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BREEDER'S PERCEPTIONS OF GOVERNMENT'S POLICY REGARDING VACCINATION FOR FOOT AND MOUTH DISEASE (FMD) IN BEEF CATTLE
(Case Study in Tikung District, Lamongan Regency)

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ABSTRACT

The cause of Foot and Mouth Disease (FMD), FMD virus (FMDV), is an acute infectious disease that is highly contagious in hoofed animals. In Lamongan Regency, outbreaks of FMD in cattle have led to a decline in population. Despite vaccination programs, breeders' willingness to vaccinate is influenced by perceptions of vaccine safety and effectiveness. Increasing vaccination coverage is hoped to restore FMD-free status in the area. This study aims to provide knowledge about the influence of breeders' perceptions of government policy on FMD vaccination of beef cattle in Tikung Sub-district, Lamongan Regency and to provide knowledge about the factors that influence breeders' perceptions of government policy on FMD vaccination of beef cattle in Tikung Sub-district, Lamongan Regency. This study is a mixed methods study with a sequential explanatory design. The instruments in this study included questionnaires and interview guidelines with data collection techniques of questionnaire distribution and in-depth interviews with informants. While data analysis techniques in the quantitative approach were carried out with univariate and bivariate analysis. And the qualitative approach was carried out using the interactive model according to Miles et al. The results of the study showed that there was a significant positive effect of breeders' perceptions on FMD vaccination policy in beef cattle in Tikung Subdistrict , Lamongan District (significance value of 0.000 (0.000 < 0.05) and t value of 5.894 > t table (1.9858)). Factors such as extensive knowledge of FMD and vaccination programs, personal experience with the disease, and support from the government and livestock groups contribute to positive perceptions of these policies. However, challenges such as concerns about post-vaccination side effects and timing conflicts with breeders' village activities affect participation rates and trust in the program.

Keywords: Breeders' Perceptions, Government Policies, Foot-and-Mouth Disease (FMD) Vaccination

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INTRODUCTION

Foot and mouth disease (FMD), known as *Foot and Mouth Disease* (FMD) or *Apthtae Epizooticae* , is a viral infection that is very contagious and progresses quickly. The cause of this disease is the FMD virus or *Foot and Mouth Disease Virus* (FMDV) from the *Picornaviridae family* and *the Aphtovirus genus* . The incubation period for FMD disease lasts between 2 and 8 days (Amri et al., 2019) . FMD can attack various types of animals with clovens and even hooves such as cows, pigs and goats, as well as wild animals such as elephants and deer. This disease has a morbidity rate of 100%, causes significant economic losses through livestock deaths and reduced productivity, although it is not transmitted to humans (Cameron, 2011) .

Lamongan Regency has great potential in the beef cattle farming sector to meet the needs for animal protein in the region and its surroundings. Even though in 2022 there will be a decline in the beef cattle population, from 117,889 heads in 2021 to 94,151 heads in 2022 and increasing slightly to 96,884 heads in 2023, this is due to the emergence of the FMD outbreak which triggered a *panic selling phenomenon* among breeders. Courage to restart farming is still low amidst concerns about this disease, coupled with limited supply of superior seeds. The first case of FMD was reported in Tikung District in May 2022, where it was thought to have entered through an animal market and the border area between Lamongan Regency and other districts was a risk factor for its spread.

The impacts of FMD include reduced production of livestock breeding, as well as reduced employee productivity and significant financial losses for society. In overcoming this problem, it is necessary to coordinate actions to control and deal with FMD by the veterinary authorities who have the authority. The main strategy includes vaccinating target animals according to applicable regulations, such as the Decree of the Minister of Agriculture regarding emergency vaccination and blanket vaccination to increase animal immunity. The challenge faced is that breeders' attitudes towards the PMK vaccine vary, influenced by varying knowledge and perceptions of the benefits of vaccination, so that a more effective communication approach is needed to increase breeders' awareness and participation in the vaccination program.

Farmers' perceptions of FMD vaccination show significant variations. Some livestock farmers welcome FMD vaccination because they understand its importance in preventing the spread of disease and protecting their livestock. However, there are also those who are still hesitant due to lack of information, concerns about side effects, and perceptions about the high price of the vaccine. A study conducted by Sarsana & Merdana (2022) in Sanggalangit Village, Bali, showed success in increasing the immunity of Bali cattle through vaccination using the Aftopor ® vaccine. This activity involved technical guidance and biosecurity measures which succeeded in inspiring active participation by farmers. On the other hand, Nugroho's (2023) research in the Banyumas area found that the positive views of farmers towards the government's policy on FMD vaccination in dairy cattle had a significant impact on FMD control in the area. The hope is that this research can be used to increase vaccination coverage *by* 80% to form herd immunity *and* it is hoped that in accordance with the 2023-2035 National FMD eradication *road map* it will subside and return Indonesia's status, especially Lamongan Regency, to being free. PMK and to make outbreak areas free, and free areas remain FMD free.

The urgency of conducting research on FMD is very important for several reasons. First, FMD is the most contagious disease and can cause huge losses to the livestock economy, especially in areas such as Lamongan Regency which has a significant livestock population. Second, a better understanding of the epidemiology, spread, and factors influencing farmers' willingness to vaccinate can help in designing more effective control and mitigation strategies. Lastly, by conducting this research, it is possible to increase the availability of information and understanding of farmers about FMD and vaccination, which in turn can increase their participation in disease control programs and encourage the achievement of optimal communal immunity targets.

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State of the Art

Beef cattle

Beef cattle are livestock whose main function is to produce meat. The characteristics of its body are large, it has optimal meat quality, it can grow quickly, its feed efficiency is high, and its marketing is also easy (Sudarmono, 2008) . The contribution of beef cattle to national meat production is very significant, making it a potentially profitable livestock business to develop. Many people keep beef cattle as a form of labor savings to manage land, with a business pattern that includes fattening and maintenance integrated with plantation crops. Prospects and directions of cattle agribusiness (Suryana, 2007) .

Foot and Mouth Disease (FMD)

The cause of FMD is the Apthovirus microorganism originating from a group of Picornaviridae , which has seven immunologically different serotypes: O, A, C, SAT 1, SAT 2, SAT 3, and Asia 1. In Indonesia, the spread of this virus in 1983 was caused by serotype O, which was also detected as the cause of the outbreak in Lamongan Regency in 2022. This virus is able to survive for a long time in the environment, including in bones, glands, milk and dairy products. The incubation period for this disease ranges from 1 to 14 days from infection, with a morbidity rate of up to 100% and low mortality in adult animals, but can reach 50% in young animals. Animals that are susceptible to FMD include ruminants such as cows, buffalo and goats, as well as wild animals such as elephants and giraffes. Although this virus can be transmitted artificially to various types of animals, its role in the spread of FMD in nature is not significant (Ministry of Agriculture, 2022; Asri & Saputra, 2023; Okti et al., 2023; Surtina et al., 2022) .

Government Policy Regarding PMK Vaccination

One important case in animal health policy is dealing with FMD in cattle, which can cause large economic losses (Zahid, 2022) . Prevention by providing education to the public and vaccinating livestock is very important to control the spread of this disease. Vaccination is the process of injecting a vaccine to improve the body's immune system, so that if infected, the body will not experience serious illness or only experience mild illness. Apart from stopping the spread of disease, vaccination also aims to eliminate the disease completely (Gurning et al., 2021) . Implementation of the PMK vaccination policy must comply with applicable *Standard Operating Procedures (POS), including the preparation, biosecurity, vaccination, final vaccination and revaccination stages (RI Minister of Agriculture Decree No. 739, 2022).* The success of policy implementation according to Marilee S. Grindle in Siregar & Prabawati (2022) is determined based on the level of implementation which includes policy content and policy environment.

Perception

Is the stage of receiving news or knowledge by the human control center with the five senses, which is then processed further and produces a response or response. According to KBBI, perception is a direct response to something, while according to Notoatmodjo (2003) , perception is an experience produced through the senses. People have different views even though they see similarities in an object, and these differences influence changes in their behavior (Ngatimin, 2001) . Perception is influenced by internal factors such as emotions, attitudes, experiences, expectations, needs, motivation, and culture, as well as external factors such as contrast, intensity, repetition, and novelty of the stimulus (Notoatmodjo, 2010) . Perceptions are also influenced by financial conditions, close relatives, and a person's level of insight, all of which have an impact on decision making to take health action (Arimbawa et al., 2020) . The *Health Belief Model (HBM)* theory states that changes in behavior can be influenced by perceptions of vulnerability, seriousness, benefits and obstacles to health problems (Surinati et al., 2018; Setiyaningsih et al., 2016) . Appropriate perception of health risks can motivate individuals to take healthier preventive measures or treatments.

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METHOD

Research design

The following study is a mixed methods study, which combines quantitative and qualitative methods to obtain more comprehensive, valid, reliable and objective data (Sugiyono, 2019) . This research uses a sequential explanatory design, starting with collecting and analyzing quantitative data, then continuing with collecting and analyzing qualitative data. The following study aims to analyze how breeders' views influence government policy regarding FMD vaccination in beef cattle and the factors that influence it in Tikung District, Lamongan Regency. Data collection was carried out through questionnaires and face-to-face interviews from February to May 2024.

Population and Sample

The population of this study was 1,512 breeders in Tikung District, Lamongan Regency (*update* January 2024). The research sample was divided into two, namely samples for qualitative and quantitative approaches. The qualitative approach applied *purposive sampling techniques* in selecting informants, namely 2 beef cattle breeders (main informants), 1 inseminator officer (additional informant), and 1 veterinary authority official (key informant). The quantitative approach applies the *Simple Random Sampling method* using Slovin's formula in determining the total sample, then produces a minimum of 95 subjects. The inclusion criteria were beef cattle breeders in Tikung District aged 20 years and over and accepted to be respondents, and the exclusion criteria were individuals who were not beef cattle breeders in Tikung District, aged under 20 years, and refused to be respondents.

Research Instruments

The use of research instruments includes questionnaires and interview guides. The questionnaire, which has been tested for validity and reliability, is used as a written and structured statement guide to analyze the influence of breeders' perceptions of government policy regarding FMD vaccination in beef cattle. Meanwhile, the interview guide was used as a data collection guide during interviews, containing questions about the factors that influence farmers' perceptions of the policy. This instrument is adapted to the research approach, questionnaires are used in the quantitative approach, while interview guides are used in the qualitative approach.

Data Collection Procedures

The techniques used in the following study are in-depth interviews and questionnaires. Interviews Very in-depth interviews (*in -depth interviews*) enable understanding of perceptions, feelings, and intensive subject knowledge. This interview uses guidelines in the form of a flexible list of questions. Meanwhile, the questionnaire, which has been tested for validity and reliability, is used to measure research variables, namely the independent variable (X) is the farmer's perception (vulnerability, seriousness, obstacles and benefits), while the dependent variable (Y) is government policy regarding PMK vaccination (*content of policy* and *context of policy*). Both variables are measured using a Likert scale.

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Data analysis techniques

The techniques in the following study involve quantitative and qualitative methods. Analyzing quantitative data using SPSS version 26 went through three stages: univariate analysis to provide an overview of variable parameters, bivariate analysis was used to identify the relationship between two variables using a simple linear regression test, and classical assumption testing before regression. Meanwhile, qualitative data analysis applies Miles and Huberman's interactive model, which includes collecting data through in-depth interviews and documentation, condensing data to filter relevant information, presenting data to discuss relationships and findings, and concluding answers to questions that have been formulated .

RESULTS AND DISCUSSION

The Influence of Farmers' Perceptions on Government Policy Regarding PMK Vaccination for Beef Cattle in Tikung District, Lamongan Regency

The characteristics of the respondents in this study consisted of 95 beef cattle breeders in Tikung District, Lamongan Regency, who were analyzed based on age, gender, occupation, education, number of cows, and length of farming. The majority of respondents were aged 40-59 years (52.6%), male (98.9%), and worked as farmers (67.4%). The highest level of education was elementary school (44.2%), with the majority owning 1-20 cows (93.7%) and having been farming for ≥ 10 years (96.8%).

The results of validity and reliability testing in the following study show that all question items for the farmer perception variable and government policy regarding PMK vaccination are considered valid. Validity testing using *Pearson's Product Moment correlation* shows that the r value is significantly greater than r table (0.361), confirming that all question items are valid. Apart from that, the reliability test using *Cronbach's Alpha* produced a high value and exceeded the established standards (perception of breeders = 0.837; government policy = 0.954), indicating that the two data constructs are reliable for use in further analysis.

Meanwhile, the results of the classical assumption test in this study indicate that the two variables studied, namely farmers' perceptions of government policy regarding FMD vaccination, meet the assumptions of normality and homoscedasticity. The normality test using *PPlot* and *One-Sample Kolmogorov-Smirnov test* shows that the residuals from the model are normally distributed, with a significance value (0.200) which is greater than alpha (0.05), showing that the residual data is not statistically significant from a normal distribution. Apart from that, the heteroscedasticity test via *a scatter plot* shows that there is no special pattern in the residual points spread above and below zero, indicating that the regression model does not experience heteroscedasticity . Thus, the results of the classical assumption test support the validity of using the regression model in the analysis of this research data.

Table 1. Hypothesis Testing Results

Coefficients [a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	31,406	8,366		3,754	,000
	Breeder Perceptions	1,105	,187	,521	5,894	,000

a. Dependent Variable: Government Policy Regarding PMK Vaccination

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From the results of a simple linear regression analysis test, it can be seen that the farmer's perception (X) has a significant influence on government policy regarding PMK vaccination (Y). Based on the regression coefficient, every one unit increase in farmers' perceptions results in an increase of 1.105 units in government policy regarding FMD vaccination, with a very low significance value (p = 0.000). This indicates that breeder perceptions have a partially positive and significant influence on government policy regarding FMD vaccination. Therefore, the hypothesis which states that there is a positive influence on breeders' perceptions of the PMK vaccination policy can be accepted based on the results of the t test carried out.

The results of the research show that farmers' positive perception of government policy regarding PMK vaccination for beef cattle in Tikung District, Lamongan Regency has a significant influence on their acceptance and support for this policy. This finding is consistent with previous research which shows that breeders' views on FMD vaccination policies have a considerable influence on the implementation and effectiveness of vaccination programs in various contexts, as has been observed in previous studies by Nugroho (2023) , Ditniadry (2023) , Asmoro (2023) , and Basuki et al. (2020) . This emphasizes the importance of positive perceptions in supporting government efforts to mitigate the impact of FMD on the cattle population.

Table 2. Coefficient of Determination Test Results (R^2)

Model Summary [b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,521 [a]	,272	,264	9.15796

a. Predictors: (Constant), Breeder Perception

b. Dependent Variable: Government Policy Regarding PMK Vaccination

Meanwhile, the results of calculating the coefficient of determination (R^2) in simple linear regression analysis show that breeder perceptions are able to explain 27.2% of the variation in government policy regarding PMK vaccination. This means that around 72.8% of the variation in policy is due to other factors and is not in the following study model. Although the influence of farmer perceptions is significant, there are still variations that cannot be explained by these variables in the context of this study.

Factors that Influence Farmers' Perceptions of Government Policy Regarding PMK Vaccination for Beef Cattle in Tikung District, Lamongan Regency

This research shows that beef cattle breeders in the Tikung area have a positive perception of government policy regarding FMD vaccination. Knowledge about FMD among beef cattle breeders in Tikung District shows that information about this disease is quite widespread. FMD is an infectious disease and has a huge impact on livestock health and productivity. Effective dissemination of information about FMD is essential to ensure that farmers can recognize the signs of the disease and take the necessary preventive measures. Various sources of information, outreach and counseling from the village government, village announcements and breeder WhatsApp groups, as well as online media shows that breeders access information in various ways. Farmers with higher education tend to get information from digital media and formal education, while breeders with low education rely more on

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local media and oral communication. This highlights the importance of a multichannel approach in disseminating information about FMD to reach all farmers, regardless of their age or level of education.

Direct experience with FMD greatly influences farmers' perceptions of the dangers of this disease. Farmers who have experienced an FMD outbreak have a higher awareness of the importance of preventive measures, including vaccination. Those who have never experienced FMD directly may feel less urgency but are still aware of the risks posed by FMD. This first-hand experience can be an important driver of participation in vaccination programs. Farmers who have experienced large losses due to FMD will be more likely to support and participate in vaccination programs to prevent the same thing from happening in the future. Therefore, experience with PMK must be taken into account when designing outreach and education programs about vaccination.

Extensive knowledge about the FMD vaccination program shows that the outreach and communication efforts carried out by the government and the Animal Husbandry and Animal Health Service have been successful in reaching many farmers. Information sources that include outreach and counseling from the village government, village announcements and breeder WhatsApp groups, as well as online media shows that various communication channels are used to disseminate this information. However, there are differences in the way information is received. Younger and more educated farmers tend to get information from digital and formal media, while older or less educated farmers rely more on oral communication and local media. This shows that it is important to use various communication channels that suit breeder preferences and habits to ensure information about FMD vaccination is well received.

Positive perceptions of the FMD vaccination policy reflect farmers' understanding of the importance of this program to prevent the spread of disease and protect the health of their livestock. All respondents held views in favor of this policy and saw it as a useful and important step. Awareness of the importance of vaccination is supported by personal experience with FMD and the information they receive. Farmers who have experienced FMD outbreaks really support this program because they are aware of the negative impacts of this disease. Meanwhile, other breeders, even though they may have never experienced FMD directly, still understand the importance of vaccination as a preventative measure.

Supporting factors identified by breeders include support from the government, breeder groups, the Animal Husbandry and Animal Health Service. This structural support plays an important role in the success of the vaccination program. Livestock groups and the Animal Husbandry and Animal Health Service can function as intermediaries providing information and technical assistance to farmers, while the government can provide the resources and facilities necessary for vaccination implementation. However, there are obstacles that must be overcome, such as post-vaccination care, doubts about vaccine side effects. Another obstacle when it coincides with other activities (rice fields, mosques) and there are cases of disease so that cows cannot be vaccinated is a significant obstacle for some farmers. Apart from that, doubts about the side effects of the vaccine also hinder participation. Uninformed breeders may be hesitant or afraid of possible side effects, thereby delaying or avoiding vaccination. To overcome this obstacle, it is important for the government and the Animal Husbandry and Animal Health Service to provide clear and complete information about vaccination, including the benefits and potential risks. Continuous education and intensive counseling can help reduce concerns and increase farmer participation in vaccination programs.

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The benefits of FMD vaccination are recognized by the majority of breeders, especially those who have direct experience with FMD. Vaccination is seen as an investment to maintain livestock health and economic stability. Farmers report that vaccination helps reduce the risk of cow infection and death, keeps livestock healthy, and prevents the spread of disease. reduced risk of infection, improved health, and improved reproduction of cows after implementing FMD vaccination.

The socialization of the vaccination program is considered quite good and easy to understand, but the use of many media that are easily accessible is an important note that needs to be considered in disseminating information. This shows that while communication efforts are already underway, there is still room for improvement. Clear and timely information is essential to ensure farmer participation in vaccination programs. Farmers need information that is easy to access and understand to make informed decisions regarding vaccination of their livestock. The use of various communication media that suit breeder preferences can help disseminate information more effectively and efficiently.

Trust in the government is an important factor in the success of the vaccination program. The majority of respondents showed a fairly high level of trust in the government in terms of handling FMD and the vaccination program. However, they expect consistency in program implementation. The government needs to ensure that breeders receive vaccination services consistently in accordance with the vaccination schedule and in the context of eradicating FMD in an area so that it can change the decision from outbreak areas to free areas in accordance with Minister of Agriculture Decree number 311 of 2023.

Suggestions from livestock breeders are that the government communicates more frequently with information and education to livestock breeders, as well as post-vaccination monitoring and evaluation. Using communication media that suits breeder preferences can help disseminate correct and more effective information, as well as forming volunteers or village cadres as the spearhead in conveying information about PMK.

By overcoming obstacles and improving communication and program implementation, the government can ensure that FMD vaccination is accepted and supported by farmers. This will help maintain livestock health, reduce the risk of FMD outbreaks, and improve the welfare of breeders as well as increase the interest and motivation of breeders to breed again. This research provides a solid foundation for designing more efficient and sustainable vaccination policies and programs in the future, to support the main performance indicators of the Lamongan Regency Livestock and Animal Health Service, namely increasing livestock populations and farmer welfare.

This research is consistent with the findings of Kamalasari et al. (2019) which highlights internal factors such as age, education, total livestock, experience in raising livestock, and income as the main determining elements in the farmer's decision to carry out vaccination activities for Bali cattle, external factors such as the function of extension mediators and institutional support also have a significant influence in influencing the decision. According to Darmawi (2011) , education plays a crucial role in influencing the way farmers think and make decisions, with formal and non-formal education providing a stronger foundation in facing new challenges such as vaccination programs. Dewi et al. (2015) added that non-formal educational background can increase rationality in decision making, while Saswita et al. (2013) emphasizes the important role of extension workers in providing information and guiding farmers towards informed decisions. Institutional support, as highlighted by Suciani et al. (2015) , also plays an important role in providing encouragement and access for farmers to follow recommended vaccination programs.

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Thus this study concludes that good knowledge about FMD and vaccination, support from the government and livestock groups, as well as personal experience with FMD are the main factors that shape this perception. However, there are several obstacles that need to be overcome to increase the effectiveness of the program. Concerns about vaccine side effects need to be addressed through IEC. The government and the Animal Husbandry and Animal Health Service also need to maintain consistency in implementing the vaccination program to build breeders' trust. Maintaining the cold chain of vaccines must also be considered, so that the effectiveness of the vaccine is maintained. Supervision of livestock traffic and animal markets must continue to be conditioned by tightening the entry and exit of livestock from outside the area. Growing interest and motivation to raise livestock again for breeders whose cattle have been exposed to FMD and motivating the emergence of new breeders (millennials) because cattle farming can be done in rural areas and is very profitable, which will ultimately increase the cattle population in Tikung District.

CONCLUSION

The results of this research show that there is a significant positive influence from farmers' perceptions of government policy regarding FMD vaccination in beef cattle in Tikung District, Lamongan Regency, with a significance value (Sig.) of 0.000 (0.000 < 0.05) and at value of 5.894 > t table (1.9858). Meanwhile, the perception of beef cattle breeders in Tikung District, Lamongan Regency regarding government policy regarding PMK vaccination is influenced by several key factors. Extensive knowledge about FMD and vaccination programs, personal experience with the disease, and support from the government and livestock groups are factors that support positive perceptions of this policy. However, obstacles such as concerns about post-vaccine side effects and the timing of vaccination implementation at the same time as livestock farmers' activities in the village affect the level of participation and trust in the program.

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