

# Optimization Of Community Income During The Covid-19 Pandemic From Cooking Oil Waste Into Soap In Sukaratu

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## ABSTRACT (10PT)

Sukaratu Village, Cikeusal has rapid population growth and culinary business development because there is the Serang Panimbang Section 1 toll gate which is an economic magnet. This has a positive impact on the community, but also has a negative impact on the environment. The negative impact of this culinary business is the high volume of used cooking oil (cooking) waste. This happens because people throw used cooking oil away. Waste cooking oil if not managed properly will make the environment dirty and can pollute water and soil. To overcome this problem, it is necessary to innovate in the management of used cooking oil by involving the community so that the waste can be used as a product of economic value. One of the potential waste cooking oil is the high content of fatty acids so that it can be used as an environmentally friendly dish soap. Therefore, community service activities were carried out to increase the added value of used cooking oil by processing it into dish soap. Skills training for processing used cooking oil into dish soap has been carried out for the community in Sukaratu Village, Cikeusal and provides benefits: 1) The community knows the negative impact of used cooking oil on health and the environment, 2) The community knows and is skilled at applying appropriate technology for processing used cooking oil into dish soap, 3) People know the economic potential of used cooking oil waste, 4) Encourage community empowerment.

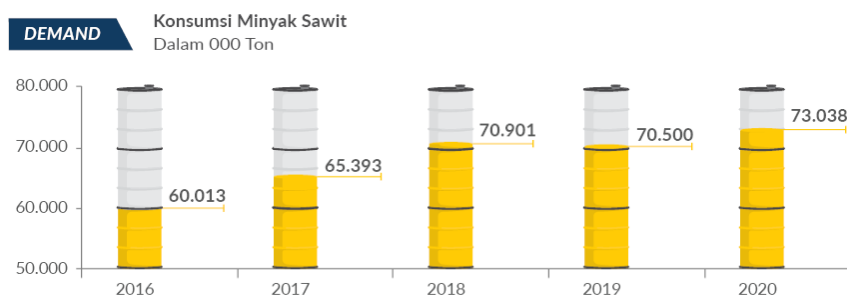
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## 1. Introduction

The main element in human life and life governance is one of the nine basic ingredients consumed by all levels of society, especially in Sukaratu Village, Cikeusal District and widely used in culinary and restaurant businesses is cooking oil. Indonesian people generally like fried food, so consumption of cooking oil is quite high (irai.co.id, 2021). The consumption of cooking oil in Indonesia reaches 290,000,000 tons/year. Cooking oil is oil derived from plant or animal fats that are purified, liquid at room temperature and are usually used for frying food.

Table 1. Palm Oil Consumption Period 2016-2020



Source: USDA, Bloomberg

Cooking oil from plants comes from plants such as coconut, seeds, nuts, corn and soybeans (Ketaren, 1986). Basically a good oil is an oil that contains more unsaturated fatty acids than the saturated fatty acid content. Cooking oil can be used up to 3-4 times for frying (Kapitan, 2013). However, if cooking oil is used repeatedly, the fatty acids contained will be more saturated and will change color. The used cooking oil is said to have been damaged or can be called used cooking oil and is not good for consumption (Lipoeto, 2011).

Frying food at high temperatures, which is done using oil that has high levels of saturated fatty acids, causes food to be dangerous for health. In addition, prolonged and repeated heating of cooking oil will produce peroxide compounds, these peroxide compounds are free radicals that are toxic to the body. The maximum limit of peroxide value in cooking oil that is suitable for human consumption is 10 meq/kg of cooking oil. However, generally used cooking oil has a peroxide value of 20-40 meq/kg so it does not meet quality standards for health (Thadeus, 2012).

Used cooking oil that is absorbed by fried food and eaten by humans will enter and be digested in the human body. Used cooking oil that enters the human body if left for years to accumulate in the body will cause disease for humans, although the effects will be seen in the long term (Asyiah, 2009). Some potential adverse effects on health can occur due to consuming too much used cooking oil, for example, abnormal fat deposits, cancer, imperfect control of the nerve center (Suryandari, 2014).

On the other hand, if used cooking oil waste from culinary businesses and households is directly discharged into the environment, it will make the environment dirty and become a pollutant for water and soil. The continuous disposal of used cooking oil waste that is not environmentally sound can have a negative impact on the environment and the survival of human life. Used cooking oil that is absorbed into the ground will contaminate the soil so that the soil becomes infertile. In addition, waste cooking oil discharged into the environment also affects the mineral content in clean water. However, due to lack of knowledge about the impact on the environment, there are still many general public and culinary traders who dispose of cooking oil waste like that. To overcome this problem, there is a need for innovation in the management of cooking oil waste by involving the wider community so that cooking oil waste can be used as a product that has economic value. One of the potentials for cooking oil waste is the high fatty acid content of vegetable oils.

Therefore, waste cooking oil can be used as dish soap that is environmentally friendly. But so far, people do not know the economic potential of the used cooking oil waste. In addition, the public also does not know the appropriate method for processing cooking oil waste as a raw material for dish soap and does not yet have knowledge about controlling water and soil pollution. Therefore, to overcome the problem of high volume of cooking oil waste, community service activities are carried out which aim to increase added value for cooking oil waste by processing cooking oil waste into dish soap. Skills training on processing waste cooking oil into environmentally friendly dish soap is very beneficial for the people of Indonesia, especially the people in Sukaratu village.

Sukaratu village, which is 22 km from the provincial capital of Banten, is one of the villages designated by the local government as a tourism village pilot project. Sukaratu Village is one of the villages located in Cikeusal District, Serang Regency which has a lot of potential in the fields of tourism, trade and offices, as well as natural tourism as well as cultural tourism and plantations.



**Figure 1. Geographical Map of Serang Regency**

The strategic geographical location of Sukaratu Village and beautiful natural conditions allow tourism to develop rapidly. Sukaratu Village has an area of 4.23 km<sup>2</sup> consisting of 5 hamlets, 5 community units, and 11 neighborhood units. because it is classified as a village that has a high number of poor people, 34% of the total 2273 households. The total population of this village reaches 6536 people, with a relatively equal number of male and female residents. The land potential in this village is actually quite good, namely 94 ha of rice fields with very good irrigation because there is a water source, 178 ha of dry land, 66.11 ha of public facilities out of a total area of 4.23 km<sup>2</sup>.

Quality human resources, the village population is classified as low is the main problem in the utilization of Natural Resources. Based on the level of education, the number of residents who graduated or did not graduate from high school reached 79.7%. The majority of the population's livelihoods are factory workers, office employees and traders by 64.3%, farmers reach 12.9%, unemployment 17% and the remaining 5.8% are government employees.

One of the opportunities for poverty alleviation in this village is by utilizing the potential of natural resources and trading resources, especially SMEs (small traders who sell their goods using cooking oil, especially for the people in Sukaratu village who are many entrepreneurs as culinary entrepreneurs. So that culinary businesses are more profitable productive, then the results of the innovation of cooking oil waste which is processed into dish soap can be used to save expenses in terms of washing materials. The community in Sukaratu village is a cooperative community and has the willingness to learn new things that are useful, as well as participate in empowering skills training community economy.

Based on these conditions, the priority problems of the partners that were mutually agreed to be overcome through this service activity were aspects of the production of dish soap from used cooking oil waste and aspects of entrepreneurial insight. Three priority issues for partners to be resolved are: (a) Limited knowledge of the community regarding the economic potential of used cooking oil waste, (b) Lack of community skills regarding the use of used cooking oil waste to be processed into dish soap, (c) Limited community skills in processing controlling water and soil pollution, (d) Limited knowledge of community entrepreneurship related to the utilization of used cooking oil waste into high economic value products (dishwashing soap).

Therefore, this community service activity is focused on: 1) providing knowledge to the community about the economic potential of used cooking oil waste, 2) skills training for the community regarding processing used cooking oil waste into dish soap, 3) providing skills regarding the pollution control process. water and land, 4) providing entrepreneurial insight related to the production of dish soap.

## **2. Literature Review (bold, 12 pt)**

Community empowerment is a development process in which the community takes the initiative to initiate a process of social activity to improve their own situation and condition. Community empowerment can only occur if the community itself also participates. the agent of development or also known as the subject. Here the subject is the driving force, and not the beneficiary (English: beneficiaries) or the object only. Community empowerment is an effort to build communities so that they have the initiative to carry out social activities so that they can improve their own situations and conditions.

### ***Article-Inline***

According to Fahrudin, community empowerment is an effort to enable and empower the community through 3 ways, including:

- a. Enabling, creating a situation that allows the birth of community potential to develop.
- b. Empowering, strengthening the potential or power of the community by increasing their capacity.
- c. Protecting, building a protection system for the community that is being developed.

### ***Aim***

According to the author of the book *Community Empowerment: In the Perspective of Public Policy*, Prof. Dr. Ir. Totok Mardikanto, community empowerment has 6 goals.

- a. Better Institution: Activities or actions taken in community empowerment are expected to improve institutions in the empowerment area.
- b. Better Business: Improvements in education or enthusiasm for learning, improvements in accessibility or affordability, and institutional improvements are expected to improve the business being run.
- c. Better Income: The existence of activities in the context of improving the business or business in the target area is expected to also increase the income of the target community.
- d. Better Environment: With efforts to improve income, it is hoped that the community will also be able to improve the environment. Because environmental damage is often caused by poverty.
- e. Better Living: When income and the environment have improved, it is hoped that people's lifestyles will also improve.
- f. Better Community: In the end, it is hoped that there will be an overall improvement in every element of society.

### ***Principles of Community Empowerment***

In community empowerment there are four principles that function so that the empowerment carried out can be successful.

- a. Equality: This is the main principle that must be adhered to. On this principle, there is equality and equality of position between the community and the institutions that carry out community empowerment programs.
- b. Participation: Programs that can stimulate community independence are programs that are participatory.
- c. Independence: This principle is to respect and prioritize the ability of the community rather than the help of other parties. In this principle, they do not see the poor as an incapable object but as a subject who has little ability.
- d. Sustainability: Basically the empowerment program must have a sustainable goal. He must slowly give the community a dominant role in empowerment, no longer a companion who plays a dominant role.

### ***Stages of Community Empowerment***

There are at least seven stages to carry out community empowerment activities.

- a. Preparation: At this stage there are two things that must be done, namely the preparation of officers/HR and field preparation. The preparation of officers can be done by community workers. Then the provision of the field which is basically attempted to be carried out in a non-directive manner.
- b. Assessment: This is the stage in the assessment of an area to be fostered. This stage is carried out with the aim of identifying the problems needed in the area to be fostered.
- c. Alternative Program Planning: The next stage is that those who will carry out empowerment involve the community to think about the problems they face and find solutions.
- d. Formalization of Action Plans: Those who will carry out empowerment form groups and plan what programs will be implemented to solve problems.
- e. Program Execution: It enters into the execution stage. Programs that have been designed have begun to be executed or applied to empowered communities.
- f. Evaluation: After implementing the program, of course there are errors that occur. This is what then becomes an evaluation so that the program in the future can be even better. In the evaluation stage, it is also advisable to involve residents to supervise the running program.
- g. Termination: The last stage in community empowerment is termination. This stage is the stage where the empowering party formally terminates the relationship with the fostered community. Termination of the relationship because it is felt that the key performance indicator (KPI) is enough to be released.

### **3. Research Method**

This activity is carried out in two main stages: (a) Making dish soap in the laboratory. The making of laundry soap is done using NaOH as a reactant and fragrance to give a good appearance. (b) Community training activities. Priority is given to training and mentoring partners to: 1) provide information on the economic potential of used cooking oil (cooking) waste into dish soap; 2) introducing the implementation of science and technology and technical skills training for processing used cooking oil waste (cooking oil) into dish soap products; 3) skills training and assistance in efforts to control water and soil pollution; and 4) providing entrepreneurial insight material related to the use of used cooking oil waste (cooking oil) as raw material for making products of economic value.

The methods implemented in this service activity are: lecture, discussion and demonstration methods or direct practice. Lecture materials include bath soap, benefits, basic ingredients of soap, active ingredients in soap, and how to make soap. Furthermore, the practice of making natural antibacterial bath soap from the basic ingredients of making bath soap and active ingredients from cooking oil, coffee powder and rice, then a discussion (Question and Answer). Finally, there was an evaluation of the participants and the bath soap products they made

### **4. Results and Discussion (bold, 12 pt)**

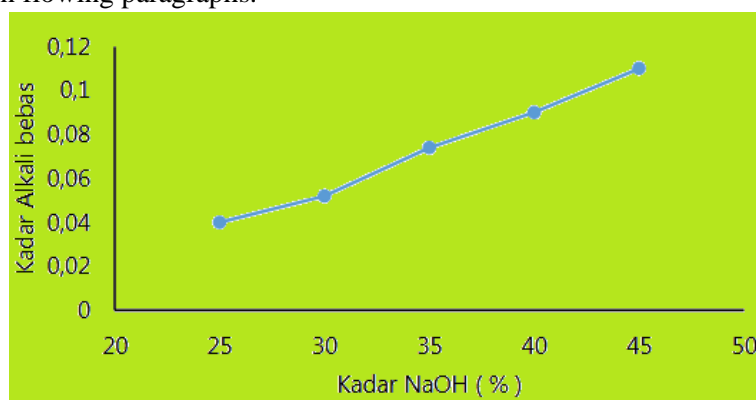
Community service activities in the form of training in making soap from used cooking oil were carried out on November 20, 2021 at a meeting of PKK Ladies RT 03 RW 01 Sukaratu, Cikeusal, Serang which was attended by 46 people. Prior to the implementation of community service, socialization, product manufacture and testing were carried out in the laboratory, community training, and monitoring. Dissemination to community leaders is carried out with the aim of approaching the community, coordinating, and consolidating, especially PKK management in the RT 03 RW 01 Sukaratu area so that service activities can run well.

Through this socialization, it can be seen the existing problems, the solutions that will be offered, and the appropriate model of service implementation. To ensure the quality and safety of soap products from used cooking oil, the product is manufactured and tested in the laboratory first. A video of the process of making soap from used cooking oil was also made to be shown later in service activities so that the public could easily understand the procedure. Experiments in the laboratory and making videos will be held on November 10-15, 2021.

This activity was assisted by two students for soap making experiments, and one student for making process videos. Soap is a compound of sodium or potassium with fatty acids from vegetable oils or animal fats in solid, soft or liquid form and foams. Soap is produced from the saponification process, namely the hydrolysis of fats into fatty acids and glycerol under alkaline conditions. The basic conditions commonly used are sodium hydroxide (NaOH) and potassium hydroxide (KOH). If the base used is NaOH, then the resulting product is solid soap, whereas if the base used is KOH then the resulting product is liquid soap (Sukeksi et al., 2017). The steps for making soap are as follows.

At first, the used cooking oil is purified through the process of despicing used cooking oil (cooking oil). Used cooking oil was weighed 100 grams and then put in a 1000 ml measuring cup. The used cooking oil is then separated from the dirt using a filter cloth. The second stage is the neutralization process. For neutralization purposes, a 15% KOH solution was prepared from 15 grams of KOH dissolved in 100 ml of distilled water. Next, the despicing cooking oil is heated at a temperature of  $\pm 40^{\circ}\text{C}$  (warm nails). Conclusion

Contains conclusions with extensive deprivation of the discussion of research results that are written briefly and clearly, showing clarity of the contribution of findings, sparking new theories and the possibility of developing research that can be done in the future. Theoretical and practical implications written in flowing paragraphs.



**Figure 2. Effect of NaOH Concentration on Free Alkali Levels**

The 15% KOH solution was then put into the desiccated oil with a ratio of 100 grams of oil: 5 ml of 15% KOH. The mixture was stirred with a mixer for 10 minutes, then filtered through Whatman filter paper number 41 to separate impurities. The next stage is the bleaching process with activated carbon (Yustinah and Hartini, 2011). At this stage, the neutralized cooking oil is heated to a temperature of  $70^{\circ}\text{C}$ . For bleaching, 7.5 grams of 240 mesh activated carbon was added to cooking oil. The solution was stirred with a mixer for 60 minutes and heated at  $150^{\circ}\text{C}$ , then filtered through Whatman filter paper number 41 to separate impurities.

The last stage is the main stage of the process of making dish soap. This stage begins with the manufacture of KOH solution with a concentration of 30%. Furthermore, the purified cooking oil is heated at a process temperature of  $45-55^{\circ}\text{C}$ . KOH solution with a concentration of 30% is put into the purified cooking oil at a temperature of  $45-55^{\circ}\text{C}$  with a ratio of oil: KOH = 1: 0.5 (100 g oil: 50 ml

KOH). The mixture was stirred with a mixer for 45 minutes. To give an attractive aroma, non-alcoholic apple perfume was added at a concentration of 1 ml of perfume per 100 g of oil.

To give an attractive color, apple green extra food coloring number 2093 (14% color content) with a concentration of 1 ml of food coloring per 100 grams of oil was added to the mixture and stirred with a mixer for 5 minutes. Colorants can also be replaced with 10 ml of natural dyes (pandan, betel and turmeric) per 100 grams of oil (Lestari, 2010). The quality requirements for bath soap are in accordance with SNI 06-35321994.

**Table 2. Quality Requirements for Bath Soap (SNI 06-3532-1994)**

No	Uraian	Tipe 1	Tipe 2	Tipe 3
1	Kadar air, %	< 15 %	< 15 %	< 15 %
2	Jumlah asam lemak, %	> 70	64 - 70	> 70
3	Alkali bebas			
	Dihitung sebagai NaOH, %	Maks 0,1	Maks 0,1	Maks 0,1
	Dihitung sbagai KOH, %	Maks 0,14	Maks 0,14	Maks 0,14
4	Asam lemak bebas, %	< 2,5	< 2,5	< 2,5
5	Minyak mineral	negatif	negatif	negatif

The core activity of community service in the form of training on making dish soap from used cooking oil was carried out on November 20, 2021 at the house of Mrs. Betty, the Chairperson of RT 03 RW 01 Sukaratu. The activity was attended by 46 members of the PKK RT 03 RW 01 Sukaratu community. The training includes explanations, video playback, and simple practice. Residents were very enthusiastic about listening to the explanations of the service team as seen from the questions asked during the training. The community is enthusiastic about participating in service activities because the material presented can increase knowledge and skills and provide entrepreneurial insight. The product from community service in the form of dish soap from used cooking oil was also exhibited in the village competition as an innovative product of RW 01 Sukaratu. The implementation of this community service activity is presented in Figures 3, 4, 5 and 6



**Figure 3. Raw Materials for Making Soap**



**Figure 4. Soap Making Printing**



**Figure 5. Soap that is ready, packaged, marketed and used**

Evaluation of this activity is carried out by providing critique sheets and suggestions to the training participants at the end of the event. The aspects that are reviewed are everything from registration to practice. Based on the results of the critique sheet and suggestions, it shows that they are very happy with this event. According to them, the training they received was new and useful. In addition, they are motivated and enthusiastic to receive similar trainings and hope that this collaboration will continue to be held every year. In addition, they also gave criticism that this event was too short and the materials used were not enough



**Figure 6. Evaluation of Service Activity Results**

The community is enthusiastic about the service activities that have been carried out and hopes that there will be regular service activities in the area. From the results of observations, this service activity increases public knowledge about: (1) The dangers of used cooking oil for human health and the environment. (2) Economic potential of used cooking oil. (3) Handling of used cooking oil waste. (4) The technique of processing used cooking oil into dish soap. The results of this community service were also exhibited in an inter-village innovation competition in the Cikeusal sub-district at the celebration of the Cikeusal District Innovation Week.

Conclusions from the priority problems of the general public in Sukaratu village, Cikeusal sub-district, which have been identified are the large volume of used cooking oil waste in the culinary industry and the rest of household use in the area. Used cooking oil is not suitable for repeated use because it has a negative impact on health. On the other hand, if it is discharged into the environment, it will become a harmful pollutant. To overcome the problem, community service was carried out which aims to provide knowledge to the community about the economic potential of used cooking oil waste and training on skills in making environmentally friendly dish soap from used cooking oil. This community service activity has a positive impact on environmental cleanliness, is useful for providing community knowledge and skills, and encourages an entrepreneurial spirit through innovative skills in making environmentally friendly dish soap from used cooking oil waste. The community is very



enthusiastic about participating in community service activities that have been carried out and hopes for the continuation of service activities in the future.

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