

Unit

2



Prevention of Diseases

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



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SESSION 1: GUIDELINES FOR PREVENTION OF DISEASES IN DAIRY ANIMALS

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

Optimum nutrition

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

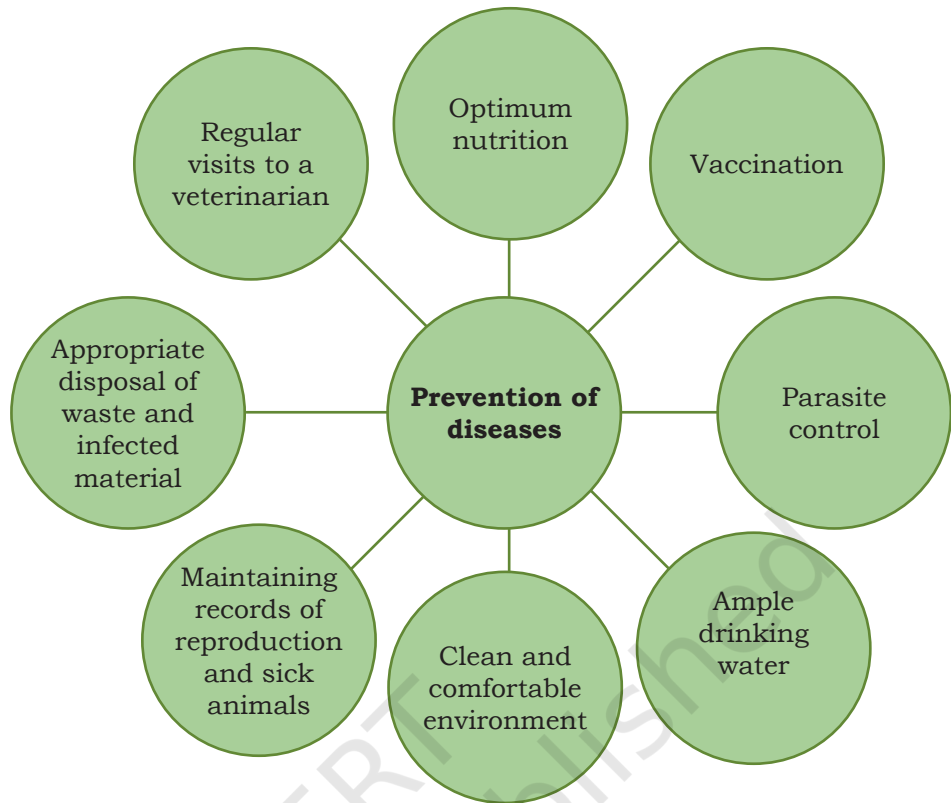


Fig. 2.1: Measures for prevention of diseases

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

Vaccination

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

Parasite control

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



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

Providing ample clean drinking water

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

Clean and comfortable environment

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

Appropriate disposal of waste

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

Maintaining records of reproduction and sick animals

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

Regular visits to a veterinarian

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



Check Your Progress

A. Multiple Choice Questions

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

B. Fill in the Blanks

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

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

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



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

SESSION 2: VACCINATION OF DAIRY ANIMALS

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

Vaccine

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

Vaccination schedule in farm animals

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

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

Table 2.1: Recommended vaccination schedule for cows and buffaloes

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

Precautions during vaccination

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

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



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

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

Different routes of administering vaccines

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

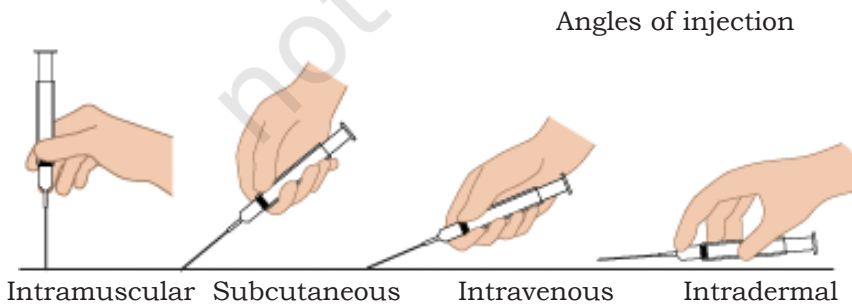
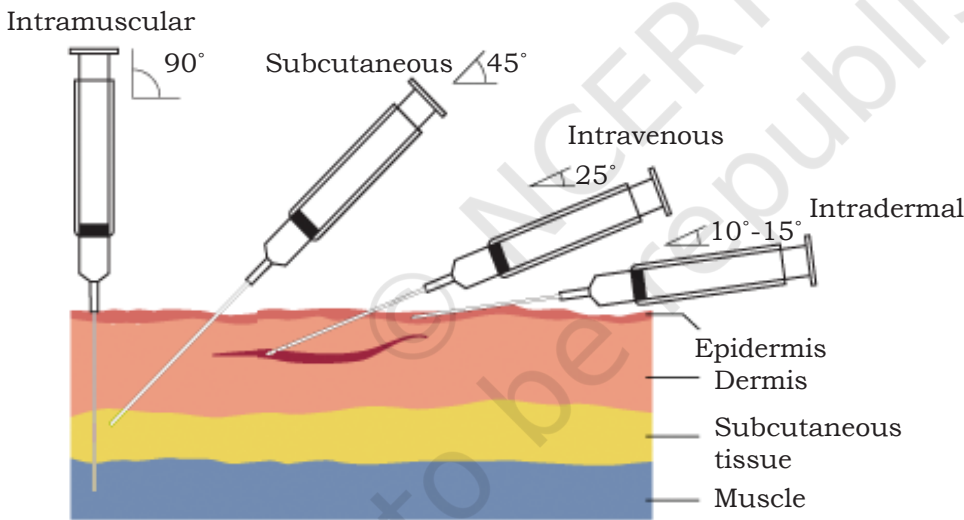


Fig. 2.2: Different angles of infection



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



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

Components of vaccination documentation

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

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

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

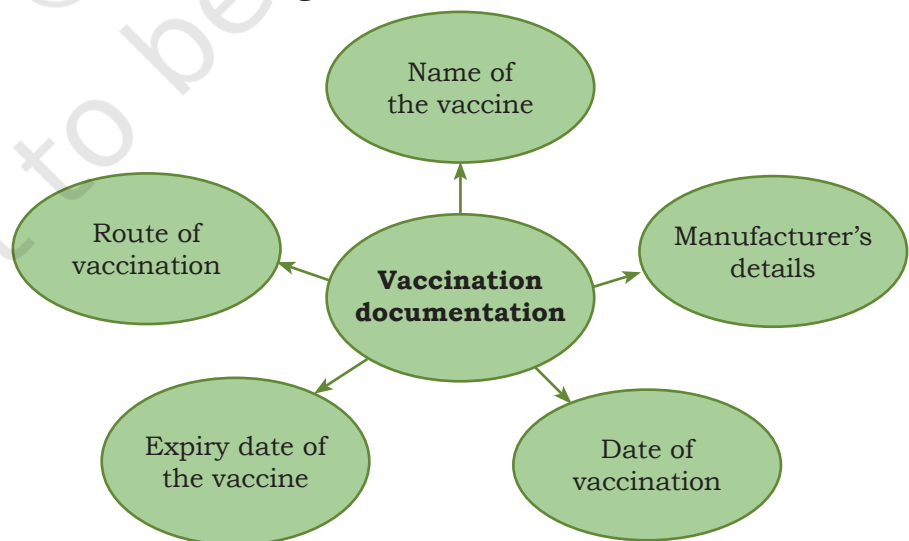


Fig. 2.5: Components of vaccination documentation



Check Your Progress

NOTES

A. Multiple Choice Questions

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

B. Fill in the Blanks

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

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

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

SESSION 3: ONE HEALTH APPROACH

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

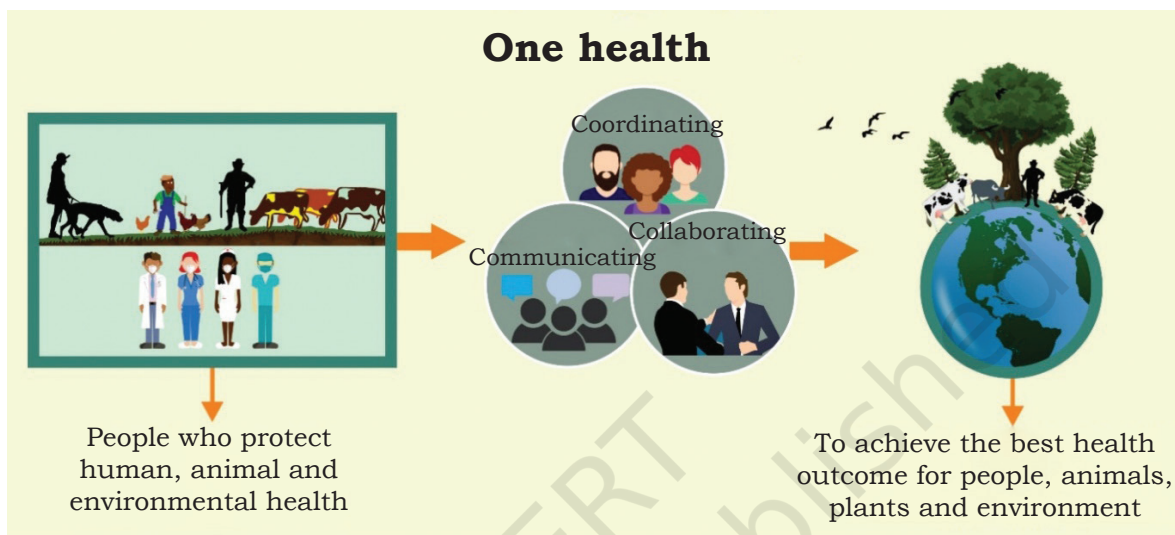


Fig. 2.6: The health of animals, humans and environment are interlinked.

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

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

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



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

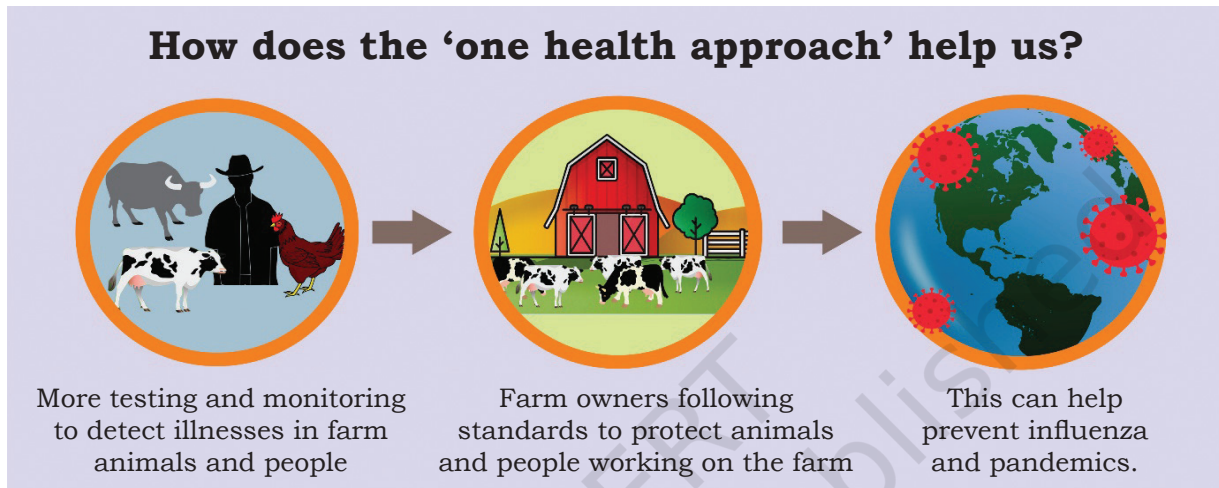


Fig. 2.7: One health approach

What is 'one health' approach?

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

Zoonosis and its control

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

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

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

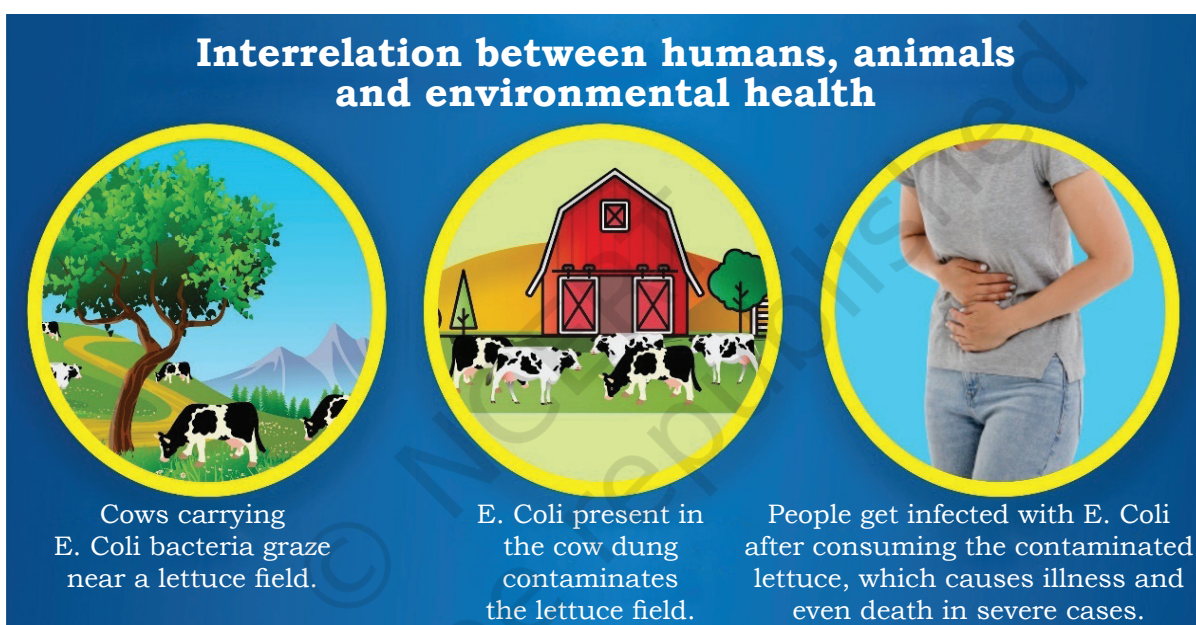


Fig. 2.8: Zoonotic infection by the transmission of *E. Coli*

Aims of one health approach

The following are the aims of the one health approach.

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



Check your Progress

NOTES

A. Multiple Choice Questions

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

B. Fill in the Blanks

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

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

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