

Epidemiological and risk-based approaches to accelerating  
achievement of Foot and Mouth Disease Free-Zone status in the  
Malaysia-Thailand-Myanmar Peninsula

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I declare that this thesis is my own account of my research and contains as its main content work which has not previously been submitted for a degree at any tertiary education institution

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This thesis is dedicated to my dear husband Gyles for his constant love and support, for his rescue mission to Bangkok, and for sharing my love of South-East Asia and its wonderful people.

## Abstract

The main purpose of this research was to identify factors which threaten the success of the Malaysia Thailand Myanmar (MTM) Campaign and to consider ways in which Foot and Mouth Disease (FMD) control may be improved such that Free Zone status can be more rapidly achieved.

This is the first time that information has been compiled to formulate a critical analysis of the whole MTM Zone, to: identify risks to the zone, explore ways to minimise those risks and thus to consider the feasibility of eradicating FMD from the zone. The impact of this research will be felt within the MTM Zone where a reduction in FMD outbreaks would reduce the financial burden on livestock keepers and, potentially, improve access to more valuable export markets. Targeting of disease in key livestock source areas would also likely impact positively on FMD control across South-East Asia and beyond to those countries which import South-East Asian livestock.

This research study involved: gathering and analysis of existing data; and collection of raw field data and development of risk models. Snowball sampling was the method of choice in identifying livestock movement pathways destined for the MTM Zone. This involved identification of initial respondents known to be involved in livestock trade to the MTM Zone, and then asking those initial respondents about where and with whom they trade livestock. This information was then used to identify further respondents and thus identify stakeholder networks and livestock trading routes leading to the MTM Zone. Risk models were developed with the purpose of quantifying the risk of FMD entering the MTM Zone and to identify the major contributors to this risk.

The key conclusions of this research were: that the MTM Zone is highly vulnerable to incursions of FMD through live animal movement; that efforts should be made to improve data collection in the field and to improve reporting of these data to central bodies; that FMD should be addressed in key strategic areas along the livestock movement pathway; and that any control strategies should be formulated in light of the specific challenges faced by the MTM member countries. The overarching conclusion of this research is that the MTM Zone is not a suitable place to initiate regional control of FMD in South-East Asia given that the Zone is largely a destination point for livestock and therefore, the success of the MTM Campaign largely depends upon the success of controlling FMD in key livestock source areas such as Central Myanmar.

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## List of abbreviations

ACI	Annual cumulative incidence
ARAHIS	ASEAN Regional Animal Health Information System
ASEAN	Association of South-East Asian Nations
CI	Cumulative Incidence
CMP	Central Myanmar Plateau
DLD	Department of Livestock Development of Thailand
DVS	Department of Veterinary Services of Malaysia
ELISA	Enzyme-linked immunosorbent assay
EU	European Union
FELDA	Federation Land Development Authority
FMD	Foot and Mouth Disease
GQS	Government Quarantine Station
HIV	Human Immunodeficiency Virus
LBVD	Livestock Breeding and Veterinary Department of Myanmar
LP	Liquid Phase
ME-SA	Middle East – South Asia



MOU	Memorandum of understanding
MT	Metric Tons
MTD	Modified Traditional Dutaik
MTM	Malaysia-Thailand-Myanmar
NSP	Non-structural protein
OIE	World Organisation for Animal Health
PCC	Pearson's Correlation Coefficient
PDR	People's Democratic Republic
PE	Participatory Epidemiology
PQS	Private Quarantine Station
RCU	Regional Coordination Unit
RRL	Regional Reference Laboratory for FMD in South-East Asia
SDRs	Standard definitions and rules
SEA	South-East Asia
SEAFMD	South-East Asia Foot and Mouth Disease
SEACFMD	South-East Asia and China Foot and Mouth Disease
SNA	Social network analysis

THB	Thai Baht
UK	United Kingdom
VP	Viral Protein
WRL	World Reference Laboratory for FMD