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# The Effect of Economic Regulations on Foot-and-Mouth Disease on the Cattle Industry in Muria Raya: An Analysis of Commercial and Socio-Economic Losses Families of cattle farmers who have suffered

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***Abstract***

*The Foot and Mouth Disease (FMD) outbreak in Central Java has raised serious concerns regarding high transmission rates, economic losses, and weak biosecurity at the farmer level. This situation calls for more effective regulations and management strategies from the government. This study aims to analyze the economic impact of the FMD outbreak, identify the factors causing the spread of the disease, and evaluate the socio-economic implications for farmers and the community. The study employs a qualitative approach, utilizing data collection methods such as observation, in-depth interviews with farmers in the Pati, Rembang, and Kudus districts, and literature review. Data were analyzed using descriptive analysis techniques, including categorization and data reduction. The results of the study indicate that the FMD outbreak in Muria Raya was caused by the entry of infected livestock through cattle traders from East Java and Aceh, exacerbated by the government's delayed response and limited access to vaccination. The Central Java Provincial Government has issued various regulations and formed a Rapid Response Unit (URC), but its implementation faces obstacles in the form of uneven vaccine distribution. The economic impacts include direct losses such as livestock deaths and reduced productivity, as well as indirect losses such as supply chain disruptions and loss of market access due to zoning policies and the closure of animal markets for over a month. The socio-economic implications of the PMK outbreak are significant for livestock farmers' families, including reduced income, increased costs for traditional medicine, forced borrowing, and education expenses for children. This study concludes that handling FMD outbreaks requires an integrated approach through regulatory strengthening, responsive government economic support, and a risk factor-based prevention system. Successful control depends heavily on synergy between the government, farmers, and stakeholders to minimize socio-economic impacts.*

***Keywords****: Foot-and-Mouth Disease, Economic Regulations, Social Implications*

## INTRODUCTION

The outbreak of Foot-and-Mouth Disease (FMD) that has hit Indonesia since May 2022 has caused significant economic losses to the national livestock sector (Firman et al., 2022) (Rohma et al., 2022). The estimated economic losses due to FMD reached Rp 40 trillion, including a decrease in production, restrictions on livestock movement, and disease control costs (Adhiem, 2025). The spread of FMD is widespread and results in deaths in animals, and delays in animal distribution can trigger losses by farmers (Ombudsman of the Republic of Indonesia 2022). The enactment of Law Number 41 of 2014 concerning Animal Husbandry and Health caused controversy in practice in the field. This is because the government's delay in

handling the outbreak of Foot and Mouth Disease in animals causes the spread of FMD and results in deaths in animals, and delays in animal distribution can trigger the number of losses by farmers (Ombudsman of the Republic of Indonesia 2022). Data from the Ministry of Agriculture shows that this outbreak has spread to 21 provinces, with the number of cases reaching more than 400,000 livestock, with Central Java being one of the provinces with the highest spread rate (Ministry of Agriculture 2022). This situation is aggravated by zoning policies and mobility restrictions that halt livestock trade, particularly ahead of Eid al-Adha, the peak period of beef demand. Paradoxically, during this crisis, the government opened meat imports to meet domestic needs, while thousands of local farmers incurred losses because their livestock could not be marketed. marketed. (Merdeka 2024).

Previous studies have shown that animal disease outbreaks have multidimensional economic impacts that include direct losses (direct losses) in the form of livestock deaths and decreased productivity, as well as indirect losses (indirect losses) in the form of supply chain disruptions and loss of market access (Knight-Jones & Rushton, 2013). Research (Muroga et al., 2013) identified that the government's delayed response in handling the FMD outbreak in Japan resulted in economic losses of up to USD 2.3 billion. Meanwhile, a study from(Rich & Winter-Nelson, 2007) emphasizing the importance of animal health infrastructure readiness and the effectiveness of surveillance systems in minimizing the economic impact of outbreaks. However, the literature that discusses the economic impact of FMD outbreaks in the context of developing countries such as Indonesia, especially at the scale of the smallholder livestock industry, is still limited and requires in-depth empirical study.

This study aims to analyze the economic impact of the Foot and Mouth Disease outbreak on the livestock industry in Central Java, identify the factors that affect the level of business losses of farmers, evaluate the effectiveness of epidemic management policies from a business economic perspective, and formulate recovery and risk mitigation strategies to improve the livestock sector in the future.

This article on the economic impact economic impact of the footh disease outbreakfoot-and-Mouth Disease The outbreak in the livestock industry is based on an argument that first, the foot-and-mouth disease outbreak has caused substantial economic losses for farmers in Central Java through the mechanism of decreasing the value of livestock assets, losing sales revenue, and increasing operational costs for handling the outbreak. Second, delays and unevenness in vaccine distribution by the government are positively correlated with the level of economic losses experienced by farmers, where farmers who are late in accessing vaccines suffer greater losses. Third, zoning policies and restrictions on livestock mobility, while effective in controlling the spread of the outbreak, create market distortions that harm farmers in the affected zones and provide disproportionate profits to meat importers. Fourth, the level of economic loss differs significantly between small-scale and large-

scale farmers, where small-scale farmers have lower adaptation and recovery capacity than large-scale farmers, who have better access to resources and information.

## LITERATURE REVIEW

### Foot-and-Mouth Disease (FMD)

The earliest description of probable foot-and-mouth disease (FMD) in cattle was made by an Italian monk, Hieronymus Fracastorius, in Venice in 1514. The affected animals refused their feed, the oral mucosa showed redness, and the animals had vesicles in the oral cavity and on their feet (Jamal & Belsham, 2013). Foot-and-Mouth Disease (FMD) is a highly contagious viral infection affecting cloven-hoofed animals, caused by the Aphtovirus genus of the Picornaviridae family (Gudata, 2019). The disease is characterized by fever, anorexia, and vesicular lesions on the mouth, feet, and teats (Gudata, 2019). FMD has a wide host range and spreads rapidly through various transmission routes, including inhalation and direct contact (Zewdie et al. 2022). Diagnosis is based on clinical signs and laboratory tests. While FMD is not zoonotic, it causes significant economic losses in livestock production (Santoso 2022). Control strategies include vaccination, strict trade regulations, and culling of infected animals (Gudata, 2019). Epidemiological simulation modeling and spatial analysis are valuable tools for evaluating potential control strategies and studying disease spread patterns (Premashthira et al., 2011). Public education on proper meat handling during outbreaks is crucial for preventing disease spread (Santoso 2022).

### Business continuity management

Business Continuity Management (BCM) represents an evolution from traditional disaster recovery planning, focusing on ensuring organizations can withstand disruptions to normal functioning rather than merely recovering from failures (Hecht, 2002). BCM is defined as a comprehensive business process that goes beyond information technology and facilities management to encompass all critical business functions (Hecht, 2002). The approach emphasizes continuity as a process rather than an event, addressing any threat that could affect business operations. Modern supply chains have become increasingly vulnerable to disruptions due to lean systems, total quality management, and time-based competition practices (Zsidisin et al., 2005). This has led to the emergence of business continuity planning in purchasing and supply management to address low-probability, high-impact risks that are difficult to predict but potentially catastrophic (Zsidisin et al., 2005). Business Continuity Management (BCM) has evolved as a critical organizational process designed to ensure companies can withstand disruptions and continue delivering products and services at acceptable levels during crises such as terrorism, earthquakes, and technology failures (Calle 2012). The field has gained significant popularity over time, developing into a key component of organizational resilience strategies (Charoenthammachoke et al., 2020).

**Disaster recovery planning**

Disaster Recovery Planning (DRP) is a critical IT process designed to mitigate risks and establish procedures for recovering IT systems during outages (Hoong & Marthandan, 2011). Research demonstrates that DRP requires adequate organizational resources and protection mechanisms against various disasters and threats that can cause physical server damage or network disruptions (Suhartono & Isnaini, 2021). The NIST SP 800-34 framework has emerged as a prominent standard for developing DRP strategies, incorporating components such as risk assessment, Business Impact Analysis (BIA), recovery strategy development, testing, and plan documentation (Suhartono & Isnaini, 2021). Educational institutions particularly benefit from this framework due to their complex IT infrastructure requirements (Prabowo & Ramadhani, 2021). DRP documentation serves as a comprehensive guide defining activities, actions, and procedures for disaster recovery, enabling organizations to continue business processes efficiently and protect information system assets during crises, including pandemic situations (Ika Romadoni Yunita & Nailis Syafi'ah, 2021).

**Risk management**

Recent research on risk management theory has explored diverse applications across various sectors. Risk management in homestays has emerged as a crucial area, with studies emphasizing the need for comprehensive theoretical frameworks to avoid operational risks and enhance tourist satisfaction (Kiswantoro et al., 2024). In the financial sector, risk management has evolved beyond traditional financial assessments to become integral to organizational control systems, affecting accountability boundaries and justifying organizational practices (Christina V. Situmorang et al., 2023). Islamic banking presents unique risk management approaches grounded in Sharia principles, requiring proper foundation through correct beliefs and prophetic characteristics, including honesty, intelligence, trustworthiness, and communication (Agustin et al., 2022). Project management has benefited from risk-based decision-making theories, which enhance effectiveness through proactive risk identification, probability assessment, and mitigation strategy development using tools like risk matrices (Altaf Alawdin et al., 2024). These studies collectively demonstrate risk management's expanding role across sectors, emphasizing structured approaches and theoretical foundations.

**Economic regulation in Indonesia**

In the intervening years, legal theory has accepted many economics concepts, such as incentive effects, opportunity costs, transaction costs, free-riding, regulatory capture, and so forth. More recently economists have realized that effective property and contract rights are fundamental to economic growth and its development. Many economists have also become

aware of the importance of the rule of law that plays a vital role in economic performance. For a nation, the formulation and regulation of the rule of law determine its economic performance's final result. This realization has opened economics to legal concepts (Sugianto & Simeon, 2020). Reveals diverse aspects of economic regulation in Indonesia. Economic growth is influenced by factors such as exports, imports, exchange rates, and inflation, with exports contributing significantly to GDP (Aji et al. 2022). The COVID-19 pandemic highlighted challenges in healthcare service regulations, exposing overlapping policies and government unpreparedness (Susanti and Supartono 2022). Sustainable construction regulations in Indonesia, guided by ministerial decrees, aim to mitigate the environmental impact of infrastructure projects. Comparative studies with other Asian countries provide insights for future policy considerations in sustainable infrastructure development (Agnes & Koestoer, 2021). These studies collectively demonstrate the complex and evolving nature of economic regulations in Indonesia across various sectors.

## RESEARCH METHOD

This study uses a qualitative approach with the aim of gaining an in-depth understanding of the economic and social losses experienced by farmers as a result of the Foot and Mouth Disease (FMD) outbreak in the Muria Raya region. This approach was chosen because the phenomenon under study is closely related to the subjective experiences of farmers, institutional responses, and management practices at the local level. The research was conducted in three districts, namely Pati, Rembang, and Kudus, which are areas with a high incidence of FMD. The research focused on government regulations, community compliance with FMD management practices, and the forms of economic losses experienced by farmers. This approach is in line with the research objective to describe the processes, contexts, and social patterns that emerge in an outbreak situation.

Data collection was conducted through observation, in-depth interviews, and literature studies. Observations were made to directly observe the traditional treatment processes carried out by farmers, particularly the use of traditional medicines such as porang as an alternative treatment before vaccines were available. Interviews were conducted with various key informants, namely farmers, heads of Rapid Response Units (URC), and veterinarians involved in FMD treatment. Informants were selected purposively based on their direct involvement in the outbreak so that the information obtained reflected the actual conditions in the field. Meanwhile, literature studies were used to supplement the primary data by examining regulatory documents, official government reports, and research related to FMD in Indonesia and other countries.

The data obtained was then analysed using qualitative descriptive analysis techniques, which included categorisation, data reduction, thematic interpretation, and conclusion drawing. The interview data was transcribed and then grouped based on themes such as the causes of the outbreak,

economic impacts, social impacts on livestock farmers' families, and the effectiveness of government regulations. Triangulation techniques were used to enhance the validity of the findings by comparing data from observations, interviews, and literature. Through this analysis, the study produced a comprehensive picture of how the FMD outbreak affected livestock businesses, the welfare of farming families, and the effectiveness of the government's response in its control efforts.

## DISCUSSION

### The Form of Economic Regulation carried out by the Central Java Provincial Government regarding the PMK Outbreak

The government, through the Ministry of Agriculture, issued regulations related to the outbreak of FMD that occurred in Indonesia. The spread of the outbreak occurred almost evenly to various regions in Indonesia, including Central Java (Disnakkeswan 2022). Outbreak occurrence FMD starts on April 28 in East Java, which includes the Gresik, Lamongan, and Sidoarjo Regencies. Then on May 9, 2022, the Decree of the Minister of Agriculture of the Republic of Indonesia Number 513 of 2022 was issued concerning Amendments to the Decree of the Minister of Agriculture of the Republic of Indonesia Number 500.1 of 2022 concerning the Determination of Areas for Outbreaks of Foot and Mouth Disease (Foot and Mouth Disease). The government has determined 15 areas affected by the FMD outbreak, including Central Java, on May 17, 2022. The following are the eliminations of FMD outbreaks in Central Java:

**Table 1**

| Date | Event / Description |
|---|---|
| 28 April 2022 | First FMD cases detected in East Java (Gresik, Lamongan, Sidoarjo, Mojokerto), infecting 1,247 livestock. |
| 9 May 2022 | FMD cases reported in 15 provinces, including Central Java. |
| 17 May 2022 | Minister of Agriculture issues decree on Designation of FMD Outbreak Areas. |
| 18 May 2022 | Circular Letter of the Minister of Agriculture on Guidelines for Animal Sacrifice and Slaughtering during the FMD Outbreak. |
| 25 May 2022 | Governor of Central Java issues Circular Letter on FMD Control Measures in the province. |
| 15 June 2022 | Governor of Central Java issues Circular Letter on Movement Protocols for Livestock and FMD-Susceptible Animal Products, regulating inter-district and inter-provincial transport. |

Source: Central Java Provincial Animal Health and Welfare Office

The vaccination is carried out by the Central Java Provincial Government based on a Letter Decree of the Ministry of Agriculture Number 510 of 2022 concerning Vaccination in the Context of Combating Foot and Mouth Disease. So far, the vaccination obtained by Central Java Province has only been 75,500 doses. In fact, the number of livestock, both cows and buffaloes, in Central Java is 2.1 million. In addition to vaccination, the Central Java Provincial

Government also imposed zoning restrictions and surveillance at the border as an anticipatory measure to reduce the spread of FMD outbreaks. Central Java Governor Ganjar Pranowo proposed that the handling or quarantine of FMD outbreaks be carried out on a non-regional zone basis (jatengprov.go.id, 2022). The following are the guidelines for the spread of FMD outbreaks and vaccinations:

**Table 2**

| Date | Event / Description |
|---|---|
| 16 June 2022 | FMD spreads to 35 districts/cities in Central Java; 20,429 animals suspected/infected. |
| 18 June 2022 | Minister of Agriculture delivers 100 vaccine doses during the FMD Task Force event in Sukoharjo. |
| 20 June 2022 | Emergency vaccine support from FAO arrives: 1,500 doses. |
| 23 June 2022 | Vaccine Drop Phase I from the Ministry of Agriculture: 75,500 doses delivered to Central Java; additional 1,800 doses to BBPTU & HPT Baturraden. |
| 24–27 June 2022 | Distribution of vaccines across districts/cities in Central Java. |
| 25 June 2022 | Ministry of Agriculture issues decree on Designation of FMD Outbreak Areas, including Central Java (national-level confirmation). |

Source: Central Java Provincial Animal Health and Welfare Office

The data on the number of livestock areas infected by FMD outbreaks in Central Java are as follows;

**Table 3**

**Suspected FMD animals in Central Java (detailed data for May-August 2022)**

| May (31 Regencies/Cities with Suspected FMD Outbreaks) | | **June (35 Regencies/Cities with Suspected FMD Outbreaks)** | | **July (35 Regencies/Cities with Suspected FMD Outbreaks)** | | **August (35 Regencies/Cities with Suspected FMD Outbreaks)** | |
|---|---|---|---|---|---|---|---|
| addition | Cumulative | addition | Cumulative | addition | Cumulative | addition | Cumulative |
| Total = 716 | 3,327 | 692 fish | 32, 715 | 92 Fish | 54, 787 | 0 tails | 56, 968 eggs |
| Presentase = 21, 52% | | Presentase = 2.1% | | | Presentase = 2.6% | | 2,7% |

*Source : iSSIKNAS*

By referring to the Decree of the Minister of Agriculture of the Republic of Indonesia Number 500.1 of 2022 concerning the Determination of Areas for Foot and Mouth Disease Outbreaks, the Central Java area is included in the areas affected by the PMK outbreak. Then the Central Java Government, through the Circular Letter of the Governor of Central Java on Oral Disease Control and Kuku (FMD), formed a Rapid Reaction Unit (URC) that focuses on handling FMD outbreaks in the Central Java region. Treatment is carried out through preventive (prevention) and curative (treatment) efforts. Preventive efforts by vaccinating healthy animals so that they are immune and do not contract FMD outbreaks. Meanwhile, preventive efforts are carried out through antiseptics and vitamins in animals (jatengprov.go.id, 2022). This is as conveyed by the Head of Animal Husbandry and Animal Services Animal Health of Central Java Province, who explained that Central Java obtained 1,500 doses of Foot and Mouth Disease (FMD) vaccine against Foot and Mouth Disease (FMD). The action carried out is an emergency vaccine stage, while mass vaccination will be carried out in August this year.

**Factors of the Occurrence of PMK Outbreak in Cattle in Central Java**

Understanding the dynamics of the spread of this disease and designing effective prevention strategies, it is important to identify and analyze various factors that contribute to the occurrence of FMD outbreaks in cattle in Central Java, ranging from epidemiological factors, livestock management, environmental conditions, to socioeconomic aspects that affect the practices of farmers in the community.

**Results of Interviews with Starch Breeders**

"What I heard from the news was that the cattle outbreak came from India. But the one from the community is that this outbreak comes from cows brought by cattle brokers from East Java. So the affected ones are in the mouth and feet. His mouth was salivating, and he was giving out a lot of foam himself like a poisoned person, so it was difficult for cows to eat. And his legs were swollen, so he was limping, and some couldn't even stand. For treatment, use your own money; reportedly, there is a vaccine from the government. But my cow has not received the FMD vaccine" (Interview Excerpt, 9 June 2022).

According to PS, the reason for the FMD outbreak in cattle was due to cattle traders who brought cattle from East Java to Central Java. This has an impact on transmission from one cow to another. This FMD disease attacks the mouth and feet, as a result of which the cow's mouth secretes saliva and a lot of foam, making it difficult to eat. His legs have swelling, which causes lameness in the cow and also difficulty standing. Regarding prevention efforts such as the FMD vaccine, news has circulated. But it is not comprehensive to farmers whose livestock are affected by FMD outbreaks.

**Results of Interviews with Rembang Farmers**

"At the beginning of the cattle outbreak, it was brought by cattle brokers (polang) from the Jatirogo cattle market, East Java. Then, it was taken to villages in Central Java. Yes, after that the cattle plague virus (FMD) is transmitted to other cows quickly. There is no effective cure to overcome the cattle outbreak. On average, they still use herbal medicine as a result of the initiative of the cow owner himself. Cattle affected by the plague were separated from healthy cows. Some are not affected, but even though they are separated, there are still those who are affected by the disease. There is not yet, only in a small number of villages that have just received the vaccine, for example, in the villages of Rendeng, Mbamban, and Sedan. Many newborn calves aged 1-2 died from the plague". (Interview Excerpt, 9 June 2022)

According to the PS explanation, the reason for the FMD outbreak in cattle is due to cattle traders who bring cattle affected by FMD outbreaks from East Java to villages in Central Java. This then causes FMD outbreaks to spread easily to other cows.

**Results of Interview with Kudus Farmers**

"This cattle outbreak was initially brought by cattle brokers, or Central Javanese people call it Polang. As a result, the cow's hooves are swollen, and its mouth is salivating and foamy; in the end, the cow has difficulty eating food. The medicine is difficult, on average, using traditional medicine. Yes, we pay our own costs for the treatment. The treatment we do uses porang (a kind of traditional medicine). While waiting for vaccine steps from the Holy Government itself." (Interview Excerpt, 9 June 2022)

According to the PB statement above, the cause of the emergence of cattle outbreaks is due to cattle sellers who bring sick cows from outside Central Java. As a result, many cows were infected with this FMD outbreak. Causes cows to have difficulty eating because their mouths emit foamy saliva. Also, swelling in the cow's legs makes it difficult for the cow to stand. The treatment carried out by Kudus farmers is with porang, or traditional medicine. While waiting for handling steps from the Kudus Regency Government in the form of the FMD vaccine.

The entry of the PM outbreak in Central Java is motivated by the distribution of livestock affected by the PM outbreak by cattle traders from East Java and Aceh. In line with this, Deputy Chairman of Commission IV of the House of Representatives Dedi Mulyadi explained that the spread of the PM outbreak was brought from East Java and Aceh. In addition, the delay in the response made by the government related to the outbreak of PMK caused the rapid spread of the outbreak almost throughout the province in Indonesia. This is in the view of Johan Rosidan, who is a Member of Commission IV of the House of Representatives, stating that the Government has failed to carry out early detection of the PM outbreak. Meanwhile, the spread of the disease FMD in Central Java It is caused by the factor of livestock brought by cattle traders from East Java. In Central Java the outbreak of PMK was detected in a number of regions, one of which is Rembang Regency. As explained by Ganjar Pranowo,

as the Governor of Central Java, in a plenary meeting with the Central Java DPRD, Ganjar explained that the PMK outbreak has been found in three districts, namely the Rembang, Boyolali, and Sragen Regencies.

**Implications of the PM outbreak on the family and community environment**

The outbreak of Foot and Mouth Disease (FMD) not only has a direct impact on the livestock sector but also has far-reaching implications for the lives of farmer families and the socio-economic dynamics of the surrounding community. When an FMD outbreak hits a region, farming families face the threat of losing their primary source of income due to the death or decline in livestock productivity, which further triggers household economic instability and affects access to basic necessities such as education, health, and food.

**Results of Interviews with Starch Breeders**

"Thank God, my family is also safe and healthy. The problem is that my son is already in college and can earn his own money. But what I feel the most is the difficulty of finding cows for me to develop and sell. I was overwhelmed with requests for cattle orders from Baznas. Baznas asked for 100 cows for the fulfillment of Qurbani animals within a period of 2 days, while the existing cows were only 25. Yes, that's what caused the decline in our livestock income. Moreover, we also spend personal money on treating our cows. Also, I have not received the existing vaccinations because the people are afraid to sell their cows, and many cattle sales markets have been closed for about a month due to an outbreak that attacks cattle". (Interview Excerpt, 9 June 2022)

Based on the PS narrative, the implications of the outbreak of PMK do not affect the health and economic aspects of the family. And the PS family also did not experience any symptoms due to the FMD outbreak. However, in terms of fulfilling the cattle order requested by Baznas, which asked for 100 cows within 2 days, there were only 25 cows. This has an impact on the expenditure of personal money to treat the cows, and there has also been no vaccination received by the PS for the cows. According to PS, the community experienced a fear of selling their cattle due to the PMK outbreak. The impact certainly has an impact on a decrease in profits due to not being able to fulfill orders from cattle buyers. As conveyed by Rochadi Tawaf in his research, which stated that there are two impacts caused by FMD outbreaks. First, the direct impact that affects the livestock production system is caused by animals not wanting to eat and the death of livestock. Second, indirect impacts that affect farmers' income, medical costs, and the plummeting price of livestock in the market (Rochadi Tawaf, 2017).

Looking at the above problems, the impact of FMD outbreaks is not only on the sustainability of livestock production. But it also has an impact on the economy of the breeders themselves, due to the lack of smooth cattle trading activities and uneven vaccination of cattle breeders in Central Java.

**Results of Interviews with Rembang Farmers**

The impact I felt was that I spent a little more money to treat my cows. Yes, use porang (traditional medicine) first, because the vaccine has not arrived here. In terms of the economy, because I personally also farm, it is not too affected. If the community is afraid to sell their cows. Moreover, the cattle market has also been closed for one month, so we temporarily take care of the cows in the cowshed first until they recover while looking at the normal animal market situation again. Yes, it will be a waste of time and energy if the condition does not immediately normalize." (Interview Excerpt, 9 June 2022)

From PY's explanation above, the impact of FMD on cows has no effect on their families. Because the FMD outbreak only attacks livestock, especially cows. However, in terms of treatment, PY spent personal money because there was no vaccine in his place. From the community itself, there is a condition of fear to sell their cattle because of the FMD outbreak. On the other hand, the closure of the animal market also causes a traffic jam in the buying and selling of cows, which has an impact on cattle farmers not being able to sell their cows and having to take care of them themselves. Where this will drain extra time and energy to take care of cows in an FMD outbreak situation like this. Meanwhile, TY has another opinion about the impact of the cattle outbreak.

"The impact I feel from the FMD outbreak is in terms of the economy, especially since I have children who enter Islamic boarding schools and Madrasah Aliyah (MA). Moreover, I also work on a farm owned by my boss. If the animal market is closed, I automatically have to find another job first to meet the needs of my family. I was forced to go into debt first because I couldn't sell cows for more than a month. And vaccines from the government are also long. So we spent our own money on the treatment. Because there was a cow of my neighbor who died because it was too late to treat it. Moreover, cows that are only one or two months old are very vulnerable to death. Regarding the number, I don't know, but there were several calves who died yesterday due to this FMD outbreak." (Interview Excerpt, 9 June 2022)

Based on TY's explanation above, the implication of an FMD outbreak does not affect his family in terms of health. However, from an economic point of view, it is very influential because TY works for the owner of the farm (or his boss). In addition, TY also has dependents for the education of his children, who just want to enter Islamic boarding schools and Madrasah Aliyah (MA). Of course, this requires a lot of money; in the end, TY decided to borrow money first while waiting for the normal situation to return. Meanwhile, the impact on the community is quite serious because if the cow is late in treatment, it can die. Especially calves are very vulnerable to death if they are attacked by FMD outbreaks.

The Central Java Government's response to the outbreak, PMK, by assisting in areas affected by FMD outbreaks. Assistance in the form of assistance to farmers by the Animal Husbandry and Animal Health Service (Disnakkeswan 2022) Also the administration of medicines to cows affected

by FMD. In addition, the handling carried out by the Central Java Provincial Government and the Disnakkeswan is related to the FMD outbreak to reduce the number of losses caused by the outbreak of PMK Ini (jatengprov.go.id, 2022). This was also conveyed by the head of the Rapid Reaction Unit (URC) of the Central Java Provincial Health Agency, who said, "In efforts to handle the PMK outbreak, we have vaccinated areas in Central Java affected by the PM outbreak, according to the dose determined by the government." Meanwhile, the obstacles encountered in the field are related to the implementation of outbreak prevention PMK, namely the difficulty of monitoring livestock entering Central Java. Ratna said that "Regarding the obstacles, the difficulty of supervision in the field is due to the many entry routes in Central Java. When the task force team was on standby on the Pantura route, the cattle sellers passed through the southern route".

Efforts to overcome the FMD outbreak have been carried out by the Central Java Provincial Government through the Dinakkeswan, which has vaccinated areas affected by the outbreak and closely monitored the entry of livestock into Central Java. However, the efforts made have not been maximized due to the obstacles found in the field. And from an economic point of view, it also has an impact on breeders and farmers who work on farms. Farmers were forced to lay off their workers because they could not sell their cows due to the closure of animal markets in various regions in Central Java.

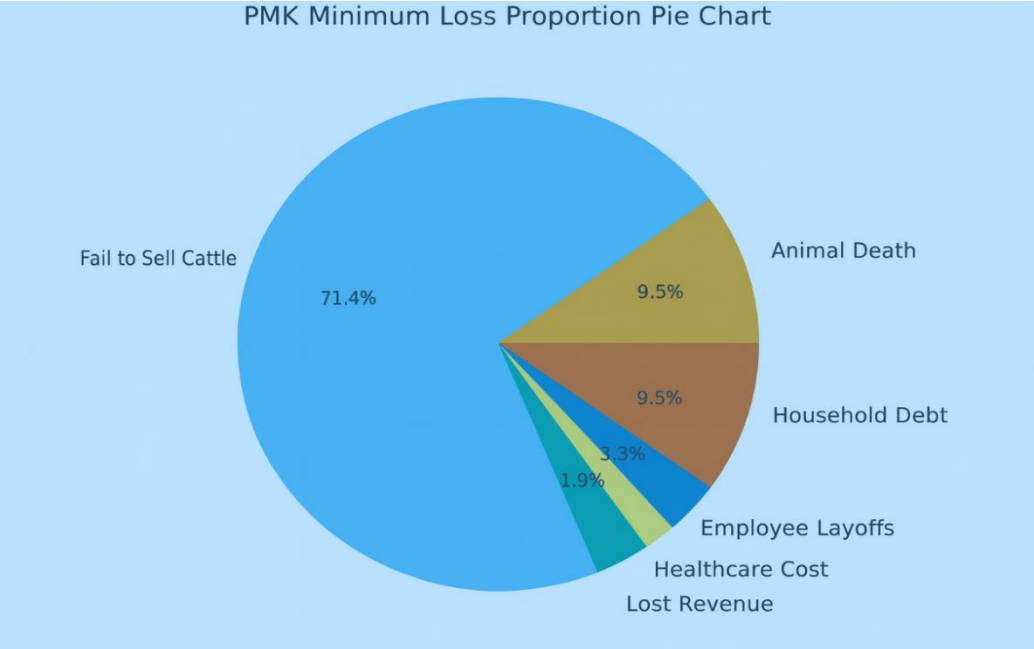
**Results of Interview with Kudus Farmers**

"It's just that the income from the sale of cattle has decreased a bit because the cattle market has been closed for a month. While taking care of the cows, I also worked odd jobs. So yes, while my cows are still caged. Because I have not received the FMD vaccine, I treated several cows affected by FMD outbreaks myself with traditional medicine. The problem is that if you rely on the vaccine, you are afraid to die first. Some of my friends who are cattle breeders have died. Alhamdulillah, my cow that was affected by FMD has started to recover." (Interview Excerpt, 9 June 2022)

Based on the PB's explanation above, the implications of the FMD outbreak in cattle are not contagious to humans, so from a health point of view, it does not have an impact on their families. However, from the economic side, there was a change in income because cattle sales stopped for one month. PB decided to treat his own cows with traditional medicine. This is to anticipate deaths in cattle due to late handling if waiting for a vaccine from the government.

In terms of health, FMD outbreaks are not contagious to humans but rather to sensitive livestock. As explained by the coordinator of the Control Task Force PMK Diponegoro University, Dian Wahyu Harjanti, FMD disease is not transmitted to humans and is not a zoonotic disease. But the impact is on sensitive animals. Animals that are sensitive to FMD are cows, buffaloes, goats, sheep, deer, pigs, camels, and several types of wild animals such as bison, antelope, giraffes, and elephants. (Mahar Prastiwi, 2022).

**Figure 1**
**PMK Loss Diagram Image**




Thus, FMD disease does not have an impact on human health. However, from an economic point of view, it has a great impact because there has been a decline in the sale of livestock in the market. This resulted in a decrease in income for farmers during the FMD outbreak. Where the vaccination efforts carried out by the government are fairly uneven for all farmers whose livestock are affected by FMD outbreaks.

The impact of the PMK outbreak has an impact on community resilience, especially from the economic and productivity aspects of livestock. This is due to the large number of animals that die, the difficulty of supplying meat in traditional markets, and livestock entrepreneurs who practically stop due to regional quarantines and the closure of animal markets. This is in line with the Chairman of the Indonesian Meat and Animal Entrepreneurs Association, Isa Anshori; the cage quarantine policy; and the closure of livestock distribution channels between regions or within regions, making the availability of healthy meat and livestock threatened. This then also caused panic for farmers in selling their livestock at low prices. This was conveyed by the General Chairman of the Cattle and Buffalo Breeders Association (PPSKI); the lockdown policy implemented on the island of Java made farmers unable to sell their cattle outside the region. This concession also caused panic among farmers, and they sold their cattle at low prices. On the other hand, the provision of FMD vaccination by the Central Java Provincial Government is only prioritized for livestock that are still healthy. As stated by Agus Warianto, Chairman of the Livestock and Animal Health Service, the allocation of vaccines received is prioritized for vulnerable livestock that are still healthy. This certainly causes anxiety for residents because, in addition to the limited

doses provided, it can also be said to be uneven because it only focuses on vulnerable animals that are still healthy.

## CONCLUSION

Based on a comprehensive analysis of the outbreak of Foot and Mouth Disease (FMD) in Central Java, it can be concluded that handling this outbreak requires an integrated and multidimensional approach. From the aspect of economic regulation, the Central Java Provincial Government has shown commitment through various assistance policies and programs, but the effectiveness of its implementation still requires evaluation and improvement to ensure a wider and more targeted reach. The factors causing the FMD outbreak in Central Java show the complexity of the problem, which includes biological aspects, livestock management, environmental conditions, and socio-economic factors, which indicate the need for a holistic and sustainable prevention strategy. This study enhances the existing literature on livestock crisis management in developing regions through the lens of economic regulation.

The impact of FMD outbreaks on families and communities has proven to be very significant, not only in economic aspects but also in social and psychological aspects, which affect the stability of people's lives as a whole. Therefore, the handling of FMD outbreaks in the future must integrate three main pillars: strengthening government regulations and economic support that is more responsive, implementing prevention systems based on identified risk factors, and recovery programs that pay attention to multidimensional impacts on families and communities. Synergy between the government, the farming community, and all relevant stakeholders is the key to success in preventing and overcoming FMD outbreaks and minimizing their negative impact on the socio-economic life of the people of Central Java.

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