



Existing Condition of Supply and Distribution Chain Model in Livestock Waste Management in Belung Village

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Abstract. Most people in Belung village, Poncokusumo district, have cows and goats, which produce livestock waste. Closed-house condition encourages negative externalities of livestock waste in the form of water and air pollution. This study reveals the existing model of the chain supply and the distribution of livestock waste management in Belung village. The researcher interviewed people with cows and goats living around the riverside and in a densely populated area. The result showed that there were various treatments in livestock waste management. People with rice fields or plantations would likely manage it as a fertilizer, and if there were still some waste lefts, it would be cleaned by others. Those who live around the riverside drain livestock waste into the river through the pipe, which flows in the morning or directly into the river. Those who did not have rice fields or plantations would collect the waste that another party would take, which was called a cleaning service. As a result, they would get some money. Otherwise, it is still debated among ulama in terms of halal.

Keywords: farm · chain supply · livestock waste

1 Introduction

Environmental pollution and global emissions have become a world concern recently. Based on the report of the World Resources Institute [1], Indonesia was one of the ten countries with the most significant global emissions contributors (3,9%) in 2019. One of the emissions sources in Indonesia is livestock waste which produces (CH₄). Not only in Indonesia, but the problem of environmental pollution in livestock waste has also become a concern in most European countries, including China, India, Japan, and the U.S.A [2].

The livestock ownership in Belung Village, Poncokusumo District, Malang Regency, is close to the house. This phenomenon raised a question of how livestock waste is managed. If it is not managed appropriately, this condition will likely trigger negative externalities for the neighbours, such as water or air pollution. Water pollution of the

river will cause the death of freshwater fish and the growth of algae, as well as river and sediment pollution because of faeces bacteria [3].

Livestock waste can be beneficial for various goods and services, such as fertilizer [2, 4, 5] and biogas [2], and solid fuel [2]. Moreover, compost fertilizer is beneficial and has good quality in farming, one of which is to stimulate vegetative growth and amino acid synthesis [6]. Furthermore, it can increase farming production and decrease environmental pollution [4]. Then, of course, the management applied the technology needed to process organic waste into various products or outputs that have value and benefits for the ecology [7].

This research reveals the existing condition of the chain supply and distribution model in Belung village. Managing chain supply and distribution, which damages the environment, would likely occur when the concept of “take-use-dispose happens in the circular economy, and finally, it will cause negative externalities in society [8]. Apart from that, in the practice of managing the distribution of livestock waste, there are still differences of opinion in terms of halal related to the transactions carried out by the owners. The question occurred based on five critical things in the process of organic fertilizer production. They are material purchase, compost process, mixing materials, drying, and also distribution [9]. Those critical things are related to the logistic system, which can trigger the non-halal logistic process.

2 Method

This research was a case study qualitative research. This research explored the existing condition of the chain supply and distribution model in livestock (cows/goats) waste management in Belung Village, Poncokusumo District. There were 20 participants in this research who were the owners of live stocks (cows/goats). They were gathered in Focus Group Discussion (FGD) activities which were classified based on the living area, near or far from the river/water flow.

There were two strategies in collecting qualitative data in this research; they were interviews and qualitative documents [10]. The interview was done by involving participants in focus group discussion activities, whereas qualitative documents were collected from journal/scientific articles/references, which were related to the model in livestock waste management, and other documents/data which supported the research question. The process of data analysis was done as follows [10].

1. Processing and preparing the data to be analyzed (interview transcripts, data which was collected from the field)
2. Reading all data to build a general sense
3. Organize the data (to make coding)
4. Describing coding into area, participants, and theme which were analyzed
5. Narrative theme presentation
6. Interpretation of the result

3 Result and Discussion

Most of the people in Belung village, Poncokusumo district, malang regency are farmers who own livestock such as cows and goats. The average number of farmers who own live stocks is in the range of one to eleven cows, and a few farmers own goats. The

tradition of farming cows or goats started years ago. So, their professions are not only as vegetable farmers but also as the owner of livestock that give them meat.

“Long-time ago, owning some cows was a side job, nowadays people realize the benefits (cows) as the main job and farming as the side job.” (R3)

The phenomenon makes farmers do better ways of taking care of the livestock as well as farming in the field. Farmers who were gathered in the group were also better. They were able to manage farm waste to be the source of food for the live stocks, such as corn cobs. They were enthusiastic about making their cows/goats became more productive, but with lower fees. Farm waste management to be compost fertilizer for plants and as a source of food for the live stocks could prevent environmental pollution and inhibit the wastage of nutrition [11, 12].

If farm waste has been managed, on the other hand, livestock (cows/goats) waste has not been managed seriously. The usages of livestock waste in Belung village are varied. Mostly managed by the owner to be fertilizer. This is because most of the livestock owners in Belung village are also farmers. However, the way or the method used was simple, removing unmanaged livestock waste (wet/dry) from their rice field or garden. The process of fertilizing is usually done in pre-planting time for the rice before ploughing. For vegetable plants, such as corn, it is done after the corn is planted. Livestock waste produces good nutrient that is beneficial [12], and one of the benefits is organic fertilizer. In the mixing process of livestock (cows) waste and tea waste, longer fermentation will increase bokashi quality (organic fertilizer) [13]. The usage of organic material can also improve the productivity of marginal soil, including acid soil [14]. Livestock waste is the substitution for chemical fertilizer [15] and also as an alternative when it is hard to get fertilizer.

“I have proven that livestock waste can decrease the usage of chemical fertilizer which has to be purchased, and the farm result is also good but more economical.” (R2)

The phenomena showed that livestock owners realized the benefits of livestock waste as fertilizer for their plants in the field. The product of livestock waste can be used as fertilizer [2, 4, 5], biogas and solid fuel [2]. Fertilizer from livestock (cows) waste is beneficial and has better quality in agriculture [6]. Increasing Not only productivity but also increasing production in agriculture and decreasing environmental pollution [4]. Some livestock waste is used directly (wet waste) or managed individually by the owner by drying or until it is ready to be used. Most livestock owners collected livestock waste in the cowshed and used it as fertilizer for their own farmland. If it has been full, the livestock owners will remove it to another land.

“I pile it up near the cow shed, but if it has been full, I transfer it to the rice field, in the side of the rice field or directly around the plants. If it is time to plant corn, it can be used directly. But, if it is for rice, it should be used before planting time.” (R5)

The usage of waste can prevent environmental pollution if managed wisely, such as by making organic fertilizer. Fertilizer from livestock waste does not produce an unpleasant smell because the texture and the smell are like the soil [16]. Livestock waste management applies technology in processing organic waste to various products/outputs which have value and benefits for the ecology [17]. The management of organic waste and livestock (cows) waste to be organic fertilizer is quite popular among livestock owners because it can increase the economic value [18, 19]. However, the management of livestock waste to be fertilizer has not been done yet by the livestock owners in the village because of a lack of knowledge.

The livestock owners that do not own rice fields or gardens usually collect livestock, and then later on, it will be taken by the collectors. Especially in the dry season, usually, a lot of collectors offer to collect livestock (cow/goat) waste. In the rainy season, it is difficult for the car carrying livestock waste to enter the cow shed area because of the muddy and slippery road. In the rainy season, livestock waste causes environmental pollution for being carried away. Livestock waste pollutes the environment because of its smell [20, 21]. In the rainy season, it is common for the area around the cow shed to be polluted with livestock (cow/goat) waste.

The dry season can make the smell less stinky, and because it is dry, it can make the transfer process easier. However, there is not any scheduled time for collecting livestock waste in Belung village. Livestock owners named livestock waste “rabuk or pupuk”. Usually, the collectors visit the cow sheds and offer to take the livestock waste. The collectors named the livestock waste “rabuk/pupuk”, although the livestock waste is still wet and has not been processed as fertilizer. People in Belung village do not recognize the collector. According to tradition, the collectors would purchase some money from the livestock owners for collecting the livestock waste. People call the collectors a “cleaning service”. The fee is more or less Rp 12.000 per 25 kg.

Model supply chain livestock waste in Belung village in Fig. 1 indicates that the livestock owners processed it for individual usage in their own rice field without processing it as fertilizer. They can use livestock waste as fertilizer for their plants [22]. Those who do not own rice field/garden and live around the riverside flows the waste to the river. It can trigger some problems, such as dirty and stinky river water [23]. The waste in the river flow can cause the death of freshwater fish and the growth of algae, as

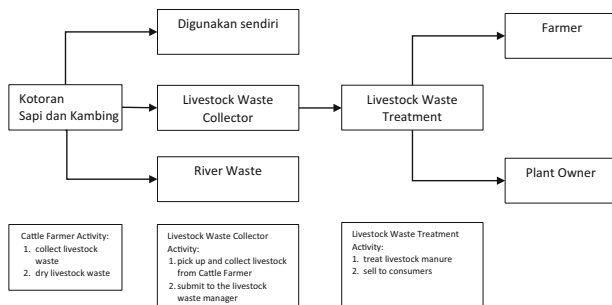


Fig. 1. Livestock Waste Management (Cows and Goats) Model in Belung Village. Source: processed by the researcher

well as river and sediment pollution because of faeces bacteria [24]. Urinal waste can cause air pollution and disease caused by flies [25]. If processed well, cows' urine can be used as organic liquid fertilizer [26].

There were also some livestock owners who collected livestock waste and gave it to the cleaning service, and they got some money in return. The cleaning service was then called the collectors. Livestock waste is then sold to the farmers as fertilizers for apple and orange plants. There were also collectors who distributed it to the ones who produced fertilizer from livestock waste. In the process, the material is not only livestock waste but also other materials such as coconut coir, calcium, and other materials [27, 28]. Next, they would sell the products to the farmers and others. Organic fertilizer from livestock waste can be used as fertilizer for all types of plants [29]. Fertilizers are sold in sacks packaging. The processed livestock waste is more expensive; Rp 20.000 per 5 kg.

The practice of giving collected livestock waste to the cleaning service is still debated in terms of halal transactions. This is because the exchange from the livestock waste to the money. From the perspective of Istihsan in Islamic law, buying and selling livestock waste is forbidden because it is dirty (najis). However, the culture allows it because it is beneficial for the plants [30].

4 Conclusion

The existing condition of the chain supply and distribution model in Belung village is varied. People who own rice fields/gardens would apply livestock waste on their land unprocessed to replace the usage of chemical fertilizer. People who live around the riverside flow livestock waste to the river through the pipe. There are also some livestock owners who collect livestock waste and then give it to another party, and they would get some money in return. Those who take livestock waste are called cleaning services, and then they sell it to the farmers or to the one who produces compost fertilizers. The practice of buying and selling livestock waste is still debated between ulama in terms of halal because livestock waste is seen as dirt (najis). However, because it is beneficial, there were some ulama who allowed it because it is beneficial as fertilizer for the plants and soil. Next, the researcher can do another research about livestock waste management in other areas, so the researcher can make a livestock waste distribution model that minimizes non-halal transactions.

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