

Utilization of Sesai as an Environmentally Friendly Planting Media: Case Study of Buruk Bakul Village, Bukit Batu Subdistrict, Bengkalis Regency, Riau

Pemanfaatan Sesai sebagai Media Tanam yang Ramah Lingkungan: Studi Kasus Desa Buruk Bakul, Kecamatan Bukit Batu, Kabupaten Bengkalis, Provinsi Riau

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ABSTRACT

Indonesia has abundant natural resources, including the Bengkalis coastal area. Bengkalis waters are the largest in Riau Province, with a water area of 677,472.44 km². One of the coastal areas is Buruk Bakul Village in Bukit Batu District, Bengkalis Regency, which has an area of about 68.05 km². However, when viewed from the condition of the waters, marine debris poses a threat. Organic waste or sesai inhibits the growth of mangrove saplings and even causes death in mangrove saplings. The location of the research object is the coast of Buruk Bakul Village. The research objectives are to determine the potential of sesai to be used as an organic planting medium and to know the community's social perceptions and economic perceptions towards sesai as a planting medium. The research method used in this research is the survey method. Primary data included the results of NPK analysis on sesai, questionnaires, interviews, and observations in the field. Purposive sampling was carried out using the Geographic Information System (ArcGIS) along the coast of Buruk Bakul Village to measure sesai potential. The analysis results show the abundant potential of sesai, which can increase utilization into environmentally friendly planting media with the availability of a total volume of sesai of 39,029.5 m³ with an average volume per location of 2,295.8 m³. NPK content analysis (0.41%, 19.44 mg/100g, and 21.84 mg/100g) can be used as planting media. Social perception showed community initiative through survey results, which showed that 64% of respondents responded well. Economic perception by utilizing sesai as a planting medium can provide a profit of IDR.3,000 per unit, opening up opportunities for increased income for the people of Buruk Bakul Village.

Keywords: Organic Waste (Sesai), Mangrove, Planting Media

ABSTRAK

Indonesia memiliki kekayaan sumber daya alam yang melimpah, termasuk wilayah pesisir Bengkalis. Perairan Bengkalis merupakan Kawasan perairan terluas di Provinsi Riau dengan luas perairan mencapai 677.472,44 km². Salah satu wilayah pesisirnya adalah Desa Buruk Bakul di Kecamatan Bukit Batu, Kabupaten Bengkalis dengan luas sekitar 68,05 km². Namun jika dilihat dari kondisi perairannya terdapat sampah laut yang menjadi ancaman. Sampah organik atau sesai menghambat pertumbuhan anakan mangrove bahkan menyebabkan kematian pada anakan mangrove. Lokasi yang menjadi objek penelitian adalah pesisir Pantai Desa Buruk Bakul. Adapun tujuan penelitian adalah untuk mengetahui potensi sesai untuk dijadikan sebagai media tanam organik, mengetahui persepsi sosial dan persepsi ekonomi masyarakat terhadap sesai sebagai media tanam. Metode penelitian yang digunakan dalam penelitian ini adalah metode survei. Data primer diantaranya hasil analisis NPK pada sesai, kuesioner, wawancara dan observasi di lapangan. Untuk pengukuran potensi sesai dilakukan secara *purposive sampling* dengan menggunakan *Geographic Information System (ArcGIS)* di sepanjang pesisir pantai Desa Buruk Bakul. Hasil analisis menunjukkan potensi sesai yang melimpah, memiliki peluang untuk meningkatkan pemanfaatan menjadi media tanam yang ramah lingkungan dengan ketersediaan total volume sesai sebesar 39.029,5 m³ dengan rata-rata volume per lokasi sebesar 2.295,8 m³. Analisis kandungan NPK (0,41 %, 19,44 mg/100g dan 21,84 mg/100g) bisa dijadikan sebagai media tanam. Persepsi sosial menunjukkan inisiatif masyarakat melalui hasil survei yang menunjukkan bahwa 64% responden memberikan respon baik. Persepsi ekonomi dengan pemanfaatan sesai sebagai media tanam berpotensi memberikan keuntungan sebesar Rp.3.000 per unit, membuka peluang peningkatan pendapatan bagi masyarakat Desa Buruk Bakul.

Kata Kunci: Sampah Organik (Sesai), Mangrove, Media Tanam

INTRODUCTION

Indonesia has abundant natural resources, including the coastal areas of Bengkalis. Bengkalis waters are the largest in Riau Province, with a water area of 677,472.44 km². One of the coastal areas is Buruk Bakul Village in Bukit Batu District, Bengkalis Regency, with an area of about 68.05 km² and a population of 2,697 people. However, marine debris poses a threat when viewed from the water's condition.

Waste is an environmental problem that needs great attention because the amount continues to grow in various types and compositions (Mada et al., 2023). In preliminary observations, marine debris in Buruk Bakul Village is dominated by organic types of marine debris, such as wood. People around the coast of Buruk Bakul Village usually call it the term *sesai*. Initial measurements were carried out randomly, and it was found that the depth of the *sesai* reached 50 cm. Measurement of *sesai* depth was carried out near the breakwater (APO). Marine debris consists of two types: organic waste, which is dominated by wood, and inorganic waste, which consists of plastic, rubber, glass, cloth, and metal (Johan et al., 2020).

Organic waste (*sesai*) has disrupted fishermen's fishing activities, disturbed the benthos ecosystem, and mangrove rehabilitation. This is due to the accumulation of *sesai* and mangrove seedlings in coastal areas. Mangrove rehabilitation is an effort to restore the function of mangroves and coastal forests that have been degraded to good conditions and can carry out ecological and economic functions. Organic waste or *sesai* inhibits the growth of mangrove seedlings and even causes the death of mangrove seedlings. The height or thickness of *sesai*, especially during the northern season, can exceed the tops of the leaves of mangrove seedlings so that seedlings that are unable to survive to experience death. Therefore, research is needed on the study of the utilization of organic waste (*sesai*) in Buruk Bakul Village, Bukit Batu District, Bengkalis Regency, Riau Province, into planting media that examines the community's ecological, economic, and social sectors.

MATERIALS AND METHOD

This research uses the ecological survey method to analyze the potential of organic waste (*sesai*) in Buruk Bakul Village. The social aspect is done by measuring public perception of organic planting media products (*sesai*) through the survey method. The economic research approach was conducted through interviews with respondents, namely the people of Buruk Bakul village and flower traders in the Pekanbaru area. The results obtained will be used for the economic calculation of planting media from *sesai*. The price of planting media on the market will be compared to the price of planting media from organic waste (*sesai*) if *sesai* is considered to be obtained for free.

Research location

The research was conducted at the coastal location of Buruk Bakul Village, Bukit Batu District, Bengkalis Regency, Riau. Sample analysis (N, P, and K) at the Soil Laboratory, Faculty of Agriculture, Universitas Riau.

Types and sources of research data

The research used a quantitative approach and a qualitative approach. Quantitative data is obtained from the measurement of power hydrocarbon parameter analysis (pH), NPK parameter analysis (nitrate, phosphate, and potassium), and production cost estimation data. At the same time, quantitative data from the results of questionnaires are sent to the community. The type of data used in the analysis is primary data obtained from the field through experiments, interviews, and observations of the environment's current condition from ecological, social, and economic aspects.

Research stages

Organic waste sampling technique (*sesai*) based on purposive sampling. The potential distribution of organic waste (*sesai*) is calculated based on the distance of the coast of Buruk Bakul Village. The location chosen is based on the place where many *sesai* are found. The survey method in determining the potential distribution of organic waste (*sesai*) by calculating the volume of *sesai* as follows:

$$V \text{ sesai} = P \times L \times T$$

Note:

- V = Custom volume
- P = *Sesai* length
- L = Crowd area

T = depth of the jam

Research on social aspects is assessed from public perceptions of organic waste products (sesai) which are used as planting media. This study looks for public perceptions of sesai organic waste products that have not previously existed, using 4 variables. The sampling method for the questionnaire was purposive sampling, and the researcher selected respondents according to the objectives to be achieved. The target respondents were 30 people with target details, namely 12 people from Buruk Bakul village (including fishermen), 7 people from the mangrove bulkhead group, 1 Buruk Bakul village official, and 10 plant sellers in Pekanbaru. Data were tabulated with the research average entered into the following formula:

$$\text{Range} = \frac{\text{Highest score}-\text{lowest score}}{\text{Number of categories}}$$

The calculation of production costs for making planting media from organic waste (sesai) in this study uses the full costing method. This method considers all elements of production costs, direct costs or indirect costs to get a comprehensive picture of the total costs incurred.

$$\text{HPP} = \frac{\text{Raw Material Cost}+\text{Labor Cost}+\text{Overhead Cost}}{\text{Quality of Production}}$$

$$\text{HJP per unit} = \text{Selling Price (HPP + Profit)} / \text{Quantity Produced}$$

Data collection

Data collection techniques in this study related to ecological aspects are obtained directly from measuring the content of sesai as a planting medium from organic waste (sesai). Data collection techniques will be used to achieve the economic objectives by determining production costs and considering all cost elements in making planting media. Data collection techniques that will be carried out for social aspects include making a questionnaire about community perceptions and flower traders.

Data analysis

The potential of sesai was systematically measured using a Geographic Information System (ArcGIS). The volume of sesai in various areas was measured with high precision, resulting in data on the distribution and concentration of sesai in the area under study. Data analysis of economic aspects by calculating the production costs of making planting media consisting of transportation costs, production costs, labor, sales estimates and savings calculations.

RESULT AND DISCUSSION

Potential distribution of organic waste (Sesai)

Based on observations made, it was found that the height or thickness of organic waste (sesai) reached an average of 50 cm. Organic waste (sesai) has different size variations. The sieving results show that the sesai that passes through the sieve hole has a dominant particle size of less than 2 cm. It can be concluded that most of the sesai consists of small particles. To illustrate the distribution of sesai, mapping has been carried out, and the results are shown on the map of sesai distribution in Buruk Bakul Village in Figure 1.

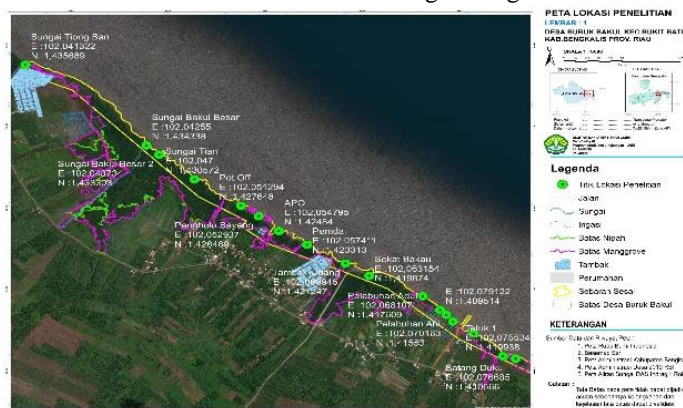


Figure 1. Sesai Distribution Map

The area with the lowest sediment thickness is located in the Ahi 1 Harbor area, with an average sediment volume of 3%. The area with the highest sesai thickness is around Adul Harbor, with an average sesai volume of 15%. This area has a topographic shape like a bay jutting inland with relatively low mangrove conditions, so the jam is under the tide to the mainland.

The existence of sesai is influenced by the movement of materials influenced by the tides. Sesai forms more in the northern season or rainy season. Where rain brings more sediment material. Conversely, during the dry season, material deposition becomes more stable. Increased flow discharge during the rainy season can bring more sediment into the water system. Meanwhile, a decrease in discharge in the dry season causes more stable deposition on the riverbed or water (Shao et al., 2020).

Table 1. Potential distribution of organic waste (Sesai)

No	Location	Length (m)	Lebar (m)	Height Sesai (m)	Volume Sesai (m ³)
1.	Batang Duku	60	15	0,5	450
2.	Teluk 1	93	23	0,5	1.069,5
3.	Pelabuhan Ahi 1	37	18	0,5	332
4.	Pelabuhan Ahi 2	66	32	0,5	1.056
5.	Pelabuhan Ahi 3	192	25	0,5	2.400
6.	Pelabuhan Ahi 4	100	15	0,5	750
7.	Pelabuhan Adul	239	50	0,5	5.974
8.	Sekat Bakau	230	36	0,5	4.140
9.	Tambak Udang	170	27	0,5	4.590
10.	Pemda	410	24	0,5	4.920
11.	APO	63	60	0,5	1.890
12.	Penghulu Sayang	342	17	0,5	2.906
13.	Pot Off	193	14	0,5	1.350
14.	Sungai Tian	150	15	0,5	1.124
15.	Sungai Bakul Besar 1	391	20	0,5	3.910
16.	Sungai Bakul Besar 2	166	14	0,5	1.162
17.	Sungai Tiong Ban	53	38	0,5	1.006
Total		2.995	443	05	39.029,5
Average					2.295,8

Based on Table 1, the potential for organic waste (sesai) in Buruk Bakul Village is a total volume of sesai of 39,029.5 m³ with an average volume per location of 2,295.8 m³ and needs to be utilized both ecologically, economically and socially. The results of an interview with Khaidir, the head of the mangrove bulkhead, stated that the high thickness of organic waste (sesai) disturbed the growth of mangrove saplings and even caused death. Therefore, organic waste (sesai) must be utilized as organic planting media.

Community social perception

Based on the results of initial observations and interviews related to knowledge, utilization, and community perceptions before sesai was used as a planting medium, it can be concluded that sesai was not utilized by the local community. This is due to the community's assumption that sesai is a problem that can interfere with mangrove life, one of which is in the process of mangrove sapling growth.

After testing on mangrove propagules and horticultural crops (water spinach and spinach), data was collected through questionnaires to measure the social perception of the community regarding planting media products. The data obtained from respondents has been tabulated based on the questions that have been asked. Each respondent gave a score according to their perception of each question. It was concluded that the manufacture of planting media from organic waste (sesai) had received a positive response from the community, as reflected in the results of the survey conducted, showing that 36% of respondents rated this initiative as "very good" and 64% as "good." This reflects the community's recognition of organic waste management's environmental and economic benefits.

Community economic perception

The results of the interviews showed that the planting media sellers welcomed the innovations that had been made. Planting media sellers expressed readiness to contribute to the sale of planting media by providing planting media storage services. This service is expected to expand the introduction of suitable planting media.

Sales accumulation is done by calculating the selling price of planting media production produced from organic waste (sesai). The calculation can be seen in Table 2. The cost of production per piece of planting media is IDR.11,926. This is based on the total production cost of IDR.1,300,000, which is then divided by the output of

109 planting media. The correct COGS calculation will help make better decisions regarding selling prices, production, and marketing (Wibowo, 2016).

Table 2. Potential distribution

Description	Total Cost (IDR)
Raw material cost	100.000
Labor cost	200.000
Variable overhead cost	1.000.000
Fixed overhead cost	0
Total cost of production (HPP)	1.300.000
Desired profit (e.g., 25% x HPP)	2.981
Total selling price	1.625.000
Total production yield	109 planting media
HPP production selling price per piece of planting	15.000 / planting media

Table 2 reflects all the expenses required to produce planting media, including raw materials and labor. From the table, a profit of IDR.2,981 per unit of planting media was obtained. The total selling price for planting media products per unit is IDR.15,000. Planting media from organic waste (sesai) supports the sustainability of coastal areas by utilizing organic waste. Sesai planting media products are expected to increase market attractiveness and help people prefer environmentally friendly products.

CONCLUSION

Utilizing the abundant potential of sesai organic waste, the coastal area of Buruk Bakul Village has the opportunity to increase utilization into environmentally friendly planting media with the availability of a total volume of sesai of 39,029.5 m³ with an average volume per location of 2,295.8 m³ of raw materials spread across the coastal area. Analysis of NPK content in sesai is good and can be used as a planting medium. This can encourage developing and utilizing sesai waste in various products, including planting media.

Social perceptions show community initiative; survey results show that 64% of respondents responded well. Economic perception by utilizing sesai as a planting medium can provide a profit of IDR.3,000 per unit, opening up opportunities for increased income for the people of Buruk Bakul Village.

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