Vaccination in Livestock: The Key to Healthy Animals and Better Production

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ABSTRACT

Livestock vaccination plays a crucial role in preventing infectious diseases and maintaining animal health and productivity. Diseases such as Foot and Mouth Disease, Hemorrhagic Septicemia, PPR, and Newcastle disease can cause severe economic losses to farmers due to mortality, reduced production, and treatment costs. Vaccination works by stimulating the animal's immune system to develop protection against specific pathogens. Regular vaccination helps reduce disease outbreaks, improve milk, meat, and egg production, and increase farm profitability. It also protects human health by preventing zoonotic diseases such as brucellosis. Proper vaccination practices, including maintaining the cold chain, vaccinating healthy animals, and following recommended schedules, are essential for effective disease control. Therefore, vaccination is an important component of modern livestock management and sustainable animal production.

INTRODUCTION

What is mean by vaccination?

Vaccination is the process of protecting animals from specific diseases by giving them a vaccine, which helps the animal's body learn how to fight those diseases and build immunity. (Sastry and Thomas, 2015).

How vaccines work in animals?

Vaccination plays a vital role in maintaining the health and productivity of livestock animals. Animals such as cows, buffaloes, goats, sheep, and poultry are highly susceptible to infectious diseases that can

spread rapidly within a herd or flock. These diseases may reduce milk production, slow growth, cause infertility, and sometimes even lead to death, resulting in significant economic losses for farmers. Vaccines work by stimulating the animal's immune system to recognize and fight specific disease-causing organisms. In simple terms, vaccination acts like a "practice session" for the immune system, preparing the body to defend itself against diseases such as Blackleg, Foot and Mouth Disease (FMD), and pneumonia without the animal actually becoming sick. By developing immunity in this way, vaccinated animals are better protected when they encounter the real infection.

Common Infectious Diseases in Livestock

1. Impact on Cattle and Buffalo Production

When these large ruminants get sick, the financial recovery is often slow because they are high-value assets with long reproductive cycles.

- **Foot and Mouth Disease (FMD):** While it rarely kills adult animals, it is a "production destroyer." It causes a permanent drop in milk yield (often referred to as "dead loss") and leads to chronic lameness, which prevents draft animals from working in fields.
- **Hemorrhagic Septicemia & Black Quarter:** These are "peracute," meaning they hit fast. The primary effect is the total loss of capital. For a small farmer, the sudden death of a prime buffalo is the equivalent of losing an entire year's income in 24 hours.

2. Impact on Sheep and Goat Production

Small ruminants are often the "mobile banks" for farmers. Diseases here hit the meat and fibre markets hardest.

- **PPR (Sheep/Goat Plague):** This disease has a massive mortality rate (up to 90%). Even if an animal survives, the "growth check" is severe; they lose significant weight and may never reach a marketable size for meat.
- **Enterotoxaemia:** This typically strikes the healthiest, fastest-growing animals in the flock (those eating the best). This results in the loss of the highest-quality meat producers just as they are reaching their peak value.

3. Impact on Poultry Production

The poultry industry operates on thin margins and high density, making disease impact nearly instantaneous.

- **Newcastle Disease:** This can wipe out an entire flock (100% mortality) in a matter of days.
- **Production Stops:** In layers, egg production drops to zero almost immediately. In broilers, the feed conversion ratio (FCR) is ruined—meaning the birds eat but don't gain weight, leading to massive wasted costs in feed.

Importance of Vaccination in Livestock

- Vaccination is one of the best ways to keep livestock healthy and productive. It protects animals from dangerous diseases that can spread quickly within a herd or village. A vaccine works like a **training exercise for the animal's body**, teaching it how to fight a disease before the real infection occurs.
- **Protection from Infectious Diseases** Vaccination helps animals develop resistance against harmful germs such as those causing Foot and Mouth Disease (FMD), PPR, or Newcastle disease. When vaccinated animals come in contact with these diseases, their bodies are already

prepared to fight the infection. This greatly reduces the chances of animals getting sick.

- **Reduction in Animal Deaths** Many livestock diseases can kill animals very quickly. Vaccination protects animals before they are exposed to these diseases. This can reduce death rates drastically and helps farmers avoid major financial losses. It ensures that animals raised with time, feed, and care survive and continue to produce milk, meat, or offspring.

- **Better Health and Productivity** Vaccinated animals remain healthier, stronger, and more active. Healthy animals eat well, grow properly, and produce more milk or better-quality meat. They also suffer less from weakness or long-term illness, which improves their overall welfare.

- **Prevention of Disease Outbreaks** When most animals in a village are vaccinated, diseases cannot spread easily from one farm to another. This is called **community or herd protection**. It helps keep the entire livestock population safe, even when animals mix at markets or grazing areas.

- **In simple words** vaccination keeps animals healthy, reduces deaths, increases production, and protects the farmer's investment.

Economic Benefits of Vaccination in Livestock

Vaccination is not just a health measure for animals; it is also a smart economic investment for farmers. By preventing diseases, vaccination helps farmers save money, increase production, and earn better profits from their livestock.

- **Reduction in Treatment Costs:** Treating sick animals can be very expensive because it requires medicines, veterinary visits, and extra care. In comparison, vaccines cost very little. By vaccinating animals on time, farmers can prevent many diseases and avoid spending large amounts on treatment. In simple words, prevention through vaccination is much cheaper than curing a disease**.**

- **Increased Milk, Meat, and Egg Production:** Healthy animals are more productive. Vaccinated cows and buffaloes continue to give good quantities of milk, while healthy goats, sheep, and poultry grow faster and produce better meat and eggs. When animals remain disease-free, farmers get regular production and better returns from their livestock.

- **Prevention of Financial Losses During Disease Outbreaks:** Disease outbreaks can cause serious losses to farmers due to animal deaths, reduced production, and high treatment costs. In some cases, entire herds or flocks may be affected. Vaccination helps prevent such outbreaks and protects the farmer's animals, which are valuable assets.

- **Improved Profitability for Farmers:** When animals stay healthy, farmers spend less on treatment and earn more from milk, meat, and eggs. Healthy animals also look stronger and fetch better prices in the market. Thus, vaccination increases the overall profitability of livestock farming.

- **Protection of Human Health through Livestock Vaccination:** Vaccinating livestock not only protects animals but also helps protect the health of farmers and their families. In many villages, people live and work closely with animals, so diseases can sometimes spread from animals to humans. These diseases are called zoonotic diseases. Vaccination helps stop these diseases at their source by preventing them in animals.

- **Prevention of Zoonotic Diseases:** Some germs can move from animals to humans through direct contact, during animal birth, while handling animals, or by consuming contaminated milk and meat. If animals are vaccinated and healthy, these germs cannot survive in them. This acts like a protective barrier, keeping farmers and their families safe from infection.
- **Example: Brucellosis:** Brucellosis is a disease that affects cattle, buffaloes, goats, and sheep. In animals, it can cause abortion and reduce milk production. Humans can get infected by touching infected animals during delivery or by drinking raw milk from infected animals. In people, it can cause fever, severe joint pain, weakness, and long-term illness. Vaccinating animals helps control this disease and protects human health.
- **Safe Milk and Meat Production:** Healthy and vaccinated animals produce clean and safe milk and meat. This reduces the risk of harmful bacteria entering the food chain. When animals stay healthy, farmers also need fewer antibiotics, which helps ensure safer food for consumers. Safe livestock products are especially important for children, the elderly, and the whole community.

Best Practices for Livestock Vaccination

1. Vaccinate at the Right Age and Time

- **Follow the schedule:** Give vaccines to young animals as recommended. Don't vaccinate too early (their mother's milk protects them) or too late (they become vulnerable).
- **Seasonal timing:** Vaccinate 3–4 weeks before the rainy season. Wet weather can trigger diseases like Hemorrhagic Septicemia (HS) and Black Quarter (BQ).
- **Boosters matter:** Some vaccines need a second shot 3 weeks later. One shot is usually not enough for full protection.

2. Vaccinate Only Healthy Animals

- **Check health first:** Animals that are weak, dull, off-feed, or have a fever should be treated before vaccination. Sick animals don't respond well to vaccines.
- **Deworm before vaccination:** Give deworming medicine 10 days prior. Worms steal nutrients that your animals need to build immunity.

3. Keep Vaccines Cool (Maintain the Cold Chain)

- **Temperature matters:** Store vaccines at 2–8°C. If they get too hot, too cold, or are in direct sunlight, they lose their effectiveness.
- **Transport safely:** Use insulated boxes with ice packs. Avoid leaving vials on hot surfaces like tractor hoods.

4. Use Trained Professionals

- **Let a vet or trained technician do it:** They know the correct dose, injection site, and hygiene practices.
- **Right injection method:** Some vaccines go under the skin, some into the muscle. Correct technique prevents abscesses and wasted doses.
- **Clean needles:** Changing needles between animals prevents spreading blood diseases.
- **Emergency support:** If an animal reacts badly (shaking, difficulty breathing), vets can provide immediate treatment.

Vaccination Schedules for Cattle and buffalo

Sr. No.	Name of disease	Age at first dose	Booster dose	Subsequent dose
1	Foot and Mouth disease (FMD)	4 months and above	1 month after first dose	Six monthly
2	Haemorrhagic Septicaemia (HS)	6 months and above	-	Annually in endemic areas
3	Black Quarter (BQ)	6 months and above	-	Annually in endemic areas
4	Brucellosis	4-8 months of age (only female calves)	-	Once in a lifetime
5	Theileriosis	3 months of age and above	-	Once in a lifetime. Only required for crossbred and exotic cattle
6	Anthrax	4 months of age and above	-	Annually in endemic areas

(https://www.nddb.coop/farmer/animal-health/vaccination/schedules)

Vaccination Schedules for Sheep and Goat

Sr. No.	Diseases	Primary Vaccination		Repeat vaccination
		First dose	Booster Dose	
1	Peste-des-Petitis Ruminants (PPR)	At 3 months of age	Not required	After 3 years
2	Foot & Mouth Disease (FMD)	At 3 months of age	3-4 weeks after 1st Dose	Every 6/ 12 month interval
3	Goat Pox (GP)	At 3-5 months of age	3-4 weeks after 1st Dose	Annually
4	Sheep Pox (SP)	At 3-5 months of age	3-4 weeks after 1st Dose	Annually
5	Eterotoxaemia (ET)	At 3-5 months of age	3-4 weeks after 1st Dose	Annually
6	Haemorrhagic Septicaemia (HS)	At 3-5 months of age	3-4 weeks after 1st Dose	Annually

(https://www.ivri.nic.in/Extension/Download/IVRI-FFL-8-2021.pdf)

Vaccination Programme for Broilers

Sr. No.	Diseases	Primary Vaccination	
		First Dose	Booster Dose
1	Marek's disease	Day old chick	Not required
2	Ranikhet disease- Lasota	1st week	3-4 weeks after 1st Dose
3	Gumboro	2nd – 3rd week	Not required

Vaccination Programme for Layers

Sr. No.	Diseases	Primary Vaccination	
		First Dose	Booster Dose
1	Marek's disease	Day old chick	Not required
2	Ranikhet disease- Lasota	1st week	4th – 5th week
3	Gumboro	2nd – 3rd week	18th -20th week
4	Infectious Bronchitis	4th week	14th week
5	Fowl pox	6th week	14th- 16th week
6	Infectious coryza	8th week	12th week
7	Fowl coryza	8th week	12th week
8	Spirochaetosis	Above 6th week	Not required
9	Egg drop syndrome	15th – 18th week	Not required

Precautions for vaccination

- Animals should be **healthy and free from illness** when they are vaccinated to ensure a proper immune response.
- Vaccines must be **stored and transported under the recommended cold-chain conditions** until they are administered to the animals.
- The **instructions provided by the vaccine manufacturer**, including the correct dose and method of administration, should always be carefully followed.
- For effective disease control, **at least 80% of the livestock population should be vaccinated** within the area or herd.
- **Deworming animals about 2–3 weeks before vaccination** is recommended, as it helps improve the animal's immune response to the vaccine.

- Vaccination should ideally be **completed about one month before the expected outbreak season** of the disease.
- It is generally advisable to **avoid vaccinating animals in the late stage of pregnancy**, even though serious complications are uncommon. (https://www.nddb.coop/farmer/animal-health/vaccination/points-to-be-noted)

CONCLUSIONS

- Vaccination protects animals from dangerous diseases like FMD, PPR, Newcastle disease, and Black Quarter.
- Healthy animals give more milk, meat, and eggs, and grow faster.
- Vaccination reduces animal deaths and saves money on treatment.
- It protects farmers and families from diseases that can spread from animals to humans.
- Vaccinate animals at the right age, follow booster doses, and only vaccinate healthy animals.
- Keep vaccines cool, use trained staff, and deworm animals 2–3 weeks before vaccination.
- Aim to vaccinate at least 80% of the herd for full protection.

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