

# **The Contribution of Female Farmers to the Sustainability of Dairy Cows Following the Outbreak of Foot and Mouth Disease: Evidence from Indonesia**

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**Abstract:** The foot and mouth disease epidemic in Indonesia began in May 2022, and its impact can still be felt today. This study aims to analyze the role of female farmers in the sustainability of dairy cows after the foot and mouth (FMD) disease epidemic. This research was conducted at Cooperative Service Center (CSC) Pojok Lembang, West Java, Indonesia, in February 2023. The research method used is a case study method using a qualitative approach. The researcher conducts the data through in-depth interviews with specific criteria. This study's results indicated that women's role in CSC Pojok was seen from the access aspect, which was the opportunity for business capital, information, and SAPRONAK (Livestock Production Facilities). The participation aspect indicated activities, from bathing the dairy cows to looking for grass. The control aspect indicated that decisions are taken based on mutual agreement. The benefits aspect indicated social and economic benefits felt by female farmers in TPK Pojok. Livelihood sustainability indicates that female farmers can make decisions, face risks, and maintain efforts. Equity indicated that female farmers could express their satisfaction with their business because of the benefits they get. Sustainability is indicated by the family's participation in raising dairy cows; female farmers also show high self-confidence and optimism to continue their business.

**Keywords:** Female farmer, Sustainability, FMD, Indonesia

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## **1. Introduction**

Livestock business is one of the very good business fields to be developed[1] and[2] the results of livestock business are also very profitable to market. One of the livestock businesses that many people are involved in is the dairy farming business. Based on BPS (Central Bureau of Statistics) data for 2015-2021, the population of dairy cows in Indonesia is still concentrated in Java Island. This is shown by the large population of dairy cows in Java Island, which reached more than 513.514 in 2015 and continues to increase until it reaches more than 569.428 in 2021 (BPS, 2020). East Java is the province with the largest population of dairy cows in Indonesia in 2021, with a total population of 301.780 heads; Central Java ranks second with a total population of 142.124 heads, and West Java ranks third with a total population of 119.915 heads (BPS, 2022).

Java Island has fulfilled the main requirements as a dairy cows breeding area because it has high altitude areas above sea level, and farmers have a disciplined and competent work ethic (BPS, 2022). Lembang is one of the highland areas in West Java, Indonesia, [3] that has the potential to be developed as a dairy farming center because it has around 6.000 smallholder dairy farmers and is supported by the availability of abundant resources. Until now, most dairy farming businesses in Lembang are managed by people's farms, then the milk production from traditional smallholder farms will be distributed to cooperatives[4]. One of the cooperatives that accommodate livestock business activities as a center for dairy farming in West Java is KPSBU Lembang, which is in Lembang, West Bandung Regency. Dairy farmers who are active members in KPSBU Lembang consist of 4.018 people, including 2.812 men and 1.206 women.

In line with the development of a dairy business to increase production yields, labor plays an important role because both the quality and quantity of labor used in dairy farming business activities will impact the success of a business. The role of the community is one of the important determinants of the success of a livestock business [5]. The involvement of women in the community is one of the main considerations in the overall livestock management strategy because women have the same rights, responsibilities, and opportunities as men to participate in livestock management activities[6, 7]. The role of women in managing dairy cows can be seen in household income because women's role in family income has shown significant results in meeting household needs[8].

On May 9, 2022, the Ministry of Agriculture issued a decree stating that Indonesia was again infected with FMD[9]. There is speculation that the government's policy on importing meat from India, a country that is not yet FMD-free, has resulted in the transmission of FMD to livestock in Indonesia[10]. Until November 22,

2022, the number of dairy cows infected with FMD in West Java reached 42.172, with a total death of 3.156 and a total conditional slaughter of 5.333. The total population of dairy cows in West Java has currently decreased to as many as 111.426 heads, resulting in a decrease of 7% of the total dairy cattle population (Siaga PMK, 2022). The spread of this disease occurs faster than expected, so it is called an epidemic. Epidemics have a greater severity and spread over a wider area[11].

The spread of FMD is very fast due to the condition of dairy cow farms in Indonesia, which traditional smallholder farms still manage[12]. One of the Lembang KPSBU work areas that was affected by the rapid spread of FMD was the CSC Pojok. The impact of FMD is felt by farmers in Pojok CSC, such as livestock mortality, decreased milk production, and reduced livestock reproducibility. With the death, decreased productivity, and reproducibility of livestock, farmers' income has decreased sharply.

Based on this, special treatment is needed to handle livestock post the FMD epidemic, so the role of women to participate in handling dairy cows is quite important. Therefore, it is necessary to conduct research to determine the role of female farmers in handling livestock during the FMD epidemic to support the sustainability of the dairy cow's business.

## **2. Literature Review**

Gender equality is a fundamental human right that is inherent to all individuals. The entitlement to life is not exclusively allocated to males. Women have virtually identical rights as men. Regrettably, women have historically been frequently perceived as lacking strength and relegated to a secondary role. Furthermore, a prevailing notion persists that the responsibilities of women are confined to domestic tasks such as cooking and servicing the wells, as well as caring for the family and children, rendering external concerns ultimately inconsequential. The representation of a woman who demonstrates exceptional abilities in both familial and professional domains is a highly uncommon occurrence. Many women experience apprehension towards pursuing a professional career due to the perceived challenges of fulfilling their traditional position as homemakers. Gender equality refers to the condition of equal rights and quality of life between individuals of different genders, specifically men and women.

Gender refers to the process by which individuals acquire and internalize societal expectations, roles, qualities, traits, attitudes, and behaviors that are associated with being male or female. Gender roles in society can be categorized into three main domains: productive duties, reproductive roles, and social roles. The primary focus among the three gender roles is the role of reproduction, which has the utmost significance. There exist inherent differences between males and females. However, there is no significant distinction between the producing and social roles of society. The scope of this issue extends beyond mere "protection" for women. Women also require safety.

The concept of safeguarding refers to the principle that both males and females has equal rights and responsibilities as prescribed by legal frameworks. This implies that gender equality should be upheld in relation to employment opportunities, remuneration, and access to amenities provided by organizations. Gender disparities persist in the workplace, whereby women often have unequal access to facilities despite being employed by the same organization, working the same hours, and collaborating closely with their male counterparts. Presently, there exists a tangible disparity between genders with regard to access, privileges, involvement in progress, and allocation of resources. The prevalence of violence against women persists despite the significant contributions women have made across diverse domains, including politics, public service, and the realms of development and building.

## **3. Methodology**

The research method used is a case study method using a qualitative approach. A qualitative approach is an approach to understanding the phenomena experienced by research subjects, such as roles, behaviors, perceptions, motivations, and actions, holistically by means of descriptions in the form of words[13]. A case study is a method of conducting research on phenomena that occur by focusing on one's life experiences (real-life context)[14]. Data search was carried out by in-depth interviews with informants with certain criteria.

## **4. Result and Discussion**

### **4. 1. Informant's Identity**

The informant is someone who is used as a source of information from this research. Informants are taken in this study as many as 12 people with a purposive sampling method. Informants taken have the following considerations: 1) Members of female farmers actively involved in the dairy cows business. 2) Members of female farmers who are affected by FMD. The female farmers' identity as informants was seen from age, education, number of cows owned, and farming experience.

**4.1.1. Informant's Age**

Age is one indicator that shows a person's physical ability. The age classification of the informants can be seen in Table 1.

Table 1. Informant's Age

Age	Amount	
	People	Percentage (%)
15 – 35	2	17
36 – 45	4	33
46 – 55	4	33
> 55	2	17
Total	12	100

Source: Interview Results Data

Based on these percentages, it can be seen that the age of female farmers in CSC Pojok is 36-55 years. This age is classified as a productive age. Workers of productive age are able to work more and better than workers of non-productive age. This condition illustrates that female farmers classified as productive have good physical abilities to develop their livestock business optimally.

**4.1.2. Informant's Formal Education**

Education is one of the determining factors for success in carrying out a livestock business. The level of education has an influence on the level of ability of female farmers to act and make decisions such as accepting innovation adoption. The classification of informant's formal education level can be seen in Table 2.

Table 2. Informant's Formal Education

Education Level	Amount	
	People	Percentage (%)
Elementary School	5	42
Junior High School (JHS)	4	33
Senior High School (SHS)	2	17
College	1	8
Total	12	100

Source: Interview Results Data

Based on these percentages, it can be seen that the education level of female farmers in CSC Pojok is elementary school level. This level of education is still relatively low and partly becomes an obstacle to work. In line with the research results conducted by [15] in general, the average education of farmers in rural areas has an elementary school education. This is supported by the statement of [16] that the education level of rural women is generally lower than that of men. However, the low level of formal education can be corrected through non-formal education. Most of the non-formal education of female farmers is obtained through counseling and discussions with other farmers.

**4.1.3. Informant's Livestock Ownership Amount**

The amount of livestock ownership affects the amount of time devoted to the business. The classification of the number of informant livestock ownership can be seen in Table 3.

Table 3. Informant's Livestock Ownership Amount

Livestock	Amount	
	People	Percentage (%)
1 – 3	4	33
4 – 6	6	50
≥ 7	2	17
Total	12	100

Source: Interview Results Data

Based on this percentage, it can be seen that the number of livestock owned by female farmers in CSC Pojok is 4–6. Total livestock ownership in CSC Pojok is still relatively small scale. These results indicate that

raising dairy cows is a side activity for housewives. The varying number of livestock ownership is due to limited capital to raise dairy cows, especially due to the FMD epidemic resulting from livestock dying.

#### 4.1.4. Informant's Farming Experience

Farming experience is the length of time the female farmers have been raising dairy cows. The classification of the informant's farming experience can be seen in Table 4.

Table 4. Informant's Farming Experience

Farming Experience (Year)	Amount	
	People	Percentage (%)
10 – 20	6	50
21 – 30	3	25
31 – 40	3	25
Total	12	100

Source: Interview Results Data

Based on these percentages, it can be seen that the experience of raising female farmers in CSC Pojok is 10–20 years. Female farmers farming experience is enough for a long time. This shows that the women involved in the dairy farming business at CSC Pojok have sufficient experience in managing their livestock business and have the knowledge, as evidenced by the length of time they have been farming. In accordance with the opinion of [17] that, the longer the farming time, the more knowledge one gets so that the skills in running a livestock business increase.

#### 4.2. The Role of Women in the Dairy Farming Business

The role of women in the dairy farming business at TPK Pojok is one of the productive roles carried out by female farmers in the local area. The role of female farmers in raising dairy cows at TPK Pojok cannot be called an easy thing because most of the activities in raising dairy cows are carried out by female farmers, such as bathing the dairy cows, cleaning the stables, milking, depositing the milk, washing the milking equipment, feeding and looking for grass. Although in carrying out these activities, time is sometimes divided between female farmers, husbands, and workers in raising dairy cows.

The role of women in productive activities is divided into four aspects: access, control, roles, and benefits. According to Field (Anak, 2018), four aspects are used to analyse women's role in productive activities: access, control, roles, and benefits. These aspects can illustrate female farmers' role in CSC Pojok raising dairy cows.

##### 4.2.1. The Role of Women from The Access Aspect

From the aspect of access, the role of women can be seen from the opportunities female farmers have in obtaining or using certain resources. In the results of this study, the role of female farmers in the aspect of access is seen from three components, namely capital (cow or money), information (matters related to raising dairy cows, especially during FMD epidemics), and sapronak (dairy livestock production facilities, namely housing equipment, feed, and medicine). You can see the research results based on interviews with informants regarding the role of female farmers from the access aspect in Table 5.

Table 5. The Role of Women from the Access Aspect

Sub Variable	Explanation	Amount	
		People	Percentage (%)
Capital	KPSBU Lembang	5	42
	Independent	12	100
Information	Counseling	9	75
	Discussions with Other Farmers	12	100
Sapronak	KPSBU Lembang	3	25
	Independent	12	100

Source: Interview Results Data

Table 5. shows that the capital owned by the female farmers in CSC Pojok comes from purchasing cow breeds independently. Owned cow breeds are usually obtained from dairy dealers or bought from individuals. However, there are several other female farmers who obtain cow breeds from the reproduction of dairy cowsthat

are bred by themselves.

The role of women in accessing information indicates that female farmers obtain information from discussions with other farmers. Discussions are carried out by one farmer with another when depositing milk at TPS so that it can add more information about cow's health, cow's feed, and cow's maintenance. Other information was obtained from the veterinarian, especially during the FMD epidemic. Most of the information regarding how to handle FMD was obtained from the veterinarian, who gave direct instructions in the barn when checking livestock reported sick. In addition, information about dairy cows was obtained through counseling conducted by KPSBU Lembang.

In addition to access to capital and information, there is also access to sapronak, namely livestock production facilities, especially on dairy farms. Access to this sapronak resulted in the results that the cow breed owned by the female farmers at CSC Pojok came from independent purchases. KPSBU Lembang had assisted dairy cows with equipment such as milk cans. However, not all members of female farmers receive assistance with equipment for dairy cows. Only a select few are given the opportunity to receive this assistance. In addition, during the FMD epidemic, the KPSBU Lembang provided Mako (concentrate) assistance to farmers affected by FMD as much as 1 sack/head.

#### **4.2.2. The Role of Women from The Participation Aspect**

The role of women in the aspect of participation can be seen from a person's participation in raising dairy cows, including bathing the dairy cows, cleaning the stables, milking, depositing milk, washing the milking equipment, feeding, and looking for grass. Female farmers at CSC Pojok greatly contributed to the maintenance of dairy cows. Therefore, women dominated the participation in raising dairy cows. This is because men work in other jobs to supplement family income. Female farmers carry out most dairy cow rearing activities because they are considered not to have a busy life, so they can help raise dairy cows.

Female farmers usually carry out the activities of bathing dairy cows and cleaning the stables, but several informants said that men had a role in doing this. This activity is done when the husband has free time before going to work in the morning. Men and women usually carry out the activities of milking and depositing milk simultaneously. However, there were also informants who only involved their husbands in milking and depositing milk because other activities had to be done in the morning. Almost all informants stated they were involved in milking, depositing milk, and washing the equipment.

Female farmers carried out feeding, but several informants said that workers played a role in this. The feed used is forage, mako, cassava, tofu dregs, and cassava dregs. Forage is obtained from grass planted in private gardens, and mako is obtained from KPSBU Lembang. Then onggok, tofu dregs, and cassava dregs are obtained by buying from distributors from Bandar Lampung.

Looking for grass is an activity in raising dairy cows that requires more energy than other activities. However, most of the female farmers who became informants are looking for grass by themselves. Female farmers usually look for grass by planting from privately owned forage land, but there are several informants who obtain grass by buying it from Subang because they do not have private forage land.

A female farmer does not only raise dairy cows every day, but also carries out domestic activities as a household manager. Therefore, it is necessary to know the working time range of female farmers in raising dairy cows. The following is the range of working hours for female farmers in raising dairy cows:

Activity	Time (hour)
Bathing cows	2 hours/day
Cleaning the stables	1,5 hours/day
Milking	30 minutes/day
Depositing milk	30 minutes/day
Washing milking equipment	30 minutes/day
Feeding	1,5 hours/day
Looking for grass	3 hours/day
Amount	9 hours 30 minutes

Source: Interview Results Data

Table 6. shows that the working time range of female farmers in raising dairy cows is 9 hours/day from 4 am to 5 pm. This illustrates that in a 24-hour day, female farmers spend 9 hours to raise dairy cows. Even though, in practice, there were several informants who divided the tasks among men/workers, most of the maintenance of dairy cows was carried out predominantly by women.

**4.2.3. The Role of Women from The Control Aspect**

From the aspect of control, the role of women can be seen from the authority they have in exercising control over resources and making decisions. Controlling the role of female farmers in using resources includes making decisions in matters of cows breeding, feeding, management, housing equipment, as well as cow’s health. You can see the results of the research based on interviews with informants regarding the role of female farmers from the control aspect in Table 7.

Table 7. Decision Making

Decision Making	Only Women	Joint Decisions	Only Men
Breeding	ISE, LS, ISU, SK, SS	EJ, SA, IIS, ER, EA, YK, TR	-
Feeding	ISE, LS, ISU, SK, SS	EJ, SA, IIS, ER, EA, YK, TR	-
Management	ISE, LS, ISU, SK, SS	EJ, SA, IIS, ER, EA, YK, TR	-
Housing Equipment	ISE, LS, ISU, SK, SS	EJ, SA, IIS, ER, EA, YK, TR	-
Health	ISE, LS, ISU, SK, SS	EJ, SA, IIS, ER, EA, YK, TR	-

Source: Interview Results Data

Table 7. shows the tendency for decision-making patterns in several indicators to be determined based on joint decisions without being dominant between men and women. The female farmers' decision-making occurred because the informant had a marital status as a widow or her husband had another job, so men did not play a role in decision-making. Decision-making is usually not made by the female farmer alone but usually by the opinion of their surviving parents.

The LS statement (46) is as follows:

*"My husband is not involved at all because he works in the garden, and he is indeed inexperienced, so he is afraid of cows, so let me decide anything related to cows."*

**4.2.4. The Role of Women from The Benefit Aspect**

The role of women from the aspect of benefits is seen from the results received from the utilization of certain resources. The existence of a dairy farming business in CSC Pojok produces benefits for female farmers, namely, meeting their daily needs from dairy cows. The benefit aspect in this study is measured based on social and economic benefits.

The aspect of social benefits obtained by the dairy farming family at CSC Pojok is the existence of cultural benefits. The culture of raising livestock from generation to generation that has been passed on to society is a social benefit for dairy farmers. In addition, there are benefits of cooperation that exist between one farmer and another to share information and knowledge to produce an innovation for the development of the dairy cows business.

Aspects of the economic benefits felt by the families of female farmers in CSC Pojok were being able to meet their daily needs, finance their children's education, build houses, and buy vehicles from dairy cows. The ISE statement (45) is as follows:

*"I will never forget because everything also comes from cows; it's only now that it has fallen after the FMD epidemic. In the past, cows were an asset, so they were the main source of livelihood. I could buy land, build houses, send my children to school, and open a side business with capital from cows. So even now, I will not stop caring for the cows in conditions like this."*

**4.3. Sustainability of Dairy Cow Farming**

Sustainability means that something continues to grow, while business means activities to mobilize energy, mind, and body to utilize resources to achieve a goal. Sustainability is someone’s efforts to meet needs by continuously utilizing opportunities, natural resources, and human resources so that they can continue to develop and survive in the face of various risks and changes.

**4.3.1. Capabilities**

Business continuity from the capabilities aspect can be seen from the ability of female farmers as managers in every decision-making and their ability to deal with various risks associated with raising dairy

cows. One of the indicators of the variable ability of female farmers as managers is being able to estimate risks and reduce risks.

The results showed that the risks experienced by female farmers in raising dairy cows were the risk of lack of feed just before the Eid Al-Fitr, the risk when the cows got sick, and the risk when the cows died. All kinds of risks can be faced by female farmers, one of which is just before Eid al-Fitr, usually the supply of feed such as onggok, tofu dregs and cassava dregs is constrained in delivery because most are obtained from outside Java, namely Bandar Lampung. So female farmers overcome them by preparing feed stocks from 2–3 weeks before the holidays.

Another risk is when female farmers face sick livestock, especially during an FMD epidemic. Usually, female farmers provide traditional treatment using traditional medicines such as turmeric, lemon, coconut, eggs, brown sugar, shallots, lemongrass, salt, and others. However, if the cows experience pain that cannot be treated with traditional medicines, treatment is carried out by calling a veterinarian who has been provided by KPSBU Lembang.

The dairy farming business is not spared by the existence of information regarding maintenance and related matters. Female farmers participate in seeking information regarding good dairy cows maintenance to support the sustainability of their business. What female farmers do is discuss with other farmers when depositing milk at TPS because during this time, they can meet other farmers to exchange information. In addition, several informants have used technological developments by seeking information about raising dairy cows from the internet and discussing WhatsApp with other farmers.

Discussions with other farmers are important, but it is even better if it is supplemented with external knowledge from counseling. Counseling is carried out to increase knowledge and information about dairy cows for female farmers to support the sustainability of the dairy cow business and as a forum for self-development for smallholder farmers. Not all informants attended counseling because there were 3 informants who had never attended counseling. However, all informants have participated in discussions with other farmers to add their insight.

The results of this study indicate that female farmers can become managers. This can be seen from the ability of female farmers to find information for the development of their business sustainability.

#### **4.3.2. Equity**

Business continuity from the equity aspect can be seen from the efforts in distributing assets (wealth), capabilities and opportunities by female farmers so they can continue their business. The results of this study indicate that all female farmers can feel the benefit from this dairy cows business. In addition, female farmers also feel the satisfaction derived from this business.

All informants explained that all needs that are primary to secondary can be fulfilled from the dairy cows business such as for the cost of daily meals, paying for children's education, building a house, buying a vehicle and capital to open a small shop. The SA statement (37) is as follows:

*"Everything I have comes from cows. From selling cows, you can pay for school fees, build houses and buy motorbikes. If the result of the milk is usually for the cost of daily living".*

The results of this study indicate that the income derived from the dairy cows business is used for daily needs. However, the FMD epidemic resulted in a decrease in income, so that the income earned could not be used for daily needs because most of the informants said that they had to pay to cover the lack of money for feed and treatment costs for dairy cows affected by FMD.

#### **4.3.3. Sustainability**

Business continuity from the sustainability aspect can be seen from the efforts made by female farmers to meet their needs independently, self-control, and confidence in caring for and sustaining their business. This study's results indicate that female farmers' level of independence in CSC Pojokis quite high. This is evidenced by statements from most informants that the business they own is not hereditary because venture capital is obtained independently, and most of the information about dairy cows is obtained from other farmers and technological conveniences such as the Internet.

All informants utilized human resources by selecting their families to assist in the process of raising dairy cows. Several informants involved their husbands to carry out several activities, but no children were involved in this study because most of the informants had children who were married so they did not live in the same house. In addition to family involvement, several informants used labor assistance from a worker to carry out several activities because their husbands were not involved in helping raise livestock. Not all informants received assistance from family or workers, there were several informants who carried out livestock rearing activities independently because the informants had marital status as widows and had unstable economic conditions, so they were unable to employ worker.

The independence of female farmers to maintain their business can be seen from the sense of optimism they have in order to build the confidence of female farmers to continue their business even in difficult circumstances due to the FMD epidemic, which has caused more losses than profits. Overall, the informants stated that they would continue to try to maintain their business by having side jobs to cover the shortage of costs for raising dairy cows. YK's statement (51) is as follows:

*"I usually work as a gardener and I like to sell my own wajit and sell it around, so that the money can rotate to cover each other's costs for the cows."*

## 5. Conclusion

Based on the aspect access, it shows that there are opportunities for business capital, information and sapronak. The participation aspect shows that activities are carried out, from bathing the dairy cows to looking for grass. The control aspect shows that decisions are taken based on joint decisions. The benefits aspect shows that female farmers feel social and economic benefits in CSC Pojok.

The dairy farming business in CSC Pojok shows the potential for sustainability because there is capability as a manager, which is shown by their ability to make decisions, face risks, and maintain their business. Equity is shown from the ability to express satisfaction with the results of the dairy cow business. Sustainability is shown by family participation in raising dairy cows, high self-confidence, and optimism to continue their business because they believe in the benefits obtained.

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