Epidemiological study to support the establishment of a progressive zoning approach for the control of Foot and Mouth Disease in Myanmar

By

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Declaration

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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Kyaw Naing Oo
Personal Declaration

Dedicated to my parents U Kyi Sein and Daw Tin Tin Aye for their unconditional love and constant support throughout my life, to my wife Dr Nilar Kyaw whose strength and love has supported and carried our family during my years studying in Australia and to my beloved daughter Su Yamone and son Zayar Htun for being a constant source of encouragement and for remembering their father during his absence.
Abstract

Epidemiological study to support the establishment of a progressive zoning approach for the control of Foot and Mouth Disease in Myanmar

Foot and mouth disease (FMD) is a highly contagious viral disease which has a significant impact on the economy and livestock productivity of affected countries. The research reported in this thesis involved investigation of the epidemiology of FMD in a potentially free (Tanintharyi) and an endemic (Sagaing) region of Myanmar. The animal level sero-prevalence in the Sagaing was high (42%, 95% CI 37.7 - 47.1) in contrast to that in Tanintharyi Division (11.7%, 5.9 - 17.4). Possible source of FMD in those locations may be due to communal grazing, using only underground water sources, purchasing cattle in March annually as a logistic regression model. In contrast, FMD was negative associated with trading of cattle within the same village where the farmers possessed less than only 10 cattle.

During this study, the traditional Dutaik meeting approach which is conducted in rural area of Myanmar, was developed as a participatory disease tool and was validated with data collected from serological surveys and questionnaire interviews. It was concluded that the MTD meeting approach is a suitable technique to use for detecting FMD with the significant advantages of time and cost effectiveness. It is proposed that the MTD meeting approach is suitable for use in progressive zoning for the control of FMD in Myanmar and can be used to actively involve farmers in the control program and to increase their awareness of the impact of FMD.

In this study, a partial budgeting model with Monte Carlo simulation was developed to understand the influence of FMD on the economics of animal draught power, which is the major livestock input into the nation's agricultural enterprise. The model revealed losses to farmers were very high if outbreaks occurred every year. The
findings of this study are useful for convincing farmers of the potential losses from FMD and the financial benefit in controlling the disease.

The movements of livestock in the Sagaing Division and in the Tanintharyi Division were different, with movements in the Sagaing being more complex. These movement data support the decision to develop a potential free zone area for FMD without vaccination in the Tanintharyi Division (Myanmar MTM area). Positive results from a sero-surveillance study conducted in 2005 in the Tanintharyi Division were most likely false positive results. This was supported by findings from the MTD meetings where no evidence of clinical disease was reported by farmers in contrast to areas where the disease was endemic.

It is concluded that the use of a zoning approach with vaccination in the endemic area of the Sagaing Division is an appropriate option for the control of FMD. At this stage it is not feasible to undertake control and eradication of FMD in the whole country. The complex animal movement patterns and the endemic nature of the disease pose real challenges for its control. However, in Myanmar the MTD meeting approach is a cost-effective option for surveillance to improve the FMD status early in an eradication campaign.
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