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One Health and Dairy Farming: Why Animal Health Means Human Health

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Abstract

Dairy farming sustains millions of rural households in India and plays a vital role in food security, nutrition, and economic stability. However, the close and continuous interaction between humans and dairy animals increases the risk of zoonotic disease transmission. Major infections such as brucellosis, bovine tuberculosis, leptospirosis, Q fever, and anthrax continue to affect both livestock and people, particularly among farmers, veterinarians, and dairy workers. These diseases reduce animal productivity, cause reproductive losses, and pose serious public health risks through direct contact, contaminated environments, and unsafe milk consumption. Climate factors, inadequate biosecurity, and limited awareness further increase vulnerability in rural dairy systems. Adopting the One Health approach which integrates animal health, human health, and environmental management is essential for preventing disease, ensuring safe milk production, and sustaining livelihoods. Strengthened vaccination programs, surveillance, hygiene practices, and farmer education can significantly reduce risks. Healthy animals ultimately support healthy families, resilient farming systems, and national food security.

Key words-One health, zoonotic disease, Dairy Farming, Dairy farmers.

Introduction

In rural India, dairy farming is more than a livelihood it is a way of life that supports household nutrition, income, and social security. Millions of families depend on cattle and buffalo for daily milk production and economic stability. However, the close relationship between farmers and livestock also creates pathways for disease transmission between animals and humans. Zoonotic diseases associated with dairy farming are increasingly recognized as a significant public health and economic concern.

Evidence from national studies indicates that several infectious diseases remain endemic in Indian dairy systems. Bovine brucellosis shows widespread prevalence in cattle populations, with substantial exposure reported among high-risk occupational groups such as farmers and veterinarians. Bovine tuberculosis caused by *Mycobacterium bovis* is also present

in dairy herds and contributes to a proportion of human tuberculosis cases, particularly among populations consuming unpasteurized milk or living in close proximity to infected animals. Leptospirosis remains endemic in many states, especially during the monsoon season, while Q fever and anthrax continue to be reported in livestock and humans in specific regions of the country.

Dairy farming is therefore closely linked with public health and environmental sustainability. Farmers and livestock share the same housing spaces, water sources, and farm environments, increasing exposure risks. Poor hygiene, unsafe disposal of animal waste, lack of vaccination, and consumption of raw milk further amplify disease transmission.

The One Health approach provides a comprehensive framework to address these interconnected challenges. It recognizes that the health of humans, animals, and ecosystems is interdependent and must be managed together. In dairy systems, maintaining animal health through vaccination, biosecurity, surveillance, and responsible antibiotic use not only improves productivity but also protects human health and reduces antimicrobial resistance. Integrating One Health principles into dairy farming is therefore essential for safe food production, sustainable livelihoods, and long-term community well-being.

What is One Health?

The concept of One Health emphasizes the interconnectedness of human, animal, and environmental health. According to the World Health Organization (2021), One Health is an integrated and unifying approach that aims to sustainably balance and optimize the health of people, animals, and ecosystems, recognizing that their health is closely linked and interdependent. One Health means recognizing that the health of animals, humans, and the environment are closely connected. When animals are healthy, they produce safe milk and meat. When animals fall sick, diseases can spread to humans. These are called zoonotic diseases.

Diseases like brucellosis, rabies, bovine tuberculosis, and anthrax are examples of infections that can pass from animals to people. In many rural areas, lack of awareness, poor hygiene practices, and limited veterinary services increase the risk of such diseases.

Major Zoonotic Diseases in Indian Dairy Farms (Revised List)

1. Brucellosis
2. Bovine Tuberculosis (*Mycobacterium bovis* infection)
3. Leptospirosis
4. Q Fever
5. Anthrax

Brucellosis: A Silent Threat in Indian Dairy Farming

Brucellosis is a major zoonotic disease of dairy cattle and buffalo in India, caused mainly by *Brucella abortus*. In animals, it leads to late-term abortion, retained placenta, infertility, and reduced milk yield, while infected humans develop undulating fever, joint pain, night sweats, and chronic weakness through contact with infected birth materials or consumption of raw milk. A national meta-analysis by Deka *et al.* (2023) reported a pooled bovine brucellosis prevalence of about 15 per cent in India, indicating widespread endemicity. Furthermore, a review by Shome *et al.* (2017) found that human seroprevalence among high-risk groups such as dairy farmers and veterinarians ranges from 0.8 per cent to over 25 per cent, suggesting substantial occupational exposure. These findings highlight brucellosis as both an economic and public health concern requiring vaccination, herd screening, and improved farm hygiene under the One Health approach.

Bovine Tuberculosis (*Mycobacterium bovis* infection)

Bovine Tuberculosis (bTB) is a chronic zoonotic disease of dairy cattle and buffalo caused by *Mycobacterium bovis*. In infected animals, the disease commonly produces progressive weight loss, chronic cough, enlarged lymph nodes, and reduced milk production, although many animals may remain asymptomatic while shedding the organism. Humans acquire infection primarily through inhalation of aerosols during close contact with infected animals or through consumption of unpasteurized milk, leading to pulmonary or extra-pulmonary tuberculosis. According to a national meta-analysis by Srinivasan *et al.* (2018), the estimated prevalence of bovine tuberculosis in India ranges between 7–14 per cent in dairy cattle populations, indicating endemic presence in several regions. Furthermore, the World Health Organization (WHO, 2022) reports that *Mycobacterium bovis* contributes to a small but significant proportion of human tuberculosis cases globally, particularly in countries where close human–livestock interaction and raw milk consumption are common. These findings highlight bovine tuberculosis as both an animal productivity issue and a public health concern under the One Health framework.

Leptospirosis

Leptospirosis is an important zoonotic disease of dairy cattle and buffalo caused by *Leptospira* spp., a spirochete bacterium transmitted mainly through contaminated water, urine, and moist soil. In dairy animals, the infection often results in fever, reduced milk yield, abortion, stillbirths, and infertility, although some animals may remain asymptomatic carriers. Humans acquire the infection through contact with contaminated water or animal urine, particularly during the monsoon season, and clinical signs include high fever, headache, muscle pain, jaundice, and in severe cases, kidney or liver failure. According to surveillance

data reported by the National Centre for Disease Control (NCDC, 2023), leptospirosis remains endemic in several Indian states, especially during rainy seasons, with thousands of human cases reported annually. Additionally, serological studies reviewed by Boqvist *et al.* (2020) indicate that bovine leptospirosis prevalence in India varies widely, often ranging between 10–20 per cent depending on region and management practices. These findings underline leptospirosis as a climate-sensitive zoonosis requiring improved sanitation, vaccination, and farm biosecurity under the One Health approach.

Q Fever

Q Fever is a zoonotic disease caused by the bacterium *Coxiella burnetii*, which primarily infects cattle, buffalo, sheep, and goats. In dairy animals, the infection is often asymptomatic but may lead to abortion, stillbirth, retained placenta, and reduced fertility, particularly during calving. The organism is highly resistant in the environment and spreads mainly through inhalation of contaminated dust particles originating from birth fluids, placenta, and manure. In humans, Q Fever commonly presents as acute febrile illness with high fever, severe headache, muscle pain, and pneumonia, while chronic infection can lead to endocarditis. Studies conducted in India have reported varying seroprevalence rates of Q Fever in livestock, generally ranging between 5–20 per cent depending on region, indicating endemic circulation (Vaidya *et al.*, 2010). Human seropositivity among high-risk occupational groups such as veterinarians and dairy workers has also been documented in different parts of the country (Stephen *et al.*, 2017), suggesting occupational exposure. These findings emphasize Q Fever as an underdiagnosed but important zoonosis in Indian dairy systems requiring improved surveillance and farm hygiene under the One Health framework.

Anthrax

Anthrax is an acute zoonotic disease caused by the spore-forming bacterium *Bacillus anthracis*, which primarily affects cattle, buffalo, sheep, and goats. In dairy animals, anthrax often causes sudden death, high fever, bleeding from natural openings, and rapid decomposition of the carcass. The infection spreads through ingestion of spores present in contaminated soil, water, or feed, particularly in endemic regions. Humans acquire anthrax through direct contact with infected animals or contaminated animal products, leading to cutaneous lesions (black eschar), fever, and in severe cases, respiratory or gastrointestinal forms that can be fatal if untreated. According to the National Centre for Disease Control (NCDC, 2023), anthrax outbreaks are periodically reported from several Indian states, especially in eastern and central India. Furthermore, surveillance data summarized by Chakraborty *et al.* (2012) indicate that India continues to report both animal and human anthrax cases annually in endemic districts, highlighting its persistent public health

importance. Effective control requires livestock vaccination in endemic areas, safe carcass disposal, and improved farmer awareness under the One Health approach.

Why Dairy Farmers Must Care About Animal Health: A Zoonotic Disease Perspective

Dairy farmers must prioritize animal health not only to improve milk production but also to protect their own families and communities from zoonotic diseases. Many infections such as brucellosis, bovine tuberculosis, leptospirosis, Q fever, and anthrax can spread from infected cattle and buffalo to humans through direct contact, contaminated milk, urine, birth fluids, or farm environments. Because dairy farmers and animal handlers work in close proximity to livestock every day, they face higher occupational risk of infection. Sick animals also suffer reproductive losses, reduced milk yield, and increased treatment costs, directly affecting farm income.

Therefore, regular vaccination, proper hygiene, safe milk handling, biosecurity measures, and early disease detection are essential not only for herd productivity but also for safeguarding public health under the One Health approach. Healthy animals ultimately mean healthy farmers and sustainable dairy farming.

Human Impact of Major Dairy-Linked Zoonotic Diseases in India

Zoonotic diseases associated with dairy farming continue to affect a substantial number of people in India, particularly among livestock handlers and rural communities. Human brucellosis remains underdiagnosed but significant; a community-based study in Gujarat reported 22.6 per cent seropositivity, while other regional studies have shown 1–17 per cent prevalence among at-risk populations (Shome *et al.*, 2017; Deka *et al.*, 2023). Bovine tuberculosis caused by *Mycobacterium bovis* also contributes to the human TB burden, with studies from central India detecting *M. bovis* in approximately 8–12 per cent of examined tuberculosis cases among exposed groups (Srinivasan *et al.*, 2018). Leptospirosis is more frequently reported in surveillance systems; hospital-based studies have documented 7–38 per cent seropositivity among patients with undifferentiated fever, and several states report hundreds to thousands of human cases annually, particularly during the monsoon season (NCDC, 2023). Anthrax, though geographically restricted, continues to cause outbreaks in endemic districts; for example, Odisha reported over 400 human cases in recent years linked to livestock exposure (Chakraborty *et al.*, 2012). In contrast, human Q fever data remain limited in India, but serological studies confirm exposure among occupational groups in contact with infected livestock (Stephen *et al.*, 2017).

These findings indicate that dairy-associated zoonotic diseases collectively affect thousands of people every year in India, especially in rural and occupationally exposed populations, highlighting the urgent need for improved surveillance, vaccination programs,

safe milk practices, and One Health-based disease control strategies.

Preventive measures for zoonotic diseases

Effective prevention relies on simple but consistent practices:

- Regular vaccination of animals
- Routine disease screening
- Isolation of sick animals
- Proper disposal of carcasses and aborted materials
- Clean housing and drainage
- Use of protective gear while handling animals
- Boiling or pasteurizing milk before consumption
- Regular veterinary consultation

Adopting these measures significantly reduces disease transmission and improves farm productivity.

Initiatives taken by the Government of India to control zoonotic diseases

The Department of Animal Husbandry & Dairying launched the National Animal Disease Control Programme (NADCP) to control Brucellosis and Foot and Mouth Disease across the country. Under this program, female calves aged 4–8 months are vaccinated with the Brucella S19 vaccine, and nationwide mass vaccination campaigns are conducted (DAHD, 2019).

For Bovine Tuberculosis, India follows a surveillance-based and test-and-segregation approach. The National Programme for Dairy Development (NPDD) strengthens dairy infrastructure and improves diagnostic and disease testing facilities (DAHD Annual Report, 2022–23).

In the case of Leptospirosis and Anthrax, the National Centre for Disease Control (NCDC) conducts surveillance, outbreak investigations, and awareness programs, particularly in endemic states (NCDC Guidelines, 2020). For Anthrax, prophylactic vaccination is carried out in high-risk areas, and rapid response teams are deployed during outbreaks.

To enhance coordination between animal and human health sectors, the Integrated Disease Surveillance Programme (IDSP), implemented by the Ministry of Health and Family Welfare, plays a crucial role in monitoring zoonotic diseases in humans. Under IDSP, data on epidemic-prone diseases such as leptospirosis, anthrax, and other zoonoses are collected weekly from district and state surveillance units. The program uses laboratory-based

reporting, rapid response teams, and an early warning signal system to detect unusual disease trends and outbreaks at an early stage. Once a suspected outbreak is identified, coordinated field investigations are conducted, and control measures are initiated in collaboration with veterinary and local authorities. This integrated reporting and response mechanism strengthens timely detection, containment, and prevention of zoonotic disease spread (MoHFW, IDSP Reports).

Additionally, India has formally adopted the One Health approach to strengthen collaboration among animal health, human health, and environmental sectors. Through joint initiatives of the Ministry of Health and Family Welfare and the Department of Animal Husbandry & Dairying, frameworks have been developed to promote data sharing, joint surveillance, coordinated outbreak response, and capacity building. The One Health strategy encourages interdisciplinary research, integrated disease surveillance, antimicrobial resistance monitoring, and policy-level coordination to address zoonotic threats holistically. By linking veterinary services, public health systems, and environmental monitoring agencies, this collaborative framework improves preparedness, strengthens risk communication, and enhances national capacity to prevent and control emerging and re-emerging zoonotic diseases (MoHFW & DAHD collaborative framework, 2022).

Conclusion

Dairy farming is essential for rural livelihoods and national food security in India, but it also carries significant zoonotic disease risks. Infections such as brucellosis, bovine tuberculosis, leptospirosis, Q fever, and anthrax continue to affect both livestock and humans. Research data show substantial prevalence in animals and measurable impact on high-risk human populations. These diseases lead to economic losses, reduced productivity, and public health burdens. Preventive measures like vaccination, biosecurity, safe milk practices, and early diagnosis are crucial for control. Government initiatives and surveillance systems further strengthen disease management efforts. Adopting a strong One Health approach is key to ensuring sustainable dairy farming and protecting community health.

References

- Deka, R. P., Magnusson, U., Grace, D., & Lindahl, J. F. (2023). Bovine brucellosis in India: A systematic review and meta-analysis. *Tropical Animal Health and Production*, 55, Article number.
- Shome, R., Kalleshmurthy, T., Shome, B. R., *et al.* (2017). Prevalence and risk factors of brucellosis among livestock and humans in India: A review. *Indian Journal of Medical Research*, 145(5), 589–601.
- Srinivasan, S., Easterling, L., Rimal, B., *et al.* (2018). Prevalence of bovine tuberculosis in India: A systematic review and meta-analysis. *Transboundary and Emerging Diseases*, 65(6), 1627–1640.
- World Health Organization (WHO). (2022). *Global Tuberculosis Report 2022*. Geneva:

WHO.

- National Centre for Disease Control (NCDC). (2023). Integrated Disease Surveillance Programme (IDSP) Annual Report and Zoonotic Disease Surveillance Data. Ministry of Health and Family Welfare, Government of India.
- Boqvist, S., Chauhan, A. S., & Gunnarsson, A. (2020). Animal leptospirosis in India: A review of prevalence and risk factors. *Veterinary Medicine International*, Article ID.
- Vaidya, V. M., Malik, S. V. S., Kaur, S., Kumar, S., & Barbuddhe, S. B. (2010). Comparison of PCR, immunofluorescence assay, and pathogen isolation for detection of *Coxiella burnetii* in animals. *Acta Veterinaria Scandinavica*, 52(12).
- Stephen, S., Ambroise, S., Pradeep, J., & Gunasekaran, D. (2017). Serological evidence of Q fever among occupationally exposed populations in India. *Journal of Vector Borne Diseases*, 54(1), 25–29.
- Chakraborty, A., Khan, S. U., Hasnain, S. E., *et al.* (2012). Anthrax outbreaks in India: Epidemiology and control strategies. *Indian Journal of Medical Research*, 135(5), 622–631.
- Department of Animal Husbandry & Dairying (DAHD). (2019). National Animal Disease Control Programme (NADCP) Guidelines. Ministry of Fisheries, Animal Husbandry and Dairying, Government of India.
- Department of Animal Husbandry & Dairying (DAHD). (2022–23). Annual Report 2022–23. Government of India.
- Ministry of Health and Family Welfare (MoHFW) & Department of Animal Husbandry & Dairying (DAHD). (2022). One Health Framework for India. Government of India.
- National Centre for Disease Control (NCDC). (2020). Guidelines for Prevention and Control of Anthrax and Leptospirosis. Ministry of Health and Family Welfare, Government of India.