

# Economic Value Approach to Cooking Oil Waste Management in Bumdes Panggung Lestari, Panggung Harjo, Bantul, Yogyakarta

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**ECONOMIC VALUE APPROACH TO COOKING OIL WASTE  
MANAGEMENT: CASE STUDI BUMDES PANGGUNG LESTARI**  
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***Abstract***

*The purpose of this study was to analyze the economic valuation of the use of used cooking oil in Bumdes Panggung Lestari, Panggung Harjo Village, Bantul. The research was conducted because the handling of externalities must be managed properly so as not to cause disturbances in community activities. Economic valuation is an attempt to give a quantitative value to economic activity, both on the basis of market value and non-market value. The method used in this research is an economic value approach which includes an opportunity cost and an economic valuation approach. The results show that the total economic value of using cooking oil is dominated by direct use value. The results imply that the management of cooking oil waste can be a source of income for the local village community and can be an effort to control environmental pollution from cooking oil waste.*

**Keywords:** *Economic Valuation, Waste Cooking Oil*

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## INTRODUCTION

Improving the community's economy is one of the policies of the Bantul Government to alleviate poverty. Bantul is a district located under Special Region of Yogyakarta province, Indonesia. This research was conducted at the Bantul district because Bantul has announced an increase in economy to eradicate poverty. One of the current government missions currently being promoted is to build rural areas that can be achieved through a community empowerment to increase productivity and diversity of existing businesses. The target of village economic growth is realized by the level of independence with the existence of BUMDes in Bantul. One of the government's missions currently being promoted is to build rural areas which can be achieved through community empowerment to increase productivity and the diversity of existing businesses. The target of village economic growth is realized by the level of independence with the presence of BUMDes in Bantul. In this case, BUMDes refer to profit-organization that organized by the village. BUMDes is a legal entity established by the village and/or together with villages to manage businesses, utilize assets, develop investment and productivity, provide services, and/or provide other types of businesses for the greatest welfare of the

Village community. Furthermore, it was also stated that BUMDes businesses are activities in the economic sector and/or public services that are managed independently by BUMDes, Mohammad, *et. al* (2020).

Bantul Regency is one of the areas that is being intensively formed and developed BUMDes. There are approximately 26 BUMDes in Bantul Regency. BUMDes in Bantul Regency is divided into 3 categories, namely start-up, developing, and advanced. The first category, Start-ups, are constrained by how they find BUMDes managers who have the ability. It develops more on how to manage management, how to organize internal management. BUMDes in the advanced category, namely how the profit obtained is for reinvestment. In this study, BUMDes Panggung Lestari was used as the object of research. According to the previous survey, the Panggungharjo BUMDes are included in the advanced BUMDes amid limited natural resources.



**Figure 1.** Bussiness Units at BUMDes Panggung Lestari

Based on the figure 1 above, there are five business units in Panggungharjo BUMDes, namely waste management, household waste management in the form of cooking oil and tamano oil, village supermarkets, agro and agriculture, as well as educational and culinary tours of Mataraman Village. However, just like the problems facing the world, waste management is still a challenge in Panggungharjo BUMDes. Waste management units and household waste management are still running less effectively. Especially the management of used cooking oil waste which is quite large in number. Waste management units and household waste management are still running less effectively. In particular, the management of used cooking oil waste, which is quite large in number, both from SMEs creative economy business actors and from household communities. This waste is disposed of by the public carelessly which has a bad impact on the environment, even though if it is recycled this waste can be useful. The problem of used cooking oil waste that is disposed of carelessly is that it interferes with environmental pollution.

The management of used cooking oil has been carried out by BUMDes Panggungharjo Lestari in Panggungharjo village since 2013. Management of used cooking oil is coordinated by BUMDes. This is evidence

that the community does not want their living environment (mainly water, soil and air) to be polluted by household consumption waste. Over time, in 2016 BUMDes Panggungharjo Lestari innovated to process used cooking oil into bio-diesel fuel. It's just that the results of processing into biodiesel are constrained by the prototype of the filter device it uses. The impact is that the cost of production becomes very expensive. So, the study of bio-diesel does not continue until now.

The management of cooking oil in BUMDes is carried out with an intensive study from local community leaders, namely the Village Head of Panggungharjo who innovated to create a filter for used cooking oil in his area. The purpose of the filter is to clean used cooking oil from the molecules contained in it. At first BUMDes received used cooking oil from the people of Panggungharjo village, but now it is not only the people of Panggungharjo village who sell used cooking oil to BUMDes but people outside the village are also interested and eventually sell their used household cooking oil.

After the used cooking oil is collected in BUMDes, the next process is to filter the used cooking oil produced by the household. This filter process is carried out by one of the local BUMDes business units named BankTiGor. Currently, the equipment owned

by BUMDes is one unit but can process 600-800 liters of filtering per day.

Used cooking oil that has gone through the filtering stage is then sold to third parties / companies that use used cooking oil for production processes, not to be recycled into new cooking oil. Third parties or companies that buy used cooking oil first make an MOU with BUMDes. This is done by BUMDes with the aim that the used cooking oil sold to several companies is not used for things that are detrimental or misused by third parties, especially in terms of national food safety. In order to maintain food safety, companies that buy used cooking oil from BUMDes must include a company license for the use of used cooking oil.

In managing cooking oil waste, Panggung Harjo village has 40 waste banks, where each waste bank has an average of 20 to 30 members. These members are active and contribute to the management of the waste bank as a depositor of used cooking oil. So, in the village of Panggung Harjo there are 1040 people as depositors of used cooking oil. In this case, it is very clear that the community is enthusiastic and concerned about environmental quality and at the same time can manage used cooking oil as an additional income.

Research conducted by IMP & Putra (2018) analyzes economic value, namely by

measuring the value of consumer surplus and the economic value applied to his research. The effect of the variables was identified using multiple linear regression analysis with a log-linear model. Meanwhile, the consumer surplus value and economic value were obtained using the Individual Travel Cost Method (ITCM) approach.

The problems of this research are: How can cooking oil waste management be applied in changing waste management so that a sustainable environment can be maintained. Based on these problems, the purpose of this study is to increase income from the performance of business units, especially the management of used cooking oil waste, it is hoped that cooking oil waste which usually pollutes the environment can be reduced. community elements, BUMDes management, waste banks, business unit actors involved in BUMDes, market business actors, community leaders and village government.

The rural development paradigm has undergone significant changes. The role of BUMDes in implementing regional development has become an icon in regional business centers. The old paradigm of rural development is very simple and is closely related to the problem of modernizing the agricultural sector and taking direct benefits resulting from the modernization of the

agricultural sector. In the end, it was realized that the completion of rural development requires an approach from various aspects. Where inclusive village development is carried out with an approach to many aspects such as economic and social such as community involvement and political issues.

Permendes Number 4 of 2015 concerning BUMDes the establishment of BUMDes aims to (1) improve the Village economy, (2) optimize village assets to be useful for village welfare, (3) improve community efforts in managing the village's economic potential, (4) develop a business cooperation plan between villages and/or with third parties, (5) create market opportunities and networks that support the public service needs of citizens, (6) create job opportunities; (7) improve the welfare of the community through the improvement of public services, growth and equitable distribution of the village economy, and (8) increase village community income and village original income.

BUMDes is implemented by the community by upholding the principles of cooperation (cooperative), participation (participatory), equal rights (emancipation), openness (transparency), accountability (accountability) and sustainability (sustainable) (Ridlwan, 2014 in Sumiasih, 2018). Organizational management in

BUMDes has also been regulated in Village Regulation Number 4 of 2015 concerning BUMDes article 10 paragraph 1 which consists of advisors, operational implementers, and supervisors. Where in paragraph 2 it is stated that organizational management in BUMDes is based on the spirit of kinship and mutual cooperation.

In this research, the existence of BUMDes is one of the considerations for channeling village community initiatives, developing village potential, managing and utilizing the potential of village natural resources, optimizing human resources (village residents) in their management, and the existence of capital participation from the village government in the form of financing, and village assets submitted to be managed as part of BUMDes. Current development has also emphasized community involvement and included aspects of community empowerment as part of the development process (people centered development) city, and village governments make efforts to empower rural communities. In paragraph 2, it is stated that village community empowerment is carried out by: (1) encourages community participation in village planning and development which is carried out independently by the village, (2) develops sustainable village development programs and activities by utilizing human

resources and natural resources in the village, (3) formulates village development plans in accordance with the priorities, potentials, and values of local wisdom;

This research refers to Sri (2017) and Trianingsih & Noor (2021). Research conducted by Sri (2017) examines waste management with a waste bank. The existence of a waste bank will generate economic benefits and social impacts, especially for the community. The analysis used uses an assessment of the community about Willingness to Accept/WTA. Trianingsih & Noor (2021) conducted a study on the economic valuation of waste on coconut ice sellers in Samarinda Ulu sub-district. The calculation technique used is economic valuation. Economic valuation is carried out on coconut waste resources. In their research using cost and benefit analysis which is quantified by considering the environment.

The point is that the novelty of this research is the application of the opportunity cost approach in analyzing cost efficiency when using used cooking oil waste, which usually pollutes the environment, has been greatly reduced, and is also supported by innovation in the use of appropriate technology in the form of filtering tools, the results of which can be used as fuel an alternative that generates profits for business

units so that it can become income for the village, is expected to achieve the independence of BUMDes Panggung Lestari for reinvestment.

## **THEORETICAL BASIC**

### **Opportunity Cost**

According to De Simón-Martín et al. (2019), opportunity cost is usually defined as the cost of inversion of the available resources against the best available inversion alternative. It is usually determined by the expected profitability of the inversion in terms of future benefits, which is ultimately related to the net present value (NPV) and/or the international rate of return (IRR). Opportunity cost is very sensitive to several parameters, which opens a wide spectrum from which scenarios can be analyzed. The main parameters are electricity price, discount rate, estimated residual value of operative wf, life expectancy and degradation rate, fixed and variable costs, and of course the initial investment.

According to Prawirisentono (2007) in Panjaitan (2017) Opportunity cost is a potential benefit that is forced to be given up because of choosing another alternative. The concept of opportunity cost which explains that investors want compensation because they have to bear the risk, the greater the level

of investment risk, the greater the desired rate of return, and vice versa (Qivtia, 2018).

**Economic Valuation**

Potential economic valuation provides several benefits, such as:

- a. Provide a description of the measured or unmeasured economic value in monetary form.
- b. Is a method to determine the importance or not of an exploration project that has been or will be carried out.
- c. As a basis for determining the management of externalities so as to minimize the socio-economic impact of the process.

The Economic Valuation method for resource use seeks to provide the overall economic value attached to the resource (total economic value), Suparmoko *et. al* (2014). This total value is not only limited to the direct use value that has been used so far, but also includes indirect use value, option value and non-use value. When formulated, the value of an activity is:

$$TEV = UV + NUV \dots\dots\dots (1)$$

Notes:

TEV = Total Ec. Value

UV = Use Value (Direct +Indirect+ Option)

NUV = Non-use Value (Existence+Bequest)

Definition:

-Direct Use Value is the value obtained through direct consumption of a resource

-Indirect Use Value is the value of indirect benefits generated due to the use of resources

-Option Value is the value of direct and indirect benefits of a resource in the future.

-Existence Value is the value of the existence of a resource, regardless of the possible benefits can be obtained from the existence of the resource itself.

-Bequest Value is the value of the possible sustainable resource.

Freeman Myrick (1993) and Fauzi (2014) show that the components of goods and services produced from natural resources consist of 2, namely: traded goods and services and non-traded goods. Traded goods and services, economic measurement techniques can be done by analyzing consumer surplus and producer surplus.

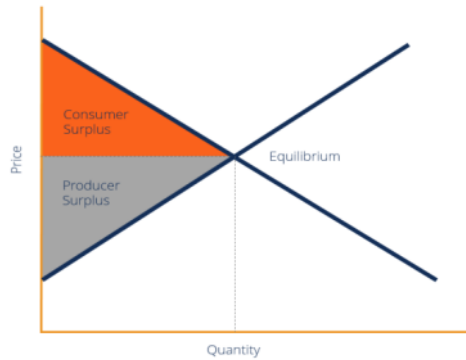
a. Consumer Surplus

Consumer surplus is a measure of welfare at the consumer level which is measured by the difference between a person's willingness to pay and what he actually pays. In resource economic valuation, this consumer surplus can be used to measure the magnitude of losses due to ecosystem damage by measuring changes in consumer surplus.

b. Producer Surplus



Producer surplus is measured from the vision of the benefits and losses of the value of producers or economic actors. In its simplest form, this value can be measured without having to know the supply curve of the goods traded.



**Figure 2.** Producer and Consumer Surplus

1. Indirect measurement technique

Assessment of goods and services that are not traded can be done using an indirect technique that is based on deduction of the behavior of a person or society as a whole towards the assessment of natural resources, so this technique is also often called the revealed willingness to pay technique.

2. Direct measurement technique

In the direct measurement approach, the economic value of resources and the environment can be obtained directly by asking individuals or communities about their willingness to pay for the goods and services produced.

## RESEARCH METHOD

The method used in this study, namely the survey method using interview techniques and Focus Group Discussion of respondents, documentation, field observations. Respondents in this study were MSME entrepreneurs, Punggung Lestari BUMDes management, Garbage Bank at Punggung Harjo, Sewon, Bantul. The analysis carried out is descriptive and verification analysis. Descriptive analysis using questionnaires distributed to respondents and secondary data obtained from the management of BUMdes Punggung Lestari and waste bank, in order to obtain a description of community empowerment, involving MSMEs, all elements of society, community leaders, government area. The importance of the opportunity cost approach analysis related to the problem of waste management of used cooking oil is one of the ideas in utilizing resources as efficiently as possible, which is expected to be able to educate the public in managing used cooking oil waste, both from the MSME community and the cooking oil used by the community at home. The need for assistance in community empowerment, especially MSMEs, is expected to optimally affect village income and the welfare of the people of Punggunharjo, Sewon, Bantul.

Analysis of the problems of this study using the method of economic valuation. Economic valuation is measured by the total value of economic value which explains the condition of use value, which consists of direct use value and indirect use value

$$TEV = DUV + IUV \dots\dots\dots(2)$$

DUV is Direct Use Value and IUV is Indirect Use Value.

The data used in this study are Cooking Oil Usage and Management Data Bumdes Revenue Data, which consists of: sales turnover, fixed costs, variable costs, operating income, other income received outside the Bumdes business

Economic Valuation Analysis of cooking oil waste management is based on: Direct use value is obtained from waste cooking oil management. To obtain direct use value, use the following formula:

$$DUV = \sum_{i=1}^2 COi \dots\dots\dots (3)$$

- DUV is Direct Use Value (IDR), DUV<sub>1</sub> is Revenue from the sale of waste cooking oil, DUV<sub>2</sub> is Revenue from tamano oil (IDR/liter) and CO is cooking oil.

- Indirect use value is the value that is felt indirectly for goods and services from

environmental and natural resources. The indirect use value of the environment in Panggung Harjo Village is the environmental cleanliness of river water and ground water that is free from waste cooking oil. The calculation of indirect use value is carried out using a replacement cost approach. The cost in question is the cost of making tools to accommodate the remaining cooking oil that is not suitable for use.

## RESULTS AND DISCUSSION

Cooking oil management in BUMDes is carried out with an intensive study from prominent figures the local community, known as the Village Head of Panggung Harjo who innovated to create a filter tool against used cooking oil in the area. The purpose of the filter tool is to cleaning used cooking oil from the contained molecules. At first BUMDes receives used cooking oil from the people of Panggung Harjo Village. Nowadays, it's not only the people of Panggung Harjo village who sell used cooking oil to BUMDes but people outside the village are also interested and eventually sell cooking oil used by their homes the stairs.

After the used cooking oil is collected in BUMDes, the next process is to carry out filtering of used cooking oil produced by the household. This Filter Process carried out by

one of the local BUMDes business units named BankTiGor. Currently the tool BUMdes has one unit but can process 600-800 liters of filtration per day.

Used cooking oil that has gone through the filtering stage is then sold to third parties / companies that use used cooking oil for production process activities, not for recycled into new cooking oil. Third parties or companies that buy cooking oil the have to entered into an agreement with BUMDes. BUMDes is aiming to ensure that third party is not going to mislead the use of used cooking oil. In order to maintain food safety, companies that buy used cooking oil from BUMDes must include a company permit which refer to the use of used cooking oil.

Economic valuation can be defined as an effort to provide a quantitative value for goods and services produced by natural resources and the environment both on market value and non-market value. The purpose of economic valuation is to promote the link between natural resource conservation and economic development. Therefore, economic valuation can be used as a tool to increase public appreciation and awareness of the environment (Fauzi, 2014).

Waste management in Panggungharjo Village is based on two perspectives, namely an environmental

health perspective as well as a business perspective, therefore waste management is carried out by Village Owned Enterprises (BUMDes). Waste management has various potentials which if managed optimally can produce economic and environmental benefits. In this case, the community creates a Banktigor group which is managed by a waste bank, where the price per liter of used cooking oil is IDR 3,500, the selling price from the waste bank to the buyer is IDR 7,000/liter, the waste bank in collaboration with PT Danon which requires approximately 5,000 liters per month.

Based on the data collected, it can be shown that the waste management map of cooking oil has been carried out in collaboration with residents and BUMDes. The economic value of waste management efforts can be categorized and explained in table 1.

In Table 1 it is explained that the community has a rating scale for the problem of cooking oil waste. To these problems, it can be summarized that the community considers it very important to dispose of uncontrolled cooking oil, causing environmental pollution. Likewise, the assessment of the smell of cooking oil waste that gets a very important score, which means that the externality of used cooking oil disturbs the air quality in the village, as well

as the importance of waste management, especially waste or cooking oil waste. With that rating scale, the community together with village officials need assistance in managing cooking oil waste. Furthermore, the results of the analysis of the economic value of cooking oil waste management can be presented in table 2.

**Tabel 1** Environmental Issues in Cooking Oil Waste Management

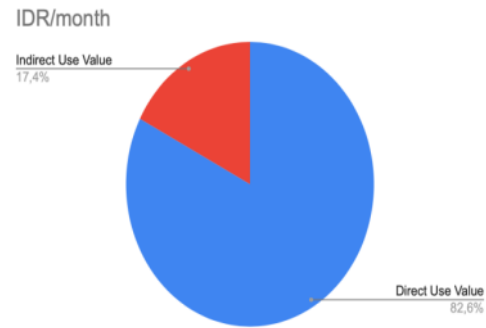
No.	Environmental Problems	Important Score
1.	Industrial and household cooking oil pollution	3
2.	Garbage Smell	3
3.	Waste management	3

Source: data processing. Note: number 1 = quite important, 2 = important, 3 = very important

**Tabel 2.** Total Economic Value

No.	Economic Value	IDR/Month	%
1.	Direct Use Value	19,824,000	82.60
2.	Indirect Use Value	4,176,000	17.40
	Total	24,000,000	100

Source: data processing



**Figure 3.** Comparison Direct and Indirect Use Value

The explanation of total economic value is shown in Table 2 and Figure 3. Total economic value is distinguished from direct and indirect use value. The direct use value in Panggung Lestari BUMDes in Panggung Harjo village has a higher percentage than the indirect value, which is 82.6%. This indicates that waste management has a reliable contribution as generating income in the BUMDes. The indicator of the amount of cooking oil (liters) and the selling price of cooking oil waste becomes a study that can be followed up by optimizing the collection and sale of cooking oil waste to collector partners.

From the results of the total economic value, it turns out that direct use should receive attention and management in the future. This is supported by the results of the study which show that the conditions for managing cooking oil waste in BUMDes are currently being used directly as raw material

for the production process by the third parties. Turnover from the sales of waste products can be directly cashed by the bumdes manager so that they can quickly get added value or the results to support the local BUMDes. Meanwhile, the indirect use value is still small, considering that the BUMDes has not optimally managed the waste cooking oil into other commodities that can be used by economic actors/community. The limitations of innovation in the management of waste cooking oil into alternative products become a challenge for the local BUMDes. For this reason, it is necessary to provide assistance and attention from the local government and the community in order to create waste products process more useful.

#### **CONCLUSION AND SUGGESTION**

Efforts to increase the participation of local communities in the management of cooking oil waste are needed to support the welfare of the people in Panggung Harjo village. This study concludes that the total economic value each month that can be obtained from the management of cooking oil waste in BUMDes which located in the Panggung Lestari, Panggung Harjo village, Bantul Regency, Yogyakarta is IDR 24,000,000 which is obtained from direct use value and indirect use value. This condition shows that the management of cooking oil

waste can be a source of income in the local village. Besides generating income for local BUMDes, this activity also supports the creation of public health which is reflected in the handling of cooking oil externalities so that environmental pollution can be controlled.

This research is still far from perfect, there are many limitations such as measuring the number of samples and the research period which was deemed not optimal. Suggestions for further research is to plan and optimize the number of samples and the research period so that the standard deviation of this study can be relevant. For further analysis methods and tools can be tested with other analytical techniques. In which enrich the dynamics of research results.

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