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Risk of Introduction and Spread of FMD SAT-1 into Southeast Asia

SEACFMD
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FAORAP



Outline

- Introduction
- Likelihood and impact of FMD SAT1 spread
- Recommendations



What's the concern?

Reports of FMD SAT1 on WAHIS (as of 21 July 2026)



What's the concern?

- Immunity to FMD is serotype specific
 - As SAT1 has not been previously detected in this region, there is no existing immunity
 - SAT1 is generally not included in routine vaccine formulations,
 - Large populations of cattle, buffalo, small ruminants and pigs are highly susceptible to infection should the virus be introduced.
- What is the likelihood and impact of further spread in Asia??



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**FAO ALERTS COUNTRIES IN ASIA AND THE PACIFIC TO
ENHANCE PREPAREDNESS FOR FOOT-AND-MOUTH
DISEASE SAT1**

15 April 2026

Source: <https://openknowledge.fao.org/handle/20.500.14283/cd9325en>

RISK QUESTIONS

REGIONAL RAPID RISK ASSESSMENT FOR FMD SAT1

**FMD
SAT1**

1

WHAT IS THE LIKELIHOOD OF **FMD**-SUSCEPTIBLE LIVESTOCK IN UNAFFECTED COUNTRIES BEING EXPOSED TO **FMD** SEROTYPE **SAT1** DUE TO ITS INTRODUCTION FROM AFFECTED COUNTRIES VIA THE FOLLOWING PATHWAYS:

a. MOVEMENT OF LIVE ANIMALS BETWEEN COUNTRIES (INCLUDING LEGAL AND INFORMAL TRADE, AND COMMON GRAZING)



b. LEGAL AND INFORMAL TRADE IN ANIMAL PRODUCTS?



c. MOVEMENT OF WILDLIFE BETWEEN COUNTRIES?



d. MOVEMENT OF FOMITES (PEOPLE, VEHICLES, FODDER) BETWEEN COUNTRIES?



2

WHAT IS THE POTENTIAL IMPACT OF **FMD**-SUSCEPTIBLE LIVESTOCK BEING EXPOSED TO **FMD** SEROTYPE **SAT1**:

a. IN UNAFFECTED COUNTRIES?

- OUTBREAK ESTABLISHMENT AND SPREAD
- SEVERE PRODUCTION LOSSES
- TRADE RESTRICTIONS AND MARKET IMPACT
- IMPACTS ON LIVELIHOODS AND FOOD SECURITY

b. IN COUNTRIES ALREADY AFFECTED?



- FURTHER SPREAD AND NEW OUTBREAKS
- INCREASED MORBIDITY AND MORTALITY
- SUSTAINED PRODUCTION LOSSES
- LONG-TERM ECONOMIC AND SOCIAL IMPACTS
- COMPLICATES CONTROL AND ERADICATION EFFORTS

BETTER
INFORMATION
BETTER DECISIONS
BETTER OUTCOMES!

COLLABORATE • SHARE • PREPARE • PROTECT OUR LIVESTOCK AND LIVELIHOODS

METHODOLOGY

Regional Rapid Risk Assessment for FMD SAT1

**FMD
SAT1**

1. DEFINE MAIN RISK PATHWAYS

Review the main pathways: live animals, animal products, wildlife, and fomites (people, vehicles, fodder).



LIVE ANIMALS



ANIMAL PRODUCTS



WILDLIFE



FOMITES
(PEOPLE, VEHICLES, FODDER)

2. ASSESS LIKELIHOOD

For each pathway, define the main steps and estimate the overall likelihood.

NEGLECTIBLE



LOW



MODERATE



HIGH



3. ASSESS UNCERTAINTY

Judge uncertainty based on the quantity and quality of available data.

LOW



MODERATE



HIGH



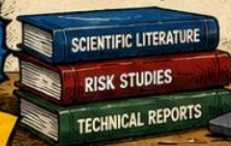
4. COLLECT DATA

Use a questionnaire on risk factors for official veterinary services in target countries.



5. COMPILE EVIDENCE

Combine questionnaire results with literature, FAOSTAT, and other secondary sources.



LIKELIHOOD
+
UNCERTAINTY
=
RISK PICTURE

INFORMED DATA. STRUCTURED ANALYSIS. BETTER RISK ASSESSMENT.

Risk Assessment Results

Rapid risk assessment completed for 17 countries in North Africa; Central, South and Western Asia; and South-Eastern Europe (v2, March 2026)

- Published online (timely, easier to update)

Rapid risk assessment: foot-and-mouth disease (FMD) virus serotype SAT1

Date of publication: 4 March 2026

Assessment period (data as of): 2 February - 23 February 2026

Version of the assessment: 2

Geographical coverage: North Africa; Central, South and Western Asia; and South-Eastern Europe

Objective: To rapidly assess the likelihood and impact of further spread of the FMD serotype SAT1 epidemic that was first reported in Iraq in March 2025 and provide recommendations for Members on risk mitigation. This work follows the publication of two regional alerts for FMD SAT1 (April 2025 and November 2025) and the first version of this assessment, published on 4 December 2025.

Scope: This assessment evaluates the risk of further spread of FMD serotype SAT1 within the next 3 months. Countries and territories are included in the assessment if they are adjacent or in close proximity to affected countries as follows: **Afghanistan, Armenia, Bulgaria, Georgia, Greece, Jordan, Libya, Oman, Pakistan, Qatar, Russian Federation, Saudi Arabia, Syrian Arab Republic, Turkmenistan, United Arab Emirates, West Bank and Gaza Strip, and Yemen.**

Contact

For any queries on this assessment, please contact EMPRES-Animal-Health@fao.org

Disclaimer

Document information: This risk assessment draws on a comprehensive review of official information, technical documents, and expert input to evaluate the risk of FMDV SAT1 infection among susceptible livestock in currently unaffected countries over a three-month horizon. The assessment separately examines the likelihood of exposure and the potential impact of an epidemic.

Aim of the RRA: To provide a rapid, evidence-based evaluation of the likelihood and impact of FMD serotype SAT1 introduction, raise awareness among Members, and inform the planning and response.

Source: <https://www.fao.org/animal-health/rapid-risk-assessment-fmd/en>

Risk Assessment Results

- Further spread very likely in N. Africa; Central, S. and W. Asia; and SE Europe
- Informal movements of livestock and common grazing are most likely pathway
 - Direct contact is most effective mode of FMD transmission
 - No sanitary measures
 - Subclinical disease in small ruminants
- Weak vet services and lack of SAT1 vaccine contribute to likelihood of spread
- Moderate - High level of uncertainty
 - Lack data, especially for informal movements/trade and level of compliance with sanitary & control measures

Table 1. Results of rapid risk assessment of FMD-susceptible livestock in unaffected countries/territories being exposed to FMDV serotype SAT1 (number of countries by likelihood-impact score combinations).

Likelihood ↓ / Impact →	Negligible	Low	Moderate	Severe
Extremely unlikely	0	0	0	0
Unlikely	0	2	0	0
Likely	0	3	4	2
Very likely	0	0	2	4

Source: <https://www.fao.org/animal-health/rapid-risk-assessment-fmd/en>

Preliminary Results from Asia

- High level of trade connectivity may increase likelihood of SAT1 spread
- Proper implementation of sanitary measures important to mitigate the risk

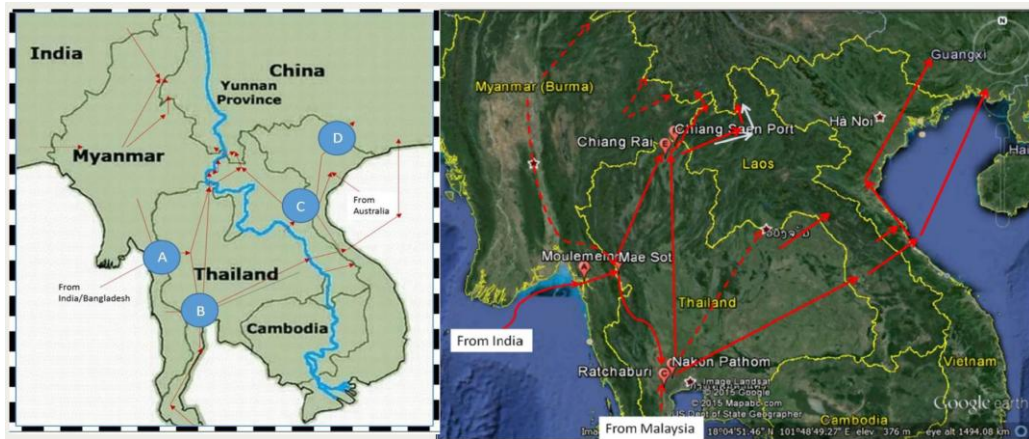
	TO																						
	Country	Bangladesh	Bhutan	Brunei Cambodia	China, India	Indonesia Japan	Lao PDR	Malaysia	Mongolia	Myanmar	Nepal	Pakistan	Philippines	Rep of Korea	Singapore	Sri Lanka	Tajikistan	Thailand	Timor-Leste	Viet Nam			
FROM	Bangladesh		M	D									D		D								
	Bhutan				A, D																		
	Brunei Darussalam							M, D, A							M								
	Cambodia				M		M, D							M	M			M		A, M			
	China, mainland		M	M	M, D	M	M, D	D, M	M, D	M, A, D	M	D, M	A, M	M, D	M, A, D	M	M, D	M	M	D, M			
	India	A, M	A, M, D	M, D	A, M, D	M	M, D		A, M	A, M, D		M	A, M, D		M, D	M	M, D		A, M, D	M	A, M, D		
	Indonesia			D, M	D, M	M, D		D		A, M, D				D, M	D	M, D			M, D	M			
	Japan			D, M	M, D	M	M, D		M	M, D, A	M	M	M		M, D	M, D	M, D		M	M, D	M, D		
	Lao PDR				A	A, M													A, M		A, D		
	Malaysia	M			A, M, D	M, D	M, A	D	M, D	M			D, M		M	M, D	M	M, D	M	M, D	M, D		
	Mongolia					A, M		M															
	Myanmar					M		A	A	A							D				M		
	Pakistan				A	M, D	M	D		M	M						D		D	A	M	M, D	
	Philippines				M, D	M	M	M, D	M, A, D		D, M					D, M	D, M			D, M	D, M	D, M	
	Rep. of Korea	M, D	M		M, A, D	D, A, M	M	M, D, A	A, D, M	D, M	M, A, D	M, D	M	A, D, M		M, D	A, D, M	M		A, M	D, M	A, M, D	
	Singapore	M, D	M		M, D	M, D	D	D	M, D	D		A, M, D		M, D		D, M	D, M		M, D		M, D, A	M, D	M, D
	Sri Lanka	D				M				M								D, A					
	Thailand	M, D	M, D	M, D	A, M, D	D, M	A	D, M	D, M	A, M, D	A, M, D		M, D, A	M	D	M, D	M, D	M			M	A, D	
	Viet Nam				A, M, D	D, M	M	M	D, M	A, M, D	A, M, D		D		D	M, D	M, D			M, D			

Trade data from FAOSTAT, 2022-2024

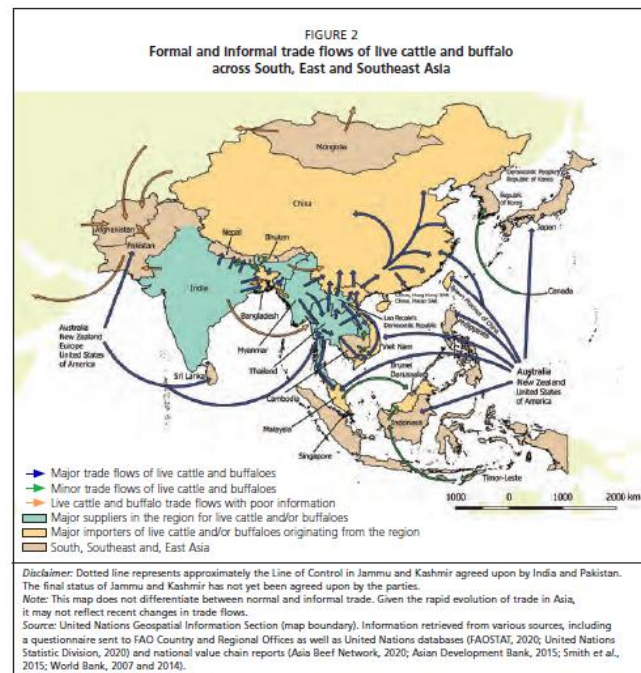
A = live ruminant, pig; M = fresh meat; D = raw milk

Preliminary Results from Asia

- Previous work has mapped informal regional movement pathways
- Are these still valid following disruptor events (ASF, COVID-19)?



Smith et al, 2015. Movement pathways and market chains of large ruminants in the Greater Mekong Sub-region



FAO 2020. Introduction and spread of lumpy skin disease in South, East and Southeast Asia

Impact

New publication available



Available at: <https://openknowledge.fao.org/handle/20.500.14283/ce0418en>

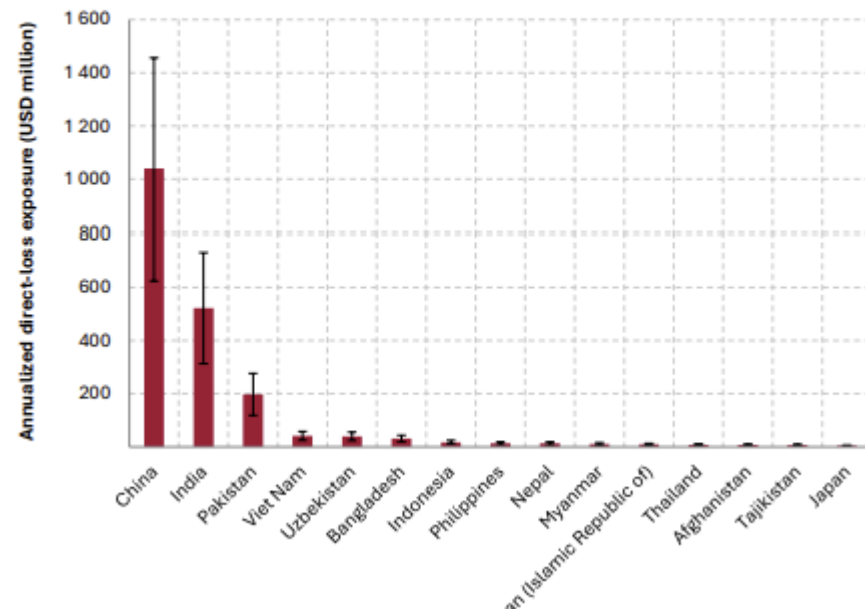
Impact

In a medium-impact scenario (12% production loss and 20% exposed product-flow value affected):

- Direct losses up to USD 1.04 billion in China and USD 0.52 billion in India
- Highest absolute impact is concentrated in a small number of large livestock-product economies.
- The estimates are NOT forecasts of where FMDV SAT1 will spread.

Figure 1

MEDIUM-IMPACT SCENARIO: ANNUALIZED ERF-ADJUSTED DIRECT-LOSS EXPOSURE FROM POTENTIAL FMDV SAT1 SPREAD IN ASIA AND THE PACIFIC (USD MILLION)



Rapid economic impact assessment of foot-and-mouth disease virus serotype SAT1 spread in Asia and the Pacific: implications for preparedness, prioritization and investment

Abstract

Foot-and-mouth disease (FMD) is a highly contagious viral disease of animals that causes significant economic losses in livestock-producing countries. The disease is caused by the foot-and-mouth disease virus (FMDV), which has seven serotypes. Serotype SAT1 is one of the most common serotypes in Asia and the Pacific. This paper presents a rapid economic impact assessment of SAT1 spread in the region, based on a medium-impact scenario. The assessment shows that the annualized direct-loss exposure from SAT1 spread could reach up to USD 1.04 billion in China and USD 0.52 billion in India. The highest absolute impact is concentrated in a small number of large livestock-product economies. The estimates are NOT forecasts of where FMDV SAT1 will spread.

Keywords: Foot-and-mouth disease, SAT1, Asia, Pacific, economic impact, preparedness, prioritization, investment.

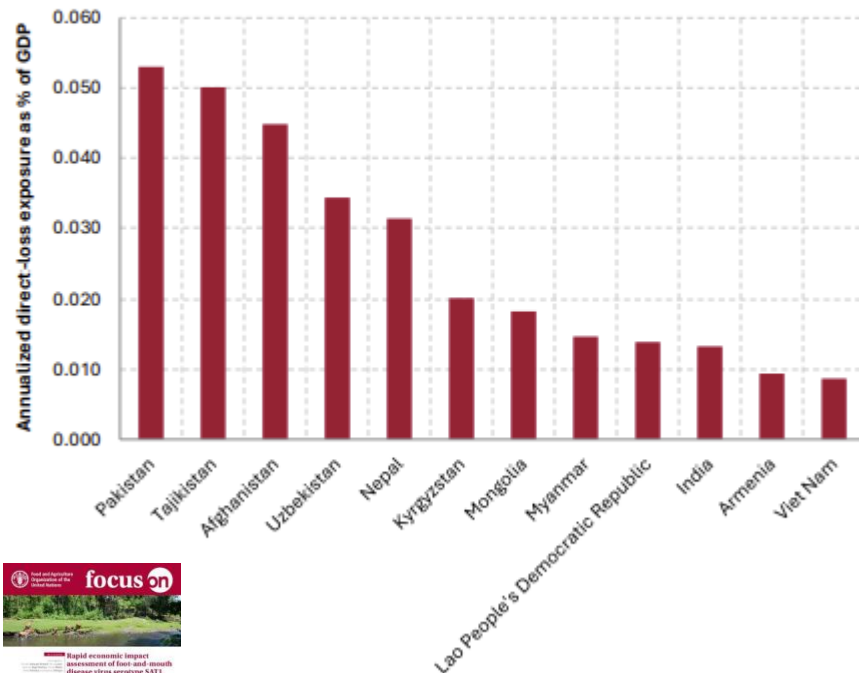
Available at: <https://openknowledge.fao.org/handle/20.500.14283/ce0418en>

Impact

Important relative impacts (as share of GDP), especially in smaller and more agriculture-dependent economies

Figure 2

MEDIUM-IMPACT SCENARIO: ANNUALIZED ERF-ADJUSTED DIRECT-LOSS EXPOSURE FROM POTENTIAL FMDV SAT1 SPREAD IN ASIA AND THE PACIFIC, AS A SHARE OF GDP (%)



Available at: <https://openknowledge.fao.org/handle/20.500.14283/ce0418en>

Conclusions and recommendations

- An outbreak of **FMD SAT1** would have a substantial negative impact
- **Prevention is paramount**: Early detection, rapid response and regional coordination
- All countries **should have an emergency response plan** for FMD that details how to manage the introduction of a novel serotype such as SAT1.
 - Needs to be realistic and funded
- Implement an **early warning system** (eg based on reports of increased mortalities, observations at slaughterhouses or panic sales, using information from farmers, value chain stakeholders and relevant social media sites.
- Support and **improve the performance and infrastructure of veterinary services**
- **Adopt Public-private partnership** approaches when appropriate



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Good emergency management practice: The essentials

A guide to preparing for animal health emergencies
Third edition



Available at:
<https://web.archive.org/web/20210610105243/http://www.fao.org/3/cb3833en/cb3833en.pdf>

Questions?

