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Evaluation of Smallholder Farmers' Awareness of Cattle Diseases in Svay Rieng and Prey Veng Provinces, Cambodia

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Abstract: In Cambodia, cattle are used as draught power, sources of fertilizer, sources of assets, and for meat production. Due to some contagious illnesses such as hemorrhagic septicemia and foot-and-mouth disease (FMD), they mostly have low reproductivity and poor physical health. Among those diseases, brucellosis is starting to appear in cattle production in rural Cambodia and is highly transmissible to humans. Thus, the objective of this study was to evaluate the farmers' awareness of cattle diseases and their transmissibility in the country. A survey was conducted in two provinces, Svay Rieng and Prey Veng, in Cambodia, starting from July 2021 to January 2022. A sample size of 216 was randomly selected from the two provinces by using Taro Yamane, and the selection criteria were that the targeted households must have at least two cows. A pre-determined questionnaire was utilized to collect data on number of cattle, raising type, feeding system, source of cattle purchase, hygienic condition, waste management, cattle disease, body score condition and symptoms. As a result, 86% of the respondents in Prey Veng province and 99.07% in Svay Rieng province have cattle disease. Smallholder farmers raise 5 to 10 cattle per household, while other farmers raise 10 to 15 calves, or 15-20 or more than 20 heads, while only 20% of smallholder farmers in Prey Veng were able to raise 5 to 10 male cattle per household. Of all the interviewees, 90% recognized FMD based on clinical signs such as blisters on the feet, loss of appetite, salivation and painful, red, blister-like lesions on the tongue. Meanwhile, 60% know lumpy skin disease (LSD) due to skin nodules. No one knew about brucellosis. The findings suggest that the knowledge farmers have over cattle disease is very limited and this needs more support from related institutions to raise their awareness in order to cope with cattle disease correctly and timely.

Key words: Awareness, smallholder farmers, brucellosis, LSD.

1. Introduction

The cattle raised in Cambodia are produced by smallholder farmers in rural areas, and the increasing demand for red meat means that cattle production represents an important opportunity for Cambodian farmers. Smallholder farmers commonly use native grasses and crop residues as feed for their animals. However, as the cattle population and the area cultivated with crops have increased, feed resources for cattle have become a constraint, resulting in low cattle productivity. Nutrition has been identified as the single most important constraint on cattle production in Cambodia [1]. The management involves a series of interventions, including the implementation of foraging technology, education in husbandry, biosecurity and marketing aimed at developing skills and knowledge at the farmer and village level, and internal parasite control. Moreover, diseases also have an important factor to contribute to cattle loss in Cambodia, such as foot-and-mouth disease (FMD), haemorrhagic septicaemia, pasteurellosis [2], and recently lumpy skin

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disease (LSD), while Brucellosis is limited in research and reporting.

The measures that can increase cattle productivity and health, such as biosecurity and behaviors linked to the risks of transmission of transboundary diseases, farmer knowledge surveys were undertaken in Cambodia in 2008 and 2010 [3]. The risk management for infectious diseases like FMD can be implemented into a more sustainable pathway for rural development by increasing the value of smallholder-owned large ruminants through nutritional interventions and improved marketing [4]. Brucellosis is commonly viewed as a problem impacting livestock health and economic loss for livestock producers due to losses in milk and meat production, and because of its zoonosis, brucellosis also remains a threat to human health. Eradication programs seldom reimburse livestock producers for animal losses [5]. In Cambodia, the disease is increasingly prevalent among the bovine population, with high zoonotic potential and a negative impact on the national economy. Despite several surveillance and control efforts, the disease is increasingly prevalent among bovine population and humans, causing a huge impact on the national economy [6]. Conversely, it is difficult to measure economic losses due to human brucellosis, such as medical costs, morbidity and reduced work efficiency [7]. Brucellosis hinders livestock production and international livestock circulation due to trade restrictions, which can cause tremendous economic losses [8]. In the past 3 years, the outbreak of LSD has caused average morbidity and mortality rates of 22.28 percent and 6.59 percent, respectively. The postmortem injuries of necropolis animals and emergency killed animals were noted [4].

However, in order to assess cattle production, the condition scoring is a technique used for assessing the body condition of livestock at regular intervals. The purpose of this booklet is to show how the simple technique of body condition scoring can contribute significantly to good husbandry animal, welfare and management of beef cows. This will help to ensure that the cows are in the correct condition for each stage of their annual cycle and that appropriate dietary changes can be made in order to correct any deficiencies [9].

Therefore, the objective of the research is to evaluate the awareness of smallholder farmers on cattle diseases in Svay Rieng and Prey Veng province, Cambodia.

2. Materials and Methods

2.1 Study Area and Period

The survey was conducted in Svay Rieng and Prey Veng provinces. Romeas Haek is a district in Svay Rieng province and Kamchay Mear is another district in Preveng province, which were selected for the study from July 2021 to January 2022.

2.2 Data Collection

A total of 216 households keeping at least 2 cattle were selected to interview according to the methods of Yamane 1967 and 1973. The number of selected households for interviewing in each province is stated in Table 1.

2.2.1 Primary Information

The semi-structural and structural interviews were developed and applied to the interviews with the selected households that have raised the cattle in the target villages. With the observation, each selected household who raised the cattle was observed and checked directly, including body condition or post-mortem, before conducting the interview.

2.2.2 Secondary Information

The related information of the research was collected from key informants such as commune chiefs and village chiefs, and provincial officers.

The number of calves and male and female cattle raised by smallholder farmers were shown in Table 2. Most farmers in Prey Veng and Svay Rieng provinces raised a small number of cattle, including calves, cows and male cattle, with less than 5 heads per household. Some farmers kept 5 to 10 heads, and a small number

Table 1 The number of selected households for interviewing.

Province	District	Commune	Village	Number of cattle households	Number of interviewed households
Svay Rieng	Romeas Haek	Koki	Tropeang Skoun	96	27
			Prey Kdoey	100	28
		Ampil	Romeas Haek	97	28
			Prey Ousey	100	28
Prey Veng	Kamchay Mear	Krabau	Chou thnoul	105	35
			Troupoung Romeas	110	37
		Cheach	Kanleang Chrouv	60	21
			Tbougn Wat	35	12
Total	2 districts	4 commnunes	8 villages	703	216

Table 2 Cattle numbers raised by smallholder farmers (%).

Number	Province	Less than 5 heads	5-10 heads	10-15 heads	15-20 heads	More than 20 heads
Calves	Prey Veng	83.33	10	2.22	1.11	3.33
	Svay Rieng	88.3	10.64	-	1.06	-
Female cattle	Prey Veng	78.90	16.51	1.84	0.92	1.84
	Svay Rieng	91.59	7.48	0.94	-	-
Male cattle	Prey Veng	80	20	-	-	-
	Svay Rieng	100	-	-	-	-

of other farmers raised 10 to 15 calves, or 15-20 or more than 20 heads, while 20% of farmers in Prey Veng were able to raise 5-10 male cattle per household.

2.3 Data Management and Data Analysis

The answers of each questionnaire were entered into the Microsoft Excel, cleaned and coded accordingly. In order to make the analysis process, Minitab version 16 was used to perform descriptive statistics such as mean calculation, frequency, and two-sample t-test for body scores.

3. Result

According to Table 2, the number of cattle raised with less than 5 heads of in Svay Rieng was higher on calves of 83.4%, female cattle of 91.6% and male cattle of 100%, as compared to the number of cattle raised on calves of 83.3%, female cattle of 78.9% and male cattle of 80%, respectively, in Prey Veng province However, for calves, female cattle, and male cattle, the number of cattle raising with more than 5 heads in Svay Rieng was lower than in Prey Veng province. In both Svay Rieng and Prey Veng provinces, there were three types of cattle raising. Based on Fig. 1, the percentage of cattle families using confinement at 70% and free range at 40.9% in Prey Veng province was higher than that in Svay Rieng province, which was 48.6% for confinement and 15.6% for free range. However, the application of tying for cattle families in Svay Rieng was more common as compared with that in Prey Veng province.

Fig. 2 shows that for method of feeding cattle raised by farmers in Prey Veng and Svay Rieng provinces

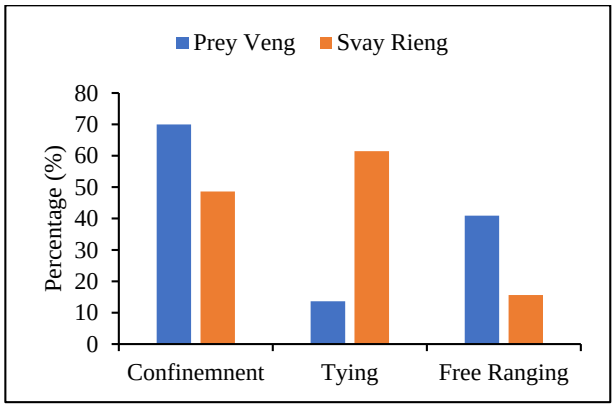

Fig. 1 Household of cattle raising system.

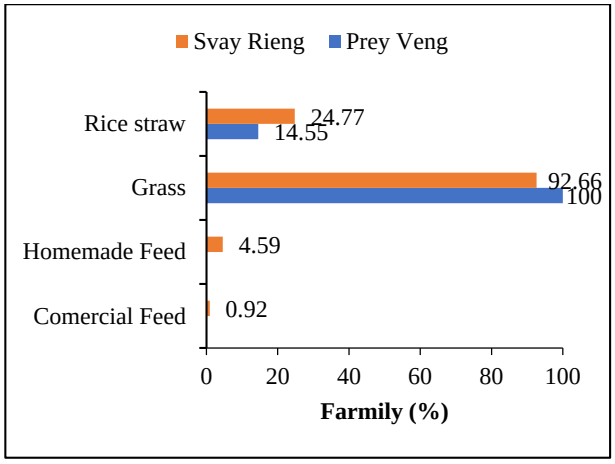

Fig. 2 Method of feeding cattle.

The utilization of grass for feeding the cattle was more common than for the families who used rice straw, homemade feed or commercial feed.

It is shown that the percentage of farmers in Prey Veng and Svay Rieng who bought the cattle in the village was higher than that of companies, middlemen, family heritage and passing from other farmers (Fig. 3).

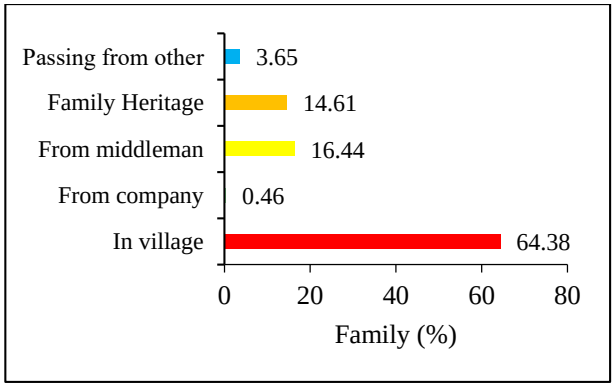

Fig. 3 Source of cattle raised by farmers.

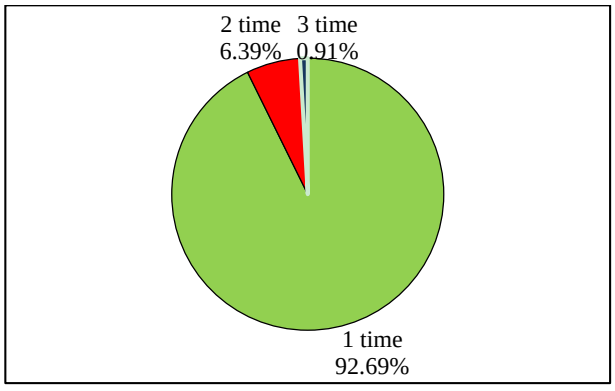

Fig. 4 Times of cleaning barn and equipment per day.

The frequency with which farmers in Prey Veng and Svay Rieng cleaned their barns and equipment was depicted in Fig. 4. One cleaning per day was preferable to two and three cleanings per day. According to Fig. 5, the majority of farmers (74% of them) pile the cattle manure in one location, while others (10% to 30%) compost it or store it in a trench. Fig. 6 showed that the numbers of farmers in both provinces of Prey Veng and Svay Rieng province who experienced the cattle disease outbreak were higher than those of some families who said no.

Farmers could identify the clinical symptoms of FMD as shown in Fig. 7, which mainly included leg lesions, salivation, anorexia—which was more common than fever-blisters, nail ulcers, and painful, red, blister-like lesions on the tongue. The clinical symptom of LSD, which was more prevalent than fever and thinner in the cattle's bodies, appeared in Fig. 8 and was recognized by families on the skin nodules. Fig. 9 showed that

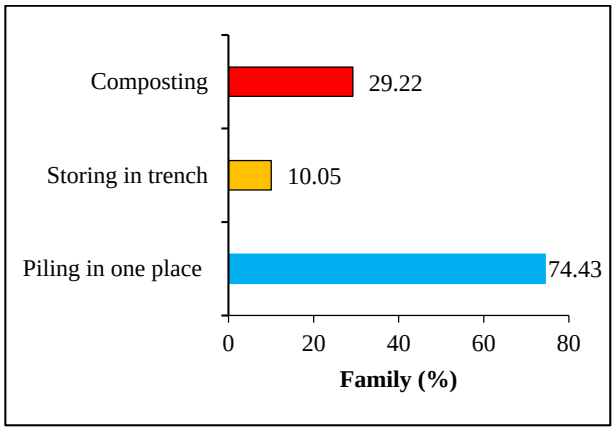

Fig. 5 Waste management.

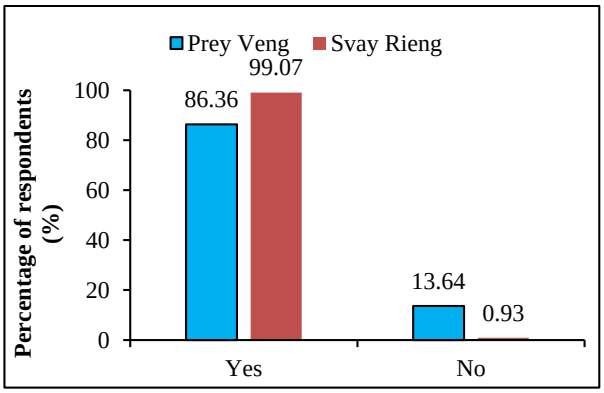

Fig. 6 Cattle disease experienced.

when their animal gets infected, the percentage of respondents who report it to village animal health worker was higher than the percentage who treat the animal themselves or separate sick animals.

The body condition score of cattle in Prey Veng and Svay Rieng provinces was significantly different for body scores of 2 and 3 as compared with body scores of 1 and 4 ($p < 0.01$).

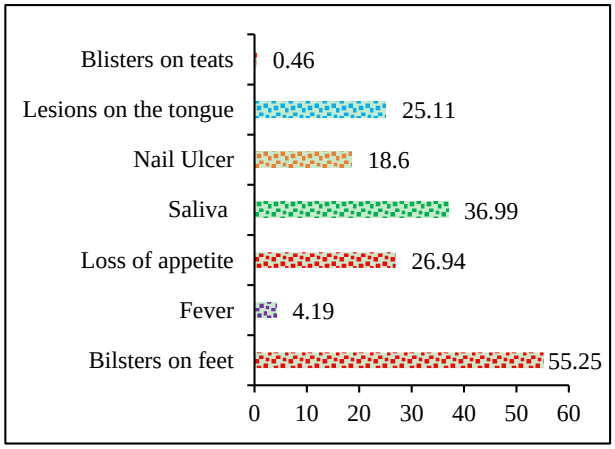

Fig. 7 Clinical sign of FMD recognized by smallholders

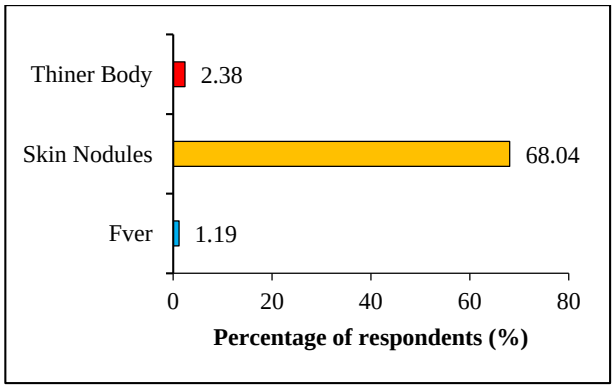

Fig. 8 Clinical Sign of LSD recognized by smallholders.

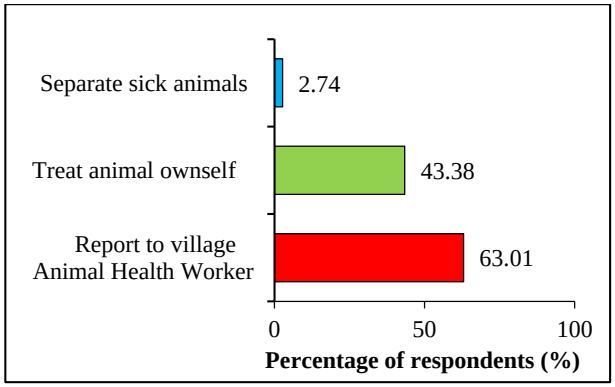

Fig. 9 The activity of the household when their animal gets infected.

Table 3 Cattle BCS (Body Condition Scores).

Body score	Svay Rieng		Prey Veng	
	#Head	%	#Head	%
1	1	0.67	7	4.67
2	37	24.67	69	46.00
3	96	64.00	67	44.67
4	16	10.67	7	4.67
Total	150	100	150	100
Chi-square	22.84			
p-value	0.000			

High significant difference in column, if $p \leq 0.01$.

Table 4 Relationship between cattle sex and body condition scores.

BSC	F		M	
	#Head	%	#Head	%
1	6	3.21	2	1.77
2	66	35.29	40	35.40
3	101	54.01	62	54.87
4	11	5.88	9	7.96
5	3	1.60	0	0.00
Chi-square	2.83			
p-value	0.587			

According to Table 4, animal sex and body condition ratings are associated ($p > 0.05$). The average BCS for healthy cattle in Svay Rieng province was significantly higher ($p < 0.01$) than the average BCS for healthy cattle in Prey Veng province (Fig. 10).

Foot and mouth disease, lumpy skin disease, and other diseases were observed among the cattle observed in Svay Rieng province.

Vaccination used by farmers to prevent infectious diseases in Prey Veng and Svay Rieng provinces, as described in Fig. 11 that vaccination against FMD was

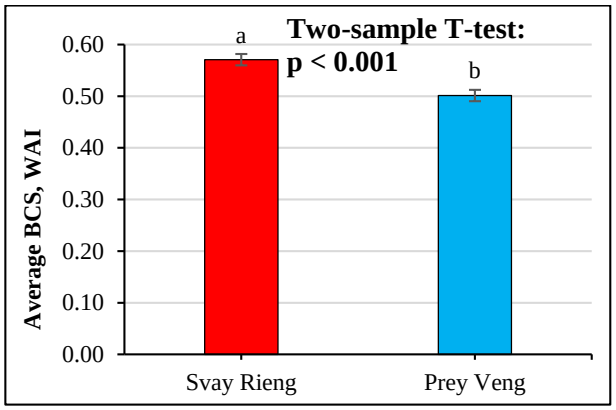

Fig. 10 Body Condition Score for health.

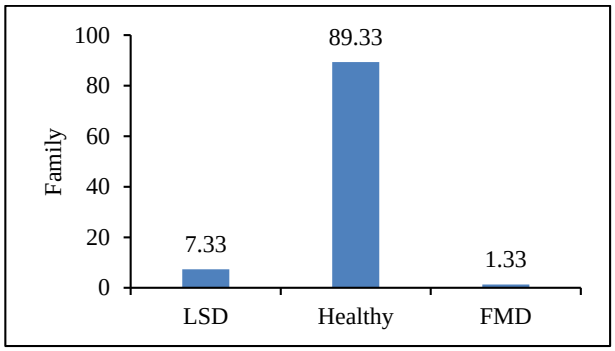

Fig. 11 Case of cattle disease occurrence in Svay Rieng Province.

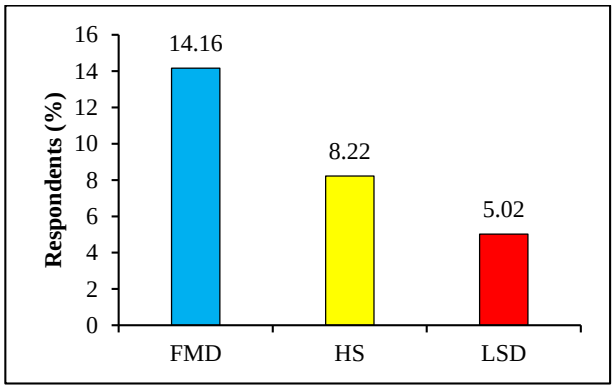

Fig. 12 Vaccination used by famers.

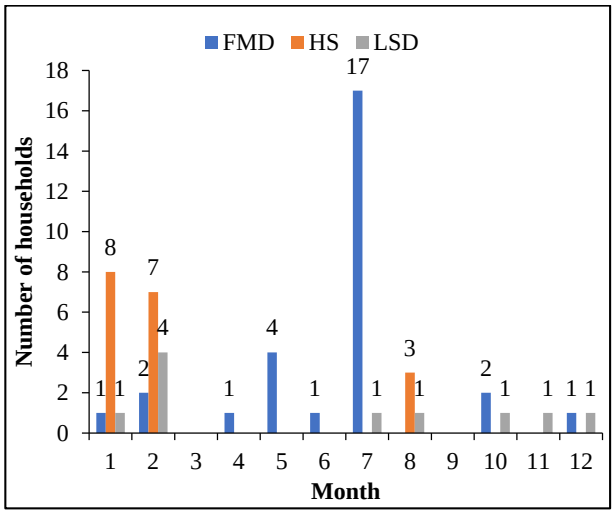

Fig. 12 Calendar of cattle infectious disease vaccination.

higher than vaccination against HS disease and LSD. The vaccination rates for FMD, HS and LSD were 14.16%, 8.22% and 5.02%, respectively.

The seasonal vaccination schedule for cattle in the provinces of Prey Veng and Svay Rieng is shown in Fig. 12, which also shows that FMD in July 2021 had higher frequencies than HS disease and LSD.

4. Discussion

The targeted surveillance of infections was selected for animal testing for brucellosis with 120 blood samples randomly collected from cattle in the six project villages in April 2008 for the presence of *Brucella abortus*, and the results were negative on both the bovine antibody rapid test and the rose Bengal testing [2]. A total of 520 individuals were surveyed from 143 farms (15 small ruminant flocks, 117 beef cattle herds and 11 dairy cattle herds). Brucellosis seroprevalence in beef cattle and small ruminants was respectively 2.6% (0.7-7.9) and 13.3% (2.3-41.6). Lack of disinfectant use (64.3%-90.9%) and consumption of placenta by farmers (40%-80.8%) were frequent among farms [10]. A total of 520 individuals were surveyed from 143 herds. Brucellosis herd-level seroprevalence for beef cattle and small ruminants (goats and sheep) was 2.6% (3/117) and 13.3% (2/15) respectively. Q fever herd-level seroprevalence for beef cattle, dairy cattle, and small ruminants was 4.3% (5/117), 27.3% (3/11) and 33.3% (5/15) respectively. This study identified a significant burden of brucellosis and Q fever among small ruminants and dairy cattle at the Thai-Cambodian border [11]. The FMD outbreaks occurred every year during the study period, with a morbidity rate of over 30%. Isolations of first infected cattle from the household herd were not practiced, with treatment identified as the first preference intervention. Farmers often assisted other farmers to restrain and treat infected cattle both before (57%) and after (43%) their own cattle were infected [12].

In semi-arid tropical areas, livestock rearing offers a means of enhancing livelihoods and lowering poverty. Low livestock productivity, meanwhile, has impacted this contribution. The inability to comprehend the dynamics of smallholder breeding choices has contributed to the failure of the majority of livestock programs, among other factors. In order to assess the effects of a research project looking at measures that can increase cattle productivity and health, including biosecurity and behaviors linked to risks of transmission of

transboundary diseases, farmer knowledge surveys were carried out in Cambodia in 2008 and 2010.

These results showed that the farmers had knowledge, type of raising, type of feeding, location of cattle bought, hygiene, waste management, cattle disease, BSC and clinical signs. In addition, the cattle disease experienced by farmers in Prey Veng and Svay Rieng provinces was 7.37% and 92.63% among the highest 5.

5. Conclusion

The study assessed smallholder farmers' knowledge of cattle production management and situation, infectious disease, and zoonotic disease. It can be concluded that the introduction of knowledge among cattle includes the following: number of cows; calves; bulls; female cattle; type of raising; type of feeding; location of cattle bought; hygiene; waste management; cattle disease; body score condition; and clinical signs. It had provided awareness to the public about the health risks of the disease, as it is a zoonotic disease. The outcome benefited farmers who kept their cattle for family income, socioeconomic purposes, and private cattle farms that used valuable low-cost agricultural byproducts in their region.

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