

Knowledge and disease management skills of cattle owners on East Coast Fever and Foot and Mouth Disease in Kazungula and Livingstone Districts of Zambia

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Abstract

Effective animal disease control and prevention should be based on accurate information from the field. Part of this field information can be obtained from the cattle owners. In order to assess their disease knowledge, a survey focusing on East Coast Fever (ECF) and Foot and Mouth Disease (FMD) was organised among 302 cattle owners from the Kazungula and Livingstone Districts of the Southern Province of Zambia. The cattle owners' level of knowledge of ECF was low (34%) with most of those able to describe the disease belonging to the endemic zone where ECF caused high death rates in cattle. A larger proportion of the cattle owners (46%) were able to give an adequate description of FMD symptoms. It reached up to 61% in the FMD high-risk zone. Reporting to the animal health service providers appeared to be low.

The results of the survey showed that attempts should be made to improve the cattle owners' knowledge and response to important diseases by carrying out more extension and sensitization activities. This is especially so in areas of low infection or where the disease was experienced long time ago.

Keywords: Zambia, Animal health services, cattle owners, Livestock disease information, East Coast Fever, Foot and Mouth Disease

Résumé

Un contrôle et une prévention efficace de maladies animales doivent être basés sur des informations précises provenant du terrain. Une partie de cette information peut être obtenue des propriétaires de bétail. Pour évaluer leurs connaissances en maladies, une enquête se concentrant sur l'«East Coast Fever» (ECF) et sur la fièvre aphteuse (FMD), a été organisée parmi 302 propriétaires de bétail des districts de Kazungula et de Livingstone au Sud de la Zambie. Le niveau de connaissance des propriétaires de bétail en matière d'ECF était bas (34 %) et la plupart de ceux capables de décrire la maladie appartenaient à la zone endémique où l'ECF a causé des taux élevés de mortalité parmi le bétail. Une plus grande proportion de propriétaires de bétail (46 %) était capable de donner une description adéquate des symptômes de la FMD. Cette proportion était supérieure (61 %) dans la zone à haut risque de FMD. La transmission de l'information aux prestataires de services de santé animale est apparue faible. Les résultats de l'enquête ont montré que des tentatives devraient être faites pour améliorer les connaissances des propriétaires de bétail et leur réaction aux maladies importantes, en effectuant plus d'activités de vulgarisation et de sensibilisation. C'est particulièrement le cas dans les zones où l'infection est faible ou où la maladie n'a été expérimenté qu'il y a très longtemps.

Mots-clés : Zambie, Services de santé animale, propriétaires de bétail, Information sur les maladie du bétail, « East Coast Fever», Fièvre aphteuse

Resumo

Um controle efetivo e prevenção de doença animal deve ser baseado em informação precisa proveniente do campo. Parte desta informação de campo pode ser obtida através dos proprietários de gado. A fim de avaliar o conhecimento dos mesmos, uma pesquisa sobre a febre da costa leste (ECF) e febre aftosa (FMD) foi organizada entre 302 proprietários de gado dos distritos de Kazungula e Livingstone na Zâmbia. O nível de conhecimento dos proprietários de gado sobre ECF foi baixo (34%) mas a maioria destes foi capaz de descrever a doença como pertencente a zona endêmica na qual ECF causou altas taxas de mortalidade no gado. A maioria dos proprietários de gado (46%) puderam descrever de forma adequada os sintomas da FMD. Esse valor atingiu níveis de até 61% na zona de alto risco desta doença. A informação fornecida para os provedores do serviço de saúde animal pareceu ser fraca. Os resultados da pesquisa mostraram que mais tentativas deveriam ser feitas para melhorar o conhecimento e a resposta dos proprietários de gado à doenças importantes através de mais atividades de extensão e sensibilização. Este é o caso especialmente em áreas de baixa infecção ou onde a doença ocorreu há muito tempo.

Palavras-chave: Zâmbia, Serviços de saúde animal, Proprietários de gado, Informação sobre doença do gado, Febre da costa leste, Febre aftosa

Introduction

Zambia, like many other southern African countries, is affected by a number of livestock diseases for which concerted efforts are needed to ensure their prevention and control. Among the most important diseases are Foot and Mouth Disease (FMD), and Bovine Theileriosis (East Coast Fever- ECF- or Corridor disease).

FMD is one of the most contagious viral diseases affecting cattle. In Zambia, it was recorded for the first time in 1933 and the country has since experienced repeated outbreaks caused by the SAT 1, 2 and 3 strains and European types A and O (Chilonda *et al.*, 1999a). Three high-risk areas have been identified where FMD epidemics occur repeatedly: the southern border (Kazungula and up westwards towards Sesheke); the Kafue flats and the Northern border with Tanzania (Overby *et al.*, 1983). The last outbreak in Kazungula was in 2001. In Zambia, FMD is controlled by vaccination, fully funded by the government (Chilonda *et al.*, 1999b).

ECF is a very important tick-borne disease caused by protozoon *Theileria parva* and responsible for killing a large number of cattle each year (Billiouw *et al.*, 1999). The disease seems to have been introduced in Northern Zambia in 1922 (Coetzer *et al.*, 1994) and in Southern Province between the years 1977-1978 (Nambota, 1994). It currently persists in several areas of the country (Makala *et al.*, 2003). A total of 683 cases were recorded in Southern Province in 2002 (Provincial Veterinary Office). Control measures outlined for Theileriosis are: tick control, the application of the preventive infection and treatment method, and treatment following infection. All these measures are financed by the cattle owners themselves as the disease is not recognised as one of national importance (Chilonda *et al.*, 1999b).

Successful prevention and control of these diseases requires an integrated approach by all key players. At the district level they are the cattle owner and the service providers. The latter include the Community Livestock Auxiliary (CLA), the Veterinary Assistant (VA) at camp level, the District Veterinary Office (DVO) and in certain cases local Non-Governmental Organisations (NGO) (Van den Bossche *et al.*, 2004). To outline efficient prevention and control methods, the service providers need to collect accurate data from the field, particularly from the cattle owners themselves, whose knowledge and management skills related to the various diseases appear to be crucial.

In order to assess the cattle owner's level of knowledge and understanding of disease prevention and management, a survey focusing on ECF and FMD was

organised in Kazungula and Livingstone Districts of the Southern Province of Zambia. The study hypothesises that despite the devastating impacts of ECF in the endemic and epidemic zones and the threat to the non-infected areas, most cattle owners are not as aware of this disease as they are of FMD, a disease that has been present for a much longer period in the Livingstone and Kazungula Districts. It also hypothesised that poor understanding of the dynamics of ECF has resulted in poor disease management skills among the cattle owners and a low reporting to the animal health service providers during outbreaks.

Materials and Methods

Overview of study area and disease background

Kazungula and Livingstone Districts are located in the southern part of the Southern Province at an altitude of about 900 meters above sea level. The Districts experience rainfall of less than 700 mm per year. They share international borders with Zimbabwe, Botswana and Namibia in the southeast, south and southwest respectively. Livingstone district is surrounded completely by Kazungula district, with the exception of the border. Administratively, the two districts fall under the same District Veterinary Office, which is based in Livingstone city (Figure 1).

In Kazungula and Livingstone Districts, ECF has been endemic in the northern part only. However, from 1998 onwards the disease started moving towards the central and western parts of the Districts (Livingstone district annual report, 1998) where it caused high mortalities. In 2002, the disease was reported for the first time in the southern part of Kazungula District and in 2003 it was reported further west in Kazungula camp. Taking into account the dynamics of the disease, the study area was divided into an epidemic, endemic and non-infected zones (Figure 2).

Kazungula is the only district in the Southern Province in which FMD has continuously been detected since 1942. The disease is endemic in Sikaunzwe, Kazungula and Simonga camps. These areas thus represent the FMD high-risk zone in this study. Makunka, Ngwezi and Bombwe camps are in the low-risk area and do sometimes experience spillovers. These camps are, together with Mukuni and Nyawa camps (far from the endemic area), considered the FMD low-risk zone. The high-risk situation is associated with the presence of buffaloes in the area and international borders giving rise to transhumance and livestock cross-border movements (see Figure 3).

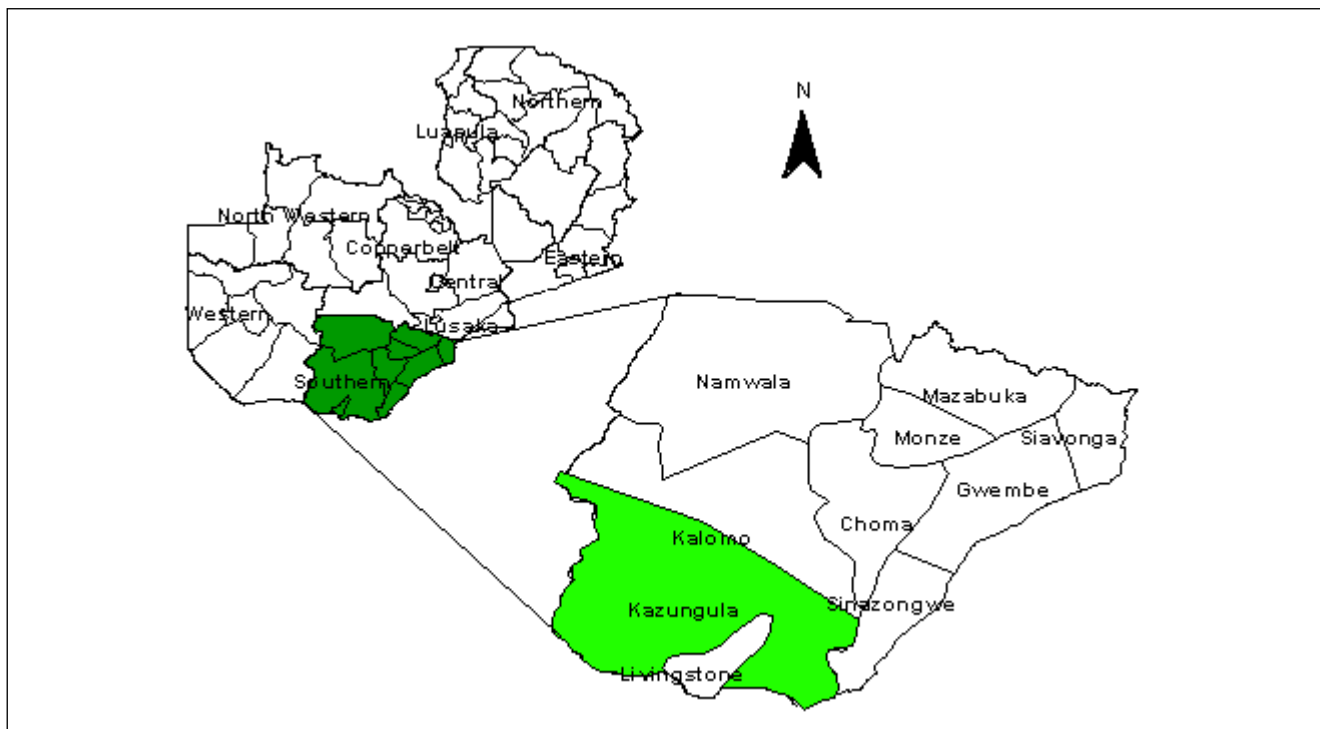


Figure 1: Map of Zambia showing the location of the Kazungula and Livingstone Districts.

Survey design and sample selection

A single visit multiple-questions survey was used in this study with trained enumerators of the Veterinary Department conducting face-to-face interviews using structured questionnaires in the local languages.

The survey design was primarily based on stratifying the area into ECF non-infected (high risk), ECF epidemic and ECF endemic zones. Eight veterinary camps were selected under these strata in Kazungula and Livingstone Districts. A total of 302 cattle owners

were interviewed with 129 coming from the ECF non-infected area, 76 from the epidemic area and 97 from the endemic area. The selection of the cattle owners was entirely based on voluntary turn up following announcements given by the local VA and their headmen about the ensuing interviews.

Beside questions aiming to obtain an insight into the cattle owner's experience in terms of cattle losses, the possible cause, and the number presently owned, the

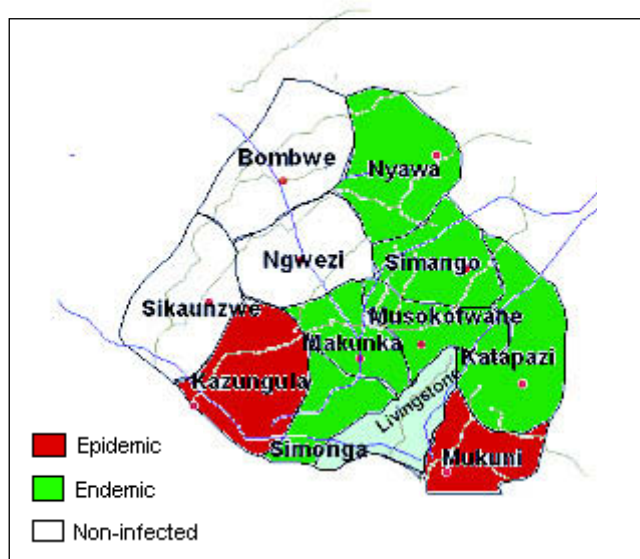


Figure 2: Map showing the ECF endemic, epidemic and non-infected areas of Kazungula District

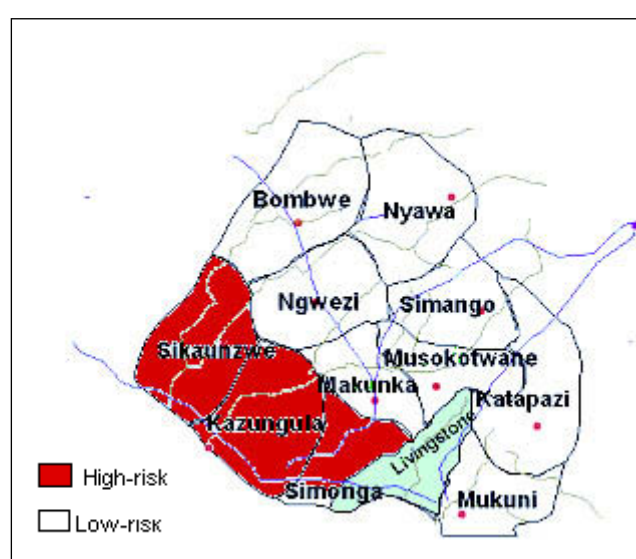


Figure 3: Map indicating the FMD high-risk and low-risk areas of Kazungula District.

questionnaire focused on the ability of the respondent to identify ECF and FMD and their response to outbreaks. Their knowledge of symptoms of these diseases were ranked into four categories with those knowing very well being ranked first, those knowing well being ranked second, others ranked under average and lastly those not knowing being ranked fourth. These categories were created by referring to the documented clinical symptoms, which were compared to the responses given by the cattle owners (see Table 1).

endemic zone, on the other hand, 74% were able to describe the symptoms with only 4% of these being able to describe the symptoms very well. There was a significant difference between the non-infected and endemic zones in the number of cattle owners who were able to describe the symptoms very well and those who could not ($P < 0.011$), those who were able to describe the symptoms well and those who were not ($P < 0.001$), and between those who were able to give an average description and those who were not ($P < 0.001$). Results indicate that almost all the cattle

Table 1: Symptoms description ranking of ECF and FMD

Symptoms ranking		ECF	FMD
1	Very well	- Swollen parotid glands, lacrimation and increased mucous discharge	- Limping, sores on tongue and hooves and failure to eat - Sores on mouth and around hooves and salivation
2	Well	- Swollen lymph nodes, salivation, dull and droopy ears - Lacrimation, profuse salivation, nasal discharge and droopy ears - Swelling of lymph nodes and dull	- Limping, dullness and not eating - Salivation and unable to walk
3	Average	- Coughing, salivation, dyspnoea and droopy ears	- Sores around mouth and tongue - Hooves coming out - Failure to graze
4	Does not know	- Just heard about the disease - Does not know disease	- Just heard about it - Does not know disease

Statistical analysis

The analysis of data was carried out in STATA (Release 7.0 College Station, TX: Stata Corporation) using multinomial logistic regression, Chi-square, and Logistic regression under the Generalised Linear Model (GLM).

Results

Cattle owner's awareness of ECF

Only 34% of the interviewed cattle owners claimed they could identify ECF. The majority of them belonged to the endemic zone (69%) while the highest number not able to identify belonged to the non-infected zone (57%). Table 2 shows that most cattle owners in the non-infected (88%) and epidemic (80%) zones had poor knowledge of the symptoms of ECF. In the

owners claiming to be able to identify ECF were able to describe the symptoms between very well and average except for two (1%) from the non-infected and epidemic zones.

Cattle owners' interventions during out-breaks of ECF

In total, 35% of cattle owners in both the epidemic and endemic zones did nothing during outbreaks in their areas. Out of this group only 8% belonged to the group that had experienced the disease. From the 65% who did something, 34% only reported the outbreak to the VA. The majority of the latter (85%) belonged to the endemic zone. 14% reported to have only attended extension meetings. The remaining 13% undertook interventions 3 to 9 (Table 3). Statistical analysis revealed that the ability of cattle owners

Table 2: Ranking of the cattle owners in each zone according to their response on ability to describe ECF symptoms (number and percentage)

Zone	Symptoms description (cattle owner %)				n
	Very well	Well	Average	Poor	
Non-infected	1 (1%)	4 (3%)	10 (8%)	114 (88%)	129 (100%)
Epidemic	1 (1%)	2 (3%)	12 (16%)	61 (80%)	76 (100%)
Endemic	4 (4%)	22 (23%)	46 (47%)	25 (26%)	97 (100%)
	6 (2%)	26 (9%)	70 (23%)	200 (66%)	302 (100%)

to undertake conventional control measures was significantly dependent on the zone ($P < 0.026$). On the other hand, 43% of cattle owners in the non-infected zone (not in table) were using the conventional control measures.

Ability of the respondents to describe the symptoms very well and the lack of ability to describe them at all does not significantly depend on the zone ($P < 0.066$). The majority of cattle owners who claimed to be able to identify FMD were able to describe the symptoms

Table 3: Different interventions undertaken by the cattle owners of the epidemic and the endemic ECF zones

Intervention Number	Cattle owner intervention	%	Epidemic (n)	Endemic (n)
1	Report to VA*	34	9	50
2	Report to CLA**	1	0	1
3	Report to VA/buy recommended drugs	5	2	7
4	Buy recommended drugs	3	0	5
6	Start dipping, restrict cattle movements and attend meetings	6	2	8
7	Start dipping	1	0	2
9	Report to VA and sell off unaffected animals	1	1	0
10	Attend meetings	14	20	5
11	Does nothing	35	42	19

* VA Veterinary Assistant; ** CLA: Community Livestock Auxiliary

Cattle owners' awareness of FMD

53% of the cattle owners claimed to be able to identify FMD with 60% belonging to the high-risk zone. Table 4 shows that 42% of them were ranked as being able to describe the symptoms very well while 46% could not describe the symptoms at all. 46% of cattle owners in the high-risk zone were able to describe the FMD symptoms very well while 40% were not able to describe them at all. In the low-risk zone, only 37% of cattle owners were able to describe the symptoms and majority (54%) were not.

very well (80%) with only 1% of those who claimed so not being able to.

Cattle owners' intervention during out-breaks of FMD

With the exception of attending meetings, more interventions take place in the FMD high-risk zone. A total of 29% of cattle owners responded that they had reported suspected disease outbreaks to the VA (Table 5). In both zones, most of the farmers indicated to have attended sensitisation meetings while 31% claimed to have done nothing at all during outbreaks (Table 5).

Table 4: ranking of the cattle owners in each zone according to their response on ability to describe FMD symptoms (number and percentage)

Zone	Symptoms ranking (% cattle owners)				Total n
	Very well	Well	Average	Poor	
High-risk	78 (46%)	11 (7%)	11 (7%)	68 (40%)	168
Low-risk	50 (37%)	8 (6%)	4 (3%)	72 (54%)	134
Total	128 (42%)	19 (6%)	15 (5%)	140 (46%)	302

Table 5: Different interventions undertaken by the cattle owners of low and high FMD risks zones in case of outbreak

Intervention number	Cattle owner intervention	% Cattle owners	High-risk (n)	Low-risk (n)	Total (n)
1	Report to VA	15	37	3	40
2	Report to VA and restrict animal movements	3	7	0	7
3	Report to VA and attend meetings	11	24	5	29
4	Report to CLA	0	1	0	1
5	Attend meetings	40	31	78	109
6	Do nothing	31	68	16	84
Total		100	168	102	270

Table 6: Percentage and number of cattle owners taking and not taking their cattle for vaccinations

Control number	Intervention	% Cattle owners	High-risk n	Low-risk n	Total n
1	Take for vaccination	81	120	98	218
2	No vaccination	19	48	4	52
Total		100	168	102	270

A total of 81% of the respondents brought their cattle for vaccination. This activity did not apply to the cattle owners in Nyawa and Mukuni camps (32 cattle owners) where vaccination activities are not carried out. The difference between the number of cattle owners taking their animals for vaccinations in the two risk zones was not significant ($P < 0.635$) (Table 6).

Comparison of cattle owners' ability to describe symptoms of ECF and FMD symptoms

For ECF and FMD, chi-square analysis revealed a significant difference between the group of cattle owners who were able to describe the symptoms very well ($P = 0.004$), between the group that was ranked average under both diseases ($P = 0.029$), and the group that could not describe symptoms of both diseases ($P = 0.001$). There was no significant difference between the group that was classified under knowing the symptoms of the two diseases well ($r = 0.158$).

Discussion

Cattle owners' awareness of ECF

Despite the devastating effects that ECF has had on their cattle population, the level of ECF awareness among cattle owners in Kazungula and Livingstone Ddistricts was quite low (34%). The cattle owner's ability to describe the symptoms of the disease was significantly dependent on the zone they belong to.

The majority who managed to give a description of the symptoms of ECF (71%) belonged to the endemic zone. This knowledge seems to be the result of the previous experience they have had with the disease. Most cattle owners in the three zones gave what was termed as average descriptions of the symptoms of ECF, since they could differentiate the disease from other endemic diseases in their areas. According to Norval *et al.* (1992), the presence of other diseases with similar symptoms makes the identification of ECF by cattle owners difficult. Among those who lost their animals to ECF, only 21% could give an acceptable description of symptoms diagnostic of ECF (Coetzer *et al.*, 1994).

Cattle owners' intervention in case of ECF outbreak

Only 41 % of the cattle owners who experienced ECF claimed to have informed the VA or CLA of their area. Not reporting or late reporting can be related to poor knowledge about the disease and subsequent poor diagnostic ability (Perry *et al.*, 1989). In some cases, cattle owners initially institute their own treatment (both conventional and traditional) before informing the local extension staff and only report to them when they do not see any improvement. This hampers the efficacy of the interventions by service providers. Additionally, inappropriate use of anti-theilerial drugs due to factors such as high cost, lack of knowledge about proper use and combinations leads to inadequate treatment (McHardy *et al.*, 1985; D'haese *et al.*, 1999).

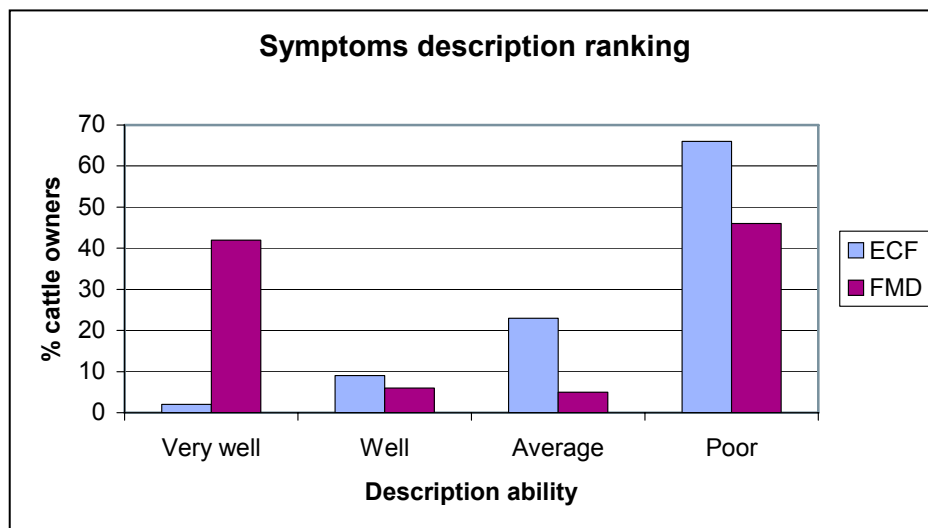


Figure 4: Comparison of farmers' ability to describe symptoms of ECF and FMD according to the ranking of the symptoms.

Only 20 % of the respondents attended extension meetings. Hence, poor knowledge of ECF symptoms can be due to poor information flow, especially among cattle farmers who do not experienced the disease, or experienced it some time back.

Attitudes towards FMD compared to ECF

The cattle owners' ability to adequately describe the symptoms of FMD was found to be significantly higher than that of ECF. This could be attributed to the fact that FMD has been endemic in the area far much longer and that the symptoms of FMD are pathognomic for this disease and therefore do not constitute a big problem in terms of differential diagnosis with other diseases in the area.

The control of FMD, according to the disease control policy is an activity fully undertaken by government, and only requires the cattle owners' cooperation in presenting their animals. This raises some questions among cattle owners as to why the government takes the responsibility for the control of a disease that causes negligible number of deaths compared to ECF whose effects are more devastating. Nevertheless, a large proportion of the cattle owners (81%) takes their animals for vaccinations even in the low-risk area. This may be due to the fact that cattle owners do not have to pay for FMD vaccinations and that ECF is still quite new to the FMD endemic zone.

In conclusion, cattle owners in the survey area generally do not have sufficient knowledge of ECF. Most of the

cattle owners of the ECF endemic zone, where high losses have been experienced, are able to describe the disease. However, the majority of respondents were not able to differentiate ECF from other endemic diseases in their areas. They nevertheless seem to have a better knowledge of FMD, a disease with which they have experiences for a much longer time and whose symptoms are easier to differentiate.

Reporting to the animal health service providers appears to be low. This delays interventions and hampers the implementation of appropriate diagnostic techniques necessary to have a good insight into the epidemiology and dynamics of the diseases in the area.

This study can therefore conclude that a number of issues need to be addressed by the government in order to streamline the collection of data from cattle owners. The most important being the improvement of their knowledge and response to important diseases such as ECF and FMD by carrying out more extension and sensitisation activities. This is especially so in areas of low infection or where the disease occurred long time ago.

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