



Biosecurity At Livestock Farms

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Introduction

Rapid globalisation has led to increased trading in livestock and its products, which now contribute to about half of the global agricultural economy. Furthermore, increased trade has also led to a higher risk of diseases affecting both humans and animals. It is elaborated how the risks of introduction of a disease on to the farm or region, or the risks of spread of diseases at the farm or that particular region could be identified and subsequently controlled to the largest extent.

Biosecurity is basically a managerial strategy for prevention of occurrence of any disease condition. It is about risk management in order to prevent infectious illnesses, pests, and weeds from entering livestock properties and from spreading from an infected property to an uninfected property. Disease prevention depends on using excellent cleanliness habits, maintaining an effective biosecurity programme, and adhering to a thorough immunisation schedule. A thorough biosecurity programme entails a process of planning, implementing, and controlling. Because it is impossible to sterilise a shed or building, the key to effective biosecurity is to lower the risk of disease introduction and stop the spread of pathogens within the farm and its facilities. The introduction and/or transmission of illness on a specific farm, between farms, or between species is minimised through biosecurity procedures specific to each operation. The farm manager is critical in this approach, especially because he or she must persuade farm workers to follow the protocols connected with this preventative measure, as prevention of these diseases is critical to addressing the implications on farm economics and animal welfare. As it is based on managerial strategy, it is focused around three key topics (3 Rs):



1. **Risk assessment:** Identification and assessment of health problems and the risks associated with a particular disease; assessment of future consequence of that particular disease on farm economics.
2. **Risk management:** It includes framing and enforcing a preventive management strategy to contain a particular health related problem in a farm.
3. **Risk communication:** It involves outlining the strategy to all farm employees, vendors of goods and services, and clients in order to assure adherence to the established biosecurity strategy.

Out of the three, risk assessment is the most important one and crucial for framing of the other two. Risk assessment is the assessment of the probability and biological and economic repercussions of a danger entering, establishing, or spreading inside the region. Because farm management methods vary, it is not possible to prescribe universal biosecurity precautions. The best place to start when educating farmers about the dangers of disease introduction particular to their farm is through an on-farm risk assessment. Prioritizing illnesses with the highest risk and implementing measures to stop their spread are both necessary. Important factors like the location and design of the farm, animal health procedures, and general farm management should be covered in a biosecurity plan. Flexible and receptive to new knowledge and technology are key components of an effective biosecurity strategy.

Biosecurity- International context

The development of rules and regulations to stop the spread of illnesses during trade in animals and animal products falls under the purview of the World Organization for Animal Health (OIE). The agreement on the application of sanitary and phyto-sanitary measures (SPS Agreement) of the World Trade Organization (WTO) has officially accepted the OIE standards since 1995. The ability of nations to prevent, manage, and recover from naturally occurring, unintentionally introduced, or purposefully introduced animal diseases is being improved through the extension of current disease prevention and containment methods, regulations, guidelines, and standards at both the national and international levels.

Biosecurity- Indian context

Various institutions and organisations which regulate biosecurity guidelines for poultry, small and large ruminants farms such as Central Poultry Development Organisation (CPDO, Bhubaneswar), Central Poultry Development Organisation & Training Institute (CPDO & TI, Hessarghatta), Department of Animal Husbandry, Dairying and Fisheries (DADF, New Delhi), ICAR-National Institute of High Security Animal Diseases (NIHSAD, Bhopal), Defence Research and Development Organisation (DRDO, New Delhi), etc. The Agricultural Biosecurity Authority of India (ABAI) is created by the Agricultural Biosecurity Bill (2013) to guard against pests and illnesses so as to ensure



agricultural biosecurity. It controls imports and exports, keeps track of illnesses and pests in the nation, declares an area a restricted area if pest infestation is suspected, and fulfils duties under numerous international trade, sanitary, and phytosanitary agreements. In upcoming years this bill will replace the century-old Destructive Insects and Pests Act (DIPA) and the Livestock Importation Act.

On-farm Biosecurity

The term "animal farm biosecurity" or "on-farm biosecurity" refers to herd management techniques that lessen the possibility of infectious diseases being brought into or transmitted throughout the farm by people or other animals. The foundation for developing biosecurity standards is the relationship between on-farm biosecurity and the decision-making of farmers. Farm biosecurity can be broadly separated into internal and external biosecurity. Internal biosecurity (Bio-containment) involves management procedures impacting animal contacts within the farms that affect disease propagation between the animals. External biosecurity (Bio-exclusion) is the management system that lowers the danger of introducing infectious diseases to a herd.

Increased productivity, lower healthcare costs, improved animal welfare, higher-quality animal products, higher overall farm profit margins, and increased public and farmer awareness of zoonoses and other infectious illnesses are all advantages of implementing biosecurity at the farm level. If properly implemented at the farm level, straightforward biosecurity precautions might significantly improve the health of people, animals, and the environment. A good public health system and the creation of a similar system for livestock, wildlife and the products associated, can reduce the impact of these illnesses.

Biosecurity measures being practiced in livestock farms

Divided into three forms, including conceptual, structural, and operational biosecurity.

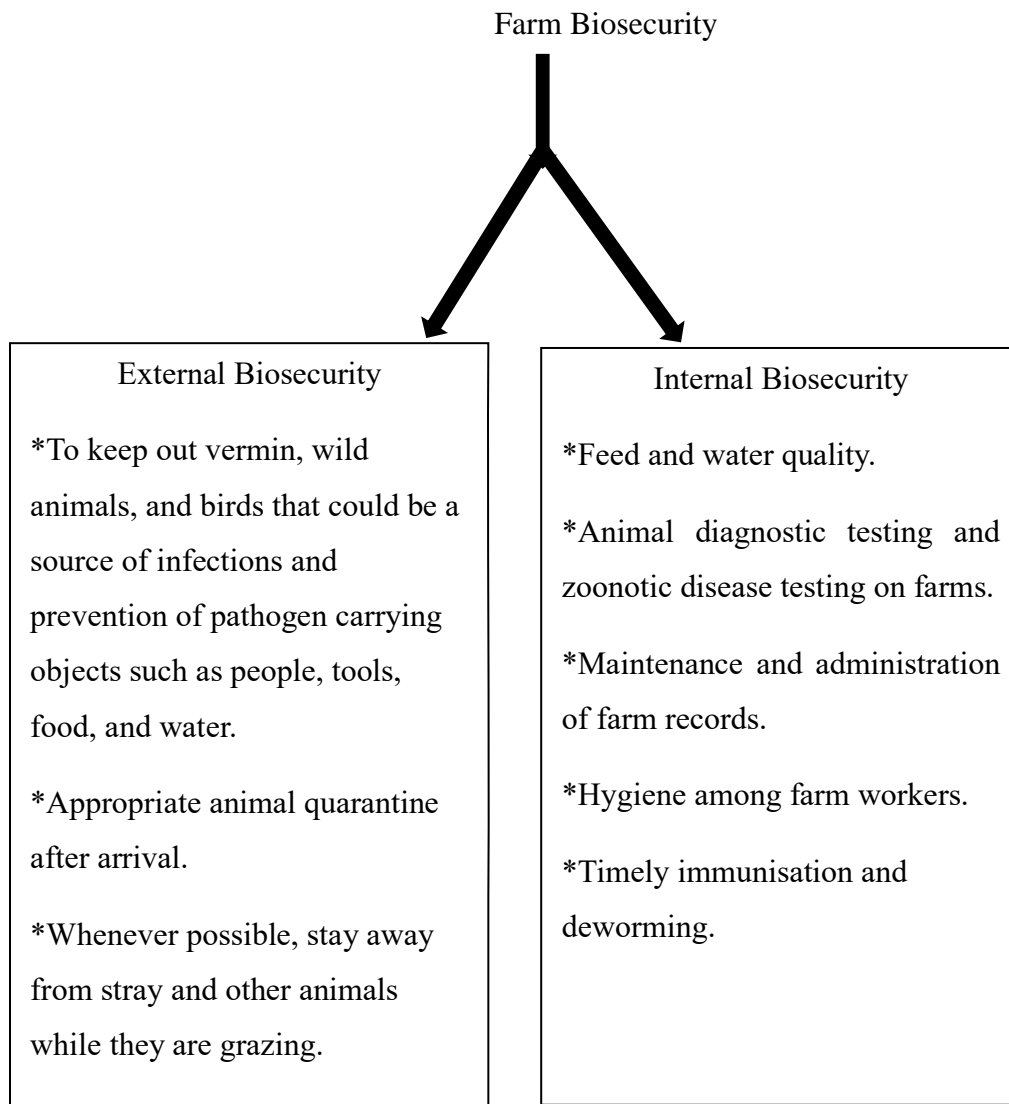
- 1. Conceptual form** is focused on minimising the ingress of infection, addressing the overall location and position, orientation, size, and scope of the farm. The farm should not be situated close to other farms, slaughterhouses, livestock markets, waste disposal facilities, or corpse centres as these places enhance the risk of infection transmission (OIE, 2013).
- 2. Structural form** is primarily concerned with issues relating to the structure of the farm, such as designs to deter domestic and wildlife species from entering, building to prevent water contamination, drainage, designated disposal place, and elements like rearing methods, home kinds, feeder designs, and type of habitat. Minimum distance of 15 meters between livestock housing areas within a farm should be maintained (FAO, 2007). To reduce the dangers, certain places are designated for treatment, isolation,



or quarantine, as well as the orientation of barns, buildings, ventilations, inlets, and outlets, unloading and loading sites (Canadian Food Inspection Agency, 2011).

3. **Operational form** includes the tasks from day old up to culling. This encompasses several practises used on a farm to completely eradicate endemic diseases or lessen the impact of diseases that are already present. It is most important form and it includes all on farm and off farm activities.

Broadly farm biosecurity is divided into two components:



Biosecurity on farms only begins at the farm's entrance. This can be accomplished by use of tyre dips and footbaths for vehicles and guests, maintaining adequate fencing around the farm's limits, keeping proper records of visitors dressed appropriately (such as with PPE and shoe covers), and maintaining hygiene among frequent visitors at the farm entrance level. Outside vehicles shouldn't be



allowed on farm property as much as feasible. At the farm's entrance, a tyre dip should be kept as a disinfectant dip for car wheels. Tyre dips that are no less than 5.5 metres long, 3.5 metres wide, and no deeper than 6 to 9 inches in the middle to be used. Foot baths should be roughly 3 metres (10 feet) length and 0.2 to 0.6 metres (8 to 24 inches) wide. The bath's sides shouldn't incline inward and should be 15 to 25 cm wide (6–9 in). Copper sulphate (most commonly used), zinc sulphate, formalin (35% formaldehyde), and occasionally bleach diluted to active 1% sodium hypochlorite are the chemicals that are typically used in foot baths and tyre wash. All other biosecurity precautions must be followed after assuring safety just at the entrance level. These include sanitation, animal supervision, feed and water management, building maintenance, handling of manure, and disposal of deceased animals.

Sanitation measures

This covers equipment sanitation, vehicle and transportation sanitation, and employee sanitation. Before using it on healthy animals, equipment that has been used on sick ones should be cleaned and disinfected. Hoof knives, clippers, tattoo pliers, ear taggers, ear notchers, and dehorers should all be cleaned and disinfected between uses. Never transport or deliver feed on machinery that has handled manure. Utilize the halters and shears provided by the farm whenever possible. Make sure that no service or visitor vehicles cross any feed delivery or manure handling routes. Away from the herd and barn areas, place holding pens for animal pickups close to the road. Keep visiting vehicles away from areas where livestock can reach them. Vehicles used to transport cattle to other farms should have their exterior, interior, and tyres well cleaned and disinfected. Encourage workers to wash farm clothes in bleach and detergent. When working with sick animals, young animals, or milking animals, require personnel to wash their hands both before and after. Employees should do tasks in the following order: younger animals, then senior animals. Diseases spread by older animals are more contagious in young animals.

Animal supervision

New animals should be kept in a separate holding area. Establishing a quarantine period will make it easier to monitor and test the health of new animals and will also help to stop the spread of disease to the existing herd. Deal with sick animals last. Protect both people and animals by immunising farm cats and dogs against rabies. Certain diseases in livestock can be prevented through vaccinations. The effectiveness of vaccines varies. In order to store and utilise most vaccines, refrigeration is required. Keep the refrigerator at a temperature of 36 to 46 degrees Fahrenheit. Store vaccinations and other medications away from direct sunlight and in a controlled atmosphere if they don't need to be



refrigerated. Internal parasites can be controlled by deworming, and external parasites, such as ticks, mites, lice, and fleas, can be eliminated by dusting, dipping, or spraying with the right pesticides, such as malathion. Pens should be cleaned between animals, especially maternity and ill pens, and excrement and bedding should be removed. Meet the requirements for the number of pens, stalls, or bedding areas per animal under your care.

Feed management

Prevent rats, birds, dogs, cats, and other wildlife from accessing food storage facilities. In silos, bins, and bunks, be sure to often inspect for and get rid of any mouldy or rotten material. Feed that is not consumed within 24 hours should be removed and disposed of. To lessen the amounts of dangerous organisms or toxins in feeds that have been stored, rotate your feed inventory. Make sure feeding mangers are smooth to reduce the amount of surface that pathogens could colonise. Care should be taken while procurement of feed. Unhygienic handling, feeding, storage, and harvesting practises, as well as inadequate storage, all contribute to mouldy feed and feed ingredients. In order to prevent microbial growth, rancidity, and the loss of micronutrients, feed shouldn't be older than 15–21 days. To lessen the number of dangerous organisms or toxins in feeds that have been stored, rotate your feed inventory. SOP to be followed for feed and fodder storage, delivery, and disposal.

Water management

Weekly cleaning of waterers. Avoid letting manure and animal carcasses (such as those of dead birds or mice) contact any water sources or containers. To ensure the quality, a water sample should be sent to the lab every three months for analysis. To purify and kill microorganisms, water can be chlorinated after 8–10 hrs of reaction time. Water tanks, for example, must be cleaned and disinfected at least twice a year. Cleaning and sanitising water sources should be done according to a SOP.

Building maintenance

Avoid hiding areas and dens used by rodents. Rats and mice both require an entryway to be at least 12 mm wide. Find their points of entry to the feed storage places and close them off. Rats are capable of vertical jumps up to 91 cm and horizontal jumps up to 122 cm (around 30 cm for mice either way). Cattle feed should be stacked at least above these distances from the floor and from side walls. The elevation should be smooth, as they can climb uneven surfaces. Where required, set traps and bait. Patch up cracks in structures to keep pests out. Examine any weather-related damage and make any necessary repairs. Any standing water that might develop into a mosquito breeding site should be eliminated. Inspection and upkeep of fences. If necessary, change the nettings. Individual pens with



separate water troughs and feed mangers for each pen are ideal in quarantine facilities. If grouping is done, facilities must be set up so that each group can raise a maximum of 5 animals. Sick animal shed should be away from quarantine shed. Distance between quarantine shed and isolation should be 100 meters.

Handling of manure

Put manure in a compost pile or storage area to kill bacteria that cause illness. Inspect the manure management system to make sure it prevents environmental contamination and complies with the acceptable agricultural practises in your state. Keeping waste out of reach of livestock, especially young animals, is important. Avoid walking through feed bunks when smelling manure. Don't let excrement from older animal groups be transferred to younger ones or let it run off. To stop the life cycles of intestinal parasites and flies, remove manure frequently. For handling of manure, use appropriate tools which are not used for handling feed.

Carcass disposal:

Composting should not be used for animals that die in quarantine or from anthrax. Animals who pass away from anthrax should not have a post-mortem performed. After the body has been removed and the area has been cleaned up, disinfect the area if a highly contagious sickness caused the death. When handling deceased stock, put on protective clothes, and before handling live animals, properly disinfect or discard the garment. Dispose of contaminated feed, bedding, or manure properly. Thoroughly wash and sanitise the vehicle used to transport the carcass. Most commonly used method of carcass disposal is burial method. Place the carcass in a grave that is 6 feet deep (in deep burial method a pit of 2 m depth is used) and more than 300 feet distant from a body of water, watercourse, well, or spring. The area needs to be properly drained. Ideally, create a 24 inch bed of organic material that is absorbent (wood chips). Cover the corpse with dry, high-carbon materials like as straw, old silage, etc. Lime powder should be liberally sprinkled both before and after laying the body to speed up decomposition. Make sure the base is big enough for a 2-foot clearance all the way around the carcass.

Conclusion

“Prevention is better than cure” - this proverb, which is credited to Desiderius Erasmus, is undoubtedly true for both human and animal health circa 1500 CE. Livestock biosecurity is a set of strategic measures for protecting a population from infectious diseases at the national, regional and farm level. The concerns of risk identification and risk awareness fall under the category of biosecurity. If we are aware of the hazards, it will be simpler to try to eliminate them or at least



lessen their effects. As a result, it can be argued that it ensures food safety, animal welfare, improved business continuity, and better resource utilisation on farms.

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