

Risk Mitigation in the Sacrificial Cattle Supply Chain in Indonesia: A Supply Chain Risk Management (SCRM) Approach

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Abstract. Paskas Farm is one of the cattle farms located in the Tangerang City area. This Paskas farm has a supply chain business process, namely small-sized cattle imported from the island of Java, namely Yogyakarta, Banyuwangi and Kediri. Then the cows are bred at the farm until they are large and have enough weight to be distributed for the benefit of Eid al-Adha. One of the supply chain risks at Paskas Farms related to animal welfare is during transportation and distribution. The transportation of this sacrificial cow takes a long time, namely for 16 hours, causing this sacrificial cow to experience stress during the distribution trip. The tight capacity in the truck also makes the sacrificial cattle experience stress because they do not implement animal welfare. Mitigation plans really need to be done to prevent or reduce the emergence of causes of risk. This study aims to determine the supply chain business process flow for qurban cattle from Paskas Farms, find out what risk events and the causes of priority risks that can arise in the supply chain business processes for sacrificial cattle at Paskas Farms, find out the appropriate handling strategy for priority risk causes in the process supply chain business for sacrificial cattle at Paskas Farm. Therefore, risk identification is carried out using the House of Risk phase 1 method which is grouped based on 5 main processes plan, source, make, deliver, return. From this process it was identified that there were 38 risk events and 24 risk agents. The recommended mitigation action or treatment strategy for the cause of the risk with the highest ranking is by using the House of Risk phase 2 method and get the result that there are 9 recommendations for mitigation actions that can be implemented by Paskas Farms.

Keywords: sacrificial animals; Paskas farms; house of risk phase 1; house of risk phase 2; supply chain

I. INTRODUCTION

The Central Statistics Agency (BPS) states that based on data for 2021, Indonesia is an archipelagic country with a land area of 1,916 million km² (Fadilah, 2022). With this land area, Indonesia is very suitable to support the activities of the livestock industry. The livestock industry is also supported because Indonesia is a tropical area so the alternation of the rainy and dry seasons regularly throughout the year. This change of season can be used by breeders to easily access livestock needs, such as clean water and green fodder such as grass. Cattle are animals that can be utilized for their meat and even their milk for the industry in the livestock

sector, so this has a great potential because it can be considered strategic from the perspective of its role in the livestock sector. The population of Muslims in Indonesia continues to increase over time, according to (Bayu, 2022) the population of Indonesia who adheres to Islam is 237.53 million people, which in 2023 will increase to 237.60 million according to (Mutia Annur, 2023). This states that the growth of Muslims from 2019 to 2023 will reach 70 thousand people. Generally, most Muslims will perform the sacrificial cattle worship during Eid al-Adha. The Ministry of Agriculture stated that livestock for Eid al-Adha are available in a safe position and are dominated by local breeders. In 2021, Nanang Perus Subendro as General Chairperson of the Cattle and Buffalo Breeders Association (PPSKI) stated that there had been a 10% decrease in demand for sacrificial cattle for Eid al-Adha due to reduced purchasing power of the public due to rising local cattle prices and obstacles of the Enforcement of Community Activity Restrictions (PPKM) affected the demand for this sacrificial cattle. As a result, turnover from the sale of sacrificial cattle in 2021 is estimated to be corrected by up to 60% (Timorria, 2023). The need

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for sacrificial cattle in 2022 will increase to 1.72 million head demanded Minister of Agriculture Syahrul quoted on *Republika.co.id* where this number increased 6% compared to 2021 which was 1.64 million head (Nasution & Pratiwi, 2022). The availability of livestock in 2022 is sufficient even though there is an epidemic that infects livestock, namely the Foot and Mouth Disease (PMK).

The Tangerang City Government through the Food Security Service (DKP) stated that there were 114 animal breeders in Tangerang City, while there were around 118 traders. The total number of cows, buffaloes, goats and sheep that will be sold as sacrificial animals is 10 thousand (PalapaNews, 2022). The need for qurban cows that are physically and mentally healthy, not handicapped in physical condition, good in their distribution is a very important factor considering that these cows will be used as sacrificial cattle. These factors are related to animal welfare (animal welfare) in beef cattle and in Indonesia, public awareness of animal welfare issues is still very minimal (Naipospos, 2019).

Animal welfare (animal welfare) is a mental and physical state of an animal related to the nature/scientific behavior of the animal. Based on Law 18 of 2009 juncto No. 14 of 2014 concerning Animal Husbandry and Health, animals need to be protected from improper treatment from everyone towards animals that humans can use (Daldiri, 2017). In cattle farming, the existence of animal welfare is such as providing adequate shelter for cows, fulfilling health facilities and facilities for cattle, protection from the environment and extreme weather, feeling comfortable during the distribution process and so on (Wehrle, 2021).

Paskas Farm is one of the cattle farms located in the Tangerang City area. The logistics activities carried out by the Paskas Farm began with breeders from Yogyakarta, Banyuwangi and Kediri supplying cattle weighing around 300 kg to the Paskas Farm using a mode of transportation in the form of fuso trucks. After the supplied cows have arrived at Paskas Farm, then Paskas Farm will raise/fatten the cows for 3 to 5 months with a target weight of 700 kg to 1 ton of cattle. After

the target is reached, the cow will be sold to be used as a sacrificial cattle during Eid al-Adha. Cattle that are ready to be sold are then distributed to consumers using modes of transportation such as trucks, carspick up cow, or escorted on foot if customer It is only a few meters away from the farm.

This supply chain management is done to connect all stakeholder important like supplier to consumers to ensure the continuity of this supply chain process (Noerdyah, Astuti, & Sucipto, 2020). This supply chain activity, of course, does not guarantee that the process will always run smoothly, but there is certainly uncertainty over risk events which will later have an impact on losses. In the case of Paskas Farm, it is very important that animal welfare is implemented because it is given that the main business of this farm is related to sacrificial cattle. The legal requirements for sacrificial cattle are one of them being free from blemishes and healthy. According to a quote from (kumparan, 2021) that Rasulullah SAW said in the following hadith: "It cannot be carried out to sacrifice animals that are lame, those that appear very lame, those that are blind in one eye and appear to be very blind, those that are sick and look very sick and animals that are fleshless skinny." (HR. Tirmidhi). In another hadith, Rasulullah SAW said: "Four types of animals that are not legal to be sacrificed, namely, those with damaged eyes, those who are sick, those who are lame, those who are thin and no longer fat." (Reported by Ahmad). Sacrificial animals must be in a condition that is not thin due to starvation, one of which is during the distribution process which takes more than 15 hours, the condition of the animals must be comfortable when traveling during distribution, the animals must be healthy and not sick due to contracting diseases, one of which is currently rife in 2022, namely Foot and Mouth Disease (FMD), then animals must also be free from stress, and animals must also be given freedom like their normal behavior.

One of the supply chain risks in Paskas Farming that is related to animal welfare is that it occurs when transportation and distribution, as in a study conducted (Noerdyah, Astuti, & Sucipto, 2020) is related to risks in the distribution of

chicken broiler. The transportation of the sacrificial cattle takes a long time, which is approximately 16 hours, causing the sacrificial cattle to experience stress during the distribution trip. The tight capacity in the truck also makes the sacrificial cows experience stress because they do not implement animal welfare. Mitigation plans really need to be done to prevent or reduce the emergence of risk agents.

This risk mitigation design for animal welfare has also been carried out in previous studies. This research was conducted by (Noerdyah, Astuti, & Sucipto, 2020) to discuss animal welfare, halal and supply chain security, especially chicken broiler. One of the problems of this research is the distribution of chicken broiler, which chicken broiler are experiencing stress due to the length of the distribution journey. The research also uses the SCRM method approach, namely HOR to identify and mitigate risks. The lack of concern for these animals has led to various risk events and risk agents that have an impact on breeders, consumers, especially on the welfare of the animals themselves.

There are other studies such as research conducted by (Usto, 2017) which uses the HOR method to identify risk events and risk agents and prioritize risks so that risk mitigation actions are carried out. The problems found in this study were in several activities ranging from livestock selection, maintenance, transfer of livestock to seed yield standards. In livestock selection there are several problems, one of which is abnormal reproductive organs, then in raising livestock, one of the problems is that livestock are disabled, cows experience stress. Then in the transfer of livestock and the standard of seed yields there are problems, namely weight loss of cattle, physical defects, and errors in handling cows so that the cows die. Based on these problems it can be seen that the lack of concern for animals, especially in distribution activities can lead to various kinds of risk events and risk agents.

Referring to (Wahyuni, Nasution, Budiman, & Arfidhila, 2020) who applied the HOR and SCOR methods in his research, where the HOR and SCOR methods were used in order to make it easier to identify risks. One of the problems

encountered in this study was fatigue in livestock due to the long journey and the animals received experienced high levels of stress. Based on these problems, it can be seen that the lack of concern for animals can lead to various risk events and risk agents which will have an impact on several aspects.

Based on this background, this study uses an approach Supply Chain Risk Management (SCRM) namely the method approach House of Risk (HOR) to identify risks and mitigate risks so that the causes of risks can be minimized or eliminated and animal welfare can be applied to supply chain business processes to run smoothly. In addition, this study also uses the method Supply Chain Operation Reference (SCOR) which is useful in measuring supply chain performance based on 5 process approaches namely plan, source, make, deliver, return. Then, based on these 5 approaches, risk events and risk agents can be identified. Method House of Risk (HOR) is a method that combines methods Failure Mode Effect Analysis (FMEA) by method House of Quality (HOQ). The two methods are combined into a simple quantitative calculation in mapping risks based on their priorities (Magdalena, 2019). Reason method House of Risk (HOR) used in this study was strengthened by research conducted by (Cahyani, Pribadi, & Baihaqi, 2016) because the method House of Risk (HOR) has a goal that is not only useful for handling risks, but also for handling risks and risk agents.

II. RESEARCH METHOD

Steps that are useful for researchers to collect data and conduct research in order to achieve its output what is desired from a study can be called a research methodology. Based on the objectives to be achieved, limitations in this research is the object of research was only carried out on one of the farms located in the Tangerang City area, namely Paskas Farm, this research focuses on identifying risks and mitigating risks that occur in the Post-Farm Livestock business process, the data collection mechanism refers to primary and secondary data. Primary data obtained through interviews conducted with

stakeholder and field observations on Paskas Farm. As for secondary data obtained from books, journals, website, paper and others, Processing data using application Supply Chain Risk Management (SCRM) namely the method approach House of Risk (HOR).

Problem identification is the earliest step used for research before conducting research. This stage is useful for identifying the risks that exist in Paskas Farm. After identifying, this research is then carried out output what you want to achieve. When conducting research, of course, we have to determine output to be achieved so that this research or research output issued as desired.

Next step is literature study, this theoretical basis and literature study is very useful for research because with the existence of a theoretical basis and literature study, researchers will know what will be needed to carry out their research or research. It is used to prove research, develop research, and can even bring up new research later.

After literature study, this research is then collecting the data, data collection step is useful for collecting data that will be used as material or supporting information in conducting research. In conducting this research, data was collected from primary to secondary data. Primary data was obtained directly by conducting interviews 4 times and observing the participants stakeholder which is on Paskas Farms. The primary data from this research is supply chain business process flow data from Paskas Farms, starting from the arrival of cattle, being raised on farms, until they are distributed to customer. Then other data, namely data on risk events that have occurred at Paskas Farms from 2019-2023. Secondary data obtained based on previous studies or also with other sources. This data is obtained from books, journals, website, paper and others. This data includes data on the principles and contents of animal welfare, data on the percentage of public awareness from various countries on animal welfare issues, besides that it is also assisted by some scientific literature that discusses risk mitigation in the supply chain, the methods used

which can be help in solving problems that arise when conducting research.

After collecting the data, next step is processing the data. Data processing can be done after getting some data that was done in the previous stage. At this stage, the HOR method is used which is useful for identifying risks and risk agents and designing risk mitigation strategies. There are two phases in this method where HOR phase 1 is used to identify risks and the result is the priority of the risk agent that will become input for HOR phase 2. HOR phase 2 is used in the analysis for risk management and the result is an action plan to prevent priority risk agents. The first stage of HOR phase 1 after obtaining data collection such as business flow obtained from SCOR mapping which is carried out through interviews, namely obtaining risk events and risk agents. After these risk events and risk agents are obtained, questionnaires can be distributed to obtain them severity, occurrence, and the correlation between risk events and risk agents. Then after that the calculation of the ARP value and compilation is carried out ranking risk agents (very high, high, medium, low, very low) based on a pareto chart. Then enter HOR phase 2, namely determining mitigation steps based on the value of the highest priority risk agent. After obtaining the mitigation action, a correlation is made between the risk agent and the mitigation action that has been given. The next step is to calculate the value of Tech, ETDk and compileranking based on the ETDk value. The last step is after getting the right mitigation steps will be carried out brainstorming with the farm to see whether the mitigation actions that have been given can be implemented or not.

The last step is analysis and discussion include conclusion and recommendation. Data analysis can be done after processing the data in the previous stage. The goal is to find solutions to existing problems and mitigate the risks associated with the supply chain process at Paskas Farm. Conclusions and suggestions are the final stages carried out in this study. These conclusions and suggestions are intended to answer the objectives of this research and provide a suggestion to the company that the proposals

given by this research can be implemented, as well as provide suggestions for further research to be better than this previous research.

III. RESULT AND DISCUSSION

By using the House of Risk method with 2 phases, 6 recommendations for priority risk mitigation actions have been obtained which are useful for minimizing the occurrence of risk causes. The following are 6 recommendations for risk mitigation actions.

PA1 Mitigation Action

PA1 mitigation action is a mitigation action with the 3rd rank. This mitigation action is useful for overcoming the causes of risk in A9, namely the distance between cattle that are very close together. This PA1 risk mitigation action is to reduce the load density by as much as 10% for large cattle, or as much as 15% during high and humid temperatures that occur during travel. This

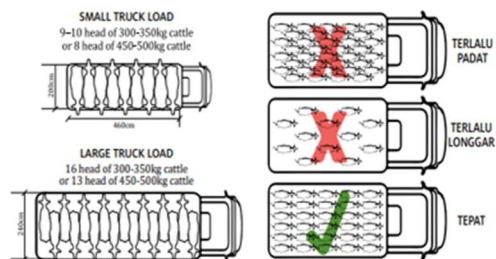


Figure 1. Measuring Cattle Loading Density on Trucks (Ma'arif, et al., 2020)

Table 1. Indicative Load Level Based on Live Weight of Livestock (Australian Government Department of Agriculture and Water Resources, 2017)

Average Livestock Weight (kg/head)	Floor Area (m ² /head)
200	0,70
250	0,77
300	0,86
350	0,98
400	1,05
450	1,13
500	1,23
550	1,34
600	1,47
650	1,63
700	1,81

mitigation action is in line with the theory of the best practice guidelines for the transport of cattle in Indonesia and also the guideline for animal welfare in the transportation of animals, edition 1. Transporting too many cattle is not recommended because if the load is too much then the cattle cannot move at all or can move but only a little so that the cow cannot be supported when the truck is moving. Giving space in the truck can also be useful if the cattle falls so that the cattle can get back up, but if not the cattle will be trampled by other cattle.

The recommended size for the density of cattle loading on trucks is as shown in Figure 1. or can be seen in Table 1. for the indicative load level based on live weight of cattle.

This mitigation action recommendation has a difficulty level of 4, which means it has a moderate scale to implement. This risk mitigation action recommendation is useful for achieving animal welfare outputs with minimum stress and minimizing the occurrence of greater injury during distribution trips which is the advantage of this mitigation action, but this mitigation action has disadvantages, namely the number of cattle transported is not many and that means more costs and resources (drivers) if you want to transport more cows because adding more than one more mode of transport, besides increasing greenhouse gas emissions if more modes of transportation are needed to transport the animals.

PA2 Mitigation Action

The PA2 mitigation action is the first ranking mitigation action. This mitigation action is useful for addressing the causes of risk in A15, namely the cattle are tied too tightly. This PA2 risk mitigation action is by loosening the straps on the cattle. This action has a difficulty level of 3 which means that this mitigation is easy to do. This mitigation action is in line with research conducted by (Australian Government Department of Agriculture and Water Resources, 2017) regarding the effect of using a gripping rope to handling on levels of the hormone cortisol in the blood of cattle on Holstein Friesian Farm. The cow binder or what is commonly called the

groaning rope has a function to tame active cattles. This groaning rope has a painful effect on the cattle when it is pulled (Radhitama, 2020), therefore it is not recommended to tie the moaning rope too tightly because it will stress the cattle. According to Astuti, et al cited by (Sole, 2022) stressed cattles are a condition of non-specific discomfort which can lead to decreased immunity, reproductive failure, decreased carcass weight, to the death of the cattle. The cattle's stress condition is known by measuring cortisol levels in blood, saliva, feces and. High levels of sugar in the blood and an increase in the hormone leptin caused by the hormone cortisol can result in a decrease in appetite in cattle according to Anisa cited by (Sole, 2022). This groaning rope has several types of knots, but what is commonly used is the typesheet bend knot with various diameters ranging from 4 mm to 13 mm (Qayyum, Sudirman, & Zulkharnaim., 2020). This mitigation action has the advantage that the cows will be more docile and will move more freely without stress, especially during the transfer or distribution process which can reduce stress and discomfort to the cows, but the drawback of this mitigation action is that this groaning rope still gives pain when pulled.

PA3 Mitigation Action

PA3 mitigation action is a mitigation action with the second rank. This mitigation action is useful for overcoming the causes of risk in A6, namely workers who are negligent, less thorough, lazy and not experts in the field of animal husbandry. This PA3 risk mitigation action is by monitoring the worker without the worker knowing, this is useful for monitoring the movements of the worker whether the worker is doing the job properly or the worker is lazy and negligent with his work, this has the advantage of being able to generate data which is more accurate without any change in behavior if the worker is aware of it, but the drawback is that this is a violation of privacy because it is done without the knowledge of the worker. Building two-way communication can also be done because there may be some things that the worker doesn't know but the worker is embarrassed to ask about

it, with this two-way communication can also provide criticism and suggestions between workers to the owner or vice versa to get lessons so that the business being run will be successful. better which is the advantage of this mitigation action recommendation, but there is a drawback, namely if this communication is not handled properly, workers will feel not heard and valued. Instilling the company's vision and mission for workers, this is useful for increasing worker discipline and work will run in harmony in terms of hard skills and soft skills. This has advantages, namely that it can also help in creating unity and pride among workers because they have the same goals, but has disadvantages, namely that there are challenges in conveying this vision and mission to workers because they have different backgrounds, values and interests. Positioning workers according to their abilities, this is useful for these workers to be more motivated if they are given jobs related to their abilities compared to being given jobs that are not in accordance with their abilities which is an advantage of this mitigation action, but the drawback is if a change in position is made because urgent matters can cause instability. Giving rewards/awards, this is something that is highly recommended because with awards or reward this can increase the performance of workers, this can also increase the loyalty of workers (Fakhidatul Ilmi, Wayan Batan, & Wayan Batan, 2012) which is an advantage of this recommendation for mitigation action, but the drawback is if it is done unfairly and consistently between one worker and another. Otherwise, unhealthy competition may occur among workers. These mitigation actions are also in line with research conducted by (sodexo.co.id, 2021) related to the analysis of the factors that affect the performance of employees. This action has a difficulty level of 4 which means that this mitigation has a moderate scale to be carried out.

PA4 Mitigation Action

PA4 mitigation action is a mitigation action with the fourth rank. This mitigation action is useful for overcoming the causes of risk in A23, namely the long distribution journey. This PA4 risk mitigation action is by avoiding routes that

are far away and have bad road and weather conditions. This risk mitigation action has a level of difficulty of 4, which means that this risk mitigation action has a moderate difficulty scale to carry out. Long routes can affect food intake

Table 2. Minimum Duration of Rest (Australian Government Department of Agriculture and Water Resources, 2017)

Cattle Condition	Minimum Duration of Rest Stops
Cattle over 6 months of age (including cows and heifers less than 6 months pregnant)	36 hour
Calves aged 30 days to 6 months	12 hour
Calves aged 5-30 days raised without their mother (age 14 days and under, travel maximum 8 hours age 15-30 days, maximum travel 12 hours)	0 hour

Table 3. Time of Prohibition of Feeding and Watering (Australian Government Department of Agriculture and Water Resources, 2017)

Cattle Condition	Timing of Feed and Water Offenses	Maximum Time No Water (Including Time of Offense of Watering and Time of Travel)
Cattle over 6 months of age	6 jam	48 jam
Calves aged 30 days to 6 months	Feeding and watering times may be reduced or eliminated if:	24 jam
Calves aged 5-30 days raised without their mother (age 14 days and under, travel maximum 8 hours age 15-30 days, maximum travel 12 hours)	the transport time from loading to unloading is expected to be more than 24 hours, or the temperature and humidity are or are expected to be very high during the journey.	18 jam

and rest time for the cattle being distributed. Therefore, this mitigation action is in line with the theory of best practice guidelines for the transport of cattle in Indonesia. Traffic and bad weather conditions including heat and rain can also cause the cow to be stressed due to heat or cold. These distribution trips must be planned so as to minimize the occurrence of delays, failures, or other emergencies so that the welfare of the cattle can be addressed.

Based on Table 2, the duration of the trip must be considered. Therefore, to minimize travel time, the route taken must be accelerated or by avoiding long routes and bad weather conditions must also be avoided. This mitigation action has the advantage that the duration of time spent on the trip is shorter, but the drawback of the mitigation action is that there are challenges in predicting road and weather conditions because these things can change from the initial predictions that have been previously determined.

PA5 Mitigation Action

PA5 mitigation action is a mitigation action with the seventh rank. This mitigation action is useful for overcoming the causes of risk in A14, namely the cows are not given enough food and drink during the distribution trip. The action to mitigate the risk of PA5 is by rationing feed early on. This risk mitigation action has a level of difficulty of 4, which means that this risk mitigation action has a moderate difficulty scale to carry out. This mitigation action is in line with the theory of best practice guidelines for the transport of cattle in Indonesia and also the guideline for animal welfare in the transportation of animals edition 1. The condition of the cattle in transit will be better if they have time without being given feed and water, or what is known as the no-go period curfew). Cattle should not be given feed and water for at least 6 hours prior to transport from the farm. Restrictions on feeding and watering time may be reduced or removed if: the transport time from loading to unloading is expected to be more than 24 hours, or the temperature and humidity are or are expected to be very high during the journey.

This feed rationing must be introduced gradually to the cattles so that the cattles will get used to it during transportation and distribution so that things such as cattles being hungry and thirsty during the journey can be overcome which is the advantage of this mitigation action, but the drawbacks of this mitigation action namely management that is more complicated because designing and managing feed for young cattles requires careful knowledge and planning related to nutritional needs and development in the early stages of a cattle's life.

PA6 Mitigation Action

PA6 mitigation action is a mitigation action with the ninth rank. This mitigation action is useful for overcoming the cause of risk in A8, namely the processloading and unloading cattles into pens that do not comply with animal welfare rules. This PA6 risk mitigation action is by renovating the placeloading andunloading beef by adding ramp or make sure thatramp no more than 20 degrees. This mitigation action is in line with the theory of the best practice guideline for the transport of cattle in Indonesia and also the guidelines for animal welfare in the transport of animals 1st edition.

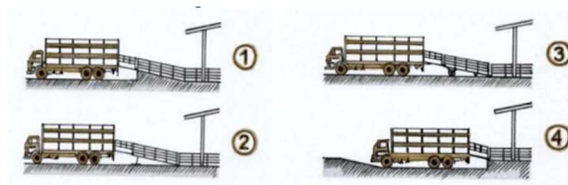


Figure 2. Design Form for Livestock Loading and Unloading Facilities (Ma'arif et al., 2020)

This risk mitigation action has a level of difficulty of 4, which means that this risk mitigation action has a moderate difficulty scale to carry out. By adding ramp on the processing facility loading and unloading cattles to the farm pen can optimize the movement of animals and prevent injuries that will be experienced by cattles when loading and unloading. Plan for ramp this is also adjusted to the size of the type of cow so as to minimize the cow being able to escape. The ramp for unloading can be as wide as 3 meters

but for loading it is only 760 millimeters wide to prevent the adult cattle from turning around. The sides can be made of wooden fences, pipes or sheets of material strong enough to prevent the animal from escaping. This mitigation action has the advantage that the cattles will be treated loading andunloading safety will be more secure from the risk of injury to cattles, but the drawback of this mitigation action is that it will increase investment costs which can cause financial burdens for livestock owners.

PA7 Mitigation Action

PA7 mitigation action is a mitigation action with the sixth rank. This mitigation action is useful for overcoming the causes of risk in A3, namely lack of coordination and communication. This recommended mitigation action is to improve communication and coordination properly and convey information concisely and clearly without causing misunderstandings. This mitigation action is supported by theory from (Ma'arif, et al., 2020) which states that good and effective communication can improve performance for the better and coordination can prevent miscommunication between one party and another. This communication is very important in understanding the information conveyed both verbally and other media that other people use to convey it. Communication and coordination are interrelated because this coordination is a human relationship in carrying out their duties, which means that if communication is not good, it will result in coordination between humans that does not work well and results in misunderstanding or miscommunication. This action has a difficulty level of 3 which means that this mitigation has an easy scale to carry out. To achieve the desired goals, both from Paskas farms, suppliers, and customer must improve the way of communication in terms of quality (accuracy), completeness and relevance. This mitigation action has the advantage of being able to increase efficiency, reduce misunderstandings, increase productivity, but there are challenges that can cause deficiencies in this mitigation action, namely the challenge of conveying complex information because it requires extra

effort so that the information can be understood properly.

PA8 Mitigation Action

PA8 mitigation action is a mitigation action with the eighth rank. This mitigation action is useful for addressing the causes of risk on A22, namely extreme weather. The recommendation for this PA8 mitigation action is to plan the delivery schedule in accordance with the weather forecast during the trip and specially design the vehicle to be used. The PA8 mitigation action recommendations are in line with (Australian Government Department of Agriculture and Water Resources, 2017) where the role of the driver in conditions like this must be highly reliable. This extreme weather must be overcome because it can affect animal welfare. Low weather accompanied by rain and wind can chill the distributed cattles, while high weather can cause severe heat stress for the cattle. Things that must be considered before transporting cattles for distribution are the weather forecast such as if you avoid hot weather then leave early or can also be distributed at night, the vehicle for transport must have adequate ventilation for good air circulation for cattle, the roof of the vehicle is closed to avoid exposure to direct sunlight, rain and wind.

If extreme weather comes in the middle of the distribution because the weather forecast is not always accurate, then what must be done is to pause the distribution process then when the weather returns to normal then the distribution

process can be resumed which is a drawback of this mitigation action, but an advantage from this mitigation action that can be seen from the side of safety and security for the driver and the cattle being transported. This mitigation action has a difficulty level of 3 which means that this mitigation has an easy scale to carry out.

PA9 Mitigation Action

PA9 mitigation action is a mitigation action with the fifth rank. This mitigation action is useful for overcoming the causes of risk in A2 and A19, namely the supplier does not implement animal welfare and chooses the wrong supplier. The recommendation from the PA9 mitigation action is to determine supplier criteria based on the level of animal welfare assessment. Before deciding to buy animal seeds, what must be considered is related to the maintenance environment and the application of animal welfare to suppliers. The first thing to look at is the livestock health management at the supplier, if the health of the livestock is not maintained it can cause various risks that will impact Paskas Farms which will later buy the livestock, for example, cattles that have infectious and deadly diseases. Cattles to be selected must be healthy and free from defects. If an cattle is identified as having a contagious and fatal disease, it is certain that the supplier is not implementing animal welfare. Therefore, such as the recommendation from the PA9 mitigation action which is in line with the theory of (Firgorita, et al., 2017) that supplier selection must be seen from the application of biosecurity in livestock raising systems and their handling according to animal welfare principles. Paskas Farms must be more careful and more thorough in the selection of suppliers because if they choose the wrong supplier and the supplier does not implement animal welfare, it will have a negative impact and pose several risks for Paskas Farms. This mitigation action has the advantage of being able to get cattles in good condition because the supplier implements animal welfare, but the drawback of this mitigation action is that there is a challenge in the complexity of the assessment where the determination of objective criteria and assessments can be difficult and must collaborate

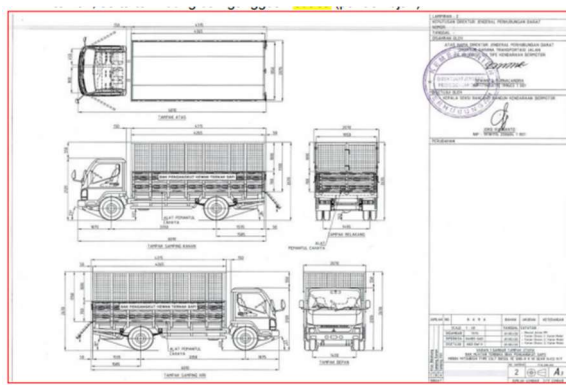


Figure 3. Cattle Transportation Open Truck (Ma'arif et al., 2020)

with experts, suppliers or related organizations to help strengthen the desired criteria properly.

IV. CONCLUSION

After carrying out risk identification using the method House of Risk phase 1 which is grouped based on 5 main processes is plan, source, make, deliver, return. From this process it was identified that there were 38 risk events and 24 risk causes. Then after calculating the ARP value is obtained The 10 priority risk causes are A9 (the distance between cattles is very close together), A6 (workers are negligent, inaccurate, lazy and expert in animal husbandry), A15 (cattles are tied too tightly), A23 (long distribution trips), A14 (cattles were not given enough water during the distribution trip), A8 (the process of loading and unloading cattles into cattle sheds that do not comply with animal welfare rules), A3 (lack of coordination and communication), A22 (extreme weather), A2 (suppliers do not implement animal welfare), and A19 (choose wrong supplier).

The recommended mitigation action or treatment strategy for the cause of the risk with the highest ranking is by using the method House of Risk phase 2. The results obtained are that there are 9 recommendations for mitigation actions that can be applied by Paskas Farm, namely PA1 (loosen the straps on the cattle), PA2 (reduce the load density by 10% for large cattle, or by 15% during high and humid temperatures what happened during the trip), PA3 (monitor the worker without the worker knowing, build two-way communication, instill the vision and mission of the company, position workers according to their abilities, give rewards), PA4 (avoid routes that are far away and have road and weather conditions poor), PA5 (to provide early feeding), PA6 (renovate the place of loading and unloading cattle by adding a ramp or make sure that the ramp is not more than 20 degrees), PA7 (improve good communication and coordination and convey information with concise and clear without causing misunderstandings), PA8 (planning the delivery schedule in accordance with the weather forecast during the trip and designing the specific vehicle to be used), PA9

(determining supplier criteria based on the level of animal welfare assessment).

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