



Government of India

General Guidelines for Biosecurity at Central Sheep Breeding Farm, Hisar

**(Basic Tenets can be applied to State
Sheep/Goat Farms)**

**Department of Animal Husbandry,
Dairying & Fisheries
Ministry of Agriculture and Farmers
Welfare
Government of India
Krishi Bhawan, New Delhi, India-110 001**



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2016**

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PREFACE

Biosecurity, the practice of protecting ranch and farm animals from disease, has become a major concern with the worldwide threat of emerging and zoonotic diseases. Effective biosecurity requires several components including isolation, movement control, and sanitation that aim to reduce exposure to pathogenic organisms and parasites that may infect animals with diseases. It has become an essential and indispensable part of the modern day farm management practices to minimize production losses.

The publication of this General Guidelines for Biosecurity at Central Sheep Breeding Farm, Hissar, would act as a reference book of biosecurity guidelines for all Sheep & Goat Farms in public sector. We have planned this biosecurity guideline broadly in two parts: Major routes for disease ingress and pathogen transmission and Overall biosecurity within the farm. The Technical Portion is applicable to most of other public & private sector farms besides CSBF.

An executive summary is also structured at the very beginning of this guideline to delineate the importance of biosecurity measures in sheep/goat farming; the first chapter outlines the major routes for disease ingress and pathogen transmission in the farm and recounts the measures to be taken during introduction, re-entry and transportation of farm animals.

The next section on overall biosecurity within the farm is a comprehensive document encompassing farm layout, facility management, perimeter and interior fencing, management of feed, water and bedding, animal health management, management of equipment and tools, cleaning and disinfection of facilities and on-farm equipment, carcass and waste management, pasture management and personnel management. Brief accounts of monitoring and record keeping, response plan for disease outbreaks and the relation between animal welfare and biosecurity also have been attempted in this technical portion of the manual.

Annual Health Calendar for Sheep & Goat adopted by the Central Sheep Breeding farm, Hissar, Haryana and a list of notifiable sheep and goat diseases is annexed in the appendices.

Though this manual has been designed for use in Central Sheep Breeding Farm, Hissar, it would be useful for all Sheep & Goat Farms in public and private sector. It would be helpful to anyone who desires to adopt sheep/goat farming as a means of livelihood or wealth generation. We further intend to add on newer developments germane to this sector and your valuable feedback would be welcome.

Sanjay Bhoosreddy
Joint Secretary (ANLM)

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**General Guidelines for
Biosecurity at Central Sheep
Breeding Farm, Hisar
2016**

A. EXECUTIVE SUMMARY

1. What is Biosecurity

1.1. Broadly speaking, biosecurity is a set of measures for protecting a population from infectious and contagious diseases at the national, regional and farm level.

2. Why is it important in a sheep and goat farm

2.1 Biosecurity is proactive and focuses on routine, day to day on-farm activities to protect the health of the herd by limiting the transmission of infectious agents that can cause disease in a farm or herd. Infectious agents are generally invisible, and can be moved from place to place in organic matter and on a wide range of materials that are frequently present in farming environments.

2.2 Biosecurity focuses on reducing the risk of disease, on the assumption that infectious agents could be present thereby contributing to improved animal health, improvement in day to day production, savings in production cost and increased profitability.

2.3 Biosecurity practices can also minimize the risk of exposure to zoonotic disease for the farmers, their families and their workers and reduce food safety risks potentially inherent in certain activities undertaken on the farm.

3. Major routes for disease ingress and pathogen transmission

3.1 Livestock

- a. transfer of livestock between different production groups/areas
- b. dead livestock disposal
- c. dirt, manure or contaminants

3.2 People

- a. farm personnel and family members living on site
- b. contractors, maintenance personnel, neighbours, service personnel, visitors
- c. dirt/ manure/ contaminants carried on hands, boots, clothing, hair, etc.

3.3 Vehicles and equipment

- a. dirt/ manure/ contaminants carried on cars, trucks, tractors, weighing scales, husbandry equipment (plants, dips & vaccination guns, etc)

- 3.4 Feed and water
 - a. raw materials
 - b. post-production contamination or spoilage during transport and storage
 - c. faecal and urine contamination from the same species or other species
- 3.5 Pests and weeds
 - a. poisonous/ invasive plants
 - b. feral animals
 - c. domestic animals
 - d. rodents
 - e. insects

4. Implementation: Keeping the above in mind, it is felt that Farm-level biosecurity is all about a series of management practices designed to minimize, prevent or control the introduction of infectious pathogens onto a farm, spread within a farm and export of these pathogens beyond the farm, which may have an adverse effect on the economy, the environment and human health. Thus these guidelines are proposed to act as roadmaps for keeping a high level of Farm-level biosecurity.

These guidelines have been prepared keeping in mind the operations and management in the Central Sheep Breeding Farm, Hisar, Haryana. It should be clear though that no single biosecurity measure/ plan provide an answer to preventing all diseases. They are not “Must Do” in a farm. These are guidelines on which any farm can dwell upon to develop their own biosecurity measures that suit their needs. All farms are advocated that they have their own set of Standing Operations Procedures while taking these guidelines into consideration. It is also necessitated that these guidelines be made aware to all personnel involved in all activities in the farm and that they are reviewed and revised from time to time.

They are structured under following heads:

I. Movement of livestock, people and vehicles

- 1. Livestock
 - 1.1 Introduction of new animals
 - 1.2 Re-entry of farm animals
 - 1.3 Transportation of farm animals
- 2. Feed
- 3. People

4. Vehicles
5. Tools and Equipment
6. Unwanted entries

II: Overall biosecurity within the farm

1. Create a diagram of the farm layout
2. Facility management
3. Perimeter and interior fencing
4. Management of Feed, Water and Bedding
5. Animal Health Management
6. Management of Equipment and tools
7. Cleaning and disinfection of facilities and on-farm equipment
8. Carcass and waste management
9. Pasture management
10. Personnel management
11. Monitoring and record keeping
12. Response Plan for Disease Outbreaks
13. Animal welfare and biosecurity

5. Though detailed elsewhere in the guidelines, should there be an indication of any widespread infection or outbreak of disease, or suspicion of a notifiable disease, etc.; the nearest RDDDL should also be informed to collect samples / material as per their norms and protocols.

6. The following may also be reported in the event of the above at following e-mail addresses:-

ahc-dadf@nic.in, jslh-dadf@nic.in, jspf-dadf@nic.in , jcpoul@nic.in, jclh-ahd@gov.in,
rajendrabambal@hotmail.com , drgarggagan@gmail.com

7. As mentioned, these guidelines have been prepared keeping in mind the operations and management in the Central Sheep Breeding Farm (CSBF), Hisar, Haryana. The CSBF was established in 1969-70 in collaboration with the Government of Australia under Colombo Plan. The farm has been established with the objectives of production of a large number of improved cross bred rams for distribution to the sheep raising areas of India; Setting up extension and Training programmes to ensure the best use of the ram produced and Development of suitable management system and requisite facilities for breeding and rearing under Indian conditions, using purely Indian

Resources. So far, over 2011 acclimatized breeding rams, 508 Beetal bucks and 1765 breeding ewes of exotic breeds and their crosses have been supplied till 2014-15.

The farm also imparts six day Training on Machine Sheep Shearing which includes machine shearing techniques, wool grading and maintenance of shearing machine, six day Training on Sheep/ Goat Management and Production, one day Training on Sheep/ Goat Production and Health. A separate training programme may also be organized if a full batch of about 30 trainees is sponsored by the State.

Further details may be obtained from the Director, Central Sheep Breeding Farm, Hisar, Haryana at telephone 01662-264329, telefax 01662-264263 or at email hisar_csbf@yahoo.com and face book page at www.facebook.com/sheepgoatindia.com.

B. INTERVENTION I: MOVEMENT OF LIVESTOCK, PEOPLE AND VEHICLES

The essence of any biosecurity plan is to prevent any ingress of disease into the farm or farm premises. Taking this into cognizance, the following are envisaged.

1. **Livestock:** Manage the introduction and movement of livestock in a way that minimizes the risk of introducing or spreading infectious disease.

1.1 **Introduction of new animals:** Newly purchased livestock entering the farm present a high risk activity for the unintentional introduction of disease agents, weed seeds or pests.

Recommendations:

- a. Check animals for health status before purchasing. Pre-purchase inspection or veterinary inspection/certification would be helpful
- b. Segregate, observe and treat (as required) newly introduced animals. Hold new stock in quarantine (isolation in separate pens) for 24 hours to ensure they have had time to empty out prior to release from quarantine and remember to provide clean drinking water all the time.
- c. Newly arrived sheep/ goats should be routinely dewormed. This should be done as per deworming plan of the farm in order to avoid anthelmintic resistance in the animals.
- d. Complete all disease testing, treatments, procedures and vaccinations before animals are released from isolation.
- e. Quarantine paddocks or pens should be as near as possible to the farm entrance and well away from other stock. As a minimum, a double fenced 3 metre gap should be provided between newly arrived animals and resident stock.
- f. Raise as many replacement stocks as possible on the farm, and only add new animals from off farm sources when necessary.

1.2 **Re-entry of farm animals:** Knowing the health status of animals that are re-entering the farm (e.g., animals attending livestock shows, etc.) enables to minimize the risk of introducing and spreading disease to the existing herd.

Recommendations:

- a. Consider testing returning animals prior to introduction or reintroduction, in consultation with herd veterinarian. Tests used to determine disease status can include serology, culture, and fecal egg counts.
- b. In any case, the animal should remain in isolation until the test results are known. Observe no clinical signs of disease are noticed during the isolation period. Have a plan for animals with positive test results; e.g., treat, do not buy or discard/dispose.
- c. Prevent any sharing of feeding or watering equipment, penning, handling facilities or equipment between isolated animals and resident animals unless they are first cleaned and disinfected.
- d. Complete all disease testing, treatments, procedures and vaccinations before sheep/goats are released from isolation.

1.3 Transportation of farm animals: When taking animals to shows, *melas* and sales, remember that the farm stock can also transmit disease(s) to other animals by mixing or by coming into contact with pens, vehicles, people and equipment.

Recommendations:

- a. No livestock shall be dispatched from the farm until authorised by the relevant authority.
- b. Ensure that a mandatory veterinary inspection of all animals attending any show/ *mela* is conducted prior to unloading, and that any animal with evidence of being diseased is not unloaded.
- c. Ensure that animals that have recently parturited/ aborted (i.e., within the last two weeks) or may parturate at the time of the show are excluded due to risk of transmission of infectious abortion diseases.
- d. Transport animals in a vehicle that has been cleaned and disinfected prior to use. Ideally, this vehicle is dedicated exclusively to the farm's use.
- e. Prevent direct contact and limit proximity with other animals and livestock in transit and on-site.
- f. Supply bedding and feed from own farm. Ensure a clean supply of water onsite.
- g. Bring feeders, water buckets, and grooming and handling equipment from home farm.
- h. Limit handling of farm's animals by others.

- i. Animal that are sold and moved out of the farm should be transported as per Transportation Rules taking into account their welfare. [*Refer Transport of Animals, Rules, 1978*]

2. Feed: Feed has the potential to be a source of contamination, infection or infestation. It can carry/ harbour disease agents, chemicals residues, weed seeds and/or pests. Incorrectly stored feeds can also deteriorate, grow unwanted disease agents (such as mould) or become contaminated via pests and vermin.

Recommendations:

- a. Purchase feed from suppliers who produce quality feeds that are labelled and comply with regulations for feed designated for ruminant feeding. Ensure that it is transported in a clean carrier.
- b. Take feed and forage samples from each batch. Label and store them to allow testing at a later date for quality and for the presence or absence of toxins, if necessary.

3. People: People entering the farm mainly are farm workers, family members, visitors and service providers. It is to be ensured that their movement and activities do not compromise with the animal and human health.

Recommendations:

- a. Ensure that all farm workers are aware and understand of the biosecurity practices on the farm and are prepared to implement them and also to comply with any changes to the plan and practices.
- b. In the event of visit of any service providers or visitors, ensure that all farm employees are made aware of the same. Similarly, all visitors and service providers are also to be made aware in advance, prior to their visit, of the biosecurity practices that will apply and come prepared.
- c. On arrival, all farm visitors/ service providers are to record their visit in the visitors' register. They are then briefed of the layout of farm, which areas they are permitted to access, and what biosecurity practices need to be applied in that location.
- d. Ensure that visitors and service providers access only areas of the farm that are necessary.
- e. Permit contact with animals only when necessary.

- f. All who enter and work on, or visit the farm wash and/or sanitize their hands upon entry and exit, when moving between farm zones, and when approaching or leaving certain identified risk areas of the farm premises such as isolation/ sick pens, etc.
- g. Hands should also be washed or sanitized before and after any contact with animals, especially those that are diseased or of unknown health status, following contact with any potentially contaminated material, such as deadstock, aborted fetuses, placentas or manure.
- h. Encourage the use of Personal Protective Equipment (PPE) when visitors move onto farm property. Visitors/ service providers are to be explained of the use of PPE, and how to put it on and remove it. It is to be ensured that all discarded PPEs or any potentially contaminated materials are disposed off in garbage cans with sealable/ proper lids provided. Personal cleanliness and general hygiene should be encouraged amongst the visitors and service providers.
- i. Meet with farm workers and their family members at least twice yearly to discuss the usefulness and effectiveness of each of the practices in the biosecurity plan. Basics such as not leaving the animal area without cleaning any contamination such as animal excreta from their clothes, or not leaving the animal area without cleansing and disinfecting their shoes may be highlighted in such sessions.
- j. Maintain a visitors' register with all required information duly entered on entry and exit from the farm.

4. Vehicles: All parts of a vehicle can carry disease causing organisms, pests and weeds seeds. Without restricting parking and vehicle movements within the property, it would be difficult to control and monitor the spread of diseases, pests and weeds.

Recommendations:

- a. Restrict access of off farm vehicles. Vehicles that travel from farm to farm should not be allowed to enter the farm unless they have been cleaned and disinfected in such a way that any contamination that may be present on the undercarriage or exterior of the vehicle will not be deposited in the farm.
- b. Multiple, unsecured entry points to the farm make it difficult to control and manage entry of vehicles to the farm. Encourage entry into the farm via one or two routes only.
- c. Animal transportation vehicles should be loaded and unloaded at the periphery of the farm and animals can then be led to the isolation area.

- d. Feed trucks should also unload or load in designated areas preferably near the feed godowns without entering the main farm area. Ensure that trucks used to transport feed or silage have not been used for any purpose that presents a biosecurity risk to the herd and that they have been suitably cleaned before use.
- e. Cleaning and disinfection is the principle biosecurity tool for reducing vehicle-related disease risk. Provide a wash area for vehicles that need to enter the farm. If possible, use a high pressure wash down facility located well away from crops or livestock for cleaning vehicles and equipment. Ensure that the run-off from vehicle wash is directed away from production areas of the farm.
- f. Should the wash area be not possible, ensure that vehicles that enter the farm pass through a wheel dip constructed at the entry point to the farm.
- g. Maintain a vehicle register with all required information duly entered on entry and exit from the farm.

5. Tools and Equipment: Tools and equipment can carry diseases, pests and weeds seeds. The risk for disease spread is higher when equipment is borrowed, lent or bought second-hand from other properties. It is to be ensured that movement and usage of equipment and machinery do not compromise animal and human health in any way, not only within the farm but also of other farms in the area.

Recommendations:

- a. Ensure that any personnel, equipment or machinery do not leave the farm until authorised by the relevant authority.
- b. Minimise lending and borrowing of equipment between properties. If lent, ensure it is cleaned before and after use.
- c. Clean and disinfect tools and equipment before and after use on livestock or between different batches or herds of animals.
- d. Clean and disinfect second-hand, borrowed or lent equipment before and after use.
- e. Have dedicated tools, clothing and footwear available for use in specific areas like production areas or in isolation areas where sick or quarantined animals are kept.

6. Unwanted entries: Pests, stray animals, predators and wildlife represent a pool of unique risks to Sheep and Goat farms. They are difficult to fully control, but do require attention in the biosecurity plan of the farm as they may be a high risk source of contamination for certain common

diseases. Predation from wild dogs, birds of prey and other animals may also pose an issue for young, weak or incapacitated livestock. Pest species may also include insects such as locusts and flies, deer, vermin, etc.

Recommendations:

- a. Access of stray animals like dogs, cats and other livestock to farm area and specifically to manure, placentas, dead-stock and other potential sources of contaminated material should not be allowed.
- b. Ensure farm buildings are in good repair and that feed stores and godowns are vermin proof.
- c. Ensure boundary fences are secure. Regularly undertake property inspections to assess possible biosecurity breaches and/or potential for breaches. Correct where necessary.
- d. Remove or contain anything that is likely to attract vermin, insect pests or wild animals. Fencing off the domestic waste disposal areas (rubbish dumps), will assist in reducing scavenging by feral and domestic animals and prevent livestock, feral animal and wildlife access.
- e. Coordinate with the families of farm workers, neighbours and other local community members and groups to maximize the effectiveness of actions to control the pest animals.
- f. Ensure a rodent control programme in the farm to avoid possible spread of disease and loss due to contamination at feed stores, etc.
- g. An integrated fly control programme may be developed.

C. INTERVENTION II: OVERALL BIOSECURITY WITHIN THE FARM

To help achieve a good level of biosecurity, the following management practices are also recommended to be added to the biosecurity plan.

1. Farm layout: Having a diagram of the layout of the farm would be a good idea as this can aid in how one can approach to tackling the biosecurity concerns of the farm. Having a map or diagram of the farm would help in assessment of the farm's operations, people on the farm, identify where risk points exist, people's activities, and facilities and how they are maintained, locate areas for housing animals with different disease status, storage areas for feed, equipment, etc.

Areas that could be highlighted on the farm layout include:

- Access points
- Gates and barriers
- Staff residential area
- Farm buildings, including barns, sheds, service areas, farm office and utility areas
- Pens and isolation areas
- Animal loading and unloading area
- Feed storage area
- Manure storage area
- Deadstock pickup area or compost location
- Driveways and lanes
- Parking areas
- Fuel delivery/storage area
- Paths and walkways
- Pastures
- Wells and other water sources

2. Facility management: Most practices that are contained in biosecurity plans for Sheep and Goat farms are designed to reduce the risk of disease transmission between animals and from people and their tools, equipment and vehicles to animals. In addition to these activities that act more directly on the disease risks, there are also important options to consider in developing a plan. The design and construction of facilities that house Sheep and Goat can be modified to support other biosecurity practices and/or to address risks directly.

Recommendations:

- a. Design floor surfaces to be more easily cleaned.
- b. Use of smooth or non-porous materials can be considered so that adherence of both organic materials and pathogens to surfaces is reduced.
- c. Design the facility so that there is less distance involved while carrying and removing manure or other sources of contamination such as soiled bedding from sick area, etc.
- d. Keep ease of access for cleaning equipment in mind while designing barns, or divisions between pens, etc.
- e. Moving new introductions or sick animals for quarantine provides a mechanism for these animals to spread any disease organisms to other members of the flock. Identify and accordingly design pathways for movement of animals within the farm, in addition to scheduling the order of animal movements, and cleaning and disinfection between uses, where appropriate.

3. Perimeter and interior fencing: Fencing is used to maintain separation between resident animals and other animals on the farm, and between the herd and livestock on adjacent farms. Fencing also serves to separate certain animals from the rest of the herd under preplanned circumstances.

Recommendations:

- a. Install and maintain perimeter fencing to ensure that animals do not wander to uncontrolled areas and to restrict interaction with wildlife or contact with neighboring livestock or other livestock on the farm.
- b. Install and maintain interior fencing that is appropriate for its biosecurity purpose. For example, when pasturing animals of differing health status in adjoining pastures, consider a buffer zone between the pastures.
- c. Regularly inspect for fencing faults such as gaps, loose wires or washouts and swiftly maintain adequate boundary fence.

4. Management of Feed, Water and Bedding: Feed, water and bedding serve to support the health of farm animals and therefore the flock's resistance to disease. Adequate and quality supplies are required, and storage is secure from contamination

Recommendations:

- a. Ensure that both farm-grown and purchased feed be free of toxins that may naturally occur or that may form in storage.
- b. Assessment of the quality and nutritional value of the feed is important to ensure a complete, healthy ration.
- c. Purchase feed from known suppliers who produce quality feeds and ensure that it is transported in a clean carrier.
- d. Store feed in a secure, clean facility that limits degradation of feed and prevents access by wildlife, rodents, pests, dogs and cats.
- e. Design and position feeders to prevent fecal and other contamination by the animals while in use. If feeders become contaminated, remove and dispose of the feed, and then clean and disinfect the feeders before use.
- f. Clean fresh water in adequate volume should be made available to all stock at all times. Water should be tested at least annually to ensure its cleanliness and safety. Its source location and facility should be checked to ensure that there is no contamination from surface water or runoff or from material such as bones, faeces, plant matter or carcasses.
- g. Design and position water bowls, troughs and other waterers to prevent fecal and other contamination by animals while in use.
- h. Dispose of contaminated water when found and clean and disinfect the waterer(s) before the next use.
- i. Bedding material purchased should be of good and clean material. It should be stored in a protected location such that it remains dry and uncontaminated. As much as possible, bedding material should be secure from contamination by pests, dogs and cats, and rodents. Bedding material in use should be judged by its moisture and cleanliness, cleared regularly, and replaced by dry, clean product.
- j. Remove and replace bedding from hospital and isolation pens regularly. Discarded bedding should be moved to an area that does not have animal access.

5. Animal Health Management: Improvements in animal health should be one of the goals in implementing an on-farm biosecurity plan. The concept of improving animal health, welfare and biosecurity on-farm, is all about managing risk. Disease in animals can be caused by infectious agents (such as viruses, bacteria, fungi, protozoa and prions), parasites (such as gastro-intestinal worms, ticks, lice, flies, fleas, etc.), chemicals and poisons, nutritional issues, injuries and inherited

genetic problems. For most of these causative classes of disease there are preventive measures that can be taken to minimise the impacts to livestock.

Recommendations:

- a. Ensure all farm workers are aware of the importance of early detection and reporting of unusual animal deaths or animals exhibiting signs of sickness.
- b. Monitor the flock's disease status through routine diagnostic testing (e.g. fecal egg counts, serological testing) and including post mortem examinations for unexpected or excessive livestock deaths.
- c. Vaccination programs to control or prevent disease within the flock.
- d. Metaphylactic / prophylactic medication programs to control or prevent disease within the flock (e.g. deworming, foot bathing).
- e. Decision plan for isolating sick animal including release from isolation. This includes resident animals, new introductions and returning animals.
- f. Do not bring young stocks which are more vulnerable to disease onto paddocks or pasture vacated by older animals (which are more disease resistant and will probably include disease carriers) without a reasonable stand-down period, such as 7 days between grazings by different stock classes.
- g. Proper storage of medications and vaccines.
- h. Proper disposal of animal health medications and vaccines, including used needles and syringes. [*Refer Bio-Medical Waste (Management & Handling) Rules, 1998 under Environment (Protection) Act, 1986*]
- i. Ensuring that the animal health management programme comply with the requirements of any relevant public and regulatory programs, including environment, food safety, animal health and animal welfare.
- j. Record the timing of vaccinations and other preventative measures being used on the herd/flock management calendar and where necessary, matched to seasonal conditions or management operations.
- k. Farm workers are to be educated when to sound alert for call on the nearest veterinarian or veterinary authorities in the event of abnormal deaths, unfamiliar disease, rapid spread of disease in flock, or any abnormal behavior in the herd.

- I. It is to be noted that under OIE Terrestrial Code some animal diseases are notifiable – which means one have a legal responsibility to report them to animal health authorities.

[Refer *Infectious and Contagious Diseases Act, 2009*]

6. Management of Equipment and tools: Equipment, tools and vehicles that are brought onto the farm are moved into it only if necessary. If possible, dedicate equipment and tools to one activity or area.

Recommendations:

- a. Purchase own equipment whenever feasible.
- b. Service equipment, tools and vehicles that are brought onto the farm are cleaned and disinfected before arrival and, if they are used, they are cleaned and disinfected between uses.
- c. Ideally, purchase and use a dedicated set of equipment (shovels, forks, scrapers, buckets, etc.) for use in each of the following areas:
 - i. isolation area for new arrivals or returning animals
 - ii. isolation areas for sick animals
 - iii. kidding pens
- d. Dedicated equipment may also be used for other facilities outside the above areas, to perform each of the following tasks:
 - i. manure and soiled bedding handling
 - ii. deadstock management
 - iii. feed management
 - iv. clean bedding management
- e. If dedicated equipment for identified risk areas or individual activities is not feasible then they have to be cleaned and disinfected properly after each use and when moving from one area facility to another.
- f. Ensure that those responsible for cleaning and disinfection know what type of soap or detergent and disinfectant solutions are required for each task for maximum effectiveness.
- g. Clean and disinfect feeders and waterers regularly, based on use and experience, and whenever contamination with manure, urine and/or other potentially contaminated materials occurs, and whenever they are being prepared for use by other sheep/ goats of differing health status.

- h. Store equipment that has been cleaned and disinfected in a clean environment.

7. Cleaning and disinfection of facilities and on-farm equipment: Cleaning is a constant activity on a livestock farm and disinfection is needed under certain circumstances when required to reduce the risk of disease transmission.

Recommendations:

- a. Ensure that pen areas, feeders, waterers, equipment and vehicles are cleaned to remove organic material that can harbour disease pathogens or other contaminants.
- b. Disinfection is required to eliminate pathogens. However, chemicals used to disinfect are not effective if the surface has not been previously thoroughly cleaned of organic matter.
- c. Set an appropriate interval for cleaning. For example, cleaning and disinfection should be completed before or after a significant management event such as clipping or shearing, removal of manure and/or bedding.
- d. Cleaning and disinfection is conducted prior to and after use, as well as in the routine maintenance of equipment and facilities. Focus on the facilities that house the herd e.g. barn surfaces, including floors, pens, railings, walkways, etc., and the tools, and equipment used to manage the herd or individual animal such as buckets, forks, shovels, feeders; water troughs etc.
- e. Ensure effective cleaning and disinfecting of vehicles that transport animals, especially those from other locations; and other vehicles, such as visitors' and service providers' vehicles, especially those that have driven on other farms.
- f. Special attention should also be given to clean and, where possible, disinfect pens or areas deadstock, aborted fetuses and placentas are discovered, areas such as the quarantine areas, kidding areas and hospital pen. Also include pathways used by animals of different disease status and/or susceptibility that pose a risk of disease transmission.
- g. Some other considerations that will influence the risk management decisions to disinfect are the density of animals, level of contamination, and health status of animals.

8. Carcass and waste management: Dead animals and waste are a high risk source for some diseases. The life cycle of many pests involves them being shed in urine or faeces and the contaminated pasture being re-ingested. Some animals are super-shedders whose waste is highly infectious.

Recommendations:

- a. Select disposal areas to avoid the potential spread of contaminants by water, wind or animals.
- b. Secure and contain disposal areas where possible to prevent access by livestock, feral and domestic animals and wildlife.
- c. Dispose of carcasses aborted fetuses, placentas and waste in a segregated area, where possible, taking into account environmental and public considerations.
- d. Ensure herd contact with manure is minimized. Manure is a high disease contamination risk for most common diseases and may be a source of weeds if not composted thoroughly.
- e. Remove manure on a regular schedule, taking care not to contaminate animals of differing disease status. Clean up spills immediately.
- f. Clean and disinfect equipment used to collect and move manure after use and, if possible, dedicate it to that purpose.
- g. Bio-waste such as leaf material or fallen fruit, etc. can attract or harbour pests and diseases. It is important to break the life cycle of insect pests. Collect all plant waste that shows signs of pests or disease and dispose of it by deep burial or burning, well away from water sources, nursery and production areas.
- h. Ensure government requirements for carcass, effluent and waste management are adhered to where applicable.

9. Pasture management: Understanding the relationships between stocking density, carrying capacity, the condition of land and the health of livestock is essential. Managing the farm's pasture within the livestock management system, how rotation of livestock through a grazing cycle, when certain areas may become deficient in certain nutrients and what practices are undertaken (such as faecal testing, etc.), and how they are performed is also essential.

Recommendations:

- a. If having own pasture for grazing, consider zoning different areas of the pasture land and ensure that certain zones are allowed for grazing. In other words, rotate the livestock through a grazing cycle in the different zones of the pasture.

- b. Set up a gastrointestinal parasite control program that manages pasture contamination, uses anthelmintics appropriately, and monitor animals for internal parasites.
- c. Avoid placing animals of differing susceptibility or immune status in the same zone/pasture.
- d. Prevent young and vulnerable livestock from immediately being allowed to graze in zones or pastures where older animals have recently grazed.
- e. Invasive weed spread can reduce the productivity of land due to competition with native grasses and improved pastures. Poisonous plants can have an impact on the productivity of the herd/flock through poor health or even death to livestock in some cases. Make a list of the poisonous plants that occur in the area. Knowledge of local poisonous plants is vital to managing animal health and livestock production.
- f. In combating infestations of weeds on farms, chemicals that may have toxic effects on livestock, are often used. These chemicals can also present a risk if they turn up as a residue in the human food chain. Such chemicals have with-holding periods associated with their use, to prevent them ending up in the food chain.
- g. Ensure that there is no misuse of chemicals which can also lead to the development of resistance by pests, potentially creating new biosecurity risks and management challenges. Be sure to follow the instructions on the label and observe withholding periods after treatments.

10. Personnel management: In addition to adverse effects on the agricultural economy, diseases and pests can have negative effects on the environment and on human health. The benefits of implementing on-farm biosecurity practices are therefore not only significant in improving animal health and welfare, or more secure financial health for the farmers, but are equally important to ensure protection of health of farm workers and other service providers as well.

Recommendations:

- a. Ensure family members, farm workers, visitors and service providers understand zoonotic diseases and take full precautions to protect themselves.
- b. Ensure all personnel working on-farm are vaccinated for identified risk diseases (e.g. tetanus) and, where necessary, vaccinate livestock against zoonotic diseases (e.g. leptospirosis).

- c. Provide clean clothing and footwear or suitable disposable clothing and footwear for farm workers, service providers and visitors who need to enter the farm, more especially to those who work in the risk areas such as quarantine/ sick areas, etc.
- d. Ensure that all farm workers and visitors understand the protocols and the use and change/disposal of protective clothing, footwear and gloves at the farm and that these are strictly followed.
- e. The farm workers should be aware of personal hygiene. All who enter and work on, or visit the farm, wash and/or sanitize their hands upon entry and exit, especially when moving between the quarantine area, or after handling animals that are diseased or of unknown health status, following contact with any potentially contaminated material, such as deadstock, aborted fetuses, placentas, manure, etc.
- f. It is to be ensured that the family members of the farm workers are also aware of the biosecurity practices in the farm and any change in the procedures is communicated to them as well.

11. Monitoring and record keeping: It is essential to have a system of maintenance of information which can then be used to improve the effectiveness of biosecurity practices. It is also only by regularly reviewing records for production, biosecurity operations, animal health events, diagnostic test results, etc can one determine the current flock status and accordingly develop strategies and initiate interventions and changes for the betterment of the farm.

Recommendations:

- a. Animal health records should be maintained together with other flock production and farm management records. Viewing production records together with movement, disease surveillance and diagnostic records, health and treatment records, etc. will provide a more complete understanding of flock performance; this, in turn, will enable valuable analysis of the impact of biosecurity practices to be done.
- b. Analysis of the farm records with respect to disease and treatment rates, productivity, diagnostic testing and results of certain practices are useful when looking ahead to future seasons.
- c. Records if reviewed regularly are useful for farmers to set goals for the health and productivity of the flock.

12. Response Plan for Disease Outbreaks: Part of biosecurity planning is also to have a farm-based plan for response to a disease outbreak or the suspicion of an outbreak on the farm or in the region. A response plan is needed to guide farm activity in rapidly-developing and large scale changes in health status.

Recommendations:

- a. The plan is developed in advance, and will include preparatory steps to be taken before an outbreak occurs, identification of potential trigger points and enhanced biosecurity protocols to be initiated on the farm under specific circumstances.
- b. Identifying the types of disease emergencies or trigger points that may require a response is vital.
- c. One must know what they are to do in each of these emergency situations.
- d. It is also important that a recovery plan be in place as the next action following execution of the response plan. While recovery efforts are often disease-specific and therefore difficult to plan in advance, one needs to know what is required to be done in order to return to full production once the disease emergency has been successfully managed.

13. Animal welfare and biosecurity: Maintaining high standards of animal welfare also assists in delivering husbandry and hygiene practices that align with good biosecurity. It demonstrates a commitment from the farm/ industry to manage risk related to animal welfare to our consumers and trading partners. It is of utmost importance that animals should be free from stress for which overcrowding should be avoided. Cleanliness, availability of quality feed and water should also be ensured. While transporting animals, it is essential that they are managed in a way that reduces stress and minimises any risks to animal welfare. [*Refer Transport of Animals, Rules, 1978*].

HERD HEALTH MANAGEMENT PROGRAMME

A herd health management program identifies the key components required for appropriate disease prevention, control, and treatment for each farm.

Following is the Annual Health Calendar for Sheep & Goat adopted by the Central Sheep Breeding farm, Hisar, Haryana. This can be altered as per regional variations and State Policy under consultation with local Veterinarian.

Table: Annual Health Calendar (Sheep & Goat) adopted by Central Sheep Breeding Farm, Hisar, Haryana

1	VACCINATION			
a).	Sheep Pox Vaccine Cost per dose :- Rs 1.00	Live Attenuated	December / January	All Breed At 4 Months Annually
b).	Goat Pox Vaccine Cost per dose :- Rs 2.00	Live Attenuated	October / November	All Goat At 4 Months Annually
c).	Multi Component Clostridial Vaccine Cost per dose :- Rs 1.97	Inactivated	August/October	All stock, New Born Lambs(Sheep &Goat) 1. At 1 month & Booster Dose after 21days. 2. Repeat after 9 months.
d).	Biovac (FMD +HS) Cost per dose :- Rs 5.21	Oil Adjuvant	October/June	Sheep & Goat 1. At3 months. 2. Repeat after 9 months.
e).	Contagious Ecthyma Vaccine (Farm Produce)	Formalized	Feb./March	Lambs & Kids 1. At 2 months.
f).	PPR Cost per dose :- Rs 1.00	Live Attenuated	October / November	All sheep& Goat 1. At 6months & Repeat after 3 years.
g).	Reverine 1 Br.melitensis. Cost per dose :- Rs 46.00	Live Attenuated	Before Breeding	All Sheep& Goat 1. At 3-6 months & Booster dose is not necessary.
2.	DEWORMING:			
a).	Broad Sepectrum Anthelmentic	Ivermectin / Closantel / Albendazole		At every two rotation of months/medicines
b).	Narrow Spectrum Anthelmentic	Praziquantel	April/May	All Lambs , Kids & Weaners 1. At 2&Repeat at 4-6 months.

c).	Anti Coccidial treatment	Sulphamethazine + Trimethoprim	June/July	Young animals & at the time diarrhoea 1. At 2-3months mix with feed.
3)	ECTOPARASITIC INFESTATION			
a).	Dipping	Ectomin / Butox	Sept/Oct/Mar/Apr	Post-Shearing
4)	LAMB/KID CARING			
a).	Naval dressing with Povidone /Betadine Immediately after birth.			
b)	Colostrum feeding to entire young stock.			
c).	Antibiotic treatment during change of climate/ weather			
5)	IMMUNOSTIMULENT	In. Lemasol	With vaccination (Twice in a year)	

For optimum benefits of vaccination, deworm animals at least 15 days before vaccination.

Multivalent vaccines may be used after judicious planning so that effective coverage is achieved by farmer and is also economical.

Ensure that deworming protocol used does not give rise to Anthelmintic Resistance.

Similarly screenings against various diseases is also advocated. Following is adapted from Annual Goat Health Calendar adopted by Central Institute for Research on Goats, Makhdoom, Mathura, Uttar Pradesh.

Table: Suggested screenings for diseases.

Diseases	Period	Recommendations
Brucellosis ⁺	Once in a year	Positive animals need to be euthanized and buried
Johne's Disease*	6 months/ Once in a year,	Positive animals are to be removed from herd/ flock
Mycoplasmosis	Once in a year	Treatment with specific drugs
Mastitis	Early milking stage	Treatment with specific drugs
Endo- parasites	Regular screening of faecal samples	Monitor worm load (EPG/OPG) of the animals to decide time of deworming.

+ Screening of adult sheep/ goats especially breeding rams/ bucks and breedable females. From aborted animals submit 2 serum samples (Zero day i.e., day of abortion / still births and 21 days after abortion / still birth).

**Preferably one month after lambing/ kidding.*

Note: *The above schedules and programmes are general guidelines and may be modified pertaining to local conditions and Veterinarian recommendations.*

LIST OF NOTIFIABLE SHEEP & GOAT DISEASES LISTED UNDER THE PREVENTION AND CONTROL OF INFECTIOUS AND CONTAGIOUS DISEASES IN ANIMALS ACT, 2009

1. Caprine arthritis/encephalitis
 2. Contagious agalactia
 3. Contagious caprine pleuropneumonia.
 4. Enzootic abortion of ewes (ovine chlamydiosis)
 5. Maedi-visna.
 6. Nairobi sheep disease.
 7. Ovine epididymitis (*Brucella ovis*).
 8. Paste des petits ruminants.
 9. Salmonellosis (*S. abortusovis*)
 10. Scrapie.
 11. Sheep pox and goat pox
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For more information, call: 1800-180-1551 (Toll Free)

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