

Biosecurity and Its Importance in the Piggery Industry

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Introduction

Biosecurity has emerged as one of the most essential practices in modern livestock production systems. It is defined as a set of preventive measures designed to reduce the risk of introduction and spread of infectious agents within and between farms. An effective biosecurity program is not just about building fences or restricting visitors but also about developing a culture of preventive management that involves every worker, veterinarian, and stakeholder associated with the farm.

In the piggery industry, biosecurity has gained special significance due to the susceptibility of pigs to a wide range of viral, bacterial, parasitic, and fungal pathogens (Samanta et al., 2018). Diseases such as African Swine Fever (ASF), Classical Swine Fever (CSF), Porcine Reproductive and Respiratory Syndrome (PRRS), Foot and Mouth Disease (FMD), and Swine Influenza cause enormous threats to pig farmers worldwide. Among these, ASF is regarded as one of the most devastating, as it causes very high mortality and has no effective vaccine or treatment (FAO, 2019). Eradication is challenging if once ASF gets introduced in a pig farm.

The economic consequences of disease outbreaks in pig production are immense. They include direct losses due to high mortality, morbidity, and culling of herds, as well as indirect losses resulting from trade restrictions, increased production costs, and reduced consumer confidence in pork products (Costard et al., 2013). Therefore, ensuring strict biosecurity is the most effective and sustainable means of disease prevention and control.

Current Status of Piggery Industry and Challenges

Pig farming forms an integral part of the rural economy in many developing countries, including India. In the North Eastern Region (NER), pigs are the most preferred livestock species, providing a major source of animal protein and livelihood security. According to the 20th Livestock census, pigs account for more than 70% of the total pig population in India, concentrated in Assam, Nagaland, Meghalaya, Mizoram, and Manipur. Pork constitutes the staple diet of many communities, and demand is continuously rising. Despite its potential, the piggery industry faces several challenges, primarily due to disease

outbreaks. In 2020, the first case of African Swine Fever (ASF) in India were reported in the states of Assam and Arunachal Pradesh, leading to the death of more than 17,000 pigs and causing economic losses amounting to several crores of rupees (Rajkhowa et al., 2020). Similar situations have been observed worldwide, where ASF has devastated pig populations in China, Vietnam, and several European countries.

The factors responsible for frequent disease outbreaks in piggery include:

1. Unrestricted animal movement: Pigs and pig products often move across farms and markets without proper health certification, increasing the risk of pathogen introduction.
2. Swill feeding or prohibited pig feed (PPF): The use of untreated food waste containing pork products can introduce highly contagious pathogens of deadly diseases. (Dept. Of Natural Resources and Environment Tasmania)
3. Poor hygiene and waste management: Inadequate cleaning of pigsties, improper disposal of manure and carcasses, and unhygienic housing create reservoirs for pathogens.
4. Rodents, insects, and fomites: Vectors and contaminated equipment can play an important role in pathogen transmission.
5. Limited awareness: Smallholder pig farmers often lack proper training in biosecurity and rely on traditional practices.

Thus, the piggery industry is vulnerable to catastrophic losses unless strong and scientifically sound biosecurity measures are implemented at the farm level (OIE, 2021).

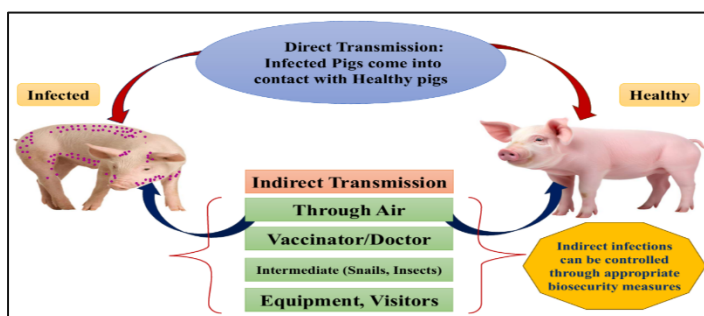


Fig: 1. Direct and Indirect Way of Disease Transmission from an Infected Animal to a Healthy Animal

Comprehensive Biosecurity Program

For a biosecurity program to be effective, it must be comprehensive, practical, and consistently enforced. The following elements are crucial:

Farm Standards for Complete Biosecurity

- Pig farms must have a well-defined boundary and fencing to establish a biosecurity zone.
- Controlled entry points should be established with facilities for footbaths and vehicle disinfection.
- Visitors should be restricted and, if necessary, must wear farm-provided clothing and boots.
- Adequate drainage systems should be developed to manage waste and wastewater.
- Newly acquired pigs and piglets should be kept in a separate quarantine facility for a minimum period of 30 days.
- Pig houses should be designed to prevent the entry of wild boars, rodents, birds and insects.
- Feed and drinking water should be clean and free of any contaminants or disease-causing organisms.
- Carcass disposal facilities such as burial pits or incinerators must be available (USDA, 2022).

Routine Biosecurity Practices

Routine practices are those implemented on a daily basis to maintain herd health. These include:

- Workers should wear clean clothes and boots, sanitized regularly.
- Hand sanitizers or disinfectant dips must be used before entering and exiting pig houses.
- Farm workers should avoid contact with pigs from other farms.
- Entry of visitors, pets, and unauthorized personnel should be discouraged.
- Regular cleaning and disinfection of housing, feeding equipment, and surroundings must be ensured.
- Treated or boiled water should be provided for drinking, especially during disease outbreaks.
- Swill feeding must be strictly avoided or properly heat-treated to inactivate pathogens (FAO, 2019).
- Routine record-keeping of animal health, vaccination, and mortality should be maintained.

Structural Biosecurity: Structural biosecurity involves the physical buildings and facilities designed to improve the prevention of diseases. Important measures include:

- Farm fencing: To prevent entry of wild boars, dogs, and unauthorized persons.
- Roads and sanitation: Construction of all-weather roads that can be disinfected easily to reduce microbial spread.
- Housing design: Pigsties should be well-ventilated, with proper drainage and sunlight exposure to reduce microbial load.
- Rodent-proofing involves using rodent traps, netting, and bait stations to stop the spread of diseases carried by rodents.
- Carcass disposal: Dead pigs should be disposed of scientifically through burial or incineration.
- Feed storage: Bagged feed and raw materials should be stored in rodent- and insect-proof facilities (OIE, 2021).

Operational Biosecurity

Operational biosecurity pertains to the management practices and daily routines on the farm that help prevent the introduction and spread of diseases. These are-

- Quarantine of new stock: Replacement pigs must be quarantined and tested before introduction.
- All-in, all-out system: Pigs of the same age group should be reared together, and pens should be disinfected between batches.
- Segregation by age: Younger pigs should be separated from adults to reduce disease transmission.
- Vaccination: Timely vaccination against CSF, FMD, and other endemic diseases is essential.
- Vector control: Insects and ticks should be controlled through chemical and biological means.
- Record keeping: Detailed records of visitors, inputs, vaccination, and treatment must be maintained.
- Early diagnosis: Veterinary surveillance, laboratory testing, and reporting of unusual mortality are critical to early containment (Rajkhowa et al., 2020).

Economic Importance of Biosecurity in Pig Farming

The financial advantages of biosecurity are significant. Preventing a single outbreak of ASF or CSF can save farmers millions of rupees in losses. For example, the ASF outbreak in Assam (2020) caused losses exceeding INR 200 crore due to pig deaths and culling (Rajkhowa et al., 2020). On a global scale, China, the world's largest producer and consumer of pork, reported its first case of African Swine Fever (ASF) in a northeastern province on August 3, 2018. Within eight months, the disease had spread across all mainland provinces, causing huge losses to the hog industry.

By August 2019, the hog population had dropped from 320.8 million to 190.9 million (40.5% decline), while the number of sows fell from 31.3 million to 19.0 million (39.3% decline). This sharp decline in pigs led to a 21% drop in domestic pork production in 2019 compared to 2018, and pork prices rose rapidly. By November 2019, wholesale prices more than doubled to 51 RMB per kilogram, while retail prices jumped from 25 RMB to over 60 RMB per kilogram (Ma et al., 2021).

Moreover, adoption of biosecurity measures in a farm ensures:

- Higher productivity due to reduced mortality and morbidity.
- Enhanced consumer confidence in pork products.
- Access to international trade by meeting sanitary requirements.

Thus, the cost of implementing biosecurity is minimal compared to the economic devastation caused by disease outbreaks.

Conclusion

The piggy industry is particularly vulnerable to devastating transboundary animal diseases such as ASF, CSF, and PRRS, which can cause massive herd losses within weeks. In this context, biosecurity acts as the first line of defence and remains the most cost-effective and sustainable method of disease prevention. Although no biosecurity plan can completely eliminate the risk of disease, a well-designed and consistently enforced program greatly reduces the probability of outbreaks. Effective biosecurity requires awareness, commitment, and collaboration among farmers, veterinarians, extension personnel, and government authorities. As the demand for pork continues to rise in India and globally, strengthening farm-level biosecurity will be critical not only for protecting livelihoods but also for ensuring food security and public health. The future of piggy lies in the hands of farmers who adopt biosecurity as a routine practice rather than as a crisis response.

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