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Risk Analysis Of Dairy Cow Milk Production

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Abstract

Dairy farmers need to know the risk management strategies in dairy cow milk production process to reach the optimal production and preventing decrease. Pangudi Mulyo Animal Husbandry Group is a farmer group that engaged in dairy cows business and makes dairy milk as its main product. This study aimed to identify risks and set priorities for handling and analyzing risk management strategies for dairy cow milk production. This research was conducted in December 2019-January 2020 in Pangudi Mulyo Animal Husbandry Group located in Randusari Hamlet, Nongkosawit Village, Gunungpati District, Semarang. The method used in this study was census method, by taking 33 active members of the Pangudi Mulyo Animal Husbandry Group. Data collection was carried out through observation and interviews according to the questionnaire. The data were analyzed using quantitative analysis with the House of Risk (HOR) Phase 1 and Phase 2 methods. The results shows that there were 17 risk events and 17 risk agents in HOR Phase 1 and there were 8 risk agents that needed handling based on the high value of Aggregate Risk Potential (ARP). There are identified 13 risk management strategies obtained from HOR phase 2 in accordance with the Effectiveness of Difficult (ETD) assessment of risk agents that need to be addressed.

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INTRODUCTION

Dairy farming is one of the farming sectors that produces dairy cow milk as its main product and contributes to improving the national economy and meeting the nutritional needs of people in Indonesia. The existing milk production in Indonesia is still relatively low and does not fully meet the demands of the community. This situation causes the dependence on imported milk to meet the public demand. Dependence on imported milk may cause a decrease in income for local dairy farming. The problem that exists in the dairy farming business in general is a fairly large production risk, because the business activities relies heavily on environmental factors, both the natural environment and the economic environment. Environmental factors that influence the milk production are climatic conditions, availability of natural resources, and the condition of livestock/cows. Meanwhile, economic environmental factors such as input prices to supply demand also have an influence on milk production in dairy farming business. The existence of these production risks requires businesses, especially farmers, to consider the existence of risks and their management to prevent a decrease in milk production and losses.

According to Putri (2015), the production risks in dairy farming business can be analyzed using the Failure Mode and Effect Analysis (FMEA) method. The FMEA method produces output in the form of a list of events and risk agents experienced by dairy farming businesses. Based on the research by Putri (2015), the highest Aggregate Risk Potential (ARP) value obtained from the Failure Mode and Effect Analysis (FMEA) method was found in risk agents in the form of microbiological contamination that exceeded the minimum standard. Contamination of dairy cow milk causes the milk to be easily damaged and rotten resulting in a decrease in selling prices. This milk contamination event could occur during the milking process. According to Krismiyanto (2016), production risks needed to be analyzed until an assessment of an efficient risk management strategy is implemented, therefore the House of Risk (HOR) method was used to identify risks and their coping strategies. Based on the results of the analysis conducted by Krismiyanto (2016), the poor hygiene of milk was also the highest risk in dairy cow business in Singosari Village, Boyolali. There were 7 risk agents that needed to get priority handling, including the poor hygiene of milk, cattle diseases, high feed prices, low feed intake, lack of cow supply, lack of milk quality checking tools and small number of cows owned by farmers. The coping strategies used to overcome these risks included developing sustainable sanitation maintenance management, considering the dairy cow genealogies in breeding and selecting good and productive breeds. In previous studies, it is not yet explained about the identification of risks that have an impact on the decline in milk production, therefore, the House of Risk (HOR) method was chosen to identify events and risk agents that exist in production and analyze the easy and efficient risk management strategies.

Gunungpati district is the center of dairy cattle business in Semarang City with 227 household farming (Central Bureau of Statistics, Semarang City, 2015). One of the dairy cattle businesses in Gunungpati District is Pangudi Mulyo Animal Husbandry Group (*KTT*). The number of cattles owned by Pangudi Mulyo are approximately 145, with Friesian Holstein (PFH) and Simmental breeds. Based on the observations, some problems faced by farmers in Pangudi Mulyo Animal Husbandry Group are the minimal water availability, the low availability of forage

feed and low production of dairy milk that caused unablity to meet the consumer demand. These problems are the impact of the production risks contained in each production activity. An accurate calculation of production risks and strategies are urgently needed for the right decision making to achieve the optimal income.

The aims of this research was to identify the events and risk agents that need to get the priority handling in dairy cow milk production activities and analyze the appropriate treatment strategies to handle the risks of dairy cow production in Pangudi Mulyo Animal Husbandry Group. The importance of this research is to solve the problems faced by farmers in Pangudi Mulyo Animal Husbandry Group that is always occured in every production process and have an impact on the decline in production and income. This research is expected to be able to facilitate dairy farmers in Pangudi Mulyo Animal Husbandry Group or other areas in addressing the risks inherent in dairy milk production activities, so that farmers will be able to cope with and mitigate existing risks in order to maintain and increase the dairy milk production.

RESEARCH METHODS

The study was conducted in December 2019-January 2020 at the Pangudi Mulyo Animal Husbandry Group, Randusari Hamlet, Nongkosawit Village, Gunungpati District, Semarang. The determination of the location was done purposively with the consideration that the Pangudi Mulyo Animal Husbandry Group had the third highest number of cattle in Gunungpati District and was involved in the Special Efforts for Cattle Pregnancy Program (*UPSUS SIWAB*) implemented by the government. Pangudi Mulyo Animal Husbandry Group got a sufficient concern from the government of Semarang city. The census was taken by taking 33 active members of Pangudi Mulyo Animal Husbandry Group. Data collection was carried out by observation and interviews with all members of Pangudi Mulyo using questionnaires. The data obtained were analyzed quantitatively by the House of Risk (HOR) phase 1 and phase 2 to determine the risk events, risk agents and risk management strategies.

HOR Phase 1 was used to assess the severity of the impact of risk events and the level of risk agent events and determine the priority risk agents. The steps taken in the Phase 1 HOR analysis according to Syamsiyah et al. (2019) were to conduct deeper observations and studies on each production activity carried out in the dairy farming business, identify risk events in each production activity carried out in the dairy farming business, identify risk agents (sources) in each production activity that were carried out conducted in dairy cattle business, and determine the value of severity (S) or the severity of the impact of risk events on a scale of 1-10.

Table 1. Severity Scales

Scale	Severity Effect
10	The effects are dangerous
9	The effects are extremely high
8	The effects are very high
7	The effects are high
6	The effects are moderate
5	The effects are low

4	The effects are very low
3	The effects are small
2	The effects are very small
1	No effect

Source: Syamsiyah *et al.* (2019)

The next step was to determine the value of occurrence (O) or the opportunity value of the appearance of the agent (source) of risk on a scale of 1-10. Occurrence assessment was based on the frequency of the agent (source) occurrence and the effects it created. The following are the rating scales to assess the level of occurrence of the risk agent:

Table 2. Occurrence Scale

Scale	Occurrence
10	Almost never
9	Very small
8	Very few
7	A few
6	Small
5	Moderate
4	Quite high
3	High
2	Very high
1	Almost certainly happen

Source: Syamsiyah *et al.* (2019)

After the severity and occurrence values of events and risk agents were identified, the next step was to assess the relationship between risk events and risk agents using a scale of 0, 1, 3, 9. Score 0 indicated no correlation, score 1 indicated low correlation, score 3 indicated moderate correlations, and score 9 indicated high correlation.

Table 3. Correlations between risk events and risk agents

Color	Score	Information
	0	No correlation
	1	Low correlation
	3	Moderate correlation
	9	High correlation

Source: Pedekawati *et al.* (2017)

To get the ranking of each risk agent, the Aggregate Risk Potential (ARP) value needed to be calculated to determine the risk agent that would be the priority using the formula as below:

$$ARP_j = O_j \sum S_i R_i$$

Information :

ARPj = *Agregat Potential Risk*
Oj = *Occurrence*
Si = *Severity*
Ri = Correlation level (0,1,3,9)

Mapping in HOR Phase 2 aimed to determine the risk treatment strategy in accordance with the priority of risk agents that have been obtained in HOR mapping phase 1. HOR Phase 2 work phase, according to Syamsiyah et al. (2019), is using Pareto analysis to select risk agents according to ARP values from highest to lowest, identify relevant handling strategies (PAk) against risk agents, measure the correlation value between handling strategies (PAk) and risk agents using the same scale when assessing the correlation of events and risk agents, and calculate the total effectiveness (TE) of the risk agent using the formula below:

$$TE_k = \sum ARP_j \, EJ_k$$

Information:

TE_k = Effectiveness value of the handling strategy

ARPj = *Agregat Potential Risk*

EJ_k = Correlation level (0, 1, 3, 9)

Next was measuring the level of difficulty in implementing risk management strategies (Dk) using the weighting scale as follows:

Table 4. Scale of Difficulty Levels for Implementing Strategies

Scale	Information
3	Handling action is easy to implement
4	Handling Action is rather difficult to implement
5	Handling action is difficult to implement

Source: Kristanto *et al.* (2014)

Next was calculating the total effectiveness of the implementation of mitigation actions or treatment strategies (ETDk) with the following formula:

$$ETD_k = TE_k \, / \, D_k$$

RESULT AND DISCUSSION

Risk Identification

Risk identification was carried out using the interview method according to the questionnaires to all active members of Pangudi Mulyo Animal Husbandry Group.

Table 5. Risk Events for Dairy Cow Milk Production

Code	Risk Events	Severity
E1	Error in selecting mother cows	5,8
E2	Interference during birth of the calf	6,8
E3	The milk is not sold out	5,1
E4	Cattle are die or get sick	6,5
E5	Lack of clean water for drinking and sanitation	8,0
E6	Lack of forage feed	6,8
E7	Lack of concentrate feed	7,1
E8	Low profits for farmers	6,3
E9	Poor calf quality	5,4
E10	Failure of artificial insemination	6,6
E11	Bloated cattle	5,5
E12	Pedigree of cow breed is unknown	8,9
E13	Poor quality broodstock	3,9

E14	Decreased milk production	7,9
E15	Lack of facilities and infrastructure of the barn	6,7
E16	Lack of technology	5,0
E17	Inability to meet consumer demands	6,6

Source: Processed from primary data (2020)

Based on Table 5, there are 17 risk events in the dairy cattle business conducted by Pangudi Mulyo Animal Husbandry Group. The occurrence of risk was assessed as the severity caused by the scale specified, the greater the impact caused, the greater the severity of the risk event. Previous research conducted by (Amam & Harsita (2019) classified the risk aspects of dairy cow milk production in Pujon district, Malang Regency consisting of seasons, safety, cattle diseases, fluctuations in milk prices, government policies, group policies and farmers' morality. These risk aspects has similarities with the risk aspects that occur in the dairy farming business conducted by Pangudi Mulyo, which is looking at the risks from the environment, government, farmers, and cattle. Previous research conducted by Tampubolon et al. (2011) in Subang Regency, West Java stated that the residual waste of livestock manure left in the barn contains CH4 emissions or methane gas which has the potential to cause risks to the health of cattle and the community. Incidence of the untreated manure accumulation also occurs in Pangudi Mulyo Animal Husbandry Group; the manure is left in the back of the barn until it is withered to the soil. Previous research conducted by Mandaka & Parulian Hutagaol (2017) in Bandung Regency, West Java stated that the risk factors that greatly affect milk production in dairy cattle business is feed, both forage and supplementary feed in the form of concentrate. Other risk factors are genetic owned by livestock, the relationship between farmers and partners, and skills of the farmers. These risk factors also occur in Pangudi Mulyo Animal Husbandry Group, that the minimum amount of feed and ignorance of the cow breed pedigree become the causes of low optimization of the milk production.

Table 6. Risk Agents of Dairy Cow Milk Production

Code	Risk Agents	Occurrence
A1	Lack of capital	7,4
A2	Lack of land availability	6,5
A3	Extreme weather changes	8,2
A4	Lack of knowledge	5,4
A5	High input prices	4,5
A6	Lack of attention to the maintenance process	4,2
A7	Wet forage feed	4,8
A8	Fluctuations in milk prices	4,1
A9	Cattle health conditions	3,5
A10	Inappropriate mating time	3,4
A11	Lack of business partnership	4,8
A12	Limited access to information / technology	5,1
A13	The lack of milk produced	7,9
A14	Lack of treatment for sick cows	2,9
A15	Lack of preparation when the cows give birth	4,2
A16	The high price of broodstock	5,0

A17	Small number of cows had by farmers	6,6

Source: Processed from primary data (2020)

Risk Evaluation

The correlation between the agent and the risk event was assessed based on the identified risk events and risk agents. This correlation value was included in the HOR Phase1 matrix and calculated the Aggregate Potential Risk (ARP) value to determine the risk agent that needs to get priority handling. Following are the results of the assessment of events and risk agents using HOR phase 1 analysis:

Table 7. HOR Phase 1 Matrix

Kejadian Risiko	Agen Risiko																	Severity
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	
E1	1			9								1				9		5,8
E2				3					3	1					9			6,8
E3								3			9							5,1
E4	1	1	3	1		9			9						9			6,5
E5			9															8,0
E6	3	9	9		1													6,8
E7	9				9													7,1
E8			1		1			3			1	1	9				3	6,3
E9	1			3														5,4
E10										9								6,6
E11			3				3		1					1				5,5
E12				9														8,9
E13	3			3												3		3,9
E14		1	9		3	3			1			1					3	7,9
E15	3	3																6,7
E16	3			1								3						5,0
E17													9					6,6
Occurrence	7,4	6,5	8,2	5,4	4,5	4,2	4,8	4,1	3,5	3,4	4,8	5,1	7,9	2,9	4,2	5,0	6,6	
ARP	1105,3	626,6	2013,7	1044,9	457,9	344,8	77,9	138,8	322,0	226,8	252,7	178,0	924,6	15,7	497,0	323,3	283,6	
Rank	2	5	1	3	7	8	16	15	10	13	12	14	4	17	6	9	11	

Source: Processed from primary data (2020)

Based on the HOR Phase 1 matrix, the ranking of existing risk agents is known. They were illustrated in Pareto diagram to find out which risk agents are the priorities. The priorities that appear in this Pareto diagram were formulated in the handling strategy so that the risks that may occur can be overcome properly. This pareto diagram illustrates a comparison with the 80/20 principle, meaning that 20% of the important part of the problem contributes to an impact of 80% (Kristanto & Hariastuti, 2014). The use of pareto diagram is expected to be helpful in choosing a risk agent that represents 80% of the impact of the occurrence of risk. Based on the HOR Phase 1 matrix illustrated in the Pareto diagram, the following priority risk agents were obtained:

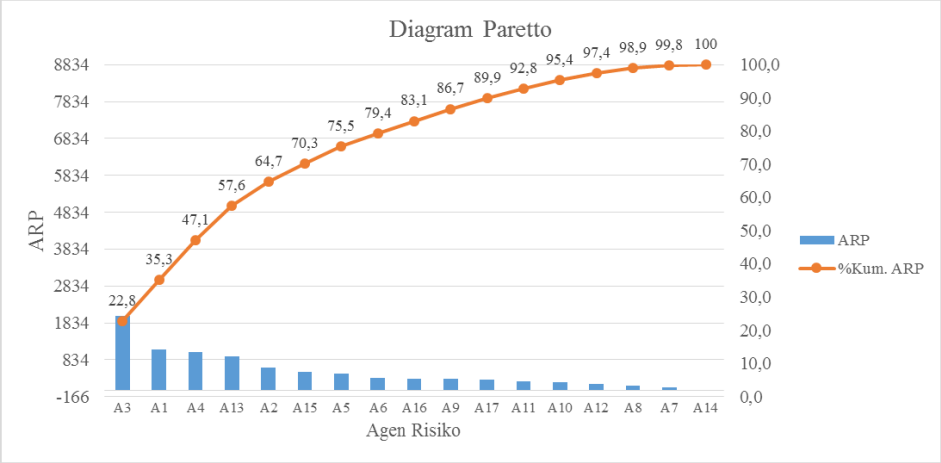

Figure 1. Pareto Diagram

Source: primary data (processed), 2020.

Based on the Pareto diagram, the percentage of priority from risk agents that need to get the priority handling can be seen. Risk agents with ≤ 80% percentage are risk agents that need to be prioritized in risk management strategies. The risk agents that shall be given treatment according to the priority are as follows:

Table 8. Priority Risk Agents for Dairy Cattle Production

Code	Risk Agents	ARP
A3	Extreme weather changes	2014
A1	Lack of capital	1105
A4	Lack of knowledge	1045
A13	The lack of milk produced	925
A2	Lack of land availability	627
A15	Lack of preparation when the cows give birth	497
A5	High input prices	458
A6	Lack of attention to the maintenance process	345

Source: Processed from primary data (2020)

ARP : Aggregate Risk Potential

This extreme weather change has the influence on the amount of water, forage feed, and housing temperature. Environmental physiology influences the sustainability of dairy cattle business. According to Suherman & Purwanto (2015) the factors of temperature, humidity, solar radiation, and wind speed affect the physiological conditions of dairy cattle. During dry season, forage feed and water will be decreasing, resulting in minimal intake of forage and drinking water for dairy cows. As the result, milk cannot be produced optimally. This lack of capital was felt by farmers in the early days of establishing the business. The price of virgin cows was quite expensive, causing farmers to be forced to buy calves and were retained until they were pregnant and could be milked, as a result, farmers had difficulty developing their businesses. According to Firmansyah et al. (2016) limited business capital caused farmers are unable to optimally provide factors of production such as forage, supplementary feeds, concentrates, drugs, and others. Inability of farmers in holding production factors caused poor livestock conditions. Knowledge of farmers in Pangudi Mulyo Animal Husbandry Group is still minimal, especially regarding the pedigree of cattle and ideal dosage of feed. So far, farmers have only been guided by

experiences and discussions with fellow farmers. According to Baba et al. (2011) farmers' lack knowledge of feed formulation and concentrate, lack of knowledge related to the benefits of feed ingredients, low quality of feed during the dry season and lack of knowledge about processing and preserving feed, causing livestock needs cannot be met optimally. Knowledge related to innovations that can improve their business was obtained by farmers through counseling activities.

Milk production produced by Pangudi Mulyo is less than 10 liters / cow / day. Milk production is relatively small compared to the minimum production of PFH cattle. According to Firman (2010), PFH type dairy cows are able to produce milk as much as 10 liters / cow / day. The lack of milk production is experienced by farmers, especially during the dry season. The farmers could get a fairly large milk production, which is around 10-14 liters / cow/ day at the beginning of the lactation period and was supported by the weather. The land that is used as the location of the enclosure by the Pangudi Mulyo Animal Husbandry Group is a crooked land owned by Pongangan Village. The members must pay a rental fee of IDR 50,000 per month. In addition to land rental fees, members of Pangudi Mulyo also paid electricity and water costs for IDR. 15,000.00 / member, which is paid during group meetings to group treasurer. The narrow area of land makes it difficult for farmers to provide forage and establish ideal housing. According to Sarwono (2008) a good barn is a barn that provides equipment to support the needs of the livestock both for maintenance and sanitation, i.e. feeding storage, feeding place, forage feed storage, a place for compost, a place to dispose the manure, a main room and a door.

Farmers in Pangudi Mulyo Animal Husbandry Group often experience difficulties when dealing with cattle that give birth. Usually, farmers work together to deal with the cattle and often use the service of veterinaries. Farmers should immediately call the vet if they are in doubt and not ready in handling the birth. According to Paputungan et al. (2019) parturition consists of three stages, the first stage is widening of the cervix for 2-6 hours, expulsion of the baby or fetus for 30 minutes to 1 hour, and removal of the placenta for 4-5 hours. If the mother cow is not able to remove the baby beyond 8 hours, it can be said that the mother cow is experiencing *distokia*. Costs used by farmers in Pangudi Mulyo to provide additional feed in the form of tofu waste are IDR 40,000 / sack, costs for water and electricity are IDR 15,000 / month, fee for artificial inseminations are IDR 40,000/shot, and land rental costs are IDR 50,000 / month. However, farmers tend to unable to optimize the supply of inputs due to high input prices, especially on the cost of additional feed ingredients. According to Wantasen et al. (2016), the high cost of production in the dairy farming business is caused by the cost of additional feed in the form of concentrate with a percentage of 79% of the total cost. The maintenance carried out by farmers in Pangudi Mulyo includes the activities of feeding, cleaning the barn and milking. Feeding and cleaning is done in the morning and evening, meaning that at that time the farmer also controls the condition of the cattle. However, suddenly paralyzed cattle are still happened sometimes. For example, when a farmer return from the Friday prayers, some cows are suddenly unable to stand up and go limp. According to Simamora et al. (2015), paralysis in dairy cattle caused by the imbalance of concentrate feed with the provision of mineral-contained feed. According to Soedjana (2005) the farmers pay less attention to the selection of

livestock breeds, the amount and time of feeding, good maintenance management and good age of livestock for sale.

Risk Management Strategy

Based on the interviews with the keypersons (chairman, secretary, and group treasurer), 13 treatment strategies were obtained in accordance with 8 risk agents that needed to get priority handling. The following risk management strategies are in accordance with the priorities of risk agents:

Table 9. Risk Management Strategies for Dairy Cow Milk Production

Code	Risk Management Strategy
PA1	Storing water in a water reservoir when it is easily available
PA2	Using water as efficiently as possible
PA3	Adding additional concentrate feeding (*komboran*)
PA4	Conducting routine cow vaccinations
PA5	Establishing communication with extension agents and asking for explanation related to cattle pedigree
PA6	Preparing quality broodstock to produce quality calves
PA7	Paying attention to feed intake during the cow breeding process
PA8	Understanding the criteria for good cattle through physical conditions
PA9	Making silage from forage fermentation or something similar
PA10	Foraging to places that have a lot of green plants and grass, even though the distance is far
PA11	Performing good and right maintenance management
PA12	Performing business credit
PA13	Establishing relationships with several veterinarians or animal paramedics

Source: Processed from primary data (2020)

Based on Table 9, the registered risk management strategies were analyzed using HOR Phase 2 to select the priority strategies based on the effectiveness value and the difficulty level of implementing the handling strategy. Previous research conducted by Krismiyanto (2016) in Mojosongo District, Boyolali stated that in order to handle production risk, a risk mitigation strategy consisting of making sustainable hygiene maintenance management, breeding management that pays attention to dairy cow pedigree, and choosing good and productive types of cattle are necessary. These strategy are also applied and agreed by the farmers in Pangudi Mulyo Animal Husbandry Group in dealing with the risk of dairy cow milk production. Another study conducted by Nurmalina (2010) in Bogor, West Java showed that the risk of production and the risk of fluctuating price of dairy cow milk could be overcome by processing livestock manure waste into proper biogas. The existence of biogas processing is beneficial in reducing waste and providing benefits in increasing income besides milk. Previous research conducted by Rusdiana et al. (2019) in Bandung, West Java, stated that to deal with the risk of dairy cow milk production, establishing partnerships with dairy cooperative is one of the effective methods. The

existence of cooperatives makes milk prices at the farm level are protected and farmers do not need to think about the market to sell their products. However, different from Rusdiana et al. (2019), Pangudi Mulynimal Husbandry Group is not interested and reluctant to partner with cooperatives or other Milk Processing Industries because farmers considered that milk production owned was not high enough and would tend to suffer losses if it sold collectively in cooperatives or Milk Processing Industries. HOR Phase 2 analysis was carried out to choose strategy priorities based on the effectiveness value and difficulty level of implementing the handling strategy, along with HOR Phase 2 matrix in accordance with the priorities of the risk agent:

Table 10. HOR Phase 2 Matrix

Agen risiko		Strategi Penanganan													
		PA1	PA2	PA3	PA4	PA5	PA6	PA7	PA8	PA9	PA10	PA11	PA12	PA13	ARP
A3	perubahan cuaca yang ekstrim	9	9	9	3					9	9	9			2014
A1	Kekurangan modal												9		1105
A4	Kurangnya pengetahuan peternak					9	9	9	9			1			1045
A13	Produksi susu menurun			9	1	1		3	1			9			925
A2	Ketersediaan lahan kurang									9	9				627
A15	Kurang siapnya peternak saat ternak melahirkan					3						1		3	497
A5	Tingginya harga input														458
A6	Kurangnya perhatian pada proses pemeliharaan											9			345
	Total efektivitas (TEk)	18123	18123	26444,2	6965,59	11819,9	9404,16	12177,9	10328,7	23762,2	23762,2	31089,5	9947,81	1491,15	
	Degree of Difficult (Dk)	3	3	3	4	4	5	4	4	5	4	5	5	4	
	Effectiveness to Difficulty (ETD)	6041	6041	8815	1741	2955	1881	3044	2582	4752	5941	6218	1990	373	
	Ranking	3	4	1	12	8	11	7	9	6	5	2	10	13	

Sumber: Diolah dari data primer (2020)

Based on Table 10, it can be seen that the priority risk management strategy that can be seen from the cumulative percentage of ETD ≤ 80% is to add additional concentrate feeding (*komboran*), make good maintenance management, store water in water reservoirs, use water as efficiently as possible, forage to places that have a lot of green plants and grass, make silage and pay attention to the feed intake of the calves. The priority of the risk management strategy is considered to be able to overcome the priority risk agents. The following risk management strategies are sorted by rank and level of effectiveness:

Table 11. Risk Management Action Results According to the HOR Phase 2 Matrix

Code	Handling action	ETD	Rank
PA3	Adding additional concentrate feeding (*komboran*)	8815	1
PA11	Performing good and right maintenance management	6218	2
PA1	Storing water in a water reservoir when it is easily available	6041	3
PA2	Using water as efficiently as possible	6041	4
PA10	Foraging to places that have a lot of green plants and grass, even though the distance is far	5941	5
PA9	Making silage from forage fermentation or something similar	4752	6
PA7	Paying attention to feed intake during the cow breeding process	3044	7

Source: Processed from primary data (2020)
Information: ETD: *Effectiveness of Difficulty*

The risk of climate change is overcome by breeders by relying on the *komboran* of tofu waste for cows' consumption. According to Danang (2017) *komboran* is food for livestock that made from a mixture of tofu pulp, concentrate, cassava pulp, chopped cassava, and water. The aim of feeding the *komboran* is to maintain, or even increase, the milk production of dairy cows. The dairy milk production could not be produced much because the feeding was only relied on forage feed. The negative impact of adding *komboran* to daily feeding is that farmers have to pay more because the price of combustion made from tofu pulp is quite high, which is around IDR 40,000 / sack. It is given 2 times precisely in the morning and evening, one sack for each. This maintenance management is very important and influential because the dairy cattle business is fully under the control of the farmers, therefore it is necessary to have proper maintenance so that the production of dairy cows can be optimal. This is in accordance with the opinion of Krismiyanto (2016) which stated that the good and right maintenance management consists of sanitation or cleaning the barn and dairy cows regularly at least 2 times a day, cleaning the milk containers or milk cans that are used to store cow's milk, cleaning the cow's nipple area before milking and disposing the first milk to avoid impurities mixed with milk, as well as controlling and checking the condition of the cows regularly. The problem of water shortages is overcome by storing water in a storage tub and using water as efficiently as possible. Both of these methods are easy handling methods for farmers, because they already have drums to store water and use it when water is hard to get, precisely in the dry season. The water used by Pangudi Mulyo Animal Husbandry Group comes from wells and from the state drinking water company which is channeled to all barns.

For the problem of forage deficiency, farmers have so far overcome it by finding other forages even though the distance is far. Farmers in Pangudi Mulyo take forage around the housing/barn. However, when the forage near the barn starts to run out, farmers look for forage in Mijen and surrounding areas which are relatively far away. Vehicle is needed to transport the forage; as the result, farmers need to pay more to get forage. Making silage or forage preservation is a way that can be used to overcome the minimal amount of forage during the dry season. According to Kojo et al. (2015) silage made from chopped *Pennisetum purpureum* with rice bran / corn added, then it is placed in an airtight (anaerobic) container called *silo*. However, the farmers have not adopted this silage innovation because they consider making silage is complicated and they do not have enough time and space to create and store the silage. Without silages, the cows still can eat healthy. Therefore, farmers prefer to provide feed that they are used to provide. Intensive feeding during livestock breeding is the method chosen by farmers to produce good quality breeders. The lack of knowledge of breeders and the absence of a recording system at the livestock sales place causes farmers to only be guided by physical characteristics when buying cattle breeds. According to Lestari et al. (2013) healthy livestock have the following characteristics: sharp and bright eyes, soft, shiny, and thin hair, no lice on skins, no hair loss, no parasites, and wet nose tip.

CONCLUSION

Risk agents that require handling are extreme weather changes, lack of capital, lack of knowledge, lack of milk produced, insufficient land availability, lack of preparation when the cattle give birth, high input prices and lack of attention to the maintenance process. There are 7 effective and easy handling strategies for Pangudi Mulyo Animal Husbandry Group farmers, namely: adding additional concentrate feeding (*komboran*), performing good and right maintenance management, storing water in a water reservoir when it is easily available, Using water as efficiently as possible, Foraging to places that have a lot of green plants and grass, even though the distance is far, Making silage from forage fermentation or something similar, and Paying attention to feed intake during the cow breeding process.

RECOMMENDATION

Pangudi Mulyo Animal Husbandry Group is expected to be able to identify the sources of existing risk critically and in accordance with field conditions. Farmers should be more courageous in adopting innovations and new problem solving strategies so that problems can be addressed more efficiently. Further researchers should be more critical in identifying the events and risk agents that occur in a business.

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