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Soap Liquid Waste due to Covid-19 Pandemic in Magelang City: Challenges and Recommendations

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The Covid-19 pandemic had a domino effect in various socio-economic aspects of society. The emergence of a pandemic has forced several countries to implement policies to restrict social, economic activity, and mobility of citizens. One of the effects of this policy is the reduction of pollutant loads and the restoration of environmental quality. However, this pandemic has also caused other environmental problems. Covid-19 gave a secondary negative impact, such as reducing recycling and increasing waste. Meanwhile, the potential for water and soil pollution comes from the use of soap in large quantities during the pandemic as washing hands using soap become a new habit in the community. This phenomenon does not only occur on a global and national scale but also reaches the level of the smallest administrative area. Magelang City is one of the regions that is starting to feel the impact of a significant increase in soap liquid waste. With the prediction that this pandemic will not end in the near future, and washing hands using soap will then become a new habit in the community, measuring the potential for liquid soap waste becomes an important thing as a reference for mitigating the risk of water and soil pollution in the long term.

This study uses descriptive analysis to measure the potential for soap liquid waste enhancement in Magelang City. Secondary supporting data is obtained from the official publication of WHO, Environmental Department of Magelang City, and the Central Statistics Agency of Magelang City. This study also presents a SWOT analysis used to map and formulate soap waste management policies in Magelang City in a sustainable manner. Details of the research variables are presented as follow (Table 1):

Table 1. Research Variables and Definitions.

No	Variables	Definitions
1	Frequency (F)	The frequency of washing hands per day using soap
2	Quantity (Q)	Average use of sink water for washing hands
3	Coefficient (c)	Waste generation coefficient
4	Population (P)	Number of populations over 5 years of age in Magelang City

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The production of liquid soap waste was obtained from the product of the waste generation coefficient, the average use of water for washing hands, and the frequency of washing hands per day. While, the data for the population variable in this study used the population of Magelang City over five years of age. This is based on data from the Covid-19 Task Force, that a confirmed case of Covid-19 has been found in this age group. Therefore this age group also plays an important role in implementing the health protocols. The calculation of the potential volume of soap liquid waste is proxied from the output function as formulated in equation:

$$\text{Volume of Generated Waste (V)} = c \times Q \times F \times P$$

Results showed that the appeal to wash hands using soap is massively implemented in all sectors with the hope that the protocol will become a new normal habit in the daily life of the people of Magelang City. The application of this new habit will certainly provides an unavoidable potential for soap liquid waste. Therefore, mitigation against the risk of accumulating soap liquid waste needs to be formulated in a comprehensive policy. This study showed that there was an increase in the volume of soap liquid waste in Magelang City at normal condition and during pandemic by the average of 50.71 percent. Laboratory examinations of grey water samples containing handwashing waste were taken from one of the offices in Magelang City and showed that several parameters exceed the established quality standards. Although several technological innovations to reduce soap liquid waste in Magelang City have been initiated, however, the utilization needs to be expanded so that the reduction of soap liquid waste becomes more effective and significant.