draw upon past experiences when reacting to a situation. For example, animals that were chased, kicked, hit or frightened when young, will naturally fear being approached.



Three essential elements of animal handling

Although the area of animal behaviour and control is quite vast, an animal health worker must be well conversant with the following three essential elements of animal behaviour and control *viz.* flight zone, blind spot and point of balance.

Flight zone

All animals have a flight zone which is the animal's "personal space". It is the space in which the animal feels comfortable. It is the minimum distance the animal tries to maintain between itself and any perceived threat. The size of the flight zone varies depending on how calm or aggressive the animal is. Cattle confined to a small space have a smaller flight zone than cattle kept in a large area. The size of the flight zone slowly diminishes when animals receive frequent gentle handling. An understanding of the flight zone of the animal can help the handlers to reduce stress and prevent accidents.

Blind spot

It is necessary to remember that the area immediately behind the tail of the animals extending up to 15° on either side (i.e., total 30°) is treated as the "blind spot", where the animal cannot perceive the handler. An efficient handler never approaches the animal in the area of blind spot as it may get frightened and cause injury to the handler.

Point of balance

This is another important concept of livestock handling (see Fig. 1.5). Farm animals have a wide angle of vision. Point of balance is the imaginary point located on the animal's shoulder which divides the animal's body into two portions, i.e., front portion and rear portion. If the handler crosses this hypothetical point in the direction of front portion, the animal generally moves

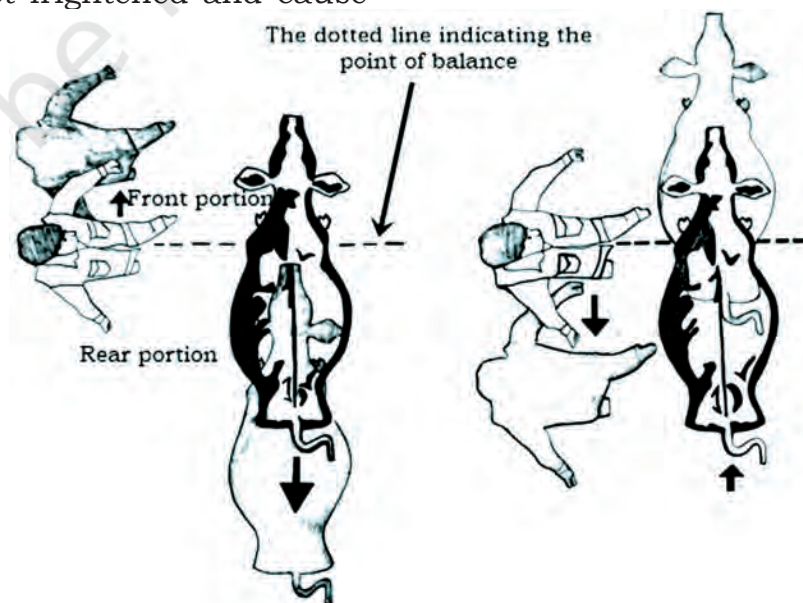


Fig. 1.5: Diagram showing point of balance in an animal

backwards. But if the handler stays in the rear portion, the animal moves in the forward direction.

Important aspects of livestock handling

The following points must be taken into consideration while handling farm animals.

Never handle excited animals

- Excited animals are difficult to handle. Thus, if cattle become excited, allow them at least 30 minutes to return to normalcy.

Changes in animal behaviour due to stress

- Animals express fear or alarm under stress through their behavioural symptoms.

Cattle are sensitive to contrasts

- Cattle are colour-blind and have poor depth perception. It implies that they are very sensitive to contrasts. Therefore, contrasting situations are avoided in the farm.

High-pitched noises

- Animals are frightened by high-pitched noises. When cattle are moved quietly, they remain calm and are a lot easier to handle.

Animals remember 'bad' experiences

- Cattle remember 'bad' experiences and create associations from fearful memories. For example, if a bald man caused pain to a cow, the same cow may exhibit fear towards all bald men. This emphasises the need for calm and respectful handling of animals at all times.

Direction of kicking

- Cattle usually kick in forward direction, then kick out and back in a swinging motion. The animal health worker must be aware of this kicking habit to avoid injury to self and to the animal.

Attachment with the owner

- Animals are also very observant. They learn to watch and listen to their owners, even when they may appear to be inattentive. Animals can sense the human mood by watching human behaviour.

Proper handling techniques

- Some animals take longer than others to get trained but all farm animals can be handled safely and effectively if proper techniques are used.

Signs of distress in farm animals

During stress condition, all animals express fear, distress or alarm through their behavioural symptoms, as shown in Fig. 1.6.

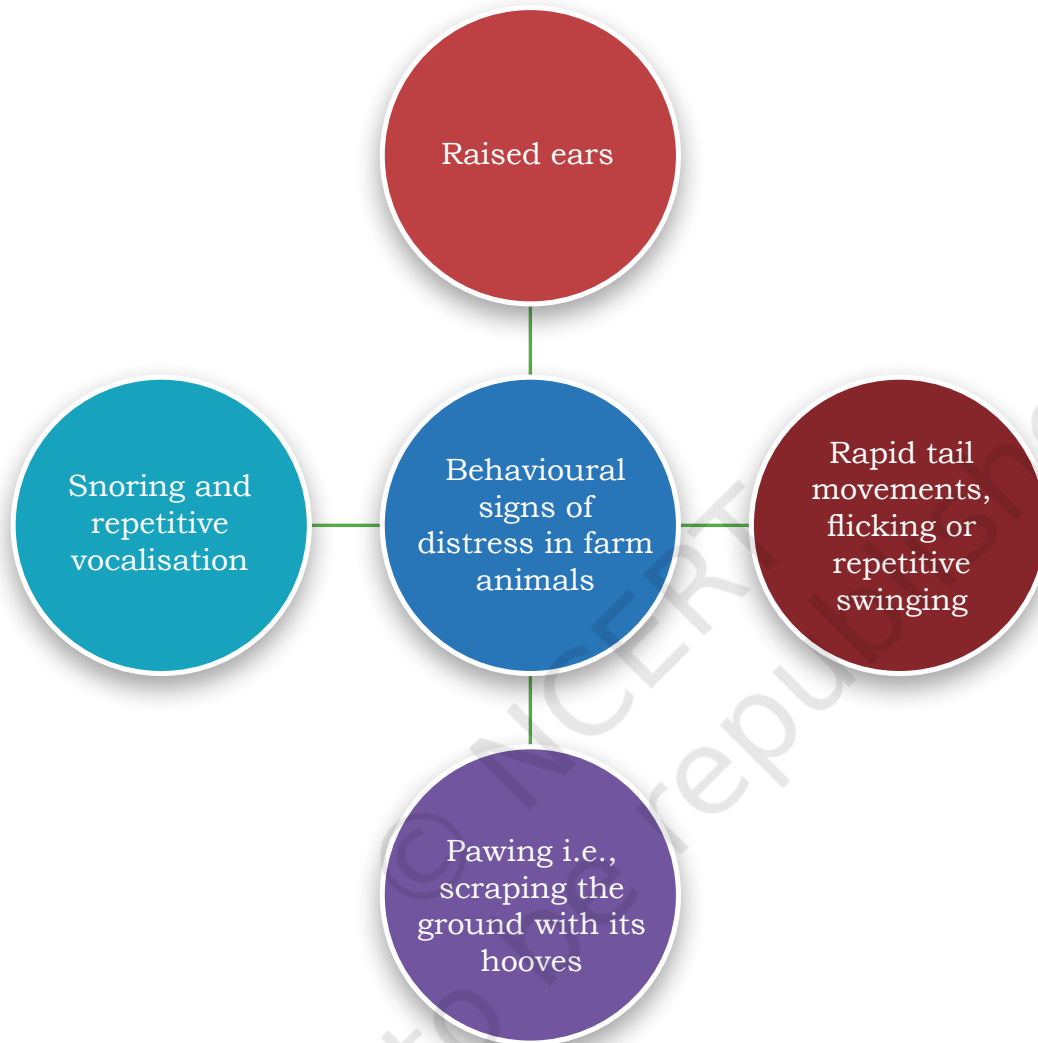


Fig. 1.6: Signs of distress in farm animals

Practical Exercises

Visit a nearby livestock farm.

1. Note down the basic behaviour of cattle in the farm.
2. Record your observations if some animals in the farm show signs of distress and explain what could be the reasons for such distressful behaviour.



Check Your Progress

A. Multiple choice questions

- The study of animal behaviour is known as
 - Ethology
 - Entomology
 - Ecology
 - All of the above
- The knowledge of livestock behaviour helps the farmer in
 - Efficient breeding
 - Feeding
 - Management of farm animals
 - All of the above
- The animal feels comfortable when the handler is
 - In the blind spot area
 - Inside the flight zone
 - Outside the flight zone
 - None of the above
- The size of the flight zone diminishes when animals receive
 - Frequent gentle handling
 - Rough handling
 - Both (a) and (b)
 - None of the above
- The imaginary point located on the animal's shoulder for moving the animals in the forward direction is called
 - Flight zone
 - Point of balance
 - Blind point
 - All of the above

B. Fill in the blanks

- Reaction of animals to a stimulus is called _____.
- Swine and cattle are generally _____ and have poor depth perception.
- All animals have a flight zone which is the animal's _____.
- Raised ears is a sign of _____ in farm animals.
- Cows kick _____ in case of pain, inflammation or injuries.

C. Mark True or False

- A bull has strong paternal instinct.
- The livestock react unexpectedly upon forcible removal from pastures, buildings, water troughs and feedlots.
- Cattle confined to a small space will have a smaller flight zone than cattle kept in a large area.

4. Animals during stress condition express fear, distress or alarm through their behavioural symptoms.
5. Animals can sense the human mood by watching human behaviour.

SESSION 3: APPROACHING AND HANDLING FARM ANIMALS

Approaching the farm animals

The right way of approaching large animals such as cows and buffaloes is important for handling them safely. As explained in the previous sessions, most large animals can see at wide angles around them and there is a blind spot directly behind their hindquarters. Any movement in the area of the blind spot makes the animal uneasy and nervous. The following aspects must be considered while approaching large animals.

- (i) Before approaching an animal, ask the attendant or the owner whether the animal is docile or furious.
- (ii) Never carry a stick when approaching an animal.
- (iii) If possible, call the animal by its name, and approach the animal preferably from the left side.
- (iv) Pat the animal gently by calling its name or words familiar to the animal.
- (v) Most large animals kick in an arch beginning towards the front and moving towards the back. Avoid this kicking region while approaching the animal.
- (vi) Some of the novice farm workers feel that a good way of restraining large animals is to entice them with concentrates and jaggery. This is not an advisable method to follow in case of large animals.

Restraining of individual cows and buffaloes

Halters and ropes can be useful for handling cattle and for moving them. Soft rope or leather strap can be used for this purpose. The following precautions must be kept in mind while restraining animals.

- (i) Cows are generally more nervous than other animals. Always announce your presence when approaching a cow and gently touch it.



- (ii) If a cow tends to kick, consider using a rope. Do not permit workers to talk loudly. Gentle cows can be dangerous while defending their calves and such information should be shared with the visitors and new workers.
- (iii) Special care is required for handling the breeding bulls. The handler should never come in direct contact with a breeding bull.
- (iv) Keep small children and strangers away from the animals.
- (v) Cattle can be difficult to handle if you force them to act in ways that are not natural for them.

Restraining particular body parts of animals

Different tools and methods are used to bring the needed



Fig. 1.7: An animal handler restraining head of a young cattle

body parts of the animals under control. The different approaches for restraining particular parts of an animal are given below.

(a) Restraining of the head region

To manually restrain the head region, grasp the bridge between the nostrils with thumb and forefinger of one hand and hold it firmly (Fig. 1.7). With the other hand, hold the horn.

Besides this method, following tools are also commonly used for controlling the head region of large animals.



Fig. 1.8: Bull nose ring



Fig. 1.9: Bull nose ring fitted to the nostril of the bull

- (i) **Bull nose ring:** It is fixed to the nasal septum of bulls and used to restrain the head region of the animal. It is made up of two semi-circular pieces of aluminium, copper or some alloy which does not rust (Fig. 1.8). Rope or bull holder is attached to the bull nose ring to control the bulls (Fig. 1.9).

(ii) *Bull holder*: It is a wooden pole fitted with metal structure which entraps the bull nose ring to control the bull (Fig. 1.10).



Fig. 1.10: Bull holder

(iii) *Bull nose leader*: It is used if examination of the animal is likely to be prolonged or if the animal is restive. The swivel allows the animal to turn and twist its head without twisting the operator's wrist (Fig. 1.11). The ring is used as a handle. The finger-like structure can be separated and inserted into the two nostrils of a bull and then closed tight.



Fig. 1.11: Bull nose leader



Fig. 1.12: Muzzle cover

(iv) *Muzzle cover*: It is made of rope, string, bamboo splits and wire netting or leather straps and used to envelope mouth of animals to prevent them from biting and overeating (Fig. 1.12).

(v) *Mouth gags*: These are used for keeping the two jaws of cattle open for examination of the mouth. One gag is used for the right jaw and the other for the left jaw (Fig. 1.13).



Fig. 1.13: Wooden mouth gag

(b) Restraining of the foreleg

The foreleg of the cattle is raised and held off the ground for examination or treatment. Raising the foreleg also helps in controlling the movement of the animals and hinder their kicking with the hind leg. The method of restraining the front leg of cattle with the help of a rope is shown in Fig. 1.14.



Fig. 1.14: Restraining of foreleg of cattle

(c) Restraining of the hind leg

Raising of the hind leg off the ground and holding it in that position facilitates examination or treatment of



Fig. 1.15: Restraining of hind leg of cattle

the animal. It is particularly useful for the treatment of hooves. Following are the two commonly used ways of restraining the hind legs (Fig. 1.15).

Anti-kicker and *Milker's knot* are used to prevent the animal from kicking during examination of udder and teats while milking or examination of the hind region in case of Mastitis and udder swelling (Figs 1.16a and 1.16b). In an anti-kicker, two metal spring clips connected by a chain are used.



Fig. 1.16 (a) Anti-kicker

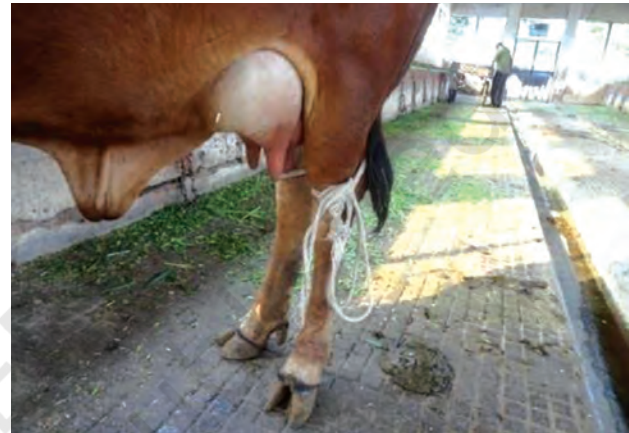


Fig. 1.16 (b) Milker's knot



Fig. 1.17: Tail restraining in cattle

(d) Restraining the tail to divert animal's attention

For this purpose, the animal worker stands on the side of the cow to avoid being kicked. Animal handler keeps both the hands close to the base of the tail as much as possible (Fig. 1.17). The grip is gentle but firm. Restraining of tail is required to distract the cattle's attention from another part of its body on which some operation is being done.

Restraining the whole animal

(a) Casting of animals

Casting of an animal means making the animal fall on the ground. Animals are cast for various reasons like surgical operations, hoof trimming, etc., to prevent



accidents during handling. In a large farm, a casting pit is set up to avoid injury during casting of animals. Casting pit is a circular area of about 8 metres diameter which is filled with bedding materials like sand, wheat straw, saw dust, etc. (Fig. 1.18). Sharp or piercing objects are never kept in the casting pit. As a precautionary measure, the animal is kept on fasting for 12 hours before casting to prevent injury to distended digestive organs. Casting of pregnant animals must be avoided.



Fig. 1.18: Casting pit filled with sand as bedding material

The following two methods are used for casting of large animals.

Reuff's method

It is the most common and efficient method of casting the large animals. For this method, around 30 feet



Fig. 1.19: Reuff's method of casting down a large animal

of rope is required to carry out the following steps for casting:

Make a loop around the animal's neck using a bowline knot placed as indicated in the pictures. Throw the end of the rope over animal's back to the opposite side. Pick the rope from under the animal, bring it around its body and near the bowline to form a half hitch just behind the shoulder. By tossing the end over the animal's back, make another half hitch just in front of the udder or scrotum in case of male cattle. Gently pull the rope to cast the animal (Fig. 1.19).

Burley method of casting

In this method, the rope is divided into two equal parts. The middle portion of the rope is placed on the upper side of the animal's neck and free ends of the rope are crossed under the neck. Then both the free ends of the



Fig. 1.20: Burley method of casting down an animal



rope pass between the front legs in backward direction on either side of the animal. Each free end of the rope then crosses over the back of the animal and subsequently passes through the area between the udder or scrotum (in case of males) and hind legs. When the rope is pulled in the backward direction, the animal is cast to the ground (Fig. 1.20).

Restraining small animals like sheep and goat

Sheep and goat are restrained by means of hand or an arm under the neck with the other arm placed on or around the rear side. Lifting or dragging sheep by the fleece, tail, ears, horns or legs is unacceptable and dangerous. Devices such as harnesses, tethers and yokes of suitable material are properly fitted and adjusted. The major steps in handling of sheep and goat are explained in Fig. 1.21.

Some other tools and equipment used for restraining farm animals

Besides the already mentioned tools for restraining the different parts of the animal, some more tools are used which are mentioned below.

Halters

Halters made of rope or leather can be used for farm animals. A 1.5 cm thick and 3 to 4 metres long rope is used for preparation of the loop.

Trevis

Trevis is used for handling animals for longer duration. It is a fixed structure constructed with steel pipes, as shown in Fig. 1.22.

Safe practices in animal handling

The animal health worker ensures personal safety by observing the following practices.

Step 1

Sheep are held above the hock by placing the left hand underneath the jaw and around the back.

Step 2

To turn up a sheep, stand against it on the left side placing left hand under its neck. Pass the right hand over the right flank as far as possible and take hold of the wool.

Step 3

Raise the sheep's forelegs off the ground with the right hand and lift the animal into a sitting position.

Fig. 1.21: Restraining of sheep and goats



Fig. 1.22: Trevis

- (i) The important protective equipment are gloves, apron, gumboots and mask (Fig. 1.23). A rigid protective helmet is also worn when required.
- (ii) It is important to wear proper gumboots when one is around livestock. Gumboots provide proper foot support and protection to the worker.



Apron



Gloves



Mask



Gumboots

Fig. 1.23: Protective equipment used in farms

- (iii) Wear rubber gloves when working with sick and injured animals as well as other protective clothing.
- (iv) Observe personal hygiene by washing hands and face after handling the animals.
- (v) A good farm health worker is concerned about zoonotic diseases which can be transmitted from humans to animals and vice versa. Leptospirosis, Rabies, Brucellosis, Salmonellosis and Ringworm are some examples of zoonotic diseases.
- (vi) To reduce exposure to diseases, use basic hygiene and sanitation practices which include prompt treating or disposal of infected animals, adequate disposal of infected tissues and proper cleaning of contaminated sites.
- (vii) Always handle any hazardous medical equipment such as needles or chemicals with extreme caution. Never throw needles away in the waste. Special red-coloured bio-hazard disposal boxes must be kept for this purpose on the farms.

Abnormal behaviour in farm animals

Animal behaviour refers to how animals react to other animals of the same species, other animal species, human beings and the environment. Abnormal behaviour

includes any behaviour reported to be outside the normal behaviour pattern for animals of that particular class and age. Knowledge of normal behaviour of livestock allows the animal health worker to detect abnormalities in animals' behaviour.

The main causes of unusual behaviour are stressful condition and prolonged sickness. Abnormal behaviour in a farm animal is sometimes detrimental to the animal itself or to other animals. Abnormal behaviour can be used to identify clues to illness, stress, inadequate nutrition and other problems. Various types of abnormal behaviour observed in farm animals are as follows.

Coprophagia

It refers to the eating of faeces of animals by other animals.

Excessive licking

Calves develop abnormal behaviour like excessive licking of other animals when housed together (Fig. 1.24). Sometimes they lick walls, floors or other objects.



Fig. 1.24: Calf showing excessive licking

Pica

It means the eating of materials other than the normal feed of the animals like paper, metals, stones, etc.

Tail biting

It is the biting or chewing the tail of another animal. This is commonly observed in swine and calves.

Cannibalism

It refers to the eating of flesh or internal organs of another animal of the same species.

Crib-biting

It refers to the grabbing of solid objects such as a fence, with the incisor teeth by the animal.

Practical Exercises

Visit a nearby livestock farm.

1. Practise the various animal restraining methods being followed at that farm.
2. Identify the various equipment used in restraining the farm animals.

Check Your Progress

A. Multiple choice questions

1. The method used for casting of large farm animals is
 - (a) Burley method
 - (b) Reuff's method
 - (c) Both (a) and (b)
 - (d) None of the above
2. Tail biting is commonly observed in
 - (a) goat
 - (b) sheep
 - (c) horse
 - (d) swine
3. Anti-kicker is used in cows during
 - (a) milking
 - (b) examination of udder
 - (c) examination of teats
 - (d) All of the above
4. Bull nose ring is used for controlling
 - (a) goat
 - (b) sheep
 - (c) swine
 - (d) bull
5. Eating the flesh or internal organs of another animal of the same species is called
 - (a) cannibalism
 - (b) coprophagia
 - (c) pica
 - (d) None of the above

B. Fill in the blanks

1. _____ is used for handling of animals for longer duration.
2. _____ is eating material other than normal food.

3. Making an animal fall on the ground is called _____.
4. _____ method is a common and efficient method of casting.

C. Mark True or False

1. Mouth gag is used for keeping open the mouth of animals.
2. Rubber gloves and protective clothing must be worn while working with sick and injured animals.
3. The easiest way to restrain a large animal is enticing it with food.
4. Avoid the kicking region while approaching an animal.
5. Pat the animal gently by calling its name or words familiar to the animal.

Glossary

Calf: *The young one of cattle or buffaloes up to one year of age.*

Castration: *Removal of testes of male livestock.*

Colour-blind: *Inability to distinguish certain colours, or any colours at all.*

Dehorning: *Removal of fully grown horns of livestock for safety reasons.*

Feedlot: *A feeding yard for intensive animal farming.*

Halters: *A strap or rope placed around the head of an animal, used for leading or tethering it.*

Harness: *A set of straps and fittings by which a horse or other draught animal is fastened to a cart, plough, etc., and is controlled by its driver.*

Instinct: *The way animals naturally react or behave, without having to think or learn about it.*

Livestock: *Animals raised on the farm for profit.*

Mastitis: *Inflammation of tissues of cow's udder due to trauma or microbial infection.*

Stress: *A state of mental or emotional tension resulting from adverse or unusual circumstances.*

Tether: *A rope or chain attached to an animal and attached to something at the other end, restricting the animal's movement.*

Yoke: *A wooden frame for harnessing two draft animals to whatever they had to pull.*



Unit



Implementation of Preventive Animal Health Care



17903CH02

INTRODUCTION

You will agree that your potential for studies and academic achievements increase if you do not fall ill throughout the year. Same is the case with farm animals. Output of animals increases if they are kept healthy. Preventive animal health care consists of measures taken for disease prevention rather than disease treatment.

Regular preventive animal health care programmes promote animal health by preventing and reducing animal diseases, thereby reducing the cost of treatment. Early diagnosis and treatment slows the incidence and extent of common diseases in animals. Implementation of preventive animal health care programmes checks animal health related threats and minimises negative impacts on the environment. In this Unit, the timely identification of occurrence of diseases on the basis of common clinical signs and the disease reporting system helpful in controlling animal diseases, are discussed.

SESSION 1: OCCURRENCE AND REPORTING OF ENDEMIC DISEASES

A large number of diseases occur frequently in farm animals and cause tremendous economic losses to the farmers. Economic losses caused due to diseases can

be either direct or indirect. Direct losses are due to the cost of treatment of diseased animals, death of diseased animals, reduced production in terms of milk, meat, wool and skin, etc. Indirect losses are due to abortions, infertility and sterility caused due to these diseases.

Occurrence and reporting of endemic diseases

Timely identification of occurrence of diseases and their reporting is necessary for keeping them in control. In the absence of timely reporting of diseases, the diseases may assume serious proportions before control and preventive steps can be initiated. The strategy for overcoming such a situation is rooted in promotion of farm animals' health and welfare through disease prevention rather than cure.

The occurrence of the animal diseases can be detected on the basis of clinical symptoms in farm animals. When such symptoms are detected, the government veterinary doctor is informed at the earliest. This information is passed on to the block level and then to the district and the state veterinary authorities for action on their part.

Fig. 2.1 shows the structure for step-wise reporting of the occurrence of diseases in our country.

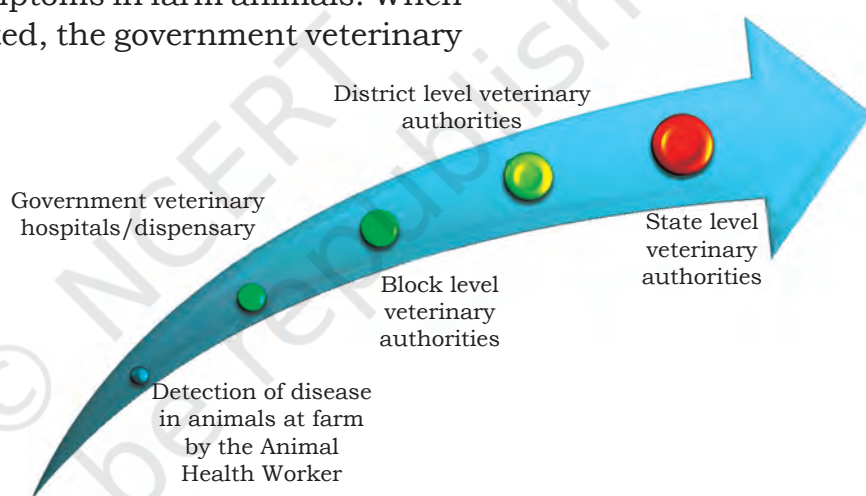


Fig. 2.1: Structure for reporting animal diseases

Common diseases of farm animals

An animal health worker is expected to have a general idea of important diseases prevalent in farm animals which keep on recurring periodically. Some of the common diseases of farm animals and their distinct symptoms are given below.

Foot and Mouth Disease (FMD)

It is characterised by high fever, formation of vesicles and blisters in the mouth, udder, teats and skin between the toes and above the hooves. There is

excessive salivation and the animal becomes lame. FMD is highly communicable and spreads by direct contact or indirectly through infected water, manure, hay and pastures. Although the disease is not life-threatening in case of adult animals, it could lead to death in a few cases in calves. It can be prevented easily by regular vaccination of the animals.

Mastitis

It is a common disease of cattle and causes substantial direct and indirect losses to the dairy farmer. It is a bacterial disease and can only be prevented by early detection and good farm management practices

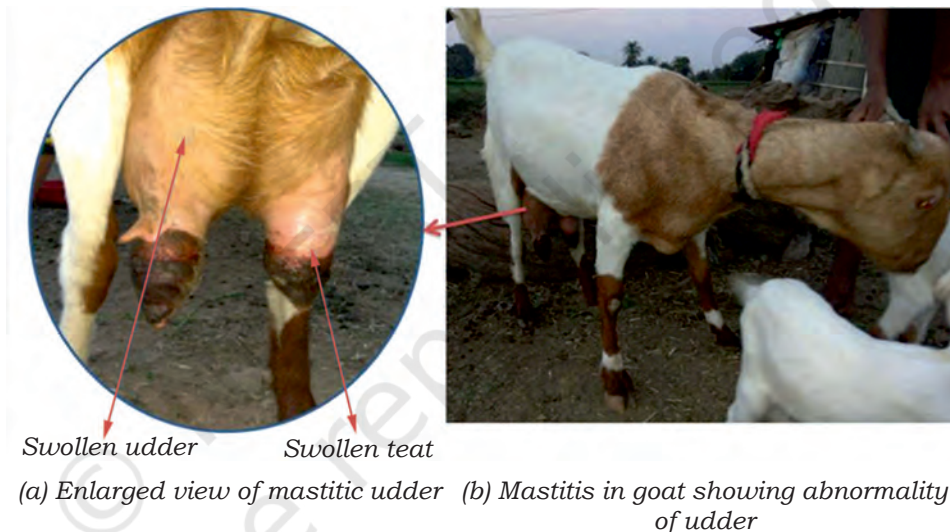


Fig. 2.2: Mastitis in goat

including hygiene. The most common symptoms are abnormalities in the udder, i.e., swelling, heat, hardness, redness or pain in the udder (Fig. 2.2). The milk of animal appears watery and sometimes flakes, clots or pus are also seen in the milk. Other symptoms are reduction in milk yield, increase in body temperature and lack of appetite.

Anthrax

It is a highly infectious and fatal disease of cattle and leads to the sudden death of the animal within two or three hours of infection. Very rarely do animals show high temperature, difficulty in breathing and

convulsions before death. Small amount of bloody discharge from the nose, mouth and other openings is visible after the death of the animal.

Black quarter (BQ)

It is a highly infectious and fatal disease of cattle, buffaloes, sheep and goats. Mostly young cattle between 6–24 months of age and having good body condition are affected. Most important clinical signs of this disease are high fever, loss of appetite, dullness, crepitating swelling over hip, back and shoulders.

Haemorrhagic septicaemia (HS)

In this disease, there is infection in the upper respiratory tract of the animal. High fever, watery discharge from the nostril and animal going off feed, are some of the symptoms of this disease. There is swelling under the neck and affected animals feel respiratory distress.

Brucellosis

It is a disease of adult animals. It causes abortions in pregnant animals thus leading to economic loss to the dairy farmer. In bulls, it causes swelling of the testicles. This disease has zoonotic implications as well.

Timely reporting of the diseases

Keeping a track of the information received regularly about the occurrence of diseases from various sources, helps in developing a disease alert system. This disease alert system is helpful in informing the farmers and animal owners about the possible outbreak of diseases. In this way, timely preventive strategies can be formulated to check the spread of the suspected diseases. The overall benefits of timely reporting of the diseases are given below:

- (i) The animal owners can follow better management of diseases for their animals.
- (ii) Early reporting of diseases helps in the timely availability of veterinary services for preventive strategies like vaccination of the susceptible animals.



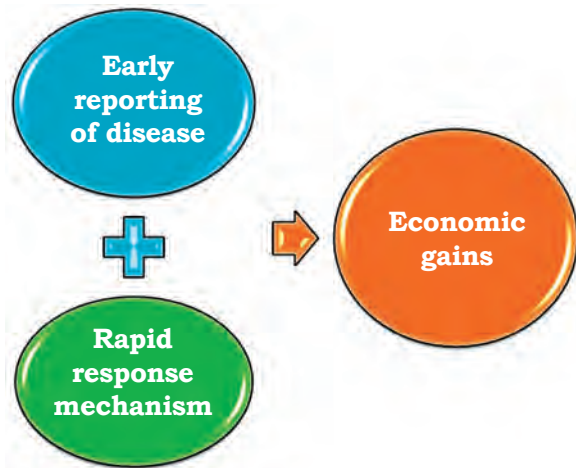


Fig. 2.3: Benefits of timely reporting of the diseases

- (iii) It helps in maintaining the productivity of animals.
- (iv) It helps in saving the costs that would have been incurred in the treatment of animals.

The effective monitoring of the occurrence of farm animal diseases helps in controlling them. The overall impact of such measures results in better animal health and economic gains to the farmers in the country. Fig. 2.3 summarises this concept.

Practical Exercises

Visit a nearby livestock farm.

1. Note down the record of occurrence of diseases during the previous one year.
2. Visit a nearby government veterinary hospital and note down the disease reporting system being used there.

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 disease causes
 - (a) abortion
 - (b) swelling of testicles
 - (c) Both (a) and (b)
 - (d) None of the above
3. In Black quarter disease, there is crepitating swelling over
 - (a) hip
 - (b) back
 - (c) shoulder
 - (d) All of the above
4. In Mastitis disease, 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 of _____ animals.
3. The _____ working in a government system is informed first at the time of occurrence of a disease.
4. In Mastitis, the milk appears _____.
5. FMD is highly _____ disease of farm animals.

C. Mark True or False

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

SESSION 2: VACCINATION IN FARM ANIMALS

What is a vaccine?

A vaccine is a fluid that helps the animal's body to become immune to a disease which is caused by certain germs or micro-organisms. The vaccine contains some part of the germ or the poison that the germ produces. The vaccine does not make the animal sick. It rather helps the animal's body to protect itself from getting diseased in future. Vaccination is usually done in cattle, buffaloes, sheep, goats and swine.

Vaccination means the administration of a particular vaccine into the animal's body to make it immune



to a specific disease. The different vaccines may be administered either subcutaneously, intradermal or intramuscularly based on the standard instructions prescribed for that particular vaccine.

In animal rearing, a vaccine produces resistance in the entire herd thereby minimising the economic losses due to treatment of infectious diseases. As a thumb rule, vaccines are administered only to the healthy animals.

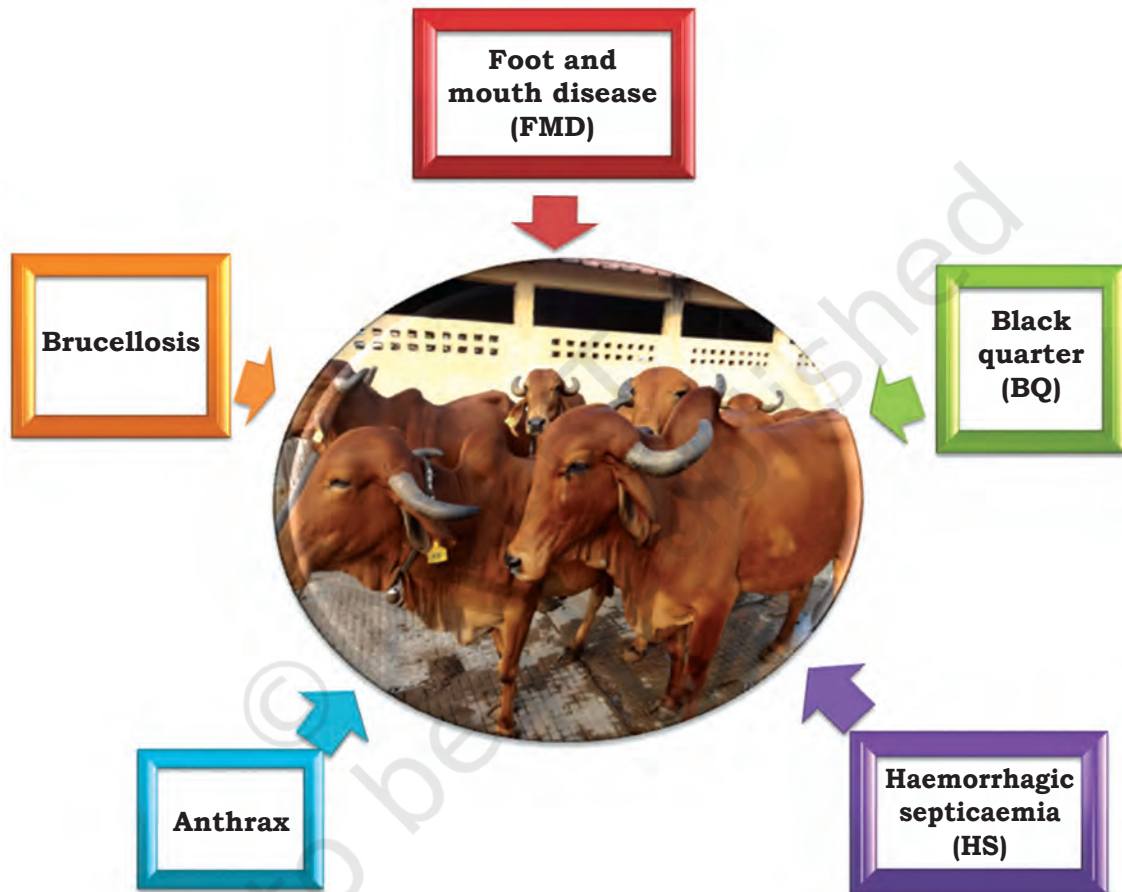


Fig. 2.4: Major diseases in cattle requiring vaccination

Vaccination schedule for farm animals

A full vaccination schedule includes primary vaccination, booster vaccination and revaccination.

Primary vaccination

It is the first dose of vaccine administered to the animal for developing an initial immune response towards a specific disease.

Booster vaccination

In most cases, the immunity of a farm animal against a disease reduces with time. To maintain the optimum level of immunity in the body of the animal, another dose of the same vaccine is administered and it is called the booster vaccination. In other words, the booster vaccination means extra administration of the same vaccine used in primary vaccination in that farm animal.

Revaccination

Most of the vaccines once administered do not give lifelong protection to the animal. There is a certain period of time for which the vaccine protects the animal. This period of time is generally one year. Therefore, vaccination is repeated on a particular date every year. This is called revaccination. Revaccination is important to protect the animal from diseases throughout its life.

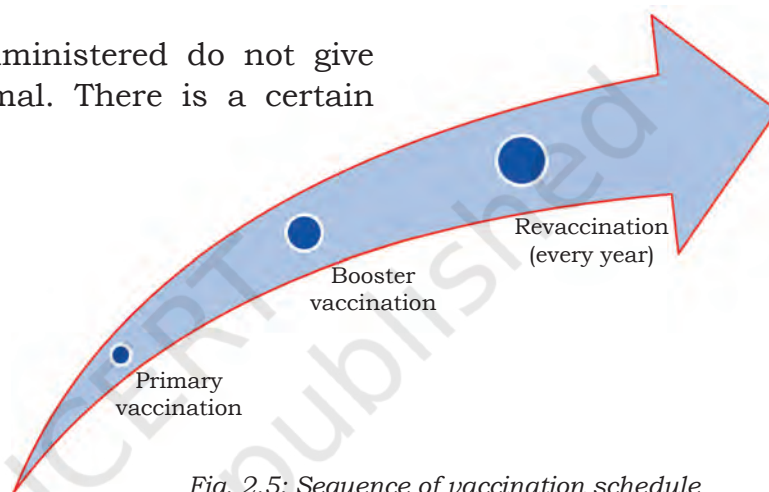


Fig. 2.5: Sequence of vaccination schedule

The sequence of vaccination schedule in animals is depicted in Fig. 2.5. The recommended vaccination schedule for diseases common in cattle and buffalo is given in Table 2.1.

Table 2.1

Vaccine	Primary vaccination	Booster vaccination	Revaccination
FMD vaccine	6–8 weeks of age	6 months after 1st dose	Annually
HS vaccine	6 months and above	–	Annually
BQ vaccine	6 months and above	–	Annually
Anthrax vaccine	6 months and above	–	Annually in endemic areas
Brucella vaccine (for Brucellosis)	4–8 months female calf, i.e., young heifers	–	–

Pre- and Post-vaccination care of farm animals

Pre-vaccination care

Ideally, all the farm animals are vaccinated, but this is difficult to achieve under field conditions. These conditions are stress in animals, adverse weather conditions, nutritional imbalances, sickness, parasitism, etc. (Fig. 2.6).

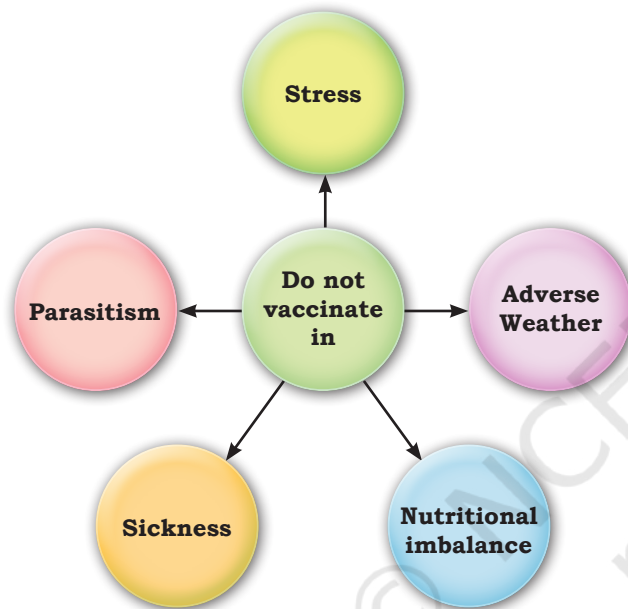
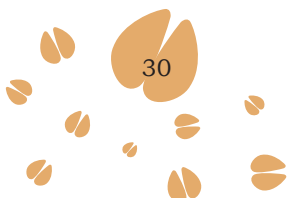


Fig. 2.6: Non-ideal conditions for vaccination

Vaccination as a rule of thumb is administered only to healthy animals. Some animals may develop adverse side-effects ranging from fever to fits upon vaccination. Some animals may even experience shock and sudden death. Vaccines administered to an unhealthy animal may fail to provide the required immunity. The farmer may assume that immunisation for the animal has been achieved but in reality the vaccine never proved effective in the first place due to the unhealthy state of the animal. Moreover, the animal's immune system, which must be primarily fighting illness caused due to so many other factors, is diverted to handle the vaccine.

Ideal conditions of animals for vaccination

- (i) *Age of the animal*: The minimum age for vaccination in farm animals is approximately 3–4 months. However, in some cases it also depends upon the type of vaccine used.
- (ii) *Pregnancy*: As a general rule, farm animals are never vaccinated during pregnancy.
- (iii) *Sick animals*: In general, injured animals and those with minor problems like watery nasal discharge, etc., can be vaccinated. However, vaccine is not administered in case of debilitated and severely ill animals. Proper response to the vaccine is generally not seen in animals with high body temperature



which could be due to fever or high environmental temperature. Therefore, the body temperature of the animal is lowered to normal level before vaccination.

- (iv) *Worm load in the animal*: High incidence of worm infection or tick infestation causes physiological stress to the animal. This stress may interfere with the desired response towards the vaccine in terms of development of immunity towards that particular disease. Therefore, all animals must be dewormed before vaccination.

Apart from the physiological status of the animal, other conditions that are kept in mind and followed strictly before vaccination are the precautions mentioned for the vaccines.

Post-vaccination care

Modern vaccines are extremely effective and safe. However, it is common for some animals to experience mild side-effects following the vaccination and therefore the farmers need not be alarmed on noticing such side-effects. Some of the common mild side-effects seen after vaccination are shown in Fig. 2.7. However, if any of these signs lasts for more than 24 hours, then the animal requires special veterinary attention.

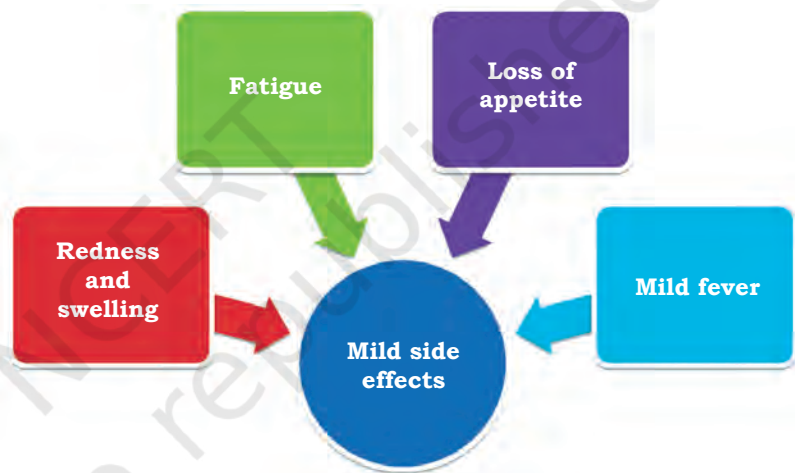


Fig. 2.7: Mild side effects of vaccination

Handling of vaccines

Most of the vaccines used in farm animals are developed from live infectious organisms. Vaccines are very sensitive to temperature variations. Proper handling and administration of vaccines is very important for their effectiveness. The following important points must be kept into consideration while handling the vaccines.

- (i) Immediately upon receiving the vaccine through transport, the seal for intactness of the vaccine is checked. It is ensured that the vaccine has been transported in ice packs. If the vaccine does

NOTES

not pass these criteria, it needs to be replaced immediately. Close attention is paid to the expiry date printed on the vaccine. In case it is already expired, then it will not be effective and could make the animal susceptible to the disease against which the vaccine was to be administered.

- (ii) Once the vaccines are unloaded, they are stored at 35°F–45°F (2°–7°C). Temperatures higher or lower than this range can result in the death of the living organisms present in the vaccine and make it ineffective. Therefore, monitoring the temperature is essential in warmer environments. Moreover, the vaccines are never frozen.
- (iii) Most of the vaccines are available in multi-dose vials. A greater risk of environmental contamination of the vaccine exists if the stopper of the vial is repeatedly pricked with different needles to draw out vaccine for different animals. To avoid this, a single needle is permanently inserted into the stopper of the vial and the vaccine is drawn out with a fresh syringe used for every animal. This practice maintains the sterility of the vaccine.
- (iv) Since most of the vaccines are freeze-dried, therefore they need to be mixed with a sterile diluent prior to their use for vaccination. These diluents are product-specific and therefore they must not be changed or substituted with another product or solution. The vaccine is reconstituted by mixing and thoroughly dissolving the diluent with the vaccine under sterile conditions. Once a vaccine has been reconstituted it is administered within 60 minutes and protected from temperature extremes by maintaining its temperature.

Administration of vaccines

- (i) As mentioned earlier, the vaccines are administered through the subcutaneous route, intradermal route or the intramuscular route. Standard instructions for the route of administration of a particular vaccine are prescribed by the manufacturer. Prior to vaccination, the route of administration, as indicated by the manufacturer, is followed properly.

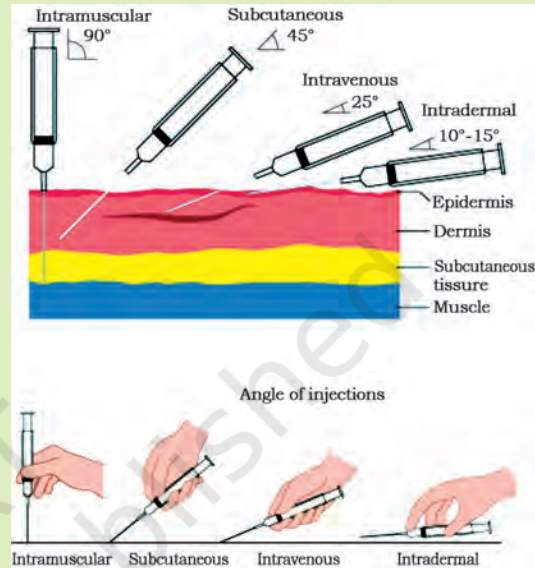


If the instructions are not followed properly it could result in inactivation of the vaccine and diseases in animals including severe organ damage and even death.

- (ii) Cleaning the skin of the animal with an alcohol swab prior to vaccination is a bad practice. Alcohol can inactivate the micro-organisms present in the vaccine.
- (iii) Most of the vaccines used in farm are infectious or “live” biological products so care must be taken to clean spillages of the vaccine. If the vaccine has spilled on the body of the animal or onto the table or floor then it must be cleaned with a disinfectant. If the vaccine has spilled onto the animal health worker, then it should be removed by thorough washing with soap and water. If the spillage of vaccine is not attended properly then it could cause illness in animals and could lead to the spread of infectious diseases in the farm.
- (iv) If the animal shows any local or systemic reaction after vaccination, it needs to be properly documented for the subsequent booster vaccinations. If the animal has a history of reaction to the vaccine, then

Different routes of administering injections

Needle insertion angles of four different types of administration of medication, i.e., intramuscular, subcutaneous, intravenous and intradermal injection.



Courtesy: <https://goo.gl/p9khzC>



Fig. 2.8: Vaccination through intramuscular route in cattle



Fig. 2.9: Vaccination through subcutaneous route in cattle

the subsequent vaccination is undertaken only under veterinary guidance. A change in the vaccine and/or pre-medication with anti-inflammatory drugs is recommended in such circumstances.

- (v) Proper documentation of the vaccination programme is important for many reasons, e.g., it is a legal proof of vaccination status whenever there is an outbreak of disease in that area. It also helps in monitoring adverse reactions in the animals after vaccination.

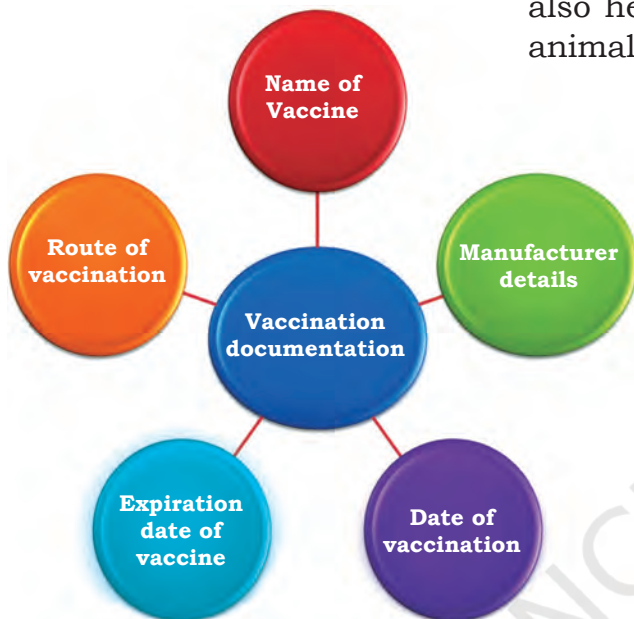


Fig. 2.10: Important components of vaccination documentation

Components of vaccination documentation

The following information is recorded in the vaccination record of each animal:

- (i) Name of the vaccine administered.
- (ii) Manufacturer's details, lot or serial number, expiration date of the vaccine.
- (iii) Date of administration of the vaccine.
- (iv) Route of administration of the vaccine.

The manufacturer's label is removed from the vaccine bottle and pasted on the record register (Fig. 2.11). It is much more easier to maintain such records on a computer.

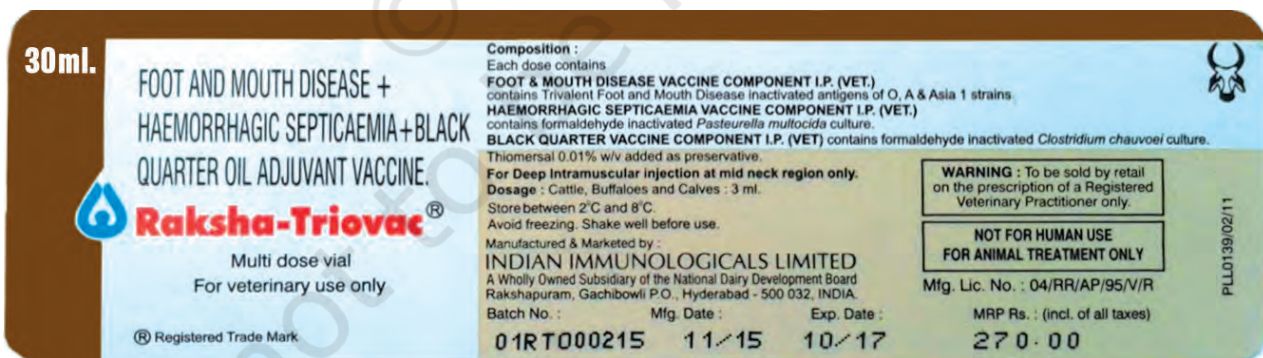


Fig. 2.11: A vaccine label showing (a) name of the vaccine, (b) route of vaccination, (c) vaccination dosage, (d) optimum temperature for storage of vaccine, (e) batch number, (f) manufacturer's details, etc.

Disposal of vaccines

Vaccination is the most cost-effective way to ensure good health and welfare of the animals. Therefore, it is important to utilise them properly and with care.

It must be borne in mind that a vaccine is a kind of biological fluid that contains germs of diseases. Therefore, proper disposal of unused vaccine is as important as its proper administration. If the unused vaccine is not disposed properly, it might cause infection or disease in animals and human beings. The following points must be kept in mind for proper disposal of vaccines:

- (i) Unused vaccines and their containers are incinerated or sterilised by autoclaving or other approved procedures.
- (ii) Vaccines are never disposed into sewers or other water sources. However, empty vials can be disposed directly with other waste.

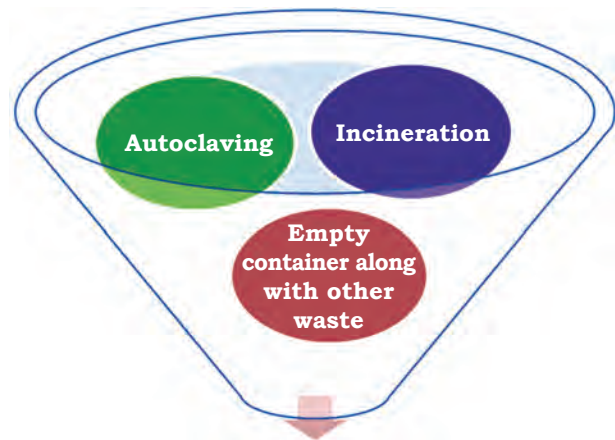


Fig. 2.12: Disposal of unused vaccine and containers

Practical Exercises

Visit a nearby livestock farm.

1. Note down the vaccination schedule followed at the farm in the preceding quarter.
2. Talk to the animal handler of the farm about handling of vaccines and method of vaccination and prepare a report on it.

Check Your Progress

A. Multiple choice questions

1. Most common mild side-effects seen 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
 - (a) subcutaneous route
 - (b) intradermal route
 - (c) intramuscular route
 - (d) All of the above

NOTES

3. Do not vaccinate the animal during
 - (a) adverse weather conditions
 - (b) nutritional imbalances
 - (c) pregnancy
 - (d) All of the above
4. FMD vaccination cannot be done at the age of
 - (a) 6–8 months
 - (b) 1 year
 - (c) 2 years
 - (d) Below 3 months
5. Revaccination is required in
 - (a) FMD
 - (b) HS
 - (c) BQ
 - (d) All of the above

B. Fill in the blanks

1. _____ is required to control diseases in animals.
2. Once a vaccine has been reconstituted it is administered within _____.
3. Vaccines are stored at the temperature of _____ °C.
4. _____ vaccine is administered only to female calves.
5. All animals must be _____ before vaccination.

C. Mark True or False

1. Vaccines are not administered on weak animals.
2. Date and route of administration of vaccine must be documented.
3. Vaccine does not require proper disposal.
4. Mildly sick animals can be vaccinated.
5. Vaccination reduces the average age of the animal.



SESSION 3: DEWORMING AND CONTROL OF ECTOPARASITES

NOTES

What are worms?

Internal parasites or worms are one of the greatest hazards in animal husbandry. Worms are internal parasites that live and prosper in the body of the farm animals. Worms grow at the cost of health of the farm animal, which acts as a host to the worms. Understanding the lifecycle of worms is important for a successful programme of controlling the worm load in farm animals.

Worms lead to significant losses in farm animals' productivity by causing various sub-clinical and clinical effects. Sub-clinical effects in farm animals include reduced milk production, weight loss and reduced conception rate. Clinical effects include roughness of skin, anaemia, diarrhoea, etc. Besides affecting the health of the animal, internal parasites also cause significant costs incurred on their treatment. The principal internal parasites of farm animals are roundworms, tapeworms, flukes and protozoa.

How do animals get parasitic infection?

Excretion of the parasites through faeces of the infected animals contaminates almost all the grazing fields. Due to their grazing behaviour, farm animals are more prone to worm infections. While grazing on such contaminated fields, the animals ingest these harmful parasites or worms. Worms live inside the body of the animals and rob them for food and blood. Thus, the need to control internal parasites will exist as long as farm animals graze the pastures.

Aim of deworming

Eliminating or lowering the level of parasites in the farm animals is an important part of animal husbandry. This can be achieved by deworming the animals. Therefore, deworming is the practice of giving medicines to the animals to help them get rid of internal parasites or worms. These medicines can be given either orally or through injections.



NOTES

It is very difficult to completely eradicate the worms from the animal farm ecosystem. Therefore, the aim of deworming the farm animals is to prevent the worms from reaching high levels of infection inside the animal body. Dewormers are used to control worm infections.

Choice and selection of dewormers

Worms develop resistance against repeated use of particular dewormers. To tackle this problem of resistance, it is advisable to use dewormers selectively and wisely. It is recommended that the same dewormer is not repeated every time, rather alternative dewormers should be used. There are a number of dewormers available but the selection of dewormer depends on various factors like age of the animal, weight of the animal and activity of dewormer against different parasites.

Young animals are more susceptible to internal parasites than adult animals. Although adult animals are less susceptible to most parasites, those reared under poor living conditions become susceptible. An ideal dewormer has the following properties:

- (i) Broad spectrum activity of the dewormer against both adult and larval stages of parasites.
- (ii) The dewormer does not have any unpleasant side-effects on the animal. Some drugs may cause vomiting, pain or irritation to the skin at the injection site.
- (iii) The dewormer is suitable from practical and economical points of view. An ideal dewormer is stable and does not decompose on exposure to normal ranges of temperature, light and humidity and has a longer shelf-life. The ideal dewormer is reasonably priced and user-friendly.

Administration of dewormers

A wide variety of formulations and preparations of dewormers is available for administration through oral route or injectable route.

Oral route

The majority of dewormers are given as liquid preparations, boluses and tablets orally. Liquid preparations are usually available as ready-to-use products. Several



devices like syringes, bottles and drenching guns can be used for administration of medicine through mouth. Boluses and tablets containing the dewormer can be placed deep into the mouth of the animal or they can be crushed into powder form, dissolved in water and then given orally using a syringe.

Sometimes, dewormers can be mixed with the feed but in such cases, the intake of dewormer might not be accurate because animals may not consume the whole amount of feed. Therefore, administration through feed is the least preferred method of deworming.

Injectable route

A number of dewormers are available as injectable preparations. The prescribed route of injection for a particular dewormer needs to be followed strictly.

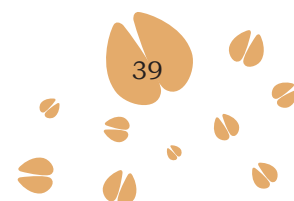
Deworming schedule

- (i) The deworming drugs and their dosage are decided under the guidance of a veterinarian.
- (ii) Both overdose and underdose of deworming drugs is avoided to control the side-effects and/or development of resistance against that particular drug.
- (iii) Deworming is started in the first week of birth of the animal.
- (iv) Deworming is done every month for the first six months after birth and thereafter once in three months. Adult cattle can be dewormed once in a year.

Control of ectoparasites

Ectoparasites are organisms which live on the skin of other animals. Ectoparasites are of different types like mites, lice, ticks and flies. They cause detrimental effects on the skin and the overall health of the animals on which they live. Ectoparasites are responsible for direct as well as indirect losses to the farm owner.

Direct losses result due to discomfort and damage caused by the parasites to the animals on which they thrive. Discomfort due to ectoparasites causes reduction in milk production and retarded growth in the suffering



animal. In some animals, ectoparasites cause damage to the skin and wool due to rubbing and scratching caused because of itching.

Many diseases are transmitted from infected animals to other healthy animals through ectoparasites. These act as carriers for transmission of other diseases in animals. Major ectoparasites of farm animals are listed below:

- (i) *Mites and lice*: Parasitic mites and lice live on hair and outer layer of the skin. Both lice and mites permanently thrive on the animal body and feed on skin tissues and blood of the animal.
- (ii) *Ticks*: They live on the body of animal for a short period of time. They feed on the animal's blood and their bites cause irritation, swelling, redness and itching to the animal (Fig. 2.13). Ticks are also responsible for transmission of a number of diseases.



(a)



(b)

Fig. 2.13: Buffalo having heavy tick infestation (a), close view of ticks (b)

- (iii) *Flies*: They feed on blood, sweat, skin secretions, tears, saliva, urine and faeces of animals. They directly puncture the skin or infest on wounds of the animal. Flies can transmit many diseases from infected animals to healthy animals. They also cause irritation and disturbance to the animal, which results in reduced weight gain and milk yield.

Heavy infestation of ectoparasites means poor health of farm animals. Several medicines for external application on the body of the affected animals are available for controlling the ectoparasites.



Points to be remembered for controlling ectoparasites

- (i) An ectoparasiticide is an antiparasitic drug used for the treatment of ectoparasitic infestations. These drugs are used to kill the parasites that live on the body surface of the farm animals. Immediately upon arrival of new animals on a farm, they must be treated with ectoparasiticides to avoid spread of new parasites to other animals of the farm.
- (ii) If external parasites are seen on the body of the animal, treat them immediately to prevent their spread to other animals.
- (iii) A single dose of ectoparasiticidal treatment may not be sufficient for the control of ectoparasites. The first treatment will only kill the active stages of the parasite present on the animal at the time of treatment. A second treatment after 15–21 days is required to kill any eggs that might have hatched since the first treatment.
- (iv) Besides treating the affected animals, it is necessary to thoroughly clean and disinfect animal houses, paddocks or barns with suitable chemicals to destroy the parasites and their eggs on the floor, walls and corners of the animal houses.

Methods of controlling ectoparasites

Ectoparasiticides can be applied to animals through several methods. Fig. 2.14 shows the most common methods used for this purpose.

Dipping

It can be done in small-sized animals. This is very effective if large number of animals are to be treated. The animal is lifted and dipped into a tank filled with the ectoparasiticide solution ensuring that the head region of the animal is not dipped into the solution. Dipping is done in early morning, so that animals are not immediately exposed to the hot sun. Dipping is not recommended if heavy rain is expected, as the medicine may be washed off.

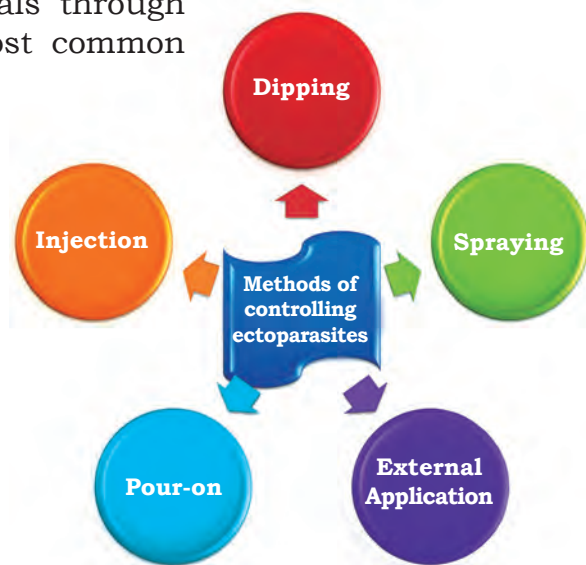


Fig. 2.14: Methods of ectoparasite control

Hand spraying/external application

Hand spraying is the most commonly used method of applying ectoparasiticides. It is effective especially if a small number of animals are to be treated. If a sprayer is not available, then the parasiticide can be applied with a paint brush or a cloth. The animal is tied securely before external application of the medicine. The sequence of application of medicine starts from the head and ends at the tail covering all areas of the body. During the application of the medicine, the eyes, nostrils and mouth are not exposed to the medicine.



Fig. 2.15: Ectoparasiticide being poured on the backline of cattle

Pour-on medicines

This is a very effective method of controlling ectoparasites. A small volume of a special medicine, available as pour-on preparation, is poured along the backline of an animal. It disperses over the body surface of the animals and kills the infesting ectoparasites. Backline of the animal on which pour-on medicine is applied is shown in Fig. 2.15.

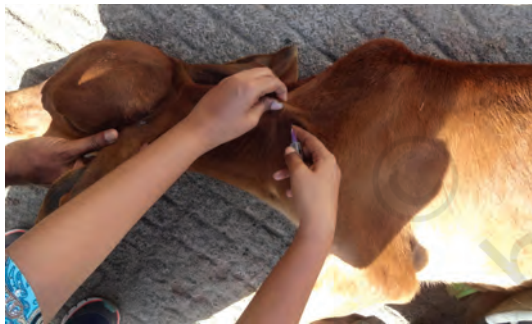


Fig. 2.16: Subcutaneous injection of ectoparasiticide being given to a calf

Injections

Some ectoparasiticides can be injected into the animal through subcutaneous route. These ectoparasiticides act against both internal and external parasites. These compounds are generally more expensive than the other medicines. An example of subcutaneous injection of ectoparasiticide being given to the animal is shown in Fig. 2.16.

Methods of controlling ectoparasites in animal houses

Ectoparasite control can be fully achieved only by an integrated approach in which measures are taken on the whole farm. Management of ectoparasites in animals and animal houses is the key to reduce their infestation. It is impossible to eradicate all ectoparasites on the farm, therefore control practices are directed towards

reducing the population of ectoparasites to tolerable levels. Good farm management is helpful in reducing the level of ectoparasites.

Good management includes general farm hygiene, maintaining health of animals, trimming the grass around animal sheds, reducing moisture in and around buildings by covering the drains, controlling water run-off and maintaining proper sewage systems. Regular removal of moist bedding, hay and manure along with controlling growth of weeds and grasses is very helpful in lowering the levels of ectoparasites.

Despite good management practices, some ectoparasites and their eggs still survive on the ground. These ectoparasites can live on the ground for many days without feeding. Therefore insecticides are sprayed on the buildings, paddocks, barns, etc., after every two weeks.

General precautions for using ectoparasiticides

- (i) Always use recommended dosage of ectoparasiticides. Using too high concentrations will not kill more parasites but may harm the animal instead.
- (ii) Application of the ectoparasiticide on the animal body is not carried out in a confined and non-ventilated area.
- (iii) The animals are provided sufficient feed and water before dipping them in the medicine solution because thirsty or hungry animals can drink the medicinal solution used for dipping, which can prove harmful to them.
- (iv) Ectoparasiticides are kept well secured so that feed or drinking water is not contaminated.
- (v) Ectoparasiticides are not applied to sick animals or animals under stress because the medicine may deteriorate their condition further.
- (vi) Animal health workers handling and applying medicine to the animals must wear gloves, protective clothing, goggles and mask to avoid the medicine splashing into the eyes or coming in contact with the skin. If there is any contact, wash immediately with soap and water.



NOTES

- (vii) It is important to ensure that the unused medicines do not damage the environment. The unused medicines are never poured into rivers or ponds. These can be drained into pits at least 150 meters away from water sources.
- (viii) It is recommended that the sprayers are cleaned immediately after use.
- (ix) It is extremely dangerous to reuse empty containers of ectoparasiticides. The containers are crushed and buried in an isolated area at least 50 cms below the ground surface.

Practical Exercises

Visit a nearby livestock farm.

1. Look for the ectoparasites on the animal body and draw their pictures.
2. Talk to the animal health workers about deworming and control of ectoparasites in the farm. Prepare a report on the same.

Check Your Progress

A. Multiple choice questions

1. Which of the following method can be used for controlling ectoparasites?
 - (a) Dipping
 - (b) Hand spraying
 - (c) Injection
 - (d) All of the above
2. Insecticides are sprayed on the buildings/paddocks, barns every
 - (a) two weeks
 - (b) two months
 - (c) three months
 - (d) None of the above
3. Dipping is done in
 - (a) afternoon
 - (b) early morning
 - (c) evening
 - (d) Anytime



4. For effective control of ectoparasites, usually second treatment is required after _____ of first treatment.
 - (a) 7–9 days
 - (b) 15–21 days
 - (c) 1–2 months
 - (d) 3–4 months
5. Persons involved in handling and applying the ectoparasiticide medicine to the animals wear
 - (a) only gloves
 - (b) only goggles
 - (c) only mask and goggles
 - (d) gloves, goggles and mask

B. Fill in the blanks

1. _____ are the organisms which live on the skin of other animals.
2. Ticks feed on the _____ of the animal on which it lives.
3. Ectoparasites are responsible for transmission of _____.
4. In the pour-on method, the preparation is poured along the _____ of an animal.
5. Some of the ectoparasitides can be injected into the animal through _____ route.

C. Mark True or False

1. Heavy infestations of ectoparasites are usually associated with poor health of animals.
2. A single treatment with ectoparasiticide may be sufficient for controlling ectoparasites.
3. Dipping of animal can be done in all the seasons.
4. Ectoparasitides are not applied to sick animals.
5. Ectoparasite control cannot be achieved by an integrated approach.

Glossary

Autoclaving: Sterilising equipment by subjecting them to high pressure saturated steam at 121°C for around 15–20 minutes.

Bolus: A rounded mass of feed in which medicine can be mixed and given orally to the animal.



NOTES

Communicable disease: Diseases which can be transmitted from infected animals to healthy animals either directly or indirectly.

Deworming: Practice of giving medicines to the animals to help them get rid of internal parasites or worms.

Drenching gun: Used for administration of fluids containing medicines, etc., to farm animals.

Ectoparasites: Organisms which live on the skin of other animals and are responsible for causing detrimental effects on the skin and the overall health of the animals on which they live.

Endemic diseases: Diseases which are present in a population at a constant rate but do not disappear completely from the population.

Freeze-drying: Preservation method of rapidly freezing an item and then subjecting it to high vacuum.

Heifer: The young female cattle or buffalo from one year of age up to the age of first calving.

Incineration: Complete and total burning of waste material.

Intradermal route: A route of medicine administration in which medicine is injected into the dermis which lies just below the epidermis.

Intramuscular route: A route of medicine administration in which medicine is injected directly into the muscle.

Sterility: Incapability to produce offspring.

Subcutaneous route: A route of medicine administration in which medicine is injected directly below the dermis and epidermis.

Vaccine: A fluid that helps the animal's body to become immune to a disease caused by certain germs or micro-organisms.

Zoonosis: An infectious disease which can be transmitted by farm animals to human beings and vice versa.



Unit



Veterinary First Aid

INTRODUCTION

First aid for farm animals means immediate treatment of injuries or any other sudden illness in the animals. The objectives of first aid are to save life of the animals and to reduce their pain and suffering. Timely first aid prevents the situation from deteriorating further and promotes recovery of the ailing animal. First aid is done in situations of life-threatening emergencies which require immediate action by the owner or animal health workers.

First aid is provided in case of infectious and non-infectious diseases, any sort of wounds, electrocution and burns, etc. In this Unit, we will discuss about the routes of transmission of infectious diseases. You will also learn about the prevention and control of transmission of diseases, preparation of common antiseptic solution, cleaning of muzzle and hooves and necessary items for a livestock first aid kit.

SESSION 1: PREVENTIVE FIRST AID MEASURES FOR INFECTIOUS DISEASES

Certain viruses, bacteria, parasites and fungi are responsible for causing infectious diseases. Infectious diseases are transmitted from one animal to another



17903CH03

animal or from animal to human beings by direct or indirect contact.

Different routes of disease transmission

Diseases can be transmitted through different routes. These are mentioned below.

Aerosols

The coughing and sneezing of an infected animal usually coming out in the form of spray can spread an infectious disease. Disease causing agents contained in the aerosol droplets are passed from infected animal to the susceptible healthy animals and healthy humans. Most of these infectious agents do not survive for long periods of time within the aerosol droplets, but the disease gets transmitted if the healthy animal comes in close contact with the infected animal.

Direct contact

The disease gets transmitted when a susceptible animal comes in direct physical contact with the infected animal or its environment (Fig. 3.1). The infection causing organisms enter through open wounds, mucous



Fig. 3.1: Close direct contact causing high risk of transmission of diseases



membranes or through skin. They also enter through blood, saliva, nose-to-nose contact, rubbing or through bites of infected animal. Diseases also spread through venereal contact (from animal to animal through coitus) and also spread through the womb route (from mother to offspring during gestation period).

Oral route

Feed and water offered to animals can be contaminated with infectious agents passed through saliva, nasal discharges, urine and faeces of infected animals. Consumption of contaminated feed or water transmits the disease to susceptible animals (Fig. 3.2 and Fig. 3.3).



Fig. 3.2: Risk of transmission of diseases through contaminated feed



Fig. 3.3: Risk of transmission of diseases through contaminated water

Fomites

Some infectious agents can live for a short time on inanimate objects like farm equipment, feed and water troughs, fencing, etc. When the susceptible animal comes in contact with these contaminated inanimate objects, the infectious agents are transmitted to them. It is a type of indirect route of disease transmission.

Through vectors

A vector acquires an infectious agent from a diseased animal and transmits it to another susceptible animal either while biting or sucking the blood of a healthy animal. Fleas, ticks and mosquitoes are common vectors of diseases in farm animals.

Practices for prevention of disease transmission

Following are the important practices for preventing the transmission of diseases between infected and healthy animals in the animal farms.

Isolation of sick animals

- Isolate all sick animals immediately so that they may not come in contact with other susceptible animals.

Avoid overcrowding of animals

- Avoid overcrowding of animals so that animals are optimally distanced from each other and avoid direct contact with one another.

Regular cleaning and disinfection of farm premises

- Proper and regular cleaning and disinfection of the farm premises and fomites is carried out to reduce the incidence of infectious diseases.

Cleaning and washing of equipment and vehicles used in transporting animals

- As far as possible farm equipment of different types are kept in clean and disinfected condition to minimise chances of disease transmission through inanimate objects. Animal transport vehicles can serve as fomites and are therefore disinfected and cleaned on a regular basis.

Restricted entry in isolated sheds

- Areas where disease animals are isolated are restricted to a limited number of workers to reduce transmission of disease to healthy animals. Staff working in isolation sheds take precautions for personal protection by using gloves, uniforms, masks, boots, etc.

By implementing these preventive measures, farmers and animal owners can reduce the risk of common diseases in their farms. These steps are summarised in Fig. 3.4 as well.

Controlling infectious diseases

Transmission of infectious diseases is controlled by maintaining hygiene and properly cleaning the animal's body parts like muzzle, mouth, hooves, feet, etc., with antiseptic solutions. Cleaning and washing of body parts with antiseptic solution in animals is carried out

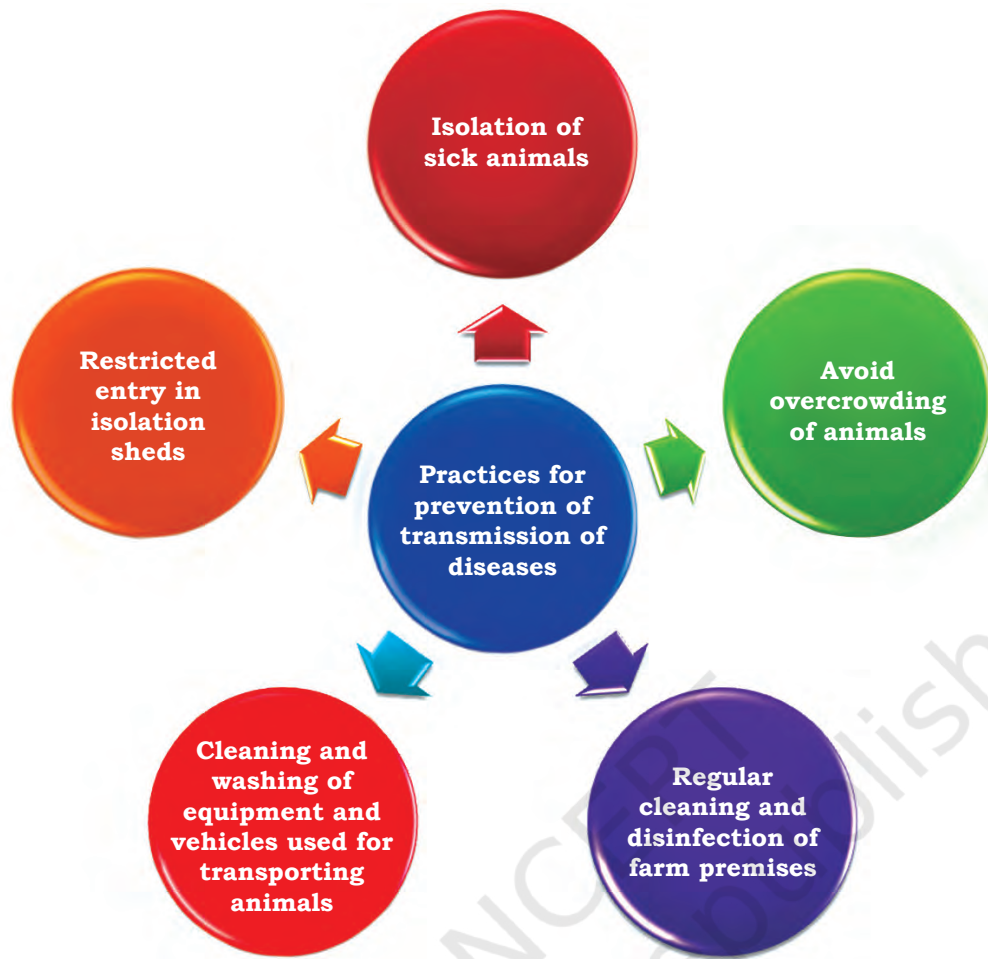


Fig. 3.4: Practices for prevention of diseases

for treating the infections, killing of surface bacteria and reducing transmission of infection to other animals.

Antiseptics

These are substances that slow down or completely stop the growth of micro-organisms on body surface of the animals and thus prevent infections. The skin and mucous membranes of the muzzle, mouth, nose, hooves and feet are fertile grounds for micro-organisms, and antiseptics are mainly used to reduce them. In cases where skin or mucous membranes are damaged, antiseptics are used to disinfect the area and reduce chances of infection.

The most commonly used antiseptic is potassium permanganate solution. Potassium permanganate is a



Fig. 3.5a: Potassium permanganate crystals



Fig. 3.5b: Potassium permanganate solution

chemical compound that is available in crystalline form (Fig. 3.5a). Potassium permanganate 0.01% solution is used for external use on the skin. The solution is prepared just before using it (Fig. 3.5b) for washing of wounds or external injuries on the skin. It can also be used to rinse the muzzle and nose externally. The solution of potassium permanganate may be used several times in a day.

(a) Preparation of potassium permanganate solution

Take one litre of water, boil it for a few minutes and subsequently bring it down to lukewarm levels, say 40°–45°C. Put 0.1 gram of potassium permanganate powder in this lukewarm water and stir well till all the powder is dissolved. The solution thus prepared looks light pink in colour.

(b) Precautions for preparing potassium permanganate solution

- (i) Before using the potassium permanganate solution, ensure that all the crystals are dissolved properly because if crystals touch the skin, they could damage it.
- (ii) Do not allow potassium permanganate crystals to come in contact with skin and eyes while preparing the solution as it may cause irritation and damage.
- (iii) The solution needs to be handled with care as it may dye the skin, nails and clothes of the person handling and administering it.

Cleaning and washing of muzzle

Muzzle of an animal is the protruding part of its head which includes nostrils, mouth and jaws. The muzzle and nostrils of healthy animals are moist-cool and free from any discharges (Fig. 3.6). If the muzzle shows dryness, it is a sign of disease in the animal. Moreover, if the nostrils of the animal show continuous watery or thick discharge, the animal is considered ill. Such animals can contaminate the feed and water through their nasal discharges.

Feed and water contaminated with the nasal discharge of sick animals can contaminate the common



Fig. 3.6: Feed sticking to moist muzzle indicates good health

feed and water sources, transmitting diseases to healthy animals. To reduce the spread of diseases, the ailing animals are separated and their muzzle and nose are washed thoroughly with antiseptic solution. The muzzle could be cleaned twice or thrice per day to maintain the hygiene of the animal.

Footbath

Disinfection of hooves and feet is another important measure in controlling transmission of diseases. Infective agents present in the discharge and secretion of the animals contaminate the floor of the animal house and grazing fields. These infective agents are stuck to the hooves of the moving animals. Footbaths are constructed in the livestock farm for effective disinfection of the hooves of the animals along with disinfection of persons entering into the farm (Fig. 3.7).

A footbath is a specially designed area about 9–15 feet long, 3 feet wide and 6 inches deep filled with a disinfectant solution. The footbath is located at a place where animals can pass through it several times in a day for disinfection of their hooves. The chemical used in the footbath is 5% solution of copper sulphate. The footbath solution is changed after passage of 150 to 300 dairy animals.



Fig. 3.7: A footbath at the entrance of a farm

NOTES

Suggested items for a livestock first aid kit

First aid measures for farm animals include the immediate initial care administered for an injured or diseased animal until specific treatment is available. First aid is important to minimise the pain and suffering of the animal and to preserve its life.

First of all, it is important to ensure that the first aid kit is easy to find and carry. The kit must be kept clean and dry. It is advisable to stick important names and phone numbers on one side of the kit, so that the important numbers can be found quickly by others even if the primary animal caretaker is away. Following are the essential items of first aid kit for animals.

1. Scissors
2. Flashlight
3. Halter and rope
4. Needle nosed pliers
5. Wire cutters
6. Disposable gloves
7. 4×4 gauze sponges
8. Skin cleanser
9. Several small bottles of sterile saline
10. Water soluble ointment
11. Anti-bloat medicine
12. Trocar and cannula
13. Rolls of medical tape
14. Fly repellent
15. Several large syringes (35–60 cc)
16. Cotton
17. Antibiotic eye ointment
18. Thermometer

Practical Exercises

Visit a nearby livestock farm.

1. Prepare a standard solution of 500 ml of potassium permanganate for use in animals.
2. Perform cleaning of muzzle of young calves.



Check Your Progress

NOTES

A. Multiple choice questions

1. Muzzle of an animal includes
 - (a) nostrils
 - (b) mouth
 - (c) jaws
 - (d) All of the above
2. The solution generally used in a footbath is
 - (a) 5% copper sulphate
 - (b) 7.5% copper sulphate
 - (c) 10% copper sulphate
 - (d) None of the above
3. Diseases can be transmitted through
 - (a) aerosols
 - (b) direct contact
 - (c) oral route
 - (d) All of the above
4. Transmission of animal diseases can be prevented by
 - (a) avoiding overcrowding of animals
 - (b) isolating all the sick animals
 - (c) proper cleaning and disinfection of the farm premises
 - (d) All of the above
5. Which of the following items should be there in a livestock first aid kit?
 - (a) Scissors
 - (b) Flashlight
 - (c) Halter and rope
 - (d) All of the above

B. Fill in the blanks

1. The potassium permanganate solution is _____ in colour.
2. Transmission of disease through fomites is a type of _____ route of disease transmission.
3. A general rule is to change the footbath solution after the passage of every _____ animals.
4. Most commonly used antiseptic for animals is _____ solution.
5. For disease control, isolation of _____ animals is required.



C. Mark True or False

1. Muzzle of a healthy animal is moist and cool.
2. Potassium permanganate crystals cause no harm to skin and eyes.
3. Fleas, ticks and mosquitoes are common vectors of diseases in animals.
4. Muzzle should be cleaned only once in a week.

SESSION 2: FIRST AID MEASURES FOR NON-INFECTIOUS CONDITIONS

Besides the infectious diseases discussed in the previous session, the farm animals are adversely affected by many conditions which are non-infectious in nature. Some of the non-infectious conditions adversely affecting the farm animals are discussed below.

Simple indigestion

Cattle and goat are ruminant animals. Ruminants are animals with a four-compartment stomach including the rumen (largest compartment), reticulum (honeycomb lining), omasum (many folds) and abomasum (gastric compartment) (Fig. 3.8). Micro-organisms living in the rumen allow ruminants like the dairy cow to digest the fibrous components of feed. The rumen functions in coordination with the reticulum to support contractions of the musculature that create the functions of rumination (cud chewing and rumen contractions) and eructation (gas release).

Simple indigestion is the failure of normal rumen movements. It is more common in cattle and goats. Rumen movements slow down but do not stop altogether. Simple indigestion is typically related to an abrupt change in the quality or quantity of the diet. It occurs due to excessive feeding of grain or silage, lack of sufficient intake of water and prolonged use of oral antimicrobials. Most common signs of indigestion are that the animal goes off feed either partially or

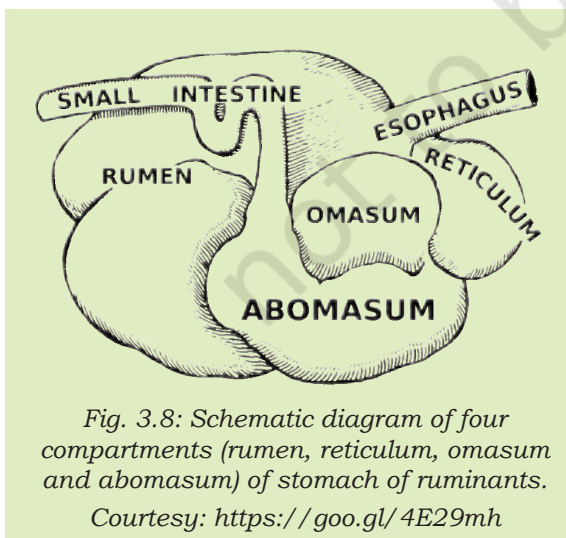


Fig. 3.8: Schematic diagram of four compartments (rumen, reticulum, omasum and abomasum) of stomach of ruminants.

Courtesy: <https://goo.gl/4E29mh>

completely. The ruminal contents become firm, causing mild bloat or swelling on the left flank. Treatment for indigestion is aimed at correcting the suspected diet. Spontaneous recovery occurs when animals are fed a roughage rich diet. The animal is orally given about 20 litres of warm water which helps in restoring normal rumen functions in adult cattle.

Constipation

Constipation is regarded as the sign of other diseases rather than a disease itself. Constipated animals cannot defecate and they pass with difficulty very hard droppings. Constipation can be treated by giving an enema. Enema is the administration of a medicine or warm soapy water into the rectum through anus. Affected animals are offered plenty of drinking water.

Tympani

It is the abnormal expansion of the rumen and reticulum caused by accumulation of gases in the rumen. Most common clinical signs include expanded left abdomen. The animal experiences pain and discomfort and refuses to graze. The animal feels strained while urinating and defecating with rapid or difficult breathing. The animal may keep the mouth open with protruding tongue and it could die in few hours if tympani persists.

For the treatment of early or mild cases, anti-bloat preparations available in the market are given orally. In moderately affected animals, stomach tube (special type of tube) (Fig. 3.9) can be passed to release the rumen gases and in severe cases, passage of trocar and cannula (Fig. 3.10) is done into the rumen high on the left flank (where the swelling is greatest) to release rumen gases. Passage of stomach tube or use of trocar and cannula requires special veterinary training. Vegetable oil (250–500 ml) or paraffin oil (100–200 ml) is traditionally used to relieve the animals suffering from tympani.



Fig. 3.9: Stomach tube



Fig. 3.10: Photographs showing (a) trocar and cannula separately and (b) trocar and cannula together

Impaction

Impaction of rumen means dense packing of rumen with indigestible roughage. It is caused due to ingestion of large amounts of highly fermentable carbohydrate rich food or the leftover of parties or marriages. Common signs start appearing within 6–12 hours of ingestion and include restlessness, kicking at the belly, frequent lying down and getting up and enlargement of upper abdomen on the left side of the belly (Fig. 3.11). The animal goes completely off feed and can even die. For treating the conditions of impaction, the affected animal's access to grains is restricted and the animal is made to exercise vigorously for half an hour for 3 times daily. Water is allowed to the animal in limited quantities at a time. About 200–400 g of sodium bicarbonate dissolved in 1 to 2 litres of water is given orally to the affected animal.



Fig. 3.11: Photograph showing upper abdomen of a cow

Diarrhoea

Diarrhoea means the passage of loose and watery faeces by the animal in increased frequency. The faeces vary in consistency from being soft to liquid (Fig. 3.12). Diarrhoea causes dehydration in affected animals. The affected animal shows signs of dullness, depression, lethargy and weakness with sunken eyes.



Fig. 3.12: A buffalo calf suffering from diarrhoea

Diarrhoea is caused due to infectious or dietary reasons. The treatment for diarrhoea is aimed at correcting the cause of diarrhoea. If it is of dietary origin, the diet is corrected. If it is due to some infection, suitable medicines are given. Initially the digestive system of the animal is given some rest by withholding the feed or offering very light and easily digestible feed for the first 24 hours. To overcome dehydration, plenty

of clean drinking water is offered to the affected animal. The ailing animals are orally given glucose along with electrolyte solution.

All these conditions when detected timely, can be easily managed with the help of preliminary treatment. If improvement is not seen within few hours, then such conditions may be life-threatening for the animal requiring veterinarian's immediate attention.

NOTES

Practical Exercise

1. Visit a nearby livestock farm and look for animals suffering from tympani, diarrhoea and constipation. Discuss with the farm workers about the treatment that they administer to the animals under such conditions.

Check Your Progress

A. Multiple choice questions

1. Passage of loose and watery faeces in increased frequency is known as _____.
(a) diarrhoea
(b) impaction
(c) loss of appetite
(d) None of the above
2. Impaction is caused due to ingestion of large amount of _____.
(a) highly fermentable carbohydrate rich food
(b) leftover eatables of parties or marriages
(c) Both (a) and (b)
(d) None of the above
3. Abnormal distension of the rumen caused by accumulation of gases is known as _____.
(a) tympani
(b) impaction
(c) indigestion
(d) None of the above

B. Fill in the blanks

1. In animals, dehydration may be caused due to _____.
2. Common sign of _____ is that the animal goes off-feed.
3. Impaction of _____ is caused by eating large amounts of highly fermentable carbohydrate rich food by animals.
4. Glucose and electrolyte solution is given to animals suffering from _____.



NOTES

C. Mark True or False

1. Simple indigestion is a minor disturbance in the digestive function.
2. Enema is the administration of a medicine or warm soapy water through anus.
3. Constipation occurs when the animal can defecate easily.
4. Diarrhoea does not cause dullness and depression in animals.
5. The stomach of ruminants has only two compartments.

SESSION 3: FIRST AID MEASURES IN SPECIAL CASES

Poisoning

It is a condition in which the animals suffer from a toxic substance or venom of an animal. Poisoning causes deleterious effects on the animals. Animals might swallow the poison, inhale it or absorb it through the skin. Even overdose of medicines given to animals may prove poisonous. Usually farm animals suffer from poisoning by eating poisonous plants, accidentally ingesting urea, rodenticides, pesticides, etc.

Poisoning causes minor irritations like mild abdominal pain, dullness and depression in the animals. In severe cases, the animal refuses to take feed and shows sudden onset of nervous signs like muscular trembling, convulsions and excessive frothing from the mouth. The animal may ultimately die if not treated in time.

Different animal species are susceptible to different plants and poisons. Young animals are generally more susceptible to poisoning than adult animals. Animals may build up resistance to certain poisons by being exposed to small quantities of that poison over prolonged periods. If a large quantity of such a poison is consumed, they may not show symptoms of poisoning because their body is already accustomed to handle that poison.

General principles of first aid in case of poisoning include immediate attention to the affected animal. If the



route of poisoning is through ingestion then purgatives are given to the affected animals. Under field conditions, the poisoned animal is fed with crushed coal because charcoal acts as an antidote for poisoning. If the animal is suspected of poisoning through skin, then the skin of the animal is washed thoroughly with soap and water. Apart from these, expert veterinary care is necessary.

Sun stroke

It is also known as heat stroke. Sun stroke is an emergency situation which results due to excessive muscular exertion of the animal in high environmental temperatures and humidity. Sun stroke results in hyperthermia in the animal. Hyperthermia is the elevation of body temperature above 104°F, which leads to increase in heart rate and respiration rate coupled with restlessness. Hyperthermia causes difficulty in breathing and convulsions and could result in death of the animal.

The treatment for heat stroke consists of reducing the body temperature of the animal. The affected animal is immediately moved to shaded and well-ventilated areas. Water is poured on the body and adequate glucose and water is given orally to the animal. Cold water enema may also be given in some cases depending on the severity of sun stroke. Special veterinary attention is required for the complete recovery of the animal.

Electrocution

Electrocution means accidental injuries or death caused by electric shock passing through the body of the animal. It can happen due to lightning, high voltage electric current from fallen transmission wires and accidental chewing of live electric wires. An animal may come directly in contact with such wires or indirectly through electrification of ponds by fallen electric transmission wires.

The clinical signs of electric shock depend upon the amount of voltage to which the animal is exposed. In most cases of electrocution by lightning stroke, the animal dies on the spot and falls without any struggle. Occasionally, affected animal becomes unconscious but



may recover in a few minutes to several hours. Other signs of electrocution are depression, blindness, etc., which may persist for few days or weeks. Electrocution due to lightning can be detected on the basis of history of lightning, single mark of injury on the dead body of the animal and damage to the immediate environment like burning of adjoining ground area. Treatment is carried out in mildly affected animals and on the basis of clinical signs observed in them. Affected animals are kept in quiet and calm area with minimum disturbances. Adequate water is offered to the affected animals. Skin wounds are treated with application of antibiotic creams.

Burn injuries



Fig. 3.13: Burn injuries on a buffalo

Burn injuries mean any type of thermal injury caused by fire, flames and hot solids. Injuries caused by hot fluids or steam are termed as scald. The extent of a burn injury depends upon the temperature of the hot object and the duration of time for which it came in contact with the animal. An example of burn injuries on a buffalo is shown in Fig. 3.13.

Depending upon the involvement of skin tissue, burns may be classified into three categories, i.e., first degree burn injury, second degree burn injury and third degree burn injury. Fig. 3.14

First degree burn injury

- Only superficial and outer layer of skin is involved.
- It is a mild type of injury and recovers within few days.

Second degree burn injury

- Partial thickness of the skin is involved.
- Vesicles are formed and for early and complete recovery, special care is taken to prevent secondary infection due to bacteria.

Third degree burn injury

- Full thickness of skin and even underlying organs may be involved.
- It is the most severe form of burn injury and special attention is required for complete cure of the animal.

shows a comparison of the three types of burn injury.

Common clinical signs of burn injuries involve pain, thirst, anaemia and loss of necessary salts from the body. There is swelling, redness and blisters in the affected areas. The recovery

Fig. 3.14: Types of burn injury



and survivability of the affected animal depends upon the body area involved, rather than the degree of burn. For treatment, local dressing of the burn with antiseptic like Betadine is done. The contamination of the wound is prevented by covering the area with clean and sterile cloth. Sufficient water and glucose solution is given to the animal.

Wounds

A wound may be defined as any injury in the skin or other body tissues due to a cut, blow or other impact. Wounds may be of different types, as summarised in Table 3.1.

Table 3.1: Types of wound and their features

Type of wound	Features
Incised wound	If the tissues are cut by a sharp instrument and the edges of the wound are smooth, it is called incised or clean-cut wound. Such wounds are also caused during surgical operations on the animal.
Lacerated wound	When the tissues are torn irregularly, the wound is known as a lacerated wound. A cut caused due to a wire is an example of this type.
Contused wound	A contused wound is an injury caused by a blunt object. Such injuries may be superficial or deep. Superficial-contused wounds may be an abrasion to the skin or mucous surface. Deep-contused wounds may be followed by loss of tissues and are generally irregular with swollen margins. Such injuries are commonly caused by kicks.
Punctured wounds	Punctured wounds are deeper than the width of opening or break in the skin or mucous membrane. This class is produced by sharp objects such as nails or splinters of wood.

Wounds frequently remain unnoticed in farm animals and they are allowed to heal on their own without any special care or treatment. A careful and intelligent treatment of wounds greatly reduces the loss resulting from these injuries. The method of treatment varies for the different kinds of wound.

How to control bleeding from a wound?

Bleeding is the most common symptom in many types of wound. The degree of bleeding depends on the kind, number and size of the blood vessels severed. Severe bleeding can also result in death of the animal.



NOTES

In case of a bleeding wound, the different methods recommended are ligation, pressure, torsion and application of heat. Bathing the wound with hot water is a satisfactory method of controlling bleeding from small blood-vessels. Surgically tying of the cut end of large blood-vessels is also carried out. Pressure over the surface of the wound is the most convenient method of controlling bleeding in most cases. Wherever possible, the wound is bandaged heavily with clean cloth or bandage. Before applying the bandage, it is advisable to cover the wound with a piece of sterile absorbent cotton that is well dusted with boric acid. If the bleeding does not stop by bandaging, then pressure should be applied with the hand or the wound should be packed with absorbent cotton and held in place with sutures. This is left in place for a period of 12 to 36 hours, depending on the extent of bleeding and character of the wound.

Management of wounded animals

The injured tissues are carefully examined for any type of foreign objects or particles such as hair, dirt, gravel, pieces of wood, nails, etc. The hair and torn tissues along the margins of the wound which can interfere with healing are trimmed. Drainage for the wound secretion and pus is provided. Suturing of wound depends on its character and location. A badly infected wound is left open unless satisfactory drainage for the pus and wound secretion occurs naturally. Wounds across the muscle and other movable parts of animals are not sutured.

Post treatment care includes keeping the animal in a quiet and clean place. Wounds in the region of the foot are irritating to the animal due to dirt and rubbing against weeds and grass. Thus, it is advisable to keep the animal in a clean stall until the wounds are completely healed.

Local treatment consists of keeping the wound clean by washing the part daily and applying any antiseptic ointment, lotion or powder over it.



Prolapse of uterus

Uterine prolapse is the protrusion of uterus through the vulva, as shown in Figs 3.15 and 3.16. A mass of uterus is found hanging through the vulva. In delayed cases the mass may get ruptured or lacerated by rubbing through the ground or walls of the cattle shed. It normally occurs immediately after calving or a few hours after calving. Prolapse of uterus is widespread in aged and malnourished animals. Animals with calcium deficiency are particularly susceptible to prolapse of uterus.

The cattle owner or animal health worker immediately washes the prolapsed mass with mild antiseptic solution. If there is swelling of the mass, it is reduced using application of cold ice on the uterine mass. Alternatively, saturated sugar solution can also be applied for reduction of the uterine mass. The cattle owner immediately wraps the prolapsed mass with a wet towel and tries to keep it raised up to the level of the vulva. The prolapsed mass is not allowed to dry. Injuries to the prolapsed mass are avoided and veterinarian is immediately called for treatment.



Fig. 3.15: Prolapsed uterus in buffalo (side view)



Fig. 3.16: Prolapsed uterus in buffalo (rear view)

Practical Exercise

Visit a nearby livestock farm.

Attend a wounded animal, provide first aid and record your treatment.

Check Your Progress**A. Multiple choice questions**

1. The management of a bleeding wound requires
 - (a) heat
 - (b) ligation
 - (c) pressure
 - (d) All of the above
2. In a first degree burn, the layer of skin involved is
 - (a) only superficial and outer layer
 - (b) deeper layers
 - (c) full thickness of skin
 - (d) All of the above
3. The outcome of poisoning may be manifested as
 - (a) mild abdominal pain
 - (b) depression
 - (c) convulsions
 - (d) All of the above
4. Electrocutation can result due to
 - (a) lightning
 - (b) high voltage electric current
 - (c) chewing of electric cords
 - (d) All of the above
5. When the tissues are torn irregularly, the wound is known as a
 - (a) lacerated wound
 - (b) contused wound
 - (c) punctured wound
 - (d) incised wound

B. Fill in the blanks

1. _____ is the elevation of body temperature above 104°F.
2. _____ is a condition in which animals suffer from toxic substances.
3. The accidental injuries or death caused by electric shock is termed as _____.

4. Any type of thermal injury caused by fire flames and hot solids is known as _____.
5. Uterine prolapse is the protrusion of uterus through the _____.

C. Mark True or False

1. Bleeding or hemorrhage is the most common symptom in wounds.
2. A contused wound is an injury caused by a sharp object.
3. Some breeds of cattle are particularly susceptible to uterine prolapse.
4. Punctured wounds are wide and less deep.

Glossary

Anaemia: A non-infectious disease in which haemoglobin is in lower range than required.

Antiseptic: A chemical or medicinal substance that prevents the growth of disease causing micro-organisms.

Dehydration: A health condition resulting due to the loss of fluids from the body.

Enema: Administration of a medicine or warm soapy water into the rectum through anus.

First aid: Immediate treatment of injured animals or those suffering from sudden illness.

Haemorrhage: Blood oozing out from a ruptured blood vessel.

Infectious diseases: Diseases caused by micro-organisms like bacteria, viruses, fungi and parasites.

Non-infectious diseases: Diseases which are not caused by micro-organisms.

Suturing: A procedure done by a veterinary doctor to hold body tissues after an injury using a needle with an attached thread.

Wound: Any injury in the skin or other body tissues due to a cut, blow or other impact.



Unit



Prevention and Control of Infectious and Contagious Diseases



17903CH04

INTRODUCTION

In this Unit, we will learn that besides controlling farm diseases and their transmission, it is equally important to know about the agencies involved in the control of animal diseases and the reporting mechanism for outbreak of diseases. You will also learn about the preventive measures to control the spread of diseases in farm animals. You will also learn how the movement of animals is responsible for the spread of animal diseases and the role of 'one health' approach and livestock value chain in animal disease control.

SESSION 1: FACTORS RESPONSIBLE FOR THE SPREAD OF DISEASES IN FARM ANIMALS

Disease is a condition of discomfort in an animal caused by pathogens like bacteria, virus, parasites (worms) and fungus.

Types of farm animal diseases

Table 4.1 lists some of the bacterial, viral and parasitic diseases affecting farm animals.

Table 4.1: Major bacterial, viral and parasitic diseases in cattle and buffaloes

Bacterial diseases	Viral diseases	Parasitic diseases
Anthrax	Foot and Mouth Disease (FMD)	Tapeworm infestation
Black quarter	Rabies	Hydatid cyst
Tetanus	Plague	Ascariasis
Tuberculosis	Pox	Babesiosis
Colibacillosis	Influenza	Theileriosis

Factors affecting spread of diseases

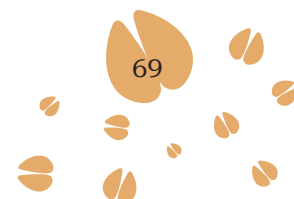
The following factors, in general, are responsible for the spread of diseases:

- (i) *Genetic factors*: Exotic breeds of cattle are more susceptible to various pathogens as compared to indigenous breeds of cattle.
- (ii) *Age factor*: Young animals have weak immunity as compared to mature animals and thus get infected with pathogens easily. For example, E. Coli infection is common in one-month old calves.
- (iii) Poorly fed and unvaccinated animals easily get infected with pathogens.
- (iv) Hot and humid climate and unhygienic farm practices propagate the pathogens at a faster rate.

Routes of disease transmission

Various diseases in farm animals are transmitted through the following routes.

- (i) *Respiratory route*: When an infected animal coughs or sneezes, the pathogens are transmitted to other animals. For example, the spread of Influenza happens through the respiratory route.
- (ii) *Digestive route*: When grass or water contaminated with dung or secretions of the infected animal is consumed by healthy animals, the disease gets transmitted. For example, Foot and Mouth Disease gets transmitted through the digestive route.
- (iii) *Through wounds*: In case of an injury or wound on the animal, some of the pathogens can enter into the body of healthy animals through the wounded part and cause diseases like Tetanus.



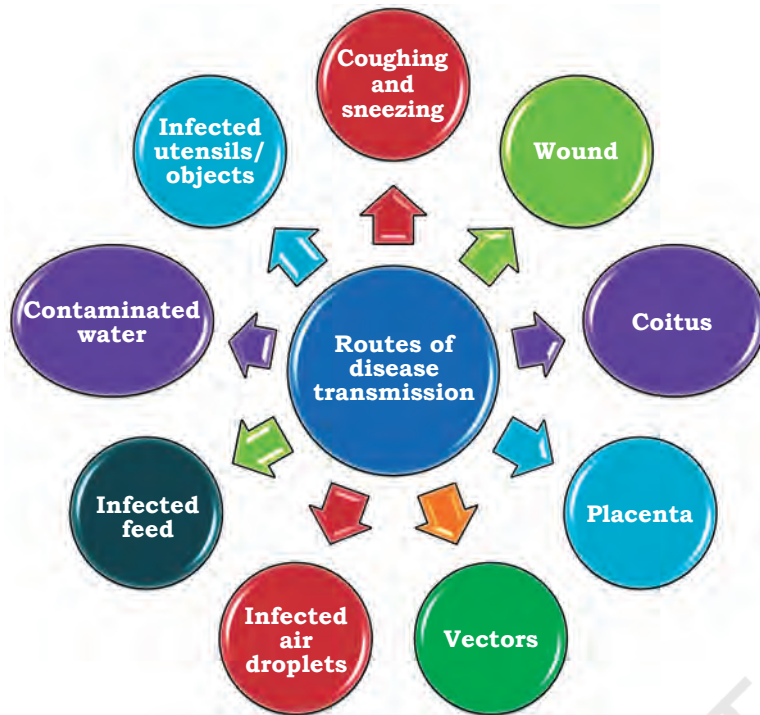


Fig. 4.1: Routes of disease transmission in farm animals

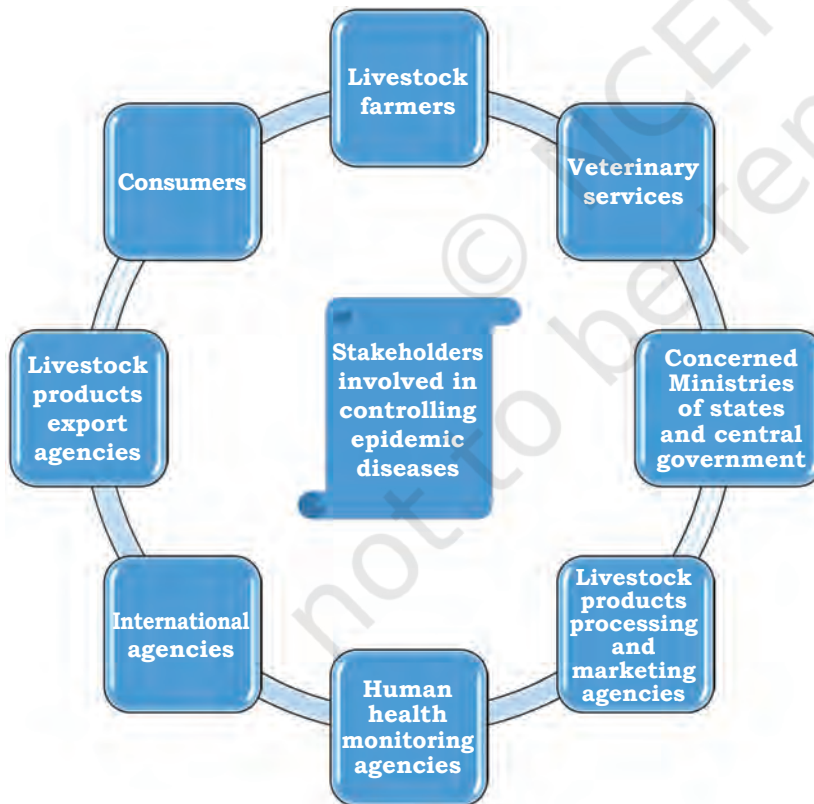


Fig. 4.2: Various stakeholders involved in controlling epidemic diseases

(iv) *Other routes:* Pathogens may transmit diseases among animals through vectors like ticks, mites, fleas, etc. For example, Babesia pathogen spreads through ticks. Some pathogens also spread through the reproductive tract and cause diseases like Brucellosis.

Fig. 4.1 summarises the different routes of disease transmission in farm animals.

Epidemic diseases

Animal diseases pose a big threat to the health of livestock and human beings. They cause economic loss to the farmers by: (a) causing death of productive animals, (b) reducing production of milk, eggs or wool and (c) decreasing fertility and reproductive capability in animals. The diseases that spread very fast and easily across the farms, regions and national boundaries are called epidemic diseases, for example, Foot and Mouth Disease in cattle.

Agencies involved in control of epidemic diseases

A successful programme for control of epidemic diseases is based on effective and efficient veterinary services and participation by farmers and other stakeholders. Such a programme must take into

consideration the culture and customs of producers and their value system along with many other factors. Control of epidemic diseases is a collaborative effort by various agencies and stakeholders like livestock farmer, veterinary services, exporters, etc., as shown in Fig. 4.2.

Trading of animals and animal products between countries and cross-border movement of animals and their products have given rise to the global issue of animal health. The laws and regulations in different countries regarding control measures and prevention of animal diseases are different. Hence, to have uniform standards on monitoring animal health and to minimise the spread of epidemic diseases, the World Organisation for Animal Health (WOAH) was formed. The WOAH is an intergovernmental organisation responsible for monitoring and improving animal health worldwide. A total of 180 countries are members of this organisation.

Measures for controlling outbreak of animal diseases

The chances of spread of animal diseases are greatly reduced if the measures shown in Fig. 4.3 are observed.

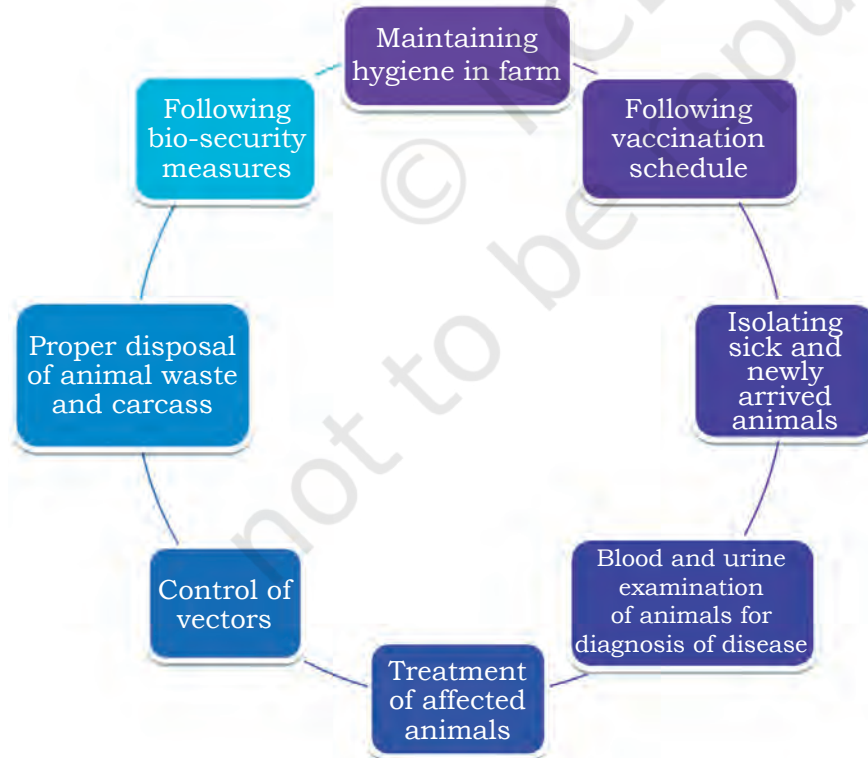


Fig. 4.3: Preventive measures for controlling outbreak of animal diseases

NOTES

Infectious and contagious diseases

Despite the adoption of all the preventive measures, there are chances that some of the animal diseases may suddenly appear in animal farms and damage animal health in a short span of time. Such a situation is called outbreak of that disease.

Recognising the seriousness of such diseases' outbreak and their immediate control, the Government of India enacted the 'The Prevention and Control of Infectious and Contagious Diseases in Animals Act, 2009'. In this Act, some of the diseases have been listed as 'Scheduled diseases'.

Scheduled diseases

The animal diseases which are listed as scheduled disease have a serious impact on the health of livestock, international trade and public health. Anthrax, Bluetongue, Brucellosis, Anaplasmosis and Tuberculosis are some examples of scheduled diseases.

Reporting mechanism in case of epidemics in farm animals

Fig. 4.4 shows the reporting mechanism in case of suspected outbreak of animal disease. It is evident from

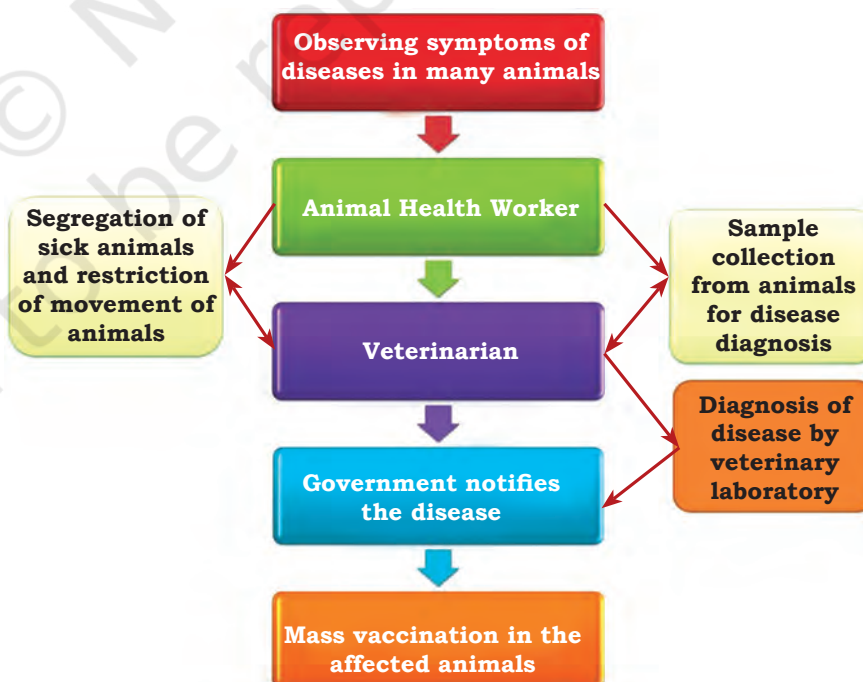


Fig. 4.4: Reporting process in case of outbreak of animal diseases



the figure how vital the role of an animal health worker is in reporting the outbreak of an epidemic as s/he happens to be the first person in this reporting process.

NOTES

Practical Exercises

Visit a nearby livestock farm.

1. Note down the preventive measures taken by the farm workers in controlling the spread of animal diseases.
2. Search the records of the farm for the past six months and note down the animal disease reporting system followed there.

Check Your Progress

A. Multiple choice questions

1. Babesia pathogen is transmitted by
 - (a) digestive route
 - (b) respiratory route
 - (c) ticks
 - (d) wound
2. Which of the following is used for control and prevention of spread of animal diseases?
 - (a) Vaccination
 - (b) Bio-security
 - (c) Hygiene
 - (d) All of the above
3. Anthrax is a _____ disease.
 - (a) parasitic
 - (b) viral
 - (c) bacterial
 - (d) fungal
4. Which of the following statements is true for Scheduled diseases?
 - (a) Listed under schedule
 - (b) Impact on international trade
 - (c) Impact on the health of livestock and public health
 - (d) All of the above
5. In an animal disease outbreak condition, what does an animal health worker do?
 - (a) Report to the Veterinarian
 - (b) Segregation of suspected case
 - (c) Restriction of animal movement
 - (d) All of the above



NOTES

B. Fill in the blanks

1. The international organisation that works for uniform standards for monitoring animal health diseases is _____.
2. The Prevention and Control of Infectious and Contagious Diseases in Animals Act was enacted in the year _____.
3. Diseases which spread fast and easily across farms, regions and national boundaries are known as _____.
4. E. Coli infection is common in young _____.

C. Mark True or False

1. Disease control is the sole responsibility of a veterinarian.
2. Poorly fed animals are more susceptible to diseases.
3. Exotic breeds of cattle are less susceptible to diseases.
4. Mass vaccination of animals is carried out to prevent outbreak of animal diseases.
5. Animal disease control programme is a collaborative effort by the producer, veterinary services, exporters and government agencies.

SESSION 2: DISEASES DUE TO MOVEMENT OF ANIMALS

Mass movement of farm animals

Livestock are moved from one place to another for meeting their requirements for water and feed. Such mass movements of animals are increasing day by day due to market pressures.

Livestock movement on a big scale is a major threat for spread of animal diseases as it spreads the pathogens from one area to another and introduce such pathogens to newer areas. Due to such unquarantined movements of animals on a big scale, the spread of highly contagious diseases of livestock like Foot and Mouth disease (FMD) and Rinderpest are witnessed periodically in our country.



Hence it is essential to record and quarantine the movement of animals to control diseases.

In India, livestock movement happens on a massive scale in the following ways —

- (i) *Pastoralism*: Herdsmen along with their families and animals move constantly in search of water and pastures for grazing. Such herdsmen keep a large herd of animals like sheep, goats, cattle or camels with them and move to newer places with their herd.

Pastoralism — A practice still followed by some farming communities in the world where the animal growers move with their flock of animals from one place to another.



Courtesy: <https://goo.gl/bJxXzP>

- (ii) *Trading*: Livestock and their products are taken from one location to another for farming, sale and consumption.
- (iii) *Animal fairs*: In our country, animal fairs like the Pushkar Camel Fair and Sonepur Cattle Fair are



Courtesy: <https://goo.gl/kxTtY7>



Courtesy: <https://goo.gl/RU2nzF>

Animal trade fair

NOTES

held for selling and buying of the livestock. These fairs attract large number of buyers, sellers and visitors from all over the country.

Prevention of diseases during animal movement

Observation of the following steps by various stakeholders such as farmers, herdsman, consumers, traders, local governments, etc., can go a long way in prevention of diseases during movement of animals.

- (i) Movement of animals from one location to another, within country and between countries is recorded.
- (ii) Only legal movement is permitted. In our country, a large percentage of animals and their products are illegally transported.
- (iii) Borders of adjoining countries are fenced to avoid illegal and unquarantined entry of animals.
- (iv) All new animals undergo quarantine check-up. Quarantine rules require that the animals are isolated and closely watched for 14 days to rule out diseases and if animals are found infected, they are denied entry.
- (v) Only disease-free and vaccinated animals are allowed to enter new areas. To achieve this end, European countries have introduced health cards for individual animals.

Methods for tracking animal movements

Recording of animal movements can be achieved by a combination of the following methods—

- (i) *Through check posts*: Interstate and inter-country movement of livestock are recorded at the check posts.
- (ii) *Through GIS (Geographical Information System)*: GIS is a cost effective and accurate system of recording animal movements and can be adopted by most nations where mass movement of livestock takes place.
- (iii) *Tracking pastoral routes*: Movement due to pastoralism can be tracked and recorded.

The interrelatedness of animals' movement and their tracking for minimising spread of animal diseases is



therefore required to be carefully taken note of. The major methods for controlling spread of diseases due to movement of animals are shown in Fig. 4.5. The major methods of tracking of animal movement are shown in Fig. 4.6.

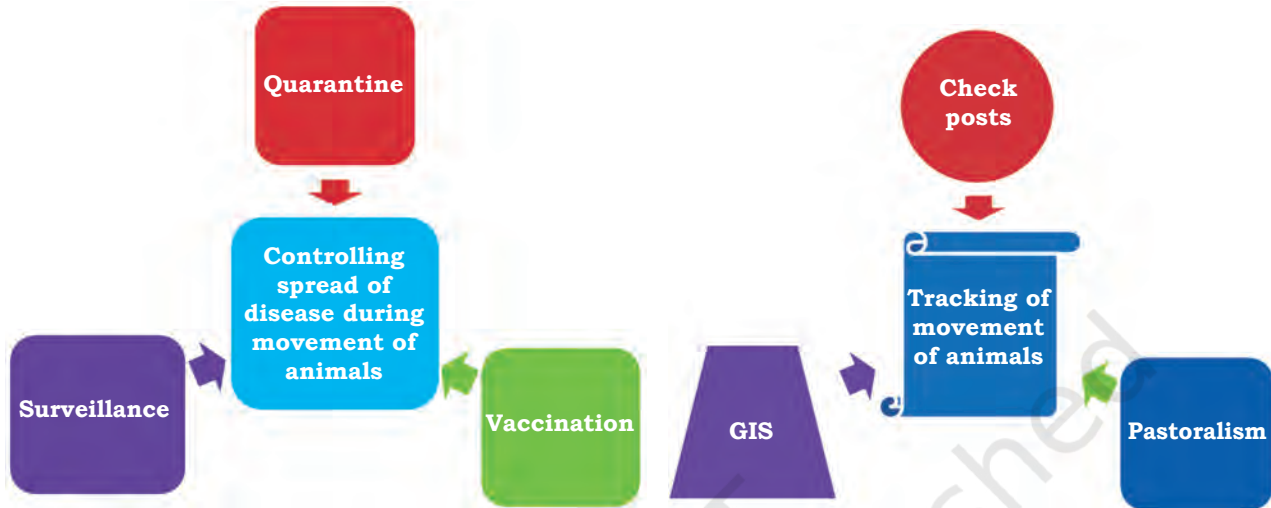


Fig. 4.5: Major methods for controlling spread of diseases during movement of animals

Fig. 4.6: Interrelatedness of animals' movement and their tracking



Fig. 4.7: Movement of a herd of sheep and goat led by a shepherd dog
Courtesy: <https://goo.gl/HEdt1c>

Practical Exercises

Visit a nearby check post.

1. Note down the recorded animal movement in that check post.
2. Draw suggestive outline of a GIS system for tracking movement of farm animals.



Check Your Progress

A. Multiple choice questions

1. Livestock movement takes place for the purpose of
 - (a) trade
 - b) trade fair
 - (c) nomadism
 - (d) All of the above
2. Which of the following is a method used for recording of animal movements?
 - (a) Through GIS
 - (b) Through check post
 - (c) Though tracking nomadic routes
 - (d) All of the above
3. Livestock movement is a major threat to
 - (a) introduction of new pathogens
 - (b) spread of Rinderpest
 - (c) emergence of Ebola virus
 - (d) All of the above
4. To control the spread of diseases due to movement of livestock, which of the following measures is taken?
 - (a) Only legal movement is allowed
 - (b) Only vaccinated animals are allowed entry
 - (c) Only disease free animals are allowed entry
 - (d) All of the above
5. Quarantine check-up prevents the entry of
 - (a) healthy animals
 - (b) diseased animals
 - (c) new infection
 - (d) Both (b) and (c)

B. Fill in the blanks

1. Herdsmen and their animals moving constantly in search of water and grazing places is known as _____.
2. Full form of GIS is _____.
3. _____ trade fair is organised at Pushkar every year.
4. Fencing of countries' border prevents _____ entry of animals.

C. Mark True or False

1. Newly arrived animals are not placed for the quarantine check-up.
2. Only disease-free and vaccinated animals are allowed movement to new areas.



3. Movement of animals from one location to another has led to the emergence of new diseases in human beings also.
4. GIS is a cost-effective and accurate system of recording animal movement.

SESSION 3: 'ONE HEALTH' APPROACH AND LIVESTOCK VALUE CHAIN

'One Health' approach

Health of human beings, animal and plant kingdoms and our environment are interdependent. 'One health' is a collaborative effort of multiple disciplines working locally, nationally and globally to attain optimal health for humans, animals including livestock, and the environment. 'One health' means taking care of health of one and all in totality. If the animals carry an infection, it may be transmitted to humans as well as to the environment. Similarly if the environment is polluted, it may adversely affect the health of all living beings. Approximately 75% of the new emerging diseases in humans are transmitted from animals.

Zoonotic diseases

The diseases, which spread from animals to humans and vice versa, are termed as 'zoonotic diseases'. Major zoonotic diseases having economic consequences are Rabies, Anthrax, Tuberculosis, Brucellosis and Nipah. Nipah is a zoonotic disease causing fatality in animals and humans. The disease is caused by fruit bats and has been responsible for many deaths in the state of Kerala in May 2018. Increased population, travelling and encroachment of territories of wild animals by humans are some of the factors responsible for the spread of zoonotic diseases.

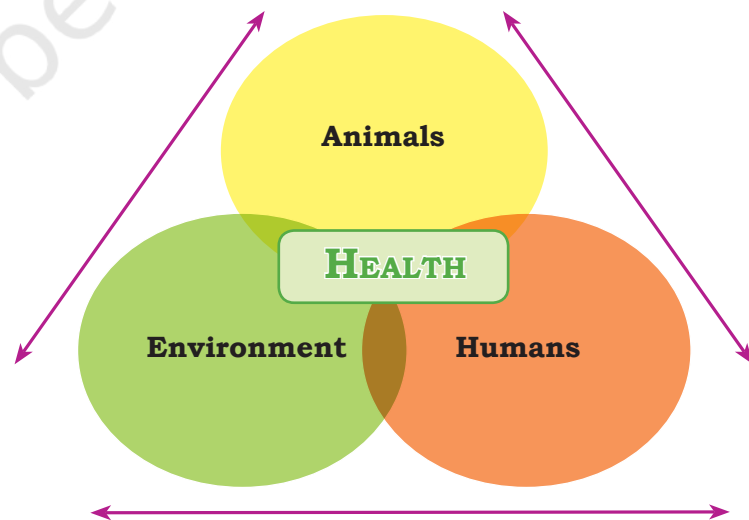


Fig. 4.8: One Health approach showing interdependence of environment, animals and humans

NOTES

‘One health’ is a new multidisciplinary approach to control the diseases where experts from the human medicine, veterinary medicine, environmentalists and agriculturalists work for the production of healthy food, healthy animals, healthy environment and healthy human life. Fig. 4.8 illustrates the idea of ‘One health’.

Objectives ‘One health’ approach

The following are the broad objectives of the concept of ‘One health’.

- (i) To have integration, cooperation and collaboration between human medicine, veterinary medicine and environmental science.
- (ii) To expand the scientific knowledge base on interdependence of environment, animals and humans for optimum health.
- (iii) To accelerate drug discoveries.
- (iv) To improve human and animal health education.
- (v) To improve human and animal health.

An example of ‘One health’ approach

Rabies is a viral disease affecting humans, dogs and farm animals. After the bite of a dog or other wild animals infected with Rabies, humans and animals show violent movements, uncontrolled excitement and fear of water. Further symptoms of Rabies include inability to move body parts, confusion, loss of consciousness and

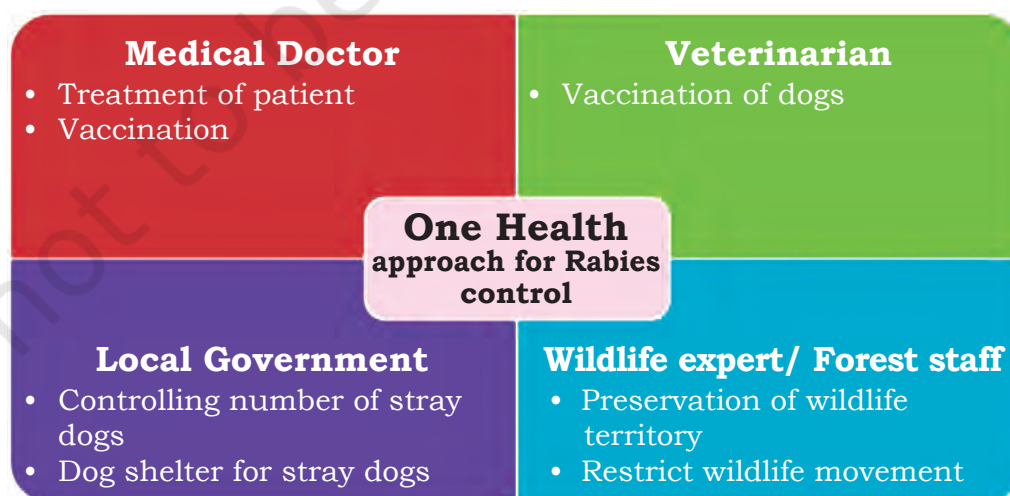
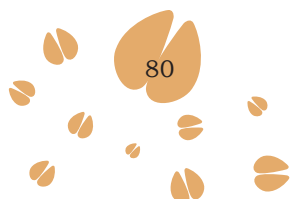


Fig. 4.9: Coordinated action by multiple agencies to control Rabies



finally death. Integrated efforts by the medical doctors, veterinarians and government agencies are required for control and eradication of Rabies. Fig. 4.9 explains the coordinated action by multiple agencies.

You may wonder how the wildlife expert and forest personnel come into the picture to control Rabies. Actually the wild foxes, jackals and bats are the reservoirs for Rabies virus. Therefore, if the wildlife territory is properly preserved with few animals moving towards human population, the incidence of Rabies will be greatly minimised, if not eliminated altogether.

Livestock value chain

Livestock are reared for farming and their products. From the stage of raw animal product to the final consumable product, a number of value addition steps are undertaken to increase profitability of the farmer. These different steps are components of the livestock value chain. This is explained with the example from goat farming. Farmers usually rear goats at the village level and sell them to traders or fatteners at the district level. These goats are then sent to the abattoir for slaughter and dressing of meat. Meat is sold in the market for household/hotel consumption or food processing industry to make various products for export. This shows that a number of steps are carried out at different processing points. A number of people are involved in bringing the product from producers (farmers) to the customers. This chain of activities, processes and groups of people is known as livestock value chain. Fig. 4.10 demonstrates the livestock value chain for goat meat production.

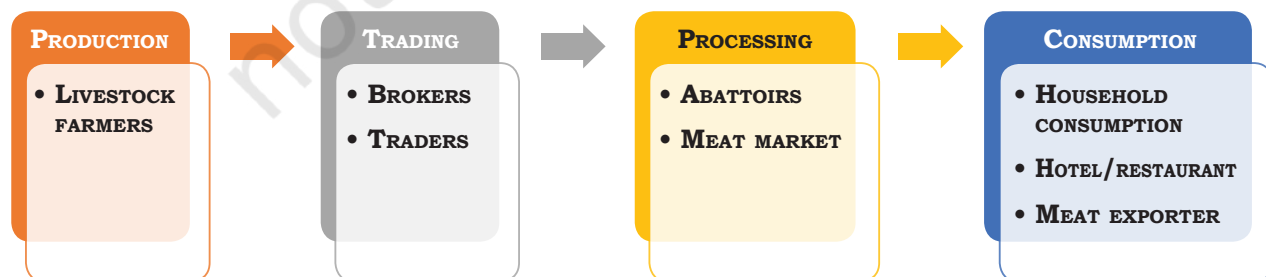


Fig. 4.10: Livestock value chain for goat meat production

NOTES

Benefits of livestock value chain

- (i) It helps to understand the problems and limitations of the market.
- (ii) Livestock value chain helps to understand the needs of the market. Farmers can produce the needed product in the value chain and earn much more.
- (iii) Usually farmers get only a small fraction of the actual profits when the products are sold through intermediaries. Livestock value chain can help the farmers to earn more by minimising the leverage of brokers and intermediaries.
- (iv) Livestock value chain also helps in control of animal diseases. The knowledge of the livestock value chain of a product can help us to identify the animals and population at risk. The disease control measures can be applied to the targeted population at risk.

Practical Exercises

1. Make the livestock value chain for milk production in dairy cattle.
2. Visit a nearby dairy farm and record the value chain of their products from the producer to the consumer.

Check Your Progress

A. Multiple choice questions

1. Which of the following is an advantage of the livestock value chain?
 - (a) Farmers can earn more
 - (b) Effective disease control programme
 - (c) Identification of population at risk
 - (d) All of the above
2. 'One health' approach involves the
 - (a) medical professionals only
 - (b) experts from multiple disciplines
 - (c) veterinarians
 - (d) environmentalists



3. What is the aim of 'One health' approach?
 - (a) To expand the scientific knowledge base
 - (b) To accelerate drug discoveries
 - (c) To have integration and collaboration between the human and veterinary medicine
 - (d) All of the above
4. 'One health' approach is useful for
 - (a) control of diseases in animals
 - (b) control of diseases in human beings
 - (c) safe environment
 - (d) All of the above
5. Select the correct sequence of components of a livestock value chain.
 - (a) Production, trading, processing and consumption
 - (b) Consumption, processing, trading and production
 - (c) Trading, processing, consumption and production
 - (d) Processing, trading, production and consumption

B. Fill in the blanks

1. Diseases that spread from animals to humans and vice versa are known as _____ diseases.
2. _____ approach means taking care of the health of all in totality.
3. Livestock value chain links the producer to the _____.

C. Mark True or False

1. 'One health' programme is mainly concerned with the health of human beings only.
2. Majority of new emerging diseases in humans are known to be transmitted from animals.
3. Wildlife experts are not a part of 'One health' programme.
4. Tuberculosis can spread from animals to human beings.
5. Human encroachment in territories of wild animals is one of the major reasons for the spread of zoonotic diseases.



SESSION 4: BIO-SECURITY AND DISPOSAL OF FARM ANIMALS

Bio-security

Bio-security means the protection of farm animals against diseases and includes measures designed to protect the animal population against harmful biological or biochemical substances. Bio-security refers to various measures that are undertaken to stop the spread or introduction of harmful organisms to animals, human and plant life. The following bio-security measures are followed in animal farms to control the diseases.

- (i) *Restricted access to livestock farm:* A livestock farm is secured by fences or walls to avoid the unauthorised entry of any person. By providing fences and walls, entry of wild animals can also be checked (Fig. 4.11).
- (ii) *Provision of footbath:* A footbath of disinfectant like solution of phenol or slaked lime or solution of copper sulphate is kept at the entry and exit points of a farm gate to prevent the spread of pathogens in animals (Fig. 4.12).
- (iii) *Use of personal protective equipment (PPEs):* Animal health workers wear apron, gloves, mask, head mask and gumboots for their safety and security while handling the animals. They need to wash their hands with soap and sanitisers frequently.



Fig. 4.11: Restricted entry in a farm, as a bio-security measure



Fig. 4.12: Footbath at the entry of a farm gate

The following measures must be regularly undertaken in an animal farm to achieve maximum cleanliness —

- (i) Cleaning and disinfecting the animal farm periodically is a must. It includes removing the used bedding and waste materials from the farm regularly (Fig. 4.13).
- (ii) Dry scrubbing and thorough cleaning of the floors and walls to remove sticking organic matter.
- (iii) Wet down the surfaces with detergent and water.
- (iv) Scrubbing and cleaning the area with fresh water.
- (v) Spraying disinfectant (like phenol or bleaching powder) on the surface.
- (vi) Cleaning the equipment, feed tubs and buckets with detergent and fresh water.
- (vii) In case of a disease outbreak, animal farm is fumigated with formalin and potassium permanganate in the ratio of 2:1.
- (viii) Waste generated in the animal farm like manure, feeds, debris, etc., are disposed off by burial or burning.



Fig. 4.13: Farm workers cleaning paddock



Fig. 4.14: Farm worker cleaning shed with water

Culling and disposal of farm animals

Culling

Culling means removal of undesirable animals from the herd. Some of the animals become undesirable due to various reasons like: (a) poor production, (b) poor reproductive ability or sterility, (c) stunted growth, (d) incurable illness, (e) diseases like Tuberculosis, Johne's disease, Brucellosis, and (f) one or more quarters of the udder being non-functional due to chronic Mastitis. Culling is an effective means of disease control in chronically diseased animals.

Disposal of animal carcass

The dead body of an animal is called carcass (Fig. 4.15). An animal carcass is a source of infections, therefore its proper disposal is a regulatory requirement. The following precautions and methods are followed for the disposal of an animal carcass.



Fig. 4.15: Calf carcass after some moments of death

(a) Precautions for carcass disposal

- (i) Wear personal protective equipment while handling the animal carcass.
- (ii) Avoid direct contact with the dead animal's blood, urine, faeces, etc.
- (iii) Avoid contact with the dead animal's parasites like lice, ticks, mites, etc.
- (iv) If a carcass for disposal is required to be transported then place it in a plastic body bag and seal it immediately.

(b) Carcass disposal methods

Any one of the following disposal methods can be adopted for the proper disposal of animal carcass.

- (i) *Burial*: Burial is a commonly used method. In this method, animal carcasses are disposed in a deep pit, followed by covering it with layers of lime and soil.
- (ii) *Burning*: Burning is a well-established procedure where wood or fire beds soaked in kerosene or diesel are kept around the animal carcass and ignited with fire. Care is taken to keep away the vehicles and burning materials from the ignition point.
- (iii) *Incineration*: In this method, animal carcasses are incinerated in an incinerator which is a fixed machine fuelled by natural gas or electricity. The whole carcass is burned and reduced to ashes. This method effectively inactivates the pathogens but is quite expensive.

Practical Exercises

1. Visit a nearby livestock farm. Note down the farm cleaning and disinfection procedure practised in the farm.
2. Collect labels of at least two disinfectants used in your surroundings. Note down the active disinfecting chemical in the disinfectants.

Check Your Progress

A. Multiple choice questions

1. A carcass can be disposed by the following method:
 - (a) Burial
 - (b) Burning
 - (c) Incineration
 - (d) All of the above
2. Bio-security means
 - (a) Security of farm premises
 - (b) Personal security
 - (c) Prevention of release of pathogens in the environment
 - (d) All of the above
3. Bleaching powder is a
 - (a) disinfectant
 - (b) antibiotic
 - (c) antiseptic
 - (d) detergent
4. Which of the following is taken care of while disposing an animal carcass?
 - (a) Wear personal protective equipment
 - (b) Avoid direct contact with the dead animal's blood.
 - (c) Avoid contact with the dead animal's parasites.
 - (d) All of the above
5. Which of the following steps is involved in cleaning and disinfection of a farm premises?
 - (a) Scrubbing and removal of waste
 - (b) Cleaning with detergent and water
 - (c) Spraying of disinfectant
 - (d) All of the above

NOTES



NOTES

B. Fill in the blanks

1. Removal of animals from the herd is known as _____.
2. _____ is a fixed machine fuelled by natural gas or electricity used for the disposal of animal carcass.
3. An animal carcass is covered with the layer of lime and soil in _____ method of carcass disposal.
4. _____ is a set of institutional and personal security measures to prevent the release of pathogens and infection in the environment.

C. Mark True or False

1. In case of outbreak of a disease, animal farm is fumigated with formalin and potassium permanganate crystals.
2. Incineration is a cheap method for carcass disposal.
3. A footbath is kept at the entry and exit points of animal farm to prevent the spread of pathogens.
4. An animal farm can allow many visitors.
5. An animal farm need not be secured by fences and doors.

Glossary

Bio-security: *The protection of the environment and health of living things from diseases, pests and bio-terrorism.*

Disease: *A disorder of structure or function in a human, animal, or plant, especially the one that produces specific symptoms.*

Disinfectant: *A chemical liquid that destroys bacteria.*

Epidemic: *An outbreak of an infectious disease that spreads more quickly and more extensively among a group of animals at a particular time.*

Immunity: *The ability of an organism to resist a particular infection or toxin by the action of specific antibodies or sensitized white blood cells.*

Prevalence: *Prevalence is a measurement of all individuals affected by the disease at a particular time.*

Zoonotic disease: *A disease spread between animals and humans or humans to animals.*



Answers

Units	Sessions	Multiple choice questions	Fill in the blanks	True or false	
Unit 1	Session 1	1. d	1. Excited	1. TRUE	
		2. a	2. Four	2. FALSE	
		3. d	3. Four	3. FALSE	
		4. a	4. Hind	4. TRUE	
	Session 2	5. TRUE			
		1. a	1. Behaviour	1. FALSE	
		2. d	2. Colour-blind	2. TRUE	
		3. c	3. "Personal space"	3. TRUE	
		4. a	4. Distress	4. TRUE	
Session 3	5. b	5. Forward	5. TRUE		
	1. c	1. Trevis	1. TRUE		
	2. d	2. Pica	2. TRUE		
	3. d	3. Casting	3. FALSE		
	4. d	4. Reuff's	4. TRUE		
Unit 2	Session 1	5. a	5. TRUE		
		1. d	1. Abortion	1. TRUE	
		2. b	2. Dairy	2. FALSE	
		3. a	3. Veterinary doctor	3. TRUE	
		4. d	4. Watery	4. TRUE	
	Session 2	5. d	5. Contagious	5. FALSE	
		1. d	1. 60 minutes	1. TRUE	
		2. d	2. 2-7	2. TRUE	
		3. d	3. Vaccination	3. FALSE	
		4. d	4. Brucella	4. TRUE	
	Session 3	5. d	5. Dewormed	5. FALSE	
		1. d	1. Ectoparasites	1. TRUE	
		2. a	2. Blood	2. FALSE	
		3. b	3. Diseases	3. FALSE	
		4. b	4. Backline	4. TRUE	
Unit 3	Session 1	5. d	5. Subcutaneous	5. FALSE	
		1. d	1. Pink	1. TRUE	
		2. a	2. Indirect	2. FALSE	
		3. d	3. 150 to 300	3. TRUE	
		4. d	4. Potassium permanganate	4. FALSE	
5. d	5. Sick				

	Session 2	1. a 2. c 3. a	1. Diarrhoea 2. Indigestion 3. Rumen 4. Diarrhoea	1. TRUE 2. TRUE 3. FALSE 4. FALSE 5. FALSE
	Session 3	1. d 2. a 3. d 4. d 5. a	1. Hyperthermia 2. Poisoning 3. Electrocution 4. Burn injury 5. Vulva	1. TRUE 2. FALSE 3. FALSE 4. FALSE
Unit 4	Session 1	1. c 2. d 3. c 4. d 5. d	1. World Organisation for Animal Health 2. 2009 3. Epidemics 4. Calves	1. FALSE 2. TRUE 3. FALSE 4. TRUE 5. TRUE
	Session 2	1. d 2. d 3. d 4. d 5. d	1. Nomadism 2. Geographic Information System 3. Cattle 4. Illegal	1. FALSE 2. TRUE 3. TRUE 4. TRUE
	Session 3	1. d 2. b 3. d 4. d 5. a	1. Zoonotic 2. One health 3. Consumer	1. FALSE 2. TRUE 3. FALSE 4. TRUE 5. TRUE
	Session 4	1. d 2. d 3. a 4. d 5. d	1. Culling 2. Incinerator 3. Burial 4. Bio-security	1. TRUE 2. FALSE 3. TRUE 4. FALSE 5. FALSE

