

Transboundary Animal Diseases of Viral Origin

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Contributor: Gyanendra Gongal , Habibar Rahman , Kishan Chand Thakuri , Kennady Vijayalakshmy

The Transboundary Animal Diseases (TADs) are highly transmissible epidemic diseases of livestock which have the capability for rapid spread to new areas and regions regardless of national borders. The TADs are a major threat to livestock of any nation as they have the potential to cause large-scale damage, staking the food security of the country, and can cripple the nation's economy significantly by direct loss in the form of disease conditions and deaths in affected population or indirectly due to required counter epizootic measures, loss in trade and probable zoonotic transmission.

cross-border

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south Asia

trade

1. Introduction

Transboundary Animal Diseases (TADs) are defined by The Food and Agriculture Organisation of the United Nations (FAO) as highly contagious and transmissible epidemic diseases of livestock which have the capability for rapid spread to new areas and regions, regardless of national borders, and have serious socio-economic and public health consequences ^[1]. Transboundary animal diseases are highly contagious and have the potential for rapid spread, irrespective of national borders, causing serious socioeconomic consequences ^[2].

The south Asian countries have established a regional specialised organisation called the South Asian Association for Regional Cooperation (SAARC) in 1985, which comprises Afghanistan, Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka. Contribution of livestock to agricultural gross domestic product (GDP) varies between 13 and 61%. SAARC countries represent around 20% of the global small ruminant population ^[3]. Average densities of livestock in this region are the highest in the world, and India possesses the largest amount of livestock in the world. As compared to Europe and America, livestock cannot be seen only from a productivity point of view, but they have a socio-cultural value, and they are also known as living banks. Since the Global Framework for Progressive Control of TADs (GF-TADs) has identified the SAARC region for sub-regional activity in Asia, eight SAARC countries were included as part of the South Asia region. Only six south Asian countries share a long porous land border with neighbouring countries, including the People's Republic of China. Although Sri Lanka and the Maldives are island countries in south Asia, there is a geographical barrier, but they are not risk-free for TADs.

High-impact animal diseases of viral origin such as FMD, PPR, Classical Swine Fever (CSF), or African Swine Fever (ASF), while not directly affecting human health, do affect food and nutrition security, livelihood, livestock production, and trade ^[1]. The FAO and World Organisation for Animal Health (WOAH) have been working together

for progressive control of TADs, particularly in low- and middle-income countries. So far, rinderpest is one of the TADs which has been eradicated in 2010 through the global rinderpest eradication programme under FAO/WHO leadership. There is proof of the concept that TADs can only be eradicated through regionally coordinated campaigns and international partnerships.

The TADs are a major threat to livestock of any nation as they have the potential to cause large-scale damage, staking the food security of the country, and can cripple the nation's economy significantly by direct loss in the form of disease morbidity and mortality in an affected population or indirectly due to required counter epizootic measures, loss in trade, and probable zoonotic transmission. The emergence of TAD poses a challenge to the country's preparedness and mitigation policies.

2. Transboundary Animal Diseases of Viral Origin

The rinderpest eradication campaign launched during the 1970s in Nepal and neighbouring countries clearly demonstrated that mass vaccination and animal quarantine measures can bring down the number of cases towards zero, but that the disease may re-emerge after many years, unless there is a regionally coordinated programme in place ^[4].

Regional cooperation is a prerequisite for prevention, control, and subsequent eradication of viral TADs, and several initiatives have been taken by GF-TADs and other partners in South Asia.

Public private partnership is critical for early detection, prevention, and control of TADs in efficient and cost-effective ways, which is possible through confidence, trust, and understanding between public and private sectors. Although a competent veterinary authority is trying to prevent and control economically important TADs in the best interest of smallholder farmers and private sectors through regulatory and technical means, there is a challenge in terms of disease reporting, control measures, compensation, and perception. Biosecurity, diagnostics, and quality vaccines are critical needs for improving the poultry health management system in SAARC countries, which must be developed under public-private partnership.

There is great disparity across the region in the strength and resources of the animal health services and livestock sector, which may have an impact on TAD prevention and control. A country with a strong commercial sector, operating within a livestock sector that is important to GDP and export, is more likely to have political commitment to TAD control than one with a weak economy, poor tax base, and poorly organised producers ^[5]. Prevention, control, and subsequent eradication of any viral TADs may require multidimensional approaches which may include: (1) vaccination of the susceptible animal population with high vaccination coverage, i.e., >80 percent; (2) movement control and quarantine; and (3) slaughter campaigns (where feasible according to the country context).

Animal vaccination against TADs as disease control measures and access to international markets are trade dispute issues because of technological deficiency in vaccine production and surveillance. The availability of safe and effective DIVA (Differentiating Infected from Vaccinated Animals) vaccines and a corresponding laboratory

diagnostic test could solve this dilemma if DIVA vaccination becomes an internationally accepted method for emergency vaccination without disruption of trade [\[6\]](#).

There are two dimensions of disease prevention and control programmes, i.e., bio-medical and socioeconomic. Poverty and ignorance are two of the factors driving people to eat sick or dead animals, as the majority of TADs are not zoonotic. The slaughter and sharing of meat and offal from sick and dead animals to neighbours and relatives in other villages or selling them at half price and the swill feeding practice have caused outbreaks of FMD. It continues to be a common factor for the introduction of ASF and CSF in countries previously free of it. In other words, TADs prevention and control measures should seriously consider human activity in outbreak areas as risk factors for disease transmission [\[7\]](#). There is no provision of regulating or banning swill feeding, which may be responsible for accelerated transmission of ASF in Asian countries.

Considering the significance of regional cooperation and preparedness for effective prevention and control of TADs, a strategic consultation meeting was organised jointly by the National Academy of Agricultural Sciences (NAAS), ILRI, SAARC, and Bangladesh Academy of Agriculture (BAAG) on 15 February 2022 [\[8\]](#). The following recommendations require due attention from policymakers, international partners, and private sectors.

On challenges and priorities of TAD in South Asian countries:

- Each country may prioritise three TADs initially, considering their disease severity, zoonotic threat, and trading to other countries, in order to develop a consensus among the member countries on addressing the priority diseases using both managerial and frontier science.
- Development of animal disease screening facilities at the major animal transportation route with appropriate diagnostic kits and trained manpower.
- Development of a SAARC vaccine bank for a quick response to any epidemic/pandemic.

On strategies to strengthen regional collaboration and funding for preparedness of TADs in the region:

- One TAD coordination centre for South Asian countries, preferably with the ILRI, may be established for better preparedness against TAD.
- A regional program on TAD, in the line of One Health, may be framed in consultation with WHO, WOAH (OIE), FAO, UNEP, and SAARC to complement and supplement the effort of each member country in controlling TAD.
- The Chief of the Animal Husbandry Department/Research Institution of each South Asian country needs to earmark a dedicated fund for managing and controlling TADs. Philanthropic organisations may also be approached for the cause.

- The efforts to contain TAD in the region may be continued through half-yearly meeting/workshop/brainstorming sessions using virtual, and at times offline mode in order to take stock of the problem and means to counter them.
- A dashboard should be created immediately, containing consolidated disease data from member countries. It would facilitate the exchange of disease information between member countries and help in planning effective control and preventive measures.
- Member nations should start a consultation/dialogue to achieve the immunological barrier so that the border areas can be immunised against TAD, which is crucial. SAARC and ILRI may act as a catalyst in bringing this to practice.
- SAARC in collaboration with international and regional partner agencies and centre of excellence on animal diseases and member states may devise a collaborative program on TAD surveillance, an early warning system, a tracking of animal movement, and vaccine synchronisation.
- Animal traders should be considered as a partner in TAD control through advocacy and confidence-building measures.

3. Way Forward

The TADs are posing a global and regional threat to livelihood, food and nutritional security, and trade due to globalisation of trade and informal movement of livestock including livestock products. The prevention and control mechanisms of TADs, at its source, are a global public good which requires coordinated efforts, solidarity, and the full political support from national and regional authorities. Ownership, leadership, and partnership are critical for regional collaboration, which demands mutual trust, confidence, and understanding among participating countries, particularly for information sharing.

Considering the evolving geopolitical situation in South Asia, it may not be possible to use the SAARC platform as desired. It will be strategic and realistic to initiate sub-regional cooperation among Bangladesh, Bhutan, India, and Nepal (BBIN), as they have extensive livestock movement and informal trade in cross-border areas and livestock, and poultry market value chain analysis were conducted in the past, which needs to be updated. Information sharing and cross-border surveillance of TAD should be prioritised, and it will take time to build mutual trust, confidence, and understanding to embark on such a mission.

The national veterinary services must have a strong and efficient technical team with a functional infrastructure, not only at the national level but also at sub-national levels ^[9]. SAARC countries should make best use of available operational tools, gap analysis, discussion-based and operations-based exercises such as the National IHR-PVS Bridging workshop, the operational tool on joint risk assessment, the multisectoral coordination mechanism, and

surveillance and information sharing, as well as simulation exercises to test the functional status of preparedness and response, the contingency plan, interagency coordination, and the communication mechanism.

A network of laboratory diagnostic and referral services should be established and strengthened in South Asia. There are already regional reference laboratories for TADs identified under GF-TAD initiatives and OIE-Reference laboratories for avian influenza, and it is time to activate them by facilitating a material transport agreement (MTA) for smooth sample flow from neighbouring countries. They have to play a proactive role in providing external quality assurance and vaccine quality control as per OIE standards.

The quality and cost of vaccines are critical for disease control and subsequent eradication. It is desirable to have a regional vaccine bank for priority TADs, starting with PPR as a regional public good. There is a need for investment for innovation of new livestock and poultry vaccines and cost-effective diagnostic tools using nanotechnology through public–private partnership. India has been a global hub for innovation and technology transfer in the pharmaceutical and biotechnological industry sector, and it is time to motivate and incentivise them.

There should be a science-based government policy to import exotic breeds of livestock animals. Regulatory frameworks should be developed to enforce sanitary and phytosanitary (SPS) measures, including harmonisation of such measures among South Asian countries. There is complexity to perform risk analysis of potential introduction of TADs through import of genetic materials of exotic breeds such as semen, ova, and embryo due to the lack of data and information.

Cross-border collaboration for surveillance, early warning and animal movement control, and synchronisation of vaccination campaigns should be encouraged on a bilateral or multilateral basis for as many countries that share a porous border.

Involvement of national stakeholders and community engagement for surveillance, prevention, and control of regional priority TADs is critical, requiring rational utilisation of mass communication and social media networks. The lesson learnt from the infodemic during the COVID-19 pandemic should be taken into consideration in terms of the better understanding of public perception and action. Animal traders should be considered as partners in TAD control through advocacy and confidence-building measures.

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