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Improving Livestock Health Through the Implementation of Prevention and Treatment of Foot and Mouth Diseases

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Abstract

Community service activities aim to transfer knowledge and technology related to the prevention and treatment of foot-and-mouth disease. The activity was carried out on June 22, 2025, at the Gemah Ripah livestock group, Jatikuwung, Gondangrejo, Karanganyar. The method used in the community service activities was Participatory Action Research (PAR). The community service began with an initial visit to the livestock group to identify the problems farmers faced. The activity continued with a group discussion on foot-and-mouth disease and its prevention and treatment. The following agenda item was to practice with a chopper machine and implement biosecurity using an electric tank. Monitoring and evaluation were conducted to monitor livestock health after the program. The results of the community service activity showed that 81.75% of livestock group members were of productive age, the majority of farmers were junior high/high school graduates, and they had an average of 6-10 years of livestock experience. The morbidity of foot and mouth disease reached 88.9% with a mortality rate of up to 5.5%. Implementation of *biosecurity* in livestock groups is still low (18.75%), and vaccination has been carried out by 43.75% of livestock breeders. 83.3% of farmers handled sick livestock themselves. Through group discussions and practical activities, farmers' knowledge increased by 60.6%. The conclusion is that this community service activity improved farmers' knowledge, which can serve as a basis for disease prevention and management.

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INTRODUCTION

Foot and mouth disease (FMD) is a serious and highly contagious animal disease caused by a virus belonging to the genus Aphthovirus, family Picornaviridae (Rahman et al., 2025). The disease affects all cloven-hoofed animals, including cows, sheep, goats, camels, deer, and pigs (Zewdie et al., 2023). FMD is a concern for many countries in the world because it can spread quickly and cause economic losses Bijari et al., (2025) which

is significant. This disease can be very debilitating for animals, which will ultimately result in loss of meat and milk production and death.

Jatikuwung Village, Gondangrejo District, Karanganyar Regency, Central Java Province, is one of 13 (thirteen) villages in Gondangrejo District, which is 25.4 km from the district capital via Jl. Ring Road. Gondangrejo District is one of 17 (seventeen) districts in Karanganyar Regency. Geographically, Jatikuwung Village is bordered to the west by Selokaton Village, to the north by Rejosari Village, to the east by Jeruk Sawit Village, and to the south by Wonorejo Village. The Regency Government strongly supports beef cattle farming as a primary business and source of income to improve welfare. Data from the Central Statistics Agency (BPS) (2025) shows the beef cattle population in Karanganyar over the past 2 years: 52,388 heads in 2023 and 55,007 heads in 2024. This indicates that the beef cattle farming business in Karanganyar is very promising in terms of profits and sustainability.

Gemah Ripah Livestock Farmers Group in Jatikuwung, Gondangrejo, Karanganyar, is a livestock farming group engaged in the breeding and fattening of SIMPO and LIMPO beef cattle. The KTT meetings are held regularly every month and attended by the management and members of the Gemah Ripah KTT. The beef cattle farming business at the Gemah Ripah KTT in Jatikuwung, Karanganyar, is experiencing declining productivity due to the FMD outbreak affecting the farmers' cattle. The cattle are experiencing declining health and reduced appetite and are thin, even dying or being forced to be slaughtered due to FMD. This occurs because the farmers at the Gemah Ripah KTT do not have the knowledge and skills to prevent and treat cattle in the event of an FMD outbreak. Even cattle that have recovered from the disease can act as carriers (Aslam and Alkheraije, 2023). Preventive measures and treatment are crucial to managing the disease. This community service activity aims to transfer knowledge, technology, and applications for the prevention and treatment of foot-and-mouth disease.

METHODS

The Tropical Animal Production and Disease Research Group team, along with the Gemah Ripah Livestock Farmers Group (KTT) in Jatikuwung, Gondangrejo, Karanganyar, conducted a community service activity on June 22, 2025, attended by 16 members of the livestock group. The method used in the community service activities was Participatory Action Research (PAR). The steps taken include surveying the livestock group's condition, analyzing existing problems within the groups, planning problem-solving, implementing activities, and maintaining sustainability. These steps are then categorized into three stages: preparation, implementation, and monitoring and evaluation. The preparation phase begins with a visit and survey of the livestock groups participating in the activities to analyze existing problems, plan problem-solving, and socialize the activities. The socialization phase results in an agreement on the program, implementation time, and location. The proposing team prepares the equipment and questionnaires to be used during the community service activities.

The activity began with a questionnaire (pretest) to assess farmers' level of understanding. The activity continued with a Focus Group Discussion (FGD) with the proposing team to transfer knowledge related to the prevention and management of foot-and-mouth diseases. The next activity included the practical application of technology in the use of chopper machines and biosecurity practices. The community service concluded with a post-test questionnaire to assess the farmers' understanding after the activity.

Monitoring and evaluation were conducted after the community service activities were implemented. This activity aimed to monitor livestock health after the service. Further discussion related to challenges encountered in implementing disease prevention and

control was conducted. Evaluation of activities with the livestock group to ensure the sustainability of disease prevention and management to keep livestock healthy. The flowchart of the methods used in the community service activities is presented in Figure 1.

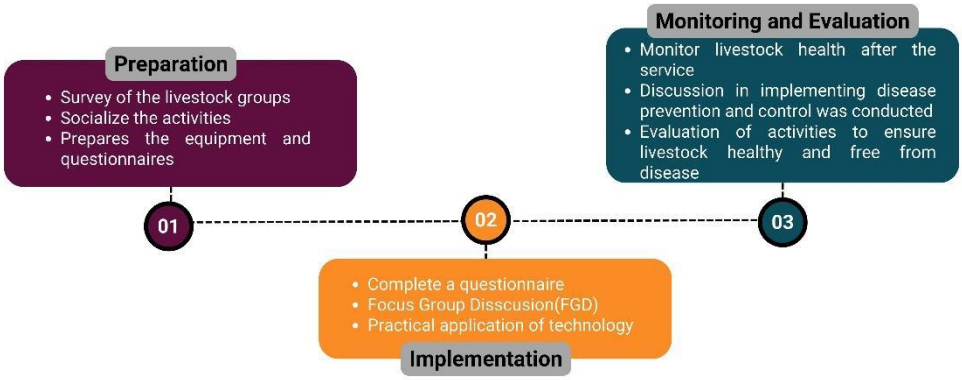

Figure 1 The flowchart of the methods used in the community service activities

RESULTS AND DISCUSSION

Our partner livestock group is the Gemah Ripah Livestock Farmers Group (KTT), a livestock farming group specializing in breeding and fattening SIMPO and LIMPO beef cattle. It is located in Jatikuwung, Gondangrejo, Karanganyar. SIMPO cattle are a cross between Simmental cattle and Ongole cross (PO) cattle, while LIMPO cattle are a cross between Limousin cattle and PO cattle (Riyanto et al., 2024). Mr. Suradi chairs this livestock farming group and has 20 livestock farmers as members. Partners (16 people during the community service activities) together with the Research Group on Animal Production and Disease. Conduct further discussions regarding the problem of foot and mouth disease in livestock. Foot and mouth disease is a viral disease with a morbidity rate of up to 100% (Sudarsono, 2022) resulting in a very high transmission rate. Mortality rates reach 20% or even higher in young livestock. Disease prevention and control efforts are essential to prevent healthy livestock from contracting the disease and to prevent its recurrence.

Cattle are savings for farmers that can contribute to the economy. Diseases that reduce production and even cause death can result in significant losses for farmers (Pawestri et al., 2020). The characteristics of breeders and livestock in the Gemah Ripah livestock group are presented in Tables 1 and 2, respectively.

Table 1 Characteristics of members of the Gemah Ripah livestock group

Parameter	Respondent	Percentage (%)
Age (years)		
a. 0-14	0	0
b. 15-60	13	81.3
c. >60	3	18.7
Education		
a. No school	1	6.3
b. SD/MI	5	31.3
c. Junior High School	7	43.7
d. High School/Vocational	3	18.7
School/Senior High School	0	0
e. Diploma	0	0
f. Masters		

Livestock farming experience (years)			
a.	≤1	2	12.5
b.	2-5	2	12.5
c.	6-10	9	56.3
d.	>10	3	18.7

The majority (81.3%) of the members of the Gemah Ripah livestock farming group are aged between 15 and 60. This indicates that the farmers are within the productive age range. Farmers within the productive age range have greater energy and a greater work ethic. Pawestri et al., (2023) compared to farmers aged >60 years. 43.7% of farmers are high school/vocational school/senior high school graduates. The level of education of farmers influences their ability to receive/seek new information. The higher the level of education, the more information, technology, and innovation can be applied (Kurnia et al., 2019). Most KTT Gemah Ripah farmers have more than 5 years of livestock farming experience. 56% of farmers have worked in the livestock sector for 6 to 10 years, indicating their experience.

Table 2 Livestock information in the Gemah Ripah livestock group

	Parameter	**Number of Livestock (Heads)**	**Percentage (%)**
Age			
a.	calf	1	5.6
b.	Virgin/prospective	2	11.1
c.	Broodstock	6	33.3
d.	Stud	9	50
Gender			
a.	Male	11	61.1
b.	Female	7	38.9

Community service activities on the theme of preventing and handling foot-and-mouth disease. The community service program for cattle at the Gemah Ripah Livestock Group in Jatikuwung, Gondangrejo, Karanganyar, held on June 22, 2025, is expected to address the problems faced by livestock farmers. The community service activity went smoothly, and the livestock group members were very enthusiastic about participating in the series of activities. The activity began with a forum group discussion (FGD) regarding FMD and its prevention and control efforts. The activity continued with the practical use of the machine chopper and the implementation of biosecurity. In the form of barn sanitation. Cattle infected with FMD show symptoms of lesions on the tongue and gums, making it difficult for the animals to eat whole feed. Chopper: This can help chop green fodder into smaller pieces, making it easier for livestock to eat. Spraying pens with disinfectant can minimize the number of infections and prevent secondary infections from other disease agents. Multivitamins and minerals given to livestock serve as supportive therapy that can boost their immune systems. Machine grafts, choppers, sprayers, minerals, vitamins, and disinfectants are expected to help farmers prevent and manage FMD incidents in their herds. The community service activity began and ended with a questionnaire to determine the farmers' level of understanding. Documentation of the activities during the FGD and practical sessions is presented in Figure 2.

(a) (b)

Figure 2 (a) Group discussion forum with the Gemah Ripah livestock group and (b) Practical use of grass chopper and biosecurity

Foot-and-mouth disease (FMD) is no stranger to livestock farmers. Since its re-emergence in 2022 (Budiono et al., 2023), after 32 years of FMD-free Indonesia, the disease has become a scourge in the livestock and animal health sectors. Incidence of the disease declined in 2023 but increased again in late 2024 and early 2025. The high morbidity rate means FMD can affect all cloven-hoofed livestock, including cattle, goats, sheep, buffalo, and pigs. Cattle in the Gemah Ripah livestock group were also not spared by the PMK disease, with 88.9% of cases recorded and 5.5% of livestock dying. The high morbidity rate is due to the high contagiousness of FMD. Dinana et al. (2023) also stated that FMD has a high transmission rate. Symptoms include fever, lameness, canker sores, and loss of appetite. According to the research done Kartono and Assauwab (2023) that the symptoms include fever accompanied by lesions in the mouth, gums, tongue, and nails, causing the livestock to suffer pain, become paralyzed, and collapse, and experience hypersalivation and a decrease in appetite. Data on the incidence of FMD disease in the Gemah Ripah livestock group are presented in Table 3.

Table 3 Occurrence foot and mouth disease in the Gemah Ripah livestock group

No.	Parameter	Amount
1.	Number of breeders (people)	16
2.	Number of livestock (heads)	18
3.	Infected livestock (tail)	16
4.	Morbidity (%)	88.9
5.	Mortality (%)	5.5

High morbidity and mortality rates due to foot and mouth disease cause economic losses (Humphreys et al., 2025). Prevention and treatment are needed to prevent disease recurrence. Communication, information, and education (KIE) and the implementation of biosecurity can be done to prevent and control FMD disease (Ariesantya et al., 2024; Viastika (2023).The implementation of IEC for livestock farmers makes them more responsive and observant of disease occurrences. The sooner a disease is detected, the better the recovery rate. Only one farmer received socialization activities. These results indicate a lack of communication, information, and education received. The data relates to the handling actions taken by farmers in the event of an outbreak. Only one farmer checked his livestock when they were sick, while the other 83.3% took their own measures. Handling livestock independently without proper drug use regulations can have a negative impact on livestock. *Biosecurity* is key to successful disease prevention and control. Members of the Gemah Ripah livestock group are still predominantly traditional farmers. Less than 50% of farmers implement biosecurity on their farms. Information on the implementation of disease prevention and management in the Gemah Ripah livestock group is presented in Table 4.

Table 4 Implementation of disease prevention and management in the Gemah Ripah livestock group

Parameter	Respondent	Presentation (%)
Socialization	1	6.2
Traffic control	3	18.7
Sanitation	3	18.7
Vaccination	7	43.7

This community service activity aims to transfer knowledge and technology to the Gemah Ripah livestock group, enabling them to detect FMD early, provide first aid, and implement disease prevention and control efforts. The success of the community service activity was measured using a questionnaire completed by farmers before and after the community service. Data on farmers' level of understanding before and after the community service are presented in Table 5.

Table 5 Level of understanding of livestock farmers before and after community service was carried out

No	Parameter	Before Counseling (%)	After Counseling (%)	Increase (%)
1.	Livestock health	12.5	75	62.5
2.	Characteristics of sick livestock	75	93.75	18.75
3.	Foot and mouth disease	25	81.25	56.25
4.	Causative agent: foot-and-mouth disease	87.5	100	12.5
5.	Clinical symptoms foot-and-mouth disease	12.5	75	62.5
6.	Mode of transmission foot-and-mouth disease	6.25	87.5	81.25
7.	The impact of foot-and-mouth disease	18.75	87.5	68.75
8.	Prevention and treatment of foot-and-mouth disease	6.25	93.75	87.5
9.	Biosecurity	6.25	93.75	87.5
10.	Vaccination	25	93.75	68.75

Based on questionnaires completed by farmers before and after the community service program, there was an increase in farmer knowledge across all parameters. The average increase was 60.6%. This increase in knowledge indicates that the community service program successfully transferred knowledge and technology for the prevention and treatment of foot-and-mouth disease. The results of monitoring livestock health after the community service activities showed that 44.4% of livestock recovered from FMD. This recovery rate is considered low compared to other studies, which reported a recovery rate for FMD of up to 99% (Gunawan et al., 2022). The lowest increase in knowledge was for the parameter causative agent of foot and mouth disease (12.5%). This low increase in knowledge was due to farmers' already understanding of the causative agent of FMD. Conversely, the highest increase in knowledge was for FMD prevention and treatment (87.5%). Farmers were unaware of the measures they could take to prevent and manage FMD. This is consistent with the results of community service activities. Before the community service, the incidence of FMD in livestock groups was high. The incidence

decreased with community service. The evaluation of this activity still requires consistency from livestock farmers in disease prevention and management to increase recovery rates and keep livestock disease-free.

CONCLUSION

The conclusion that can be drawn is that this community service activity is able to increase the knowledge of the livestock group, which can then be used as provisions in preventing and treating diseases. Consistency from farmers in implementing disease prevention and treatment is required to ensure livestock are healthy and free from disease.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

AUTHOR CONTRIBUTIONS STATEMENT

Conceptualization, JR and WP; methodology, WP and YY; formal analysis, AK and MC; writing preparation of the original draft, WP.

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