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Abstract of Thesis/Dissertation

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Title : Socio-economic and epidemiological study on foot and mouth disease control in Sri Lanka

(スリランカにおける口蹄疫コントロールの 社会経済疫学的研究)

Abstract

In Sri Lanka livestock plays an integral part of rural economy and providing livelihood support to the rural communities. Among livestock diseases Foot and Mouth Disease (FMD) is highly contagious, causing economic impact on production, and suppressing the development of livestock sector in Sri Lanka. FMD causes high morbidity and less mortality of cattle. It is endemic in eastern province causing extensive outbreak leading major epidemics which affect other provinces. The accepted control measures for FMD are, stamping out, tracing outbreaks, regulations, quarantine, movement control, vaccination and hygiene practice. Culling of infected animals and compensation for farmers are not practiced due to financial limitation like in developed countries. The effective control measures are considered to prevent outbreak of FMD with limited budget.

The general objective of the research is to clarify present foot and mouth disease status and related farmers' behavior, provide inputs for effective control strategy in Sri Lanka. Based on the related literature review, dairy farmers' knowledge, attitudes and practices, FMD vaccination and farmers behavior towards FMD control were identified for the successful eradication factors in FMD free countries. In Sri Lanka, there is research gap in these points, therefore the specific objectives are:

1) to identify the farmers' knowledge, attitudes and practices (KAP) of FMD
2) to explore the factors affecting vaccination behavior of farmers to control FMD
3) to clarify the farmers' embedded traditional behavioral practices for the treatment and control of FMD

Ampara district in eastern province, Kalmunai (KAL), Navithanveli (NAV), and Sammanthurai (SAM) veterinary ranges has been affected by FMD outbreak almost every year. Therefore, these three areas were selected for the study area. The ethnicity of these range is mainly Muslims and Tamils who are engaged in livestock farming. The list of farm registrations available at the government veterinary office was used as the sampling frame, and farmers were randomly selected from three ranges in equal proportions of 60 farmers. The questionnaire was used to select 180 respondents for the study. This study was conducted among small and large-scale livestock farmers who maintained cattle and buffaloes. The study was conducted during September and October 2019. Data was collected from farmers through a questionnaire and "face to face" interviewed survey in their language (Tamil). The Structured questionnaires used to collect information for the purpose of this study which considered social-farm factors, livestock training programs, FMD vaccination, FMD outbreak, the number of animals vaccinated for FMD and farmers traditional behavior of animal husbandry.

Responding to the first specific objective described in Chapter 3, improving KAP among rural livestock farmers could have a significant impact on FMD prevention. The objective of this study is to describe and evaluate the farmers' KAP among dairy farmers with regard to FMD. The regression model was used to analyze, the influence of social and farm factors and a t-test was

applied to compare these factors and KAP levels. Overall knowledge of FMD and practice scores were 4.36 and 2.46, respectively. The score for attitudes of the farmers was 3.49, with the maximum scores for knowledge, attitudes, and practice being 4.38, 3.50, and 3.04, respectively. Among the respondents, 83.9% reported to the veterinary office that FMD was one of the main livestock diseases. The educational levels of farmers were positively influenced KAP regarding FMD ($p < 0.05$). The outcome of attending training program in livestock management and cattle rearing for more than five years farming experience was also significantly important to improve KAP on FMD ($p < 0.05$). To improve livestock health, it is imperative to enhance farmer KAP in cattle management through education and training for effective disease control.

To response to the second specific objective, study on farmers' vaccination behavior in Chapter 4 was aimed at determining to identify the factors influencing FMD vaccination participation, and vaccination coverage. The probit and Tobit regression models were applied to determine the factors. On an average, the score for knowledge of FMD and hygiene management was calculated as 54.5% and 49.2%, respectively. Farmers' knowledge of FMD was strongly associated with gender, level of education and participation in the farmer training program ($p < 0.01$). The vaccination behavior was enhanced significantly by the number of animals, farming experience, knowledge of FMD score ($p < 0.05$), and hygiene management score ($p < 0.1$). It was revealed that social and farm factors contributed to the knowledge of FMD and vaccination behavior. Therefore, we recommend that the livestock educational training program will motivate better participation in the FMD vaccination for control plan in Sri Lanka.

The Chapter 5 corresponds to the third specific objective of clarifying the farmers' embedded indigenous behavior on self-treatment and FMD prevention approaches. The purpose of this study was to identify farmers' traditional practices for FMD control and to find out the method to motivate the farmers to change their behavior in order to adopt more effective ways of preventing FMD outbreak. Only 87 farmers were interviewed in three ranges for this purpose by asking open questions on FMD treatment and prevent. The number of samples of free writing questions were from KAL, NAV and SAM were obtained 34, 38 and 15 respectively in three ranges. Text mining method was used to explore the farmers' behavior to FMD treatment and prevention. The KH Coder which widely used text mining software was applied for the purpose to identify farmer embedded behavior of frequency and co-occurrence network for total sample and two ethnicities. Regarding the relative strength of the co-occurrence, value of Jaccard coefficient is calculated with respect to all combinations of the key words in the text. The result revealed the frequency for "vaccine" was higher than other farmer behavioral practices. The Jaccard coefficient between "vaccine" and "vet office" was higher (0.36) than other coefficient between two practices. In total sample, "vaccine", "vet office", "traditional practices" and "wound treatment" were strongly linked together in one group. Use of "wound powder" and "salt water" linked in one subgraph. Practice of warm water and neem oil was in another subgraph. Use of "engine oil" and "dry fish" smoke connected between all subgraph. Study on farmers' indigenous embedder behavior provided helpful information on FMD treatment and control measures during outbreak,

which could be used to improve the effective future implementation of method to control FMD by changing the risk-behavioral practices. Changes in indigenous ingrained behavior are critical for the success of FMD control approaches in preventing and controlling the disease.

In conclusion, the disease is endemic in the country particularly in the eastern province. Therefore, FMD has been ranked as the highest priority cattle disease for control and eradication. It was found that farmers' KAP towards FMD was poor and lead to risk farming behavior related to FMD transmission, vaccination and biosecurity practices. This clearly showed asymmetry information situation among farmers in this study population.

The present farmer training is insufficient to control FMD outbreak therefore, the socio-economic aspects of FMD control should be incorporated in farmer training awareness program. Findings of this study can be utilized not only in Sri Lanka, but also in other FMD-endemic developing countries. The study of farmers' KAPs revealed helpful information on FMD control and organize the frequent training in regional veterinary divisions. The training program should be considered to follow, such as hygiene management, isolation of FMD infected animal, animal movement restriction during FMD outbreak and recommended vaccination practices which were not implemented now. Improving farmers' knowledge and changing embedded indigenous behavior is vital for animal disease control. Changing farmer behavior should be prioritized in order to implement effective management practice. It was revealed that the sustainable control strategy of FMD which were identified above should be considered in effective disease control policy in Sri Lanka.