Community Perception of Cheese-Making Wastes Utilization and its Sustainability

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Abstract. Cheese-making wastes utilization has been done in KPBS (The Dairy Farmer Cooperatives of South Bandung) and affect the surrounding communities. The research aimed to determine the perception of the community towards the utilization of cheese-making wastes that has been done. Cluster random sampling was taken on three groups of respondents, namely KPBS employees, KPBS member farmers and the affected communities around KPBS. Randomized numerical tables used to determine the respondent which resulted 24 respondents of KPBS employees, 41 respondents of KPBS member farmers and 28 respondents of affected communities around KPBS, with the total of 93 respondents. Questionnaires used to obtain the community perceptions of cheese-making wastes utilization and its sustainability that covered social, economic, environmental and technological dimension with five levels Likert scale to express the respondent’s preference. Results showed that the communities perception of cheese-making wastes utilization on social, economic and ecological dimension shown neutral to positives perception with average Likert score of 3.61, 3.82 and 3.35 respectively, while technological knowledge dimension shown neutral to negative perception (2.99) which could be a threat towards cheese-making sustainability.

Keywords: cheese-making wastes, perception, sustainability, utilization

1. Introduction

Perceptions about the ecology will be related to physical space and disturbances that occur in it [1]. Disposing of cheese-making wastes into the environment improperly can cause perception disruption in the community both directly and indirectly. The proper utilization of cheese-making wastes results in a reduction in pollution disturbances that trigger the emergence of comfort and assurance for environmental hygiene and health, thus affecting people's perceptions towards the cheese producers environment [2,3].

Cheese whey, which is a waste of cheese-making process, needs to be managed through a sustainable approach that generated from the community engagement so that positive community perceptions are resulted [4,5]. This approach is higher than community participation because it promotes authentic partnerships, including mutual support, respect, trust, equality, "win-win solutions" in the collaboration initiative [6]. The concept of community engagement in sustainable waste management means working together collaboratively with related partners who have common goals and interests in reducing the negative impacts caused.
Community perceptions of a process's sustainability can be used as an approach in managing food industry waste. This approach is able to ensure that the management carried out is socially acceptable and practically applicable. In addition, the approach taken can reduce the risk of interference from the community, avoid the risk of exploitation through equitable distribution of benefits, and be able to calculate the social hazards that may arise from the management carried out so that sustainability is achieved [7]. In addition to the calculation of social hazards, achieving sustainability from a business can also be determined by economic aspects perception. However, some companies that integrate this are only able to achieve economic performance indicators without being able to integrate sustainability with other performance [8].

Various developing companies around the world are trying to integrate sustainability in their business practices [9]. It is important to note that sustainability is not only achieved by one or two dimension. The economic dimension is not only limited to short-term performance indicators such as how much profit is earned, but must be able to cover various elements that support long-term financial success such as reputation and public trust in the company and company relations with the community [10]. In line with the various environmental and economic benefits produced, various social benefits are also expected to emerge.

Pollution load reduction will trigger the emergence of comfort and assurance for cleanliness and environmental health which ultimately impacts on changes in people's perceptions around cheese producers. This can create community engagement in the form of support from the community for various activities carried out by cheese producers. As a result, a sustainable cheese-making business will be generated. The research done to determine the community perception towards cheese-making wastes utilization by KPBS Pangalengan and its sustainability.

2. Materials and Methods

Cluster random sampling was taken as the methodology by directing random election towards three cluster of respondents (KPBS plant staff, KPBS farmer member and influenced communities). The survey had been conducted on April to May 2019, around KPBS Pangalengan, Bandung District, and West Java Province, Indonesia. Respondents' information were gotten from 93 respondents and inspecting utilizing randomized numerical tables [11]. The consequences of randomization are as per the following, 24 plant staff, 28 farmer members, and 41 influenced communities (Figure 1).

![Figure 1. Respondents Compositions](image)

The research variables are respondents’ perception of cheese-making wastes utilization represented by social, economic, ecological and technological dimension. Community perception were taken utilizing questionnaires which contained 24 question related to the research variables which divided to 6 question of every dimension including social, economic, ecological and technological dimension. Data analysis was done by clustering the evaluations into five classification according to the Likert scale and outlined as radar graphs. All of the data were averaged, then analyzed descriptively.

3. Results and Discussions

The respondents’ profiles plays an important role in the sustainability of the production process and utilization of cheese-making waste in the KPBS environment. Profiles of respondents showed the 88 (94.62%) of respondents were male and only 5 (5.38%) respondents were female. The largest proportion of respondents aged between 20-40 years and the last highest education is elementary school, which is which is 32 (34.41%) respondents (Figure 2).

Production activities that have been carried out by KPBS have had an impact on the surrounding community. The resulted cheese-making waste creates various perceptions either directly or indirectly. Waste generated from the production process is able to bring out various possible perceptions in the community [12]. Perceptions of social, economic and ecological impacts supported
by the technological knowledge mastery can be useful in ensuring the continuity of production activities. One of the perceptions sampled was the social dimension which included six statements related to the social impact of cheese production and cheese-making wastes utilization (Figure 3).

![Chart showing respondents profiles](image)

**Figure 2. Respondents Profiles**

Three cluster of respondents had a variety of perceptions of the social dimensions that were generated. The three groups of respondents have the same perception of the cheese-making utilization and will actively participate in the utilization activities carried out. Meanwhile, there are differences in the three statements related to plant staff attention to public complaints, responsiveness towards complaints and the possibility of increasing public trust in KPBS.

Increased public trust can be generated through the quality of service [13]. The two groups of external respondents (influenced communities and farmer members) still feel neutral about the statements related to the responsiveness towards community complaints, while the internal respondent cluster (plant staff) feel that the service has been done well so that trust can be generated. Despite the
differences, the three groups of respondents had positive perceptions above the value of 3.0-4.0 (neutral - agree).

Other perceptions tested were economic dimension which included six statements related to the economic impact of cheese production and cheese-making wastes utilization (Figure 4). The economic impact of cheese production and cheese-making utilization shows a positive perception above neutral values. The three cluster of respondents agreed with two statements related to increased income generated from cheese production and cheese-making wastes utilization. This is in line with Utama, et al. [14] that mentioned the economic benefit of cheese-making wastes bioconversions into bioethanol and liquid organic fertilizer. The three cluster of respondents also had neutral-agreed perceptions on three statements regarding sales profits, the benefits of community involvement in the use and involvement of farmer members in marketing. Meanwhile, differences in perceptions between internal (plant staff) and external groups (farmer members and influenced communities) occurred in the involvement of farmer members in marketing the by-products resulted by cheese-making wastes of utilization process. However, the external group of respondents still have a neutral perception towards KPBS.

Community perceptions of the ecological dimension of cheese production and cheese-making wastes utilization include six questions (Figure 5). The process of cheese production and cheese-making wastes utilization have resulted in ecological impacts that give rise to diverse perceptions of respondents. Almost all statements of respondents were neutral including statements that did not smell, did not pollute the soil and air. However, the respondent cluster of the community has a disagree-neutral perception regarding the statement of not polluting water. According to Ir. Herry Hidayat statements who is the Production Manager of KPBS Plant, several times the disposal of the cheese-making wastes into the waters caused pollution in surrounding wells belonging to the community around the plant. However, KPBS immediately made compensation related to the pollution caused. This is reflected in the response to the statement on social impacts, related to KPBS attention to public complaints and the responsiveness towards community complaints. Cheese-making wastes utilization into bioethanol and liquid organic fertilizer could reduce the wastes disposal to the environment up to 62.1% which can be roles as a solution to the pollution resulted [15]. This is in line with the perceptions of all respondents, especially the internal group (plant staff) who agree with the utilization of cheese-making wastes to results pollution reduction around the KPBS.

Support for the sustainability of the utilization of cheese-making wastes is also determined by the technological knowledge possessed by the community that will be involved (Figure 6). Technological knowledge mastery are important in ensuring sustainable management of natural resources [16].
Technological knowledge mastery by respondents, especially external respondents (farmer members and influenced communities) regarding the cheese-making wastes utilization is still categorized as poor. Only internal respondents (plant staff) responded well to the five statements, but the weakness was still in the statement regarding bioconversion knowledge. Meanwhile, external respondents clearly showed a poor response to the five statements except for statements regarding the benefits of by-products utilization. These results indicate the weakness of technological knowledge dimension and mastery by respondents so that it also has an impact on responses to social, economic and environmental aspects.

Knowledge and mastery of technological knowledge, one of which can be obtained through education, therefore the education level of respondents will influence the response produced. This is in line with Hermawan [17] which states that there is a positive correlation between the level of education with perceptions and behavior in ecological preservation. Poor technological knowledge about the utilization of cheese-making wastes and reduction of other residual can be a threat and have a negative impact on the sustainability of the cheese-making process at KPBS.
4. Conclusions

Cheese-making wastes utilization that has been done by KPBS resulted in positive community perception towards social, economic and ecological dimensions. However, still found negative perception and low technological knowledge mastery in the community that could be a threat to the sustainability of cheese production by KPBS. Community empowerment through capacity building related to specific technological knowledge of cheese-making wastes bioconversion or other residual reduction technology could be an alternative to decrease the threat of unsustainable cheese production.

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