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African Swine Fever in India: Why It Matters and Why Biosecurity Alone Is Not Enough

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INTRODUCTION

A disease that can empty a pig shed

For a pig farmer, African swine fever (ASF) is one of the most frightening diseases. A few pigs may first show fever, weakness and loss of appetite. Soon, more animals become sick, and deaths may follow rapidly. In severe outbreaks, many or even nearly all pigs in a herd may die. This is why ASF has become a major concern not only for veterinarians, but also for farmers, traders and rural families who depend on pigs for income and food security. ASF is caused by African swine fever virus (ASFV), a large and complex DNA virus. The disease does not infect humans, and people do not get sick from ASF. However, infected pigs, pork and contaminated materials can carry the virus to other pigs. That is why the disease spreads so efficiently once it enters pig-producing areas.

What is African swine fever virus?

ASFV is the only known member of the family Asfarviridae. It is a large, enveloped, double-stranded DNA virus with a complicated structure and many genes that help it survive and interfere with the pig's immune response. The virus mainly targets cells of the monocyte–macrophage system. These are important defense cells, but once infected they become sites of virus replication and sources of severe inflammation. Because the virus is hardy, it can survive for long periods in blood, tissues, pork products and the environment. This ability to remain infectious in meat and contaminated material makes control difficult, especially where pig movement, swill feeding and carcass disposal are poorly managed.

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How ASFV spreads

ASFV spreads both directly and indirectly. Direct spread occurs when healthy pigs come into contact with infected pigs or their blood, saliva, urine, faeces and tissues. Indirect spread occurs when the virus is carried on contaminated pork, raw swill, feed utensils, vehicles, clothing, boots, cages, knives and other fomites. Unsafe carcass disposal and the movement of infected pigs are especially dangerous. In some regions, contact between domestic pigs and wild boar may also contribute to spread. In short, ASF often moves because people, pigs or contaminated materials move. That is why strict hygiene and movement control are at the heart of prevention.

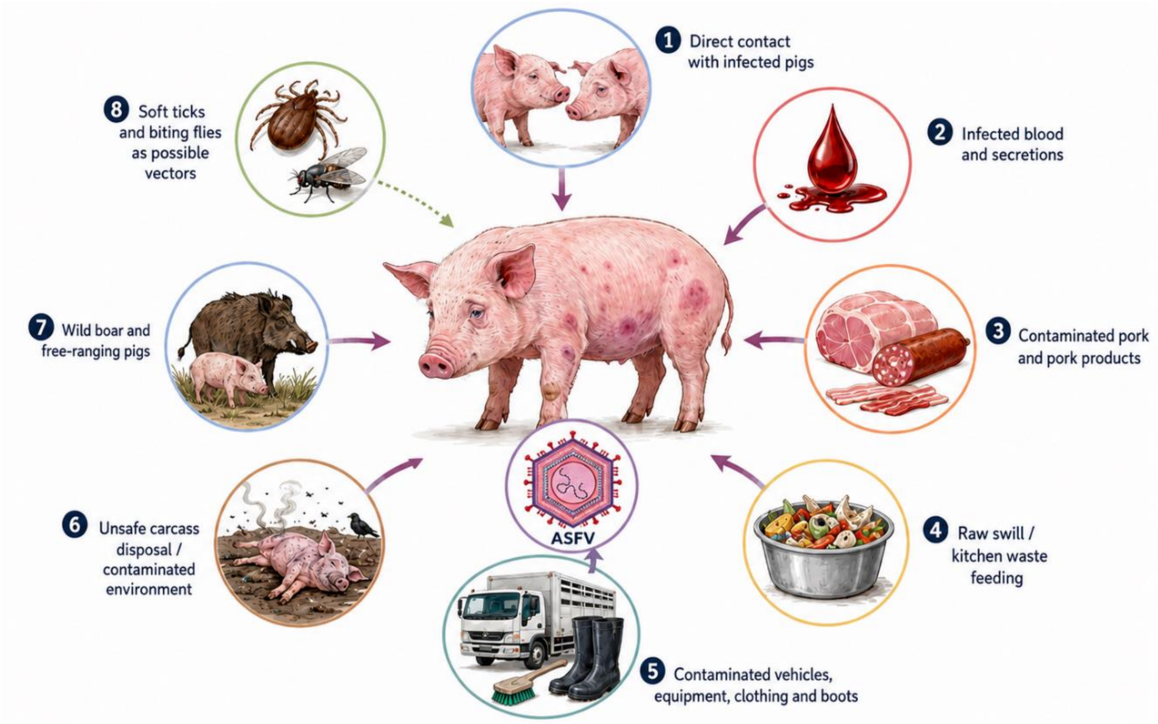

Figure 1. Important transmission pathways of African swine fever virus (ASFV).

What happens after the virus enters a pig?

After ASFV enters through the mouth, nose or contaminated contact, it first multiplies in the tonsils and nearby lymph nodes. It then infects macrophages and weakens the immune defense. This process can trigger an intense inflammatory response, often called a cytokine storm. The virus then spreads in the blood to major organs such as the spleen, lymph nodes, lungs, liver and kidneys. As the disease progresses, it causes inflammation, blood-vessel damage, bleeding and severe tissue injury. In highly virulent infections, this can lead to rapid collapse and death. Common signs include high fever, loss of appetite, weakness, red or bluish discoloration of the skin, vomiting, diarrhoea, breathing difficulty and sudden death. The disease is therefore both a severe systemic infection and a major haemorrhagic disease of pigs.

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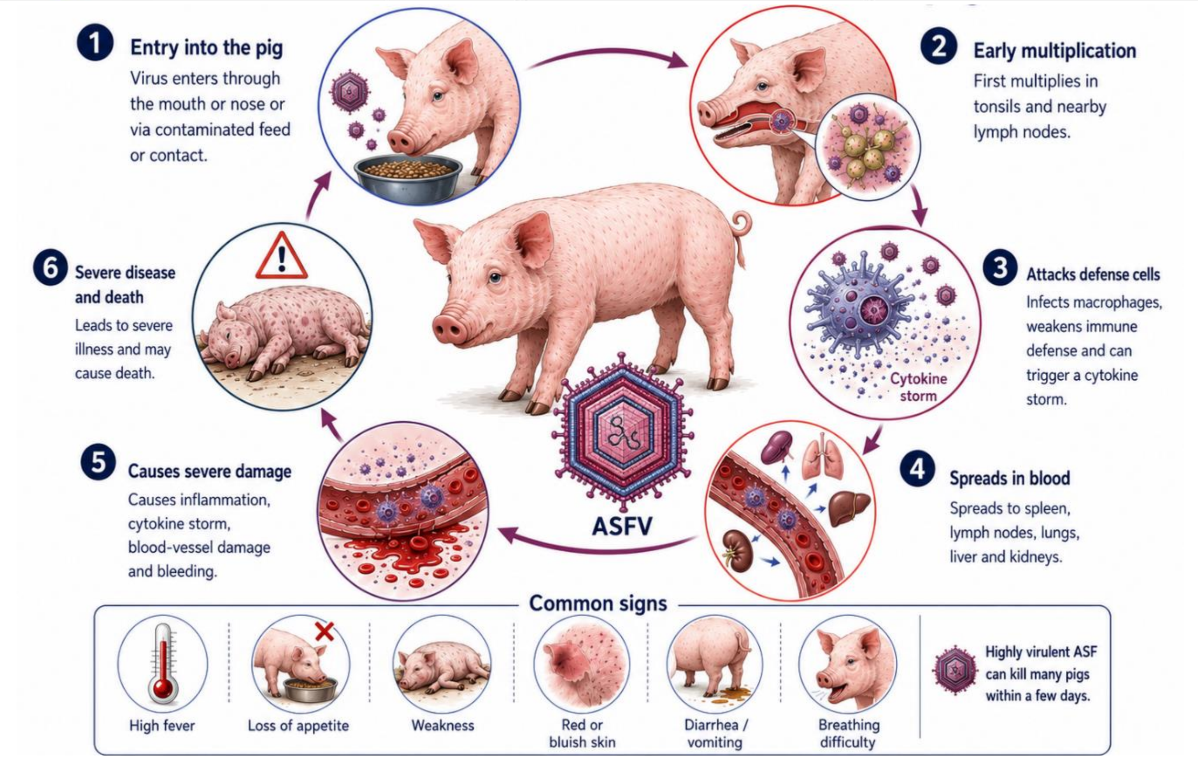

Figure 2. What ASFV does after it enters a pig, including immune damage, cytokine storm, organ spread and common clinical signs.

The Indian scenario

India first confirmed ASF in 2020 in Assam and Arunachal Pradesh. Genetic studies showed that the virus belonged to genotype II and was closely related to the pandemic lineage already circulating in Europe and Asia. What began in the Northeast did not stay there. Over time, the disease spread to many other parts of the country. According to the Department of Animal Husbandry and Dairying, 99,308 pigs died and 51,261 were culled in 2024 alone, showing that the disease has already caused heavy losses in India (DAHD, 2025). The Food and Agriculture Organization has also indicated that ASF has been officially reported from a large number of Indian states and remains an active challenge (FAO, 2026). This is particularly serious because pig farming in many areas is closely linked with smallholder livelihoods, household nutrition and local trade.

Why biosecurity alone is not enough

Biosecurity is the first and most important barrier against ASF. Farmers should restrict entry of people and vehicles, avoid raw swill feeding, quarantine new pigs, use dedicated clothing and boots, and safely dispose of carcasses. But Indian field conditions show that biosecurity alone may not fully protect pigs once the disease becomes widespread. There are several reasons. India has many backyard and smallholder pig units with limited resources. Informal movement of pigs and weekly markets can spread infection quickly. Swill feeding still occurs because it is cheap. Delayed reporting may happen when farmers fear culling or poor compensation. Free-ranging pigs, wild boar contact and unsafe carcass disposal can add further risk. Also, because the virus survives so well in pork and in the environment, even one weak point can restart transmission.

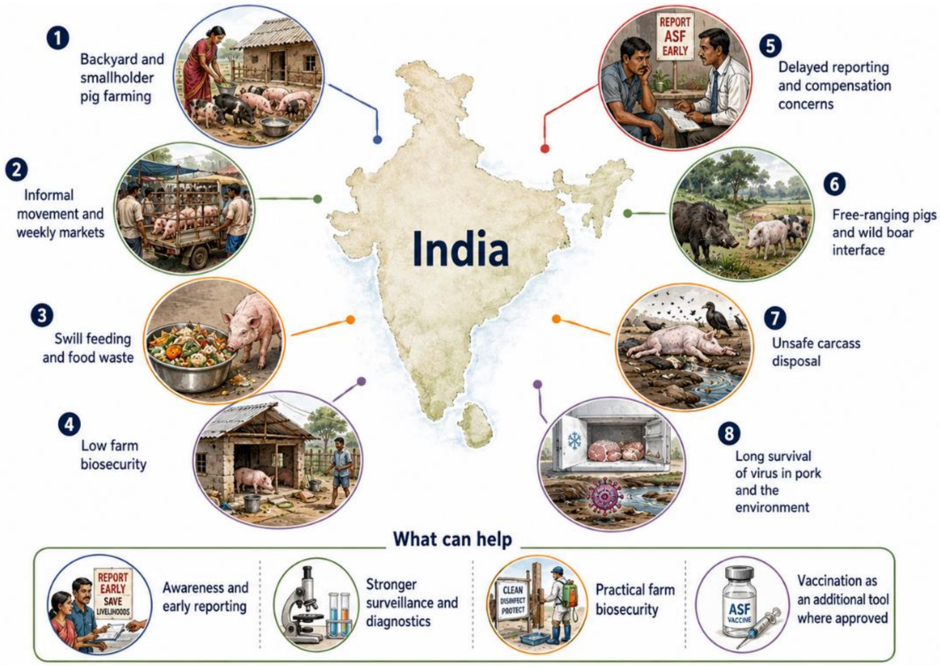

Figure 3. Major reasons why ASF control is difficult in India and the practical areas that can help.

Control and prevention

Prevention and control of ASF depend on an integrated strategy. Farm entry control, quarantine of new pigs, no raw swill feeding, cleaning and disinfection, dedicated clothing and equipment, early reporting, laboratory confirmation, movement restriction, safe carcass disposal and farmer awareness are all important. These measures reduce the chance that the virus will move from one pig shed, village or district to another. This also means that veterinary services, farmers, traders and local authorities must work together. Rapid diagnosis and timely response are just as important as farm-level hygiene. Without early reporting and strong surveillance, outbreaks may continue silently and spread before control measures begin.

Figure 4. Main control and prevention measures for African swine fever.

Vaccination: the path to sustainable control

Biosecurity, culling and movement restrictions can reduce virus introduction and help contain individual outbreaks, but experience in endemic and repeatedly affected areas shows that these measures alone are often unable to achieve sustainable control of ASF. Vaccination is therefore regarded as a central long-term strategy for protecting pig populations and reducing the continuing impact of the disease. Vietnam licensed two genotype-II live attenuated vaccines: NAVET-ASFVAC, based on ASFV-G-ΔI177L, and AVAC ASF LIVE, based on ASFV-G-ΔMGF. Initial experimental and field observations showed strong immune responses and protection against closely related genotype-II viruses (Tran et al., 2022; Department of Animal Health, Viet Nam, 2024). However, these first-generation vaccines do not provide a complete answer. Later studies raised important safety concerns for ASFV-G-ΔI177L, including reduced reproductive performance in pregnant sows and reversion to virulence during serial passage in pigs. In addition, neither ASFV-G-ΔI177L nor ASFV-G-ΔMGF reliably protected pigs against the emerging highly virulent genotype-I/II recombinant ASFV strain; vaccinated pigs developed fatal or chronic disease after challenge (Diep et al., 2024). These findings do not weaken the importance of vaccination; rather, they show why safer, genetically stable, DIVA-compatible and broader-protective next-generation vaccines are urgently needed. For India, the main lesson is to watch vaccine developments carefully, evaluate them scientifically and use them only with proper regulatory oversight and monitoring. At present, the immediate priorities remain early detection, farmer awareness, movement control, hygiene and safe disposal.

CONCLUSION

African swine fever is not a human disease, but it is a devastating pig disease. It spreads easily, survives well in the environment and can kill pigs quickly. The Indian experience since 2020 shows that ASF is not only a veterinary problem; it is also a livelihood problem. Practical farm biosecurity remains essential, but long-term protection of pigs needs more than biosecurity alone. India needs a strong and realistic control approach built on farmer awareness, early reporting, rapid laboratory diagnosis, movement control, safe carcass disposal, compensation support and continued scientific evaluation of new tools such as vaccines. When all these measures work together, the chance of limiting ASF becomes much stronger.

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