Risk Management: How to Avoid the Loss Potential Risk on Production of Bali Cattle Business

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Abstract

The agricultural sector is the same as other fields, which has the potential to trigger risks, such as risks in the production sector, risks in the use of technology, risks in marketing, policy risks, and risks in the work security and safety system. This study aims to explore the potential risks that can cause business losses and determine the appropriate steps in production risk management on Bali cattle farms (local cattle). This study used a mixed method approach, on 100 beef cattle breeders, using a purposive sampling technique. Analysis of business risk management in Bali cattle production using the House of Risk matrix 1 and 2. The results identified 20 risk events, while 45 risk agents were found in the Bali cattle business activities. Priority risks are determined based on the highest ARP value, where in the study found 11 priority risks, and mitigation actions obtained as many as 10 preventive actions. The conclusion of the study shows that there are 4 stages in building a risk management model in the field of Bali cattle production, namely the risk identification stage, the risk analysis stage, the mitigation action determination stage, and the production risk management results reporting stage. Where the four core activities in risk management in Bali cattle production synergize with each other to form a strong unit, which can be used as a guideline for stakeholders in the beef cattle sector.

INTRODUCTION

The agricultural sector is the same as other fields, which has the potential to trigger risks, such as risks in the production sector, risks in the use of technology, risks in marketing, policy risks, and risks in the work security and safety system. Risks can occur in all lines of life including agriculture (Noor & Kusnandar, 2018). Agriculture is a sector that is very vulnerable to risks, because it is very dependent on aspects of natural resources and even more so on human resources who will provide treatment and handling related to fertilization, as well as other farming management. And the biggest challenge for farmers is when pests and diseases attack (Budiman et al., 2019).

Agricultural commodities have a risk to their farming business (Misqi & Karyani, 2019). Farmers are required to be more responsive to events that will be detrimental to their farming business, but farmers do not yet have the ability for that, they are not yet able to take a phenomenon that occurs in

nature and limited information that makes them far behind. Risk cannot be separated from a business, the greater the risk to the business, the greater the results to be obtained, but of course this must be supported by management in farming, especially on the issue of risks that will arise and how to handle them if the risks must be taken.

The decline in land productivity due to the use of chemical inputs in the agricultural sector puts farmers at risk of a lack of yields. Production risk in the agricultural sector is greater than in the non-agricultural sector (Hasanah et al., 2018). This is because agriculture is very vulnerable to losses starting at the production stage, all the way to marketing. In contrast to non-agricultural businesses, in general, farming always encounters problems with risk and uncertainty (Suryani et al., 2018). However, the farming business must make wise use of this situation, because behind the big risks there are also big profits. Proficiency in managing or managing risk is needed, then it can be carried out in a systematic and structured manner in order to monitor, minimize, prevent, avoid, or even take risks. Of course, this kind of thing needs detailed and critical identification, so that the determination of concrete steps in taking risk management actions can be right on target. Risk management has developed and penetrated into traditional farming businesses, but its implementation is still not known in detail by agricultural business actors.

Livestock business is an important part of the agricultural sector, which has a responsibility in maintaining the availability and adequacy of protein from animal sources. Increased consumption of animal protein for the community must be in line with increased production of food derived from livestock (Lestari et al., 2013). The livestock business can have an impact on increasing community (farmer) income and food security for the beef commodity (Saleh et al., 2021). The beef cattle sub-sector is still one of the potential sectors, where the product of this beef cattle commodity is still in great demand by the public because of its unique taste and cannot be replaced by other commodities. The need for livestock has increased drastically along with the implementation of a traditional ceremony, both a death ceremony and a thanksgiving event, so that stock availability is always maintained (Rasyid et al., 2020). This research will discuss how the process of risk management in the Bali Cattle farming business. The high adaptability of Bali cattle provides a big advantage to cultivate (Astaman et al., 2021). The livestock business is very dependent on capital security (Rohani et al., 2021), this is because this business is mostly carried out on a small and medium scale.

Many risk studies on cattle farms have been carried out, such as (Cahyadi et al., 2019) studying beef cattle on traditional breeders, the risk of disease that can cause business losses in ruminants, which has been carried out by (Purwaningsih et al., 2018; Weny et al., 2017) found a risk of disease that could infect livestock caused by worm infections found through animal feed, (Noerdyah et al., 2020) chose to study the broiler supply chain to prevent and maintain product halalness, so (Damiaans et al., 2020) conducting risk research in the field of cattle biosecurity. Risks in strategic managerial

aspects of agriculture (Bishu et al., 2018). Risks in the technical field are reported by (Nawaz et al., 2019) that there is a link between effectiveness and the success of a construction project, besides that (Hoseini et al., 2021) also implements risk management in construction projects, study studies (Daria, 2018) apart from construction and agriculture, risks are also applied to environmental projects, and banking by (Republic & Republic, 2018). However, risk management in beef cattle production systems is rarely studied.

This research will examine the risks that will impact the Bali cattle business and will cause potential losses coming from internal and external a smallholder livestock business. Then we will develop a risk management model for the Bali cattle production business that can be used to handle potential risks in this endeavor. The study on the business development model by taking into account the risk aspects in the field of beef cattle farming has never been studied. We are trying to explore potential losses from sources of business activity that have uncertainties, in order to support increased income for farmers and food independence in terms of national beef supply can be realized. The purpose of this study is to explore the potential risks that can cause business losses and determine the appropriate steps in production risk management on Bali cattle farms (local cattle).

MATERIAL AND METHODS

This study uses a mixed method approach, where the hypothesis is built based on qualitative findings. Where qualitative data is collected based on interviews with experts (experts) from stakeholders in the livestock sector to identify sources of risk from livestock business. This research was conducted to examine the Bali cattle breeding business, as one of the potential local biodiversity to be developed. The research was carried out in Barru Regency from June to October 2022, using a purposive sampling method on 100 farmers who raise Bali cattle, the location was chosen based on the consideration that this area is a center for the development of beef cattle, especially Bali cattle in South Sulawesi Province, Indonesia. The review step will refer to a risk management framework that is applied to the House of Risk method. First, mapping all production activities in the Bali Cattle business, activities ranging from procurement, farm management (animal husbandry), to products ready for harvest/sell. Second, identification of the quality of risks in all business activities, it is suspected that there are some risks that may have an adverse impact on the continuity of business activities. Risks are identified by directional observation and brainstorming methods, and then data validation is carried out to farmers and stakeholders in the livestock sector. Then evaluate the potential risk to determine its severity, likelihood and assessment of the relationship between risk factors and risk events. The result of this step is the HOR-1 matrix which contains the ranking of the risk factors (Aggregate Potential Risk), the most critical risk factors and the Pareto chart.

$$\mathrm{ARP}j = \mathrm{O}\mathrm{j} \sum_i SiR\mathrm{ij} \text{…….}$$

(Anggrahini et al., 2015)

Where:

Oj = Probability of risk agent j
Si = Severity of risk i
Rij = Correlation of risk agents with severity
ARP = Aggregate risk potential of the risk agent j

The next step is the development of risk management. This study uses the results of the risk assessment process, the Pareto chart, to determine risk factors. Then determine the correlation value between mitigation strategies and risk factors. Company stakeholders validate the results of the score through a questionnaire. All related questions were formulated based on previous results and applied to the House of Risk II. The expected result is corrective action that is suitable to be applied to the Bali Cattle business at the research location. At the end of this research, we try to build an alternative model of risk management in the production sector for the development of Bali cattle farming business.

$$TEk = \sum j\ ARPj\ Ejk\ \forall k \ldots\ldots\ldots\ldots$$

(Anggrahini et al., 2015)

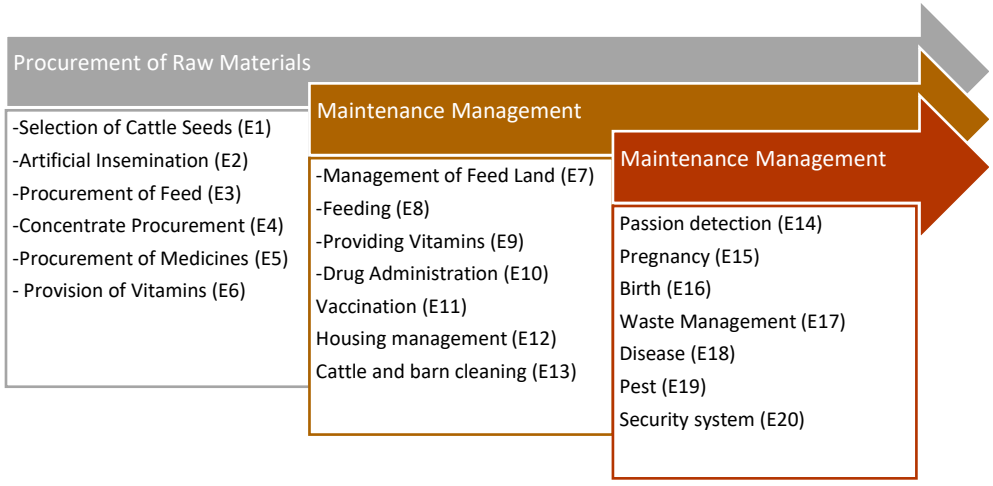
$$ETDk = \frac{TEk}{Dk} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$$

(Anggrahini et al., 2015)

RESULT AND DISCUSSION

Mapping Activity of Bali Cattle Production Business

The Bali Cattle business in carrying out production is divided into two stages of activity, namely the procurement of raw materials and maintenance management. Procurement activities consist of selecting cattle seeds, artificial insemination, procuring feed, procuring concentrates, procuring medicines, and procuring vitamins. Maintenance management activity is a key activity in the Bali cattle business because this activity covers almost all of the 80% of activities that determine the success or failure of a beef cattle business (Agustiyana, 2022).



Picture 1. Mapping Risk on Bali Cattle Production.

Risks Identification

The most important phase in risk management is the critical identification process. When all potential losses and uncertainties in the business are properly identified, it can be said that more than half of the risk management work has been completed. Risk can cause losses that bring more than one risk event (Anggrahini et al., 2015), each risk has its own characteristics that are included in a business activity. Numerous dangers that affect livestock frequently result in losses for those involved in the industry, particularly small-scale beef cattle farmers (Sirajuddin, et al., 2022). This identification study was carried out by observing and brainstorming with expert informants who were directly involved in beef cattle farming activities. The procurement activity consisted of 6 risk events, while the maintenance management system identified 14 risk events.

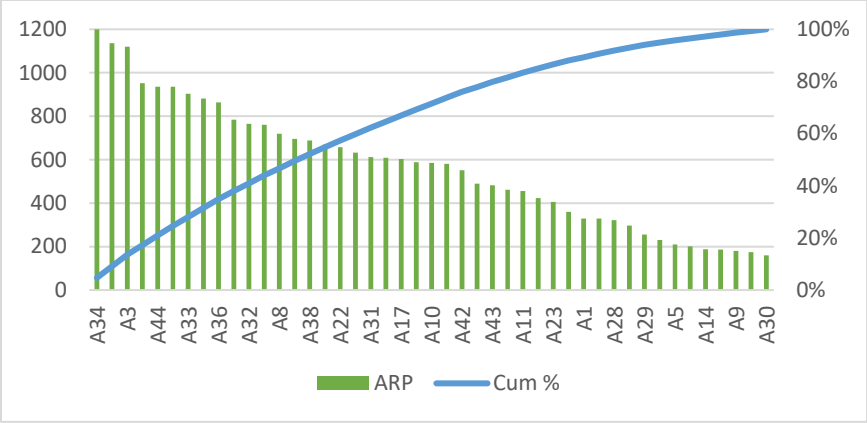
Risk Evaluation

All potential risks identified in the previous stages will be analyzed, this is done to identify consistency in identifying ARP values with the help of the House of Risk (HOR) tool stage 1, the help of questionnaires, and Pareto diagrams. At the HOR 1 stage, an assessment of the risk agent with the highest value is carried out as a priority risk that requires special treatment, this is the first step in carrying out risk mitigation actions. The ARP rating is obtained by multiplying the severity value with the occurrence. The highest ARP value will be used as a potential risk agent for special handling. The Bali Cattle Business shows 11 risk agents that have the potential to cause harm to business activities. There is 1 risk in procurement activity and 10 potential risks in maintenance activity. The table below will describe the risk agent that has the highest ARP value.

Tabel 1. Identification of Critical Risk Agent

No	Risk Agent	Code	ARP	Rank	Activity
1	Abortion occurred	A34	1200	1	Maintenance
2	Calf death	A35	1136	2	Maintenance
3	Artificial Insemination Failure	A3	1120	3	Procurement
4	Vaccine delays cause cows to be susceptible to disease	A21	952	4	Maintenance
5	Cow stolen	A44	936	5	Maintenance
6	Cow hit by vehicle	A45	936	5	Maintenance
7	There is no recording of estrus cycles	A33	904	6	Maintenance
8	Parent Death	A41	882	7	Maintenance
9	New disease threats arise	A36	864	8	Maintenance
10	Delay in giving vitamins	A18	784	9	Maintenance
11	Failed to detect brood heat	A32	765	10	Maintenance

Source: Research data, 2022.



Picture 2. Diagram Pareto for Rank of ARP Value

In the analysis of Figure 2 above, risk agents are determined based on the highest ARP value and 11 critical risk agents are found that require preventive handling or mitigation actions to avoid potential losses. However, in your critical agricultural business system the risks can have a serious impact on the business in a significant way.

Risk Mitigation on Bali Cattle Business

Mitigation measures are taken to prevent and correct what may occur in the Bali Cattle production business activities.

Tabel 2. Mitigation Action on Risk Production of Bali Cattle

Mitigation Action	Code
Implement a risk-sharing partnership system	PA1
Giving vitamins regularly	PA2
Improved hygiene and sanitation	PA3
Improved surveillance system	PA4
Management of feeding and nutritional content of feed	PA5
Increasing farmer's knowledge about maintenance management	PA6
Proper handling of sick cows	PA7
Improvement of the stable system that keeps livestock safe	PA8
Giving vitamins regularly	PA9
Insurance for livestock kept	PA10

Source: Research data, 2022.

Based on Table 2, we provide solutions in carrying out mitigation measures for risk handlers that can cover all business activities in Bali cattle production. However, in strengthening the accuracy of the analysis to provide treatment for priority risks, further analysis will be carried out to see the inconsistency or correlational relationship between risk agents and preventive measures against a risk will be analyzed using HOR 2, which will be explained in the following table.

Tabel 3. House of Risk 2 Analysis

Risk Agent	PA1	PA2	PA3	PA4	PA5	PA6	PA7	PA8	PA9	PA10	ARP

34	9	1	1		3	1			1		1200
35	1		9	3		9					1136
3		3	9	1	9	3	1		1	3	1120
21		9	3	3		3	1		1	1	952
44	9			9	1			9		9	936
45	3			9		1		9		3	936
33	3			9		9				3	904
41	1	9	9	9	3	3	9		9	9	882
36	9	3	3	3	1	9	3		3	9	864
18		3	3	3	1	3	1		9	1	784
32				9		9				1	765
Total Effectiveness	34538	26010	37242	52135	18910	46371	13386	16848	20858	35519	
Degree of Difficulties	3	3	4	5	5	4	3	4	3	3	
Effectiveness to difficulty Ratio	11513	8670	9311	10427	3782	11593	4462	4212	6953	11840	
Rank of Priority	5	6	3	1	8	2	10	9	7	4	

Source: Research data, 2022.

The results of the calculations in the previous stage are to provide a simulation of a risk mitigation plan simulation action. In the operationalization of HOR 2 there are several key criteria to produce a decision in handling a critical risk.

1. The ranking of mitigation actions is determined based on HOR 2 analysis.
2. Implementation Actions will have the impact of using an additional budget or additional methods that must be observed carefully by breeders and stakeholders in the beef cattle business world.
3. Scoring in determining connectivity is given a score of 9 for mitigation steps
4. Information generated based on historical data searches from many online reference sources.

Risk Management Model on Bali Cattle Production Business

The mitigation measures that have been determined in the previous discussion have a good impact on carrying out preventive measures and avoiding a potential risk, but this cannot be used as a reference if it has not been set forth in a model text that can be used by all stakeholders in the field of cattle farming. slaughter, especially in the Bali Cattle business. Livestock activities tend to be profitable and a source of income for farmers, but if not managed properly, they

will only produce waste (Sirajuddin, Amrawaty, et al., 2022). Therefore, we try to design a model for risk in a beef cattle production system which will be presented in Figure 3 below.

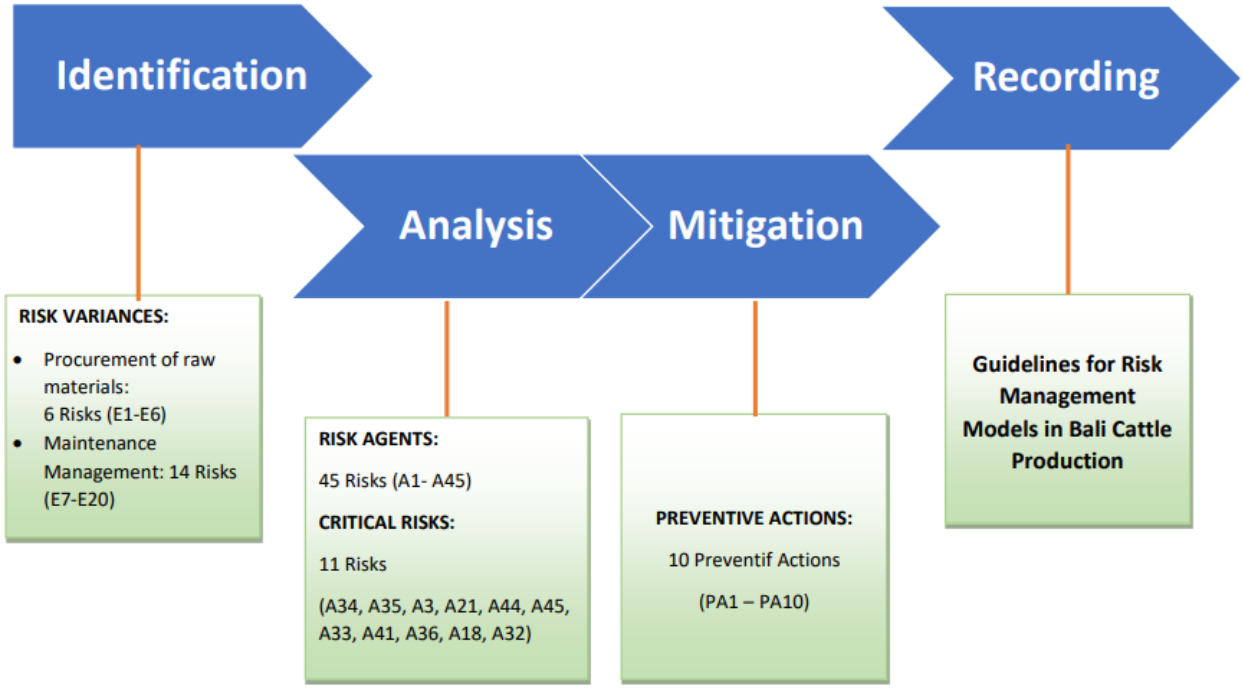


Figure 3. Risk Management Model on Production of Bali Cattle.

The process of managing the production risk of Bali Cattle involves 4 important activities, namely risk identification, analysis, mitigation measures and reporting. All of these activities are an inseparable unit to obtain maximum results in anticipating risks, both threats from outside the business and especially threats that exist in the business. The presence of risk in a business makes business actors even more creative in running their business, this is because risk cannot be underestimated, because each activity in a business has its own risk with different levels of severity if it occurs. However, apart from examining various factors from case studies, some existing concepts from the literature were revisited for their application to agricultural risk management (Singla & Sagar, 2012).

Basically the treatment of a risk is not all the same, but there are risks that can be taken, risks that should be avoided, and risks that can be exploited to gain more profit. This kind of treatment can only be seen by level managers who are able to see directly all the business activities they carry out. In the implementation of risk management at the level of traditional businesses such as Bali cattle, observations or identification are carried out by the breeders themselves, this causes the process of identifying risk sources to be not optimal. So that we need help from researchers to see the extent to which business activities contain risks, and how big the impact of the risks should they occur.

Model studies in risk management in the traditional Bali cattle business produce a reference for mitigation actions or

recommendations for improving the business to be even better, by prioritizing a risk situation in the business. In the initial identification, we were assisted by breeders who were able to see risks massively and we also conducted a literature search related to this (agricultural business risks). Therefore, in the Bali Cattle production process, as many as 20 risk events were found, which were found in two key activities, namely the procurement of raw materials and maintenance management on the Bali Cattle business. In the next stage, we conduct an analysis to assess all risk events based on their severity and occurrence. So that a total of 45 risk agents were obtained, each of which had characteristics that could damage the Bali cattle business. The next step is to establish preventive actions to avoid damage caused by risk agents. Based on this, we propose a model for managing production risk in the Bali Cattle business which is reported in the form of scientific papers so that it can assist the development of the livestock business, in order to obtain maximum profits.

CONCLUSION

Based on the review of the discussion on the risk management process, we can conclude that there are 4 stages in building a risk management model in the field of Bali cattle production, namely the risk identification stage, the risk analysis stage, the mitigation action determination stage, and the production risk management results reporting stage.

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