Risk Analysis for Beef Cattle Farmers in Banyuasin Regency

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ABSTRACT

This study aims to classify and map the risks faced by beef cattle farmers in Banyuasin Regency. This study employed a descriptive method using a survey as the main strategy of data collection. The study was carried out in two disaster-prone subdistricts in Banyuasin Regency, namely Tanjung Lago and Muara Telang. The sample selection of farmer respondents used a quota, based on which there were 30 farmers from each subdistrict. Therefore, according to the simple random sampling method, 60 farmers were involved in this study. Failure Mode and Effect Analysis (FMEA) was employed to identify sources of the risks. The results showed the mapping of risks experienced by beef cattle farmers illustrates the risks that occur in beef cattle business activities divided into four quadrants. The main risks that were prioritized are in quadrant one, namely natural disasters with an occurrence value of 0.35 and the value of severity of 2.57, availability of feed with an occurrence value of 0.17 and the value of severity of 2.16, government policies or regulations with an occurrence value of 0.12 and the value of severity of 2.31, and sick/dead cattle with an occurrence value of 0.10 and the value of severity of 2.09. It could be concluded the main risk in beef cattle farming in Banyuasin Regency was natural disasters, such as forest fires, floods, and tornadoes.

Keywords: Banyuasin Regency, Beef cattle, FMEA, Natural disaster, Risk analysis.

1. INTRODUCTION

According to the Great Dictionary of the Indonesian Language [1], risk is the possibility of events that can harm the company. Kountur [2] stated that risk is the possibility of an adverse event. Thus, risk can be defined as everything that can be harmful for a business or company. Yulianto and Cahyo [3] divided the risks of beef cattle farming into three categories, namely production risk, price risk, and income risk. Kasidi [4] stated that disaster, the cause of a natural deviation from the expected event, is one of the risks faced in livestock business, for example, floods, earthquakes, landslides, and others.

These various risks will affect the results of beef cattle farming if they are not anticipated and prepared for handling. Beef cattle farmers who consider the various risks that will be faced and carry out the right strategy in dealing with the risks will have an impact on the overall business performance. One of the strategies that can be used is a mitigation strategy, which is a strategy related to efforts to reduce or minimize the adverse impacts caused by the risks [5]. Flanagan and Norman [6] divided the forms of mitigation strategies into four types, namely risk retention, risk reduction, risk transfer, and risk avoidance.

Every business will experience various problems that must be resolved. However, it will usually impose certain risks that must be taken into account so as not to have a detrimental impact on the business. The risks faced by a business can be either big risks or small risks, which depends on the amount of loss it causes. In other words, it can be said that risk is everything that occurs as a result of a decision-making action in solving problems. If it is not anticipated and handled properly, it will result in losses for the business.

According to the data from Banyuasin in Numbers [7], natural disasters that frequently hit Banyuasin Regency are forest fires, floods, and tornadoes [8]. Banyuasin Regency is one of the regencies in South Sumatra, which is the second province that has a large population of beef cattle in South Sumatra Province (37,835 cattles), after Ogan Komering Ulu Timur (69,517 cattles) [7]. Livestock activities are mostly carried out by small farmers with a minimal level of knowledge for

good livestock and the difficulty of obtaining feed which is a risk factor. Therefore, it is necessary to carry out a risk analysis in raising cattle in Banyuasin Regency so that the quality and quantity of cattle can be improved. This study seeks to examine the sources of risk based on the level of occurrence and severity.

2. MATERIALS AND METHOD

2.1. Materials

This study was conducted in Banyuasin Regency. It was carried out in two Disaster-Prone Areas (Kawasan Rawan Bencana/KRB) in the subdistricts of Banyuasin Regency, namely Tanjung Lago Subdistrict and Muara Telang Subdistrict. Farmers who became respondents in this study were farmers who participated in the People's Animal Husbandry Center (Sentra Peternakan Rakyat/SPR) program. The sample selection method was employed using a quota system. Quota sampling is a technique to determine a sample from a population that has certain characteristics to the desired quota amount [9]. Each subdistrict has 30 farmers, so there was a total of 60 farmers according to the simple random sampling method. Sugiyono [9] suggested that simple random sampling technique is a sampling technique from members of the population that is carried out randomly regardless of the stratification that exists in the population. The data source used in this study was primary data. Primary data were data obtained directly from respondents from interviews and measurements in the field. A questionnaire was employed as a tool. The type of questionnaire used was a structured questionnaire with a Likert scale.

2.2. Methods

This study employed a descriptive method using a survey as the main strategy of data collection. Sugiyono [10] suggested that descriptive research is "research conducted to determine the presence or absence of independent variables, only for one or more variables without comparison or association with other variables". The primary data used in this study were obtained through deep interviews with key informants (Livestock Office and the head of livestock group) as well as questionnaires that had been tested for validity and reliability for beef cattle farmer respondents.

The selection of informants as data sources in this study was based on the principle of subjects who master the problem, have adequate data, and are willing to provide complete and accurate information. To ensure that each item in the questionnaire is valid and reliable, the instrument's validity and reliability were tested. The validity test was carried out to ensure that the questionnaire instrument used in the study is truly valid or can be used to measure what should be measured.

Meanwhile, the reliability test was carried out to ensure that the questionnaire instrument used in the study is reliable as a measuring instrument [9].

3. RESULTS AND DISCUSSION

The development of beef cattle farming is currently being carried out jointly by the government, the community (small beef cattle farmers), and the private sector. The government formulates the rules of the game by encouraging and supervising the flow and supply of products in quantity and quality to meet halal, safety, nutrition, and health requirements. In addition, the private sector and farmers play an important role in achieving sufficient livestock products through production, import, processing, marketing, and distribution of beef cattle products [11]. One of the efforts to increase the number, yield, and productivity of beef cattle is to use high quality beef cattle because it is one of the determinants of production and has a strategic value in efforts to develop beef cattle in a sustainable manner [12].
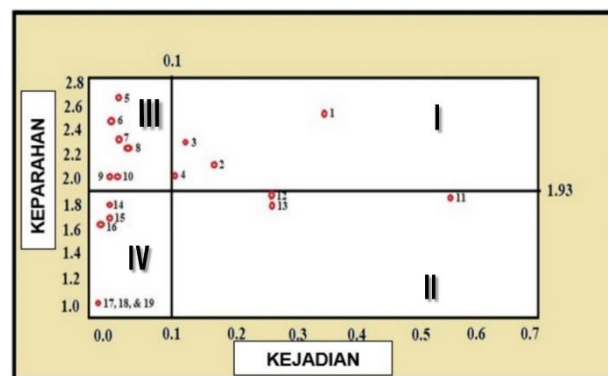

Figure 1 *Risk map in beef cattle business*

In a business activity, whether on a large scale or on a small scale, business people cannot be separated from the existence of a risk [13]. In this research, which was conducted in Banyuasin Regency, the risk experienced by farmers can be identified using the Failure Model and Effects Analysis (FMEA) method. From the risk identification process, 19 risks were obtained, then these risks were assessed using the FMEA method and risk evaluation was carried out using the Rapid Agricultural Risk Assessment Framework. Surahman [14] researched the risk management of Ongole Crossbreed beef cattle breeding in Bojonegoro, East Java. This study identifies the characteristics of farmers and livestock businesses, finds out the main risks that need to be addressed and to analyze the factors that trigger these risks to identify the characteristics of farmers and livestock businesses, identify the main risks that need to be addressed and to analyze the factors that trigger these risks. From the risk identification process, 17 risks were obtained. As a result, there are four main risks, namely the risk of drought/long drought, the risk of difficulty in obtaining feed, the risk of sick people, and the risk of sick cows. In this study,

which was conducted in Banyuasin Regency, the risks experienced by farmers can be identified based on the severity (S) and occurrence (O) which are presented in Figure 1.

Based on Figure 1, the mapping of risks experienced by beef cattle farmers illustrates the risks that occur in beef cattle business activities. The main risks that were prioritized are in quadrant one, namely natural disasters, availability of feed, government policies or regulations, and sick/dead cattle. The risk of natural disasters has a huge impact on beef cattle farming. This is in accordance with the background of the problem in this study. However, this risk is not the main subject of this study because it is covariate, implying that it can be experienced by all farmers. The occurrence of disaster risk does not affect beef cattle farmers in obtaining feed because farmers who have higher incomes have the ability to buy feed elsewhere. The high economic scale also affects the vulnerability to the risk of sick cattle. In addition to allowing the transmission of cattle disease very quickly, it also hampers the success of cattle breeding. In addition to the risk of stressed cattle, fluctuations in the selling price of cattle also have a very large influence on the success of the beef cattle breeding business.

Uncertainty indicates the possibility of an event that is unknown by business actors as decision makers. The inability of business actors to quantify or measure the probability of an event can be caused by various reasons, such as the absence of supporting information or data based on historical data or the experience of business personnel in managing business activities when handling the event. The risks that are mapped into the four quadrants in Figure 1 were grouped by occurrence and severity according to the risk mapping quadrant. The value of each risk of beef cattle breeding can be seen in Table 1 below.

The risks in Table 1 were grouped by the type of risk itself. There are four types of risk, namely disaster risk, general risk, livestock risk, and economic risk. Disaster risks are events caused by natural factors and climate change. General risks are risks that are common to all farmers in nature, including accidents, births, theft of livestock, and difficulty in getting feed. Livestock risks are risks that are directly related to the beef cattle business, such as mating failure (artificial insemination), difficulty in giving birth, poor livestock growth, sick cattle, and dead cattle. Economic risks are the risks associated with beef cattle farmers' economic activities, government policies, price changes, market bargaining power, as well as losses from the sale of calves, workforce, commercial capital, and feed prices.

The risk of difficulty in obtaining feed is caused by the long dry season which can reduce forage in the fields. One of the examples of the risk of natural disasters is a long dry season that has caused drought in Muara Telang

for the last three years. The most important risk is livestock risk which is directly related to the beef cattle breeding business. The risk of artificial insemination failure is known as the risk of artificial mating. Other risks are stunted cows or ungained weight of cattle, sick cattle, dead cattle, decrease in the selling price of cattle and giving the wrong selling price.

Table 1. Risk variables based on risk mapping

No	Risk Variable	Events	Severity	Type of Risk
Quadrant I				
1	Natural disaster	0.35	2.57	Disaster risk
2	Availability of feed	0.17	2.16	General risk
3	Government policies or regulations	0.12	2.31	General risk
4	Sick/dead cattle	0.10	2.09	Livestock risk
Quadrant II				
5	Stressed cattle	0.03	2.67	Livestock risk
6	Wrong selling price of cattle	0.02	2.50	Livestock risk
7	Cattle price fluctuation	0.03	2,33	Livestock risk
8	Uncertainty about the selling price of cattle	0.04	2.25	General risk
9	Difficulty in giving birth	0.03	2.00	General risk
10	Unability to fulfill request	0.02	2.00	General risk
Quadrant III				
11	Failure in mating	0.55	1.84	Livestock risk
12	Unsold cattle	0.28	1.90	General risk
13	Profit uncertainty	0.28	1.80	Economic risk
Quadrant IV				
14	Workforce	0.02	1.80	Economic risk
15	Venture capital	0.02	1.75	Economic risk
16	Stunted cattle/cattle not gaining weight	0.01	1.70	Livestock risk
17	Increase in feed prices	0.01	1.00	Economic risk
18	Theft	0.01	1.00	General risk
19	Losses in selling calves	0.01	1.00	Economic risk

The risk of lack of capital to develop a business is also one of the most common risks for farmers. Access to capital is quite difficult for farmers because they need collateral as guarantee and they do not understand the business plan they are doing. The risk of rising feed prices is caused by scarcity of feed supplies and other risks, such as being cheated by other people.

These risks are drawn according to the risk quadrant. The first quadrant has a very high impact and frequency. The probability of occurrence of risk in this quadrant has a significant impact on the success or failure of a cattle farming business. The risks in this quadrant are natural disasters, feed supply, government policies or regulations, and sick or dead livestock. Feed supply risk occurs due to the long dry season from June to October.

According to Anatan and Ellitan [14], dangerous and rare supply chain risks pose a threat to the implementation of livestock business operations. Therefore, integrated supply chain activities require good management [15]. This situation occurs in the second quadrant, where the definition in the mapping area has the highest risk impact and the probability of its occurrence is very low. The risks that occur in this quadrant are, for example, stressed cattle. This risk is triggered by the susceptibility of cattle to stress. In addition to causing sick or dead cattle, it also hinders the success of artificial insemination. In the third quadrant, there are often low-level risk opportunities such as mating failure, unsold cattle, and uncertain profits. Meanwhile, the fourth quadrant has a low severity and incidence such as workforce, venture capital, stunted cattle, increase in feed prices, theft, and losses in selling calves.

Economic theory suggests a trade-off between risk and return, i.e., a person who accepts a higher risk should expect a higher return assuming there is no other alternative with the same return with less risk. Choosing the right risk-return trade-off is a critical management decision. Those who are very risk averse will want an alternative where the risk involved is small and/or the reward (return) is very high compared to the amount of risk taken. Those who are less at risk of harm will be willing to accept risk without expecting the greatest reward and are likely to consider alternatives that may be considered more detrimental.

4. CONCLUSION

The results showed the mapping of risks experienced by beef cattle farmers illustrates the risks that occur in beef cattle business activities divided into four quadrants. The main risks that were prioritized are in quadrant one, namely natural disasters with an occurrence value of 0.35 and the value of severity of 2.57, availability of feed with an occurrence value of 0.17 and the value of severity of 2.16, government policies or regulations with an occurrence value of 0.12 and the value of severity of 2.31, and sick/dead cattle with an occurrence value of 0.10 and the value of severity of 2.09. It could be concluded the main risk in beef cattle farming in Banyuasin Regency was natural disasters, such as forest fires, floods, and tornadoes.

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