



Mangrove Optimization to Improve Economic Growth of Coastal Communities

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ABSTRACT

Mangrove leaves contain high antioxidants that can be used as drinks such as tea. This research aims to make de.ruju tea, which is a tea that is produced simply. The research methods include organoleptic tests to determine the level of public liking for de.ruju tea. besides that, SWOT analysis to determine the strengths, weaknesses, opportunities and threats to determine the opportunity value of de.ruju products. The results showed that processing mangrove leaf raw materials into functional food as tea improved the economic level of the Tambakrejo Village community by increasing profits by 112%. The SWOT analysis results show that de.ruju products have an IFAS matrix value of 2.7. This shows that the product situation is very good and has advantages higher than weaknesses and an EFAS matrix of 2 so that the product is able to take advantage of opportunities to avoid threats from the environment.

Keyword: Mangrove Optimization, Economic Growth, Coastal Communities



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1. Introduction

Indonesia is a country with abundant natural resources. One of them is the natural resources of mangrove forests. About 23% of the world's mangrove forest ecosystems are located in Indonesia ([Sofian and Marsoedi, 2012](#)). Mangrove forests are the green belt of coastal areas that have ecological and socio-economic functions ([Alimuna and Murti, 2019](#)). This makes mangrove forests a great socio-economic potential to be utilized by Indonesian coastal communities. Generally, mangroves are used for firewood, building materials and places to get food in traditional ways according to the habits of local communities. ([Paramita, 2012](#)). According to [Jumaedi \(2016\)](#), so far the majority of people utilize mangroves as firewood and charcoal, causing mangrove damage in nature. This is due to the lack of public understanding of the benefits and potential of mangroves.

According to [Akbar \(2017\)](#), climate change greatly affects the catch of coastal communities who work as fishermen. Bad weather will cause the catch to decrease because fishing activities cannot be carried out. In fact, the fisheries sector is one of the businesses that support the economy of coastal communities. In addition to climate change, the decline in the quality of the aquatic environment due to overfishing also worsens people's income due to the decreasing number of fish catches, so it is necessary to have an alternative source of income for people affected by the decline in income, especially in pandemic conditions like today ([Liviana et al., 2020](#)).

Currently, the global economy is experiencing a slump due to the Covid-19 pandemic, and Indonesia is no exception. According to the Central Bureau of Statistics, in 2020 the economic growth rate in Indonesia has

decreased to 5.32%. This figure is inversely proportional to 2019 which was able to increase to 5.05%. The weakening of economic conditions in Indonesia is characterized by low foreign exchange rates to price fluctuations in several economic commodities. For fishermen, the covid-19 pandemic has an impact on income which is decreasing due to low market prices for catches, many economic activities are closed, the community and regional economy are decreasing but the needs are increasing. More than that, this pandemic also has a direct influence on all spheres of human life, especially in the economic and health fields ([Aryanti et al, 2021](#)).

The Covid-19 pandemic is also causing pressure on public health conditions in Indonesia. The latest data from the Ministry of Health up to March 22, 2022 has recorded more than 6.23 million confirmed Covid-19 cases with more than 155 thousand deaths. On the other hand, various health problems still haunt the state of society. One of them is obesity, which is one of the triggers for heart and blood vessel disease. According to the World Health Organization in 2015, 70% of deaths in the world were caused by non-communicable diseases (39.5 million out of 56.4 deaths). Of all the deaths from non-communicable diseases, 45% were caused by heart and blood vessel diseases, namely 17.7 million of the 39.5 million deaths. According to the Indonesian Pharmacists Association in 2020, one of the ways that can be done in dealing with Covid-19 is to exercise, maintain health protocols and also eat nutritious foods, especially foods that contain high antioxidants such as mangrove leaves.

2. Method

2.1. Literature

According to Suzana et al, ([2011](#)), the development of mangrove areas is needed to increase economic income and social conditions of the surrounding community, but it requires consideration, assessment, and good environmental analysis for the community without having to have a negative impact on the environment in this case damaging the ecosystem that already exists in the mangrove forest. Therefore, the existing environmental and ecological balance needs to be a concern in planning the development of mangrove forest areas. It is necessary to calculate the economic value of mangrove forest resources, which is an effort to see the benefits and costs of resources in a monetary form that considers the environment. The method is the willingness to pay from individuals for environmental services or resources and also the willingness to receive compensation for environmental damage that occurs. Economic valuation of mangrove ecosystems requires data that includes the structure and composition of vegetation in mangrove ecosystems.

Mangrove comes from a combination of Portuguese (Mangue) and English (Grove). According to Law No. 41/1999 and Law No. 19/2004 governing Forestry, mangroves are forest vegetation that grows on alluvial soils in coastal areas and around river mouths that are influenced by tidal currents. Mangroves also grow on coral beaches or coral reefs with thin sand or muddy beaches. Mangroves function very strategically in creating coastal ecosystems that are suitable for the life of aquatic and terrestrial organisms ([Firdaus et al, 2019](#)). The physical function of mangroves is to resist coastal abrasion, maintain the coastline and filter garbage. The ecological function of mangroves is, as spawning fish, crabs and land animals. Meanwhile, economically mangroves have a very high economic value. Not widely known by the general public, that mangrove leaves can be used as processed medicinal materials for food.

Acanthus ilicifolius has beautiful flowers that can be used as ornamental plants or ornamental plants, besides being used as bioindicators of pollution. The abundance of jeruju plants in mangrove vegetation does not reduce their potential to be utilized by the community as medicinal plants and producers of foodstuffs such as crackers and tea drinks. The fruit of *A. ilicifolius* mashed in water can be used to stop bleeding from wounds and also to treat wounds caused by snake bites. The leaves are used as a liniment to relieve pain and heal wounds caused by poisoned arrows. Leaves boiled with cinnamon bark (*Cinna- momum burmani*) can be drunk to cure flatulence. Other *Acanthus* species can also be used medicinally, but must be mixed with *Ceriops* to be more effective. All *Acanthus* species are not edible, as they are poisonous. Cough medicine can be made by boiling *A. ebracteatus* seeds together with star fruit flowers, sugar and cinnamon. Swelling of the body can be cured by pounding the seeds and infusing them, or by drinking the roasted seed plant. The juice from the leaves is also effective as a hair preservative ([Johannes and Sjafaraenan, 2017](#)).

According to Tanti et al, ([2021](#)), *Bruguiera* is a shrub or small tree that is always green, tall (although rare) can reach 20m. The bark is buried, gray to dark brown, split and slightly swollen at the base of the tree. Knee roots can reach 30 cm in height. There are black spots on the underside of the leaves and they turn yellowish green as they age. Unit & Location: simple and opposite. Elliptical shape. The tip is tapered. Size: 5.5-13 x 2-4.5cm Flowers clustered at the end of the cluster (cluster length: 2cm). According to Paramita ([2012](#)), Utilization of

mangrove species as food and medicine, by local communities is still done traditionally. Biak tribal community is one of the local communities located in the Papua region that utilizes mangrove forests to meet the needs of daily life. Mangrove forests can directly provide these needs, one of which is as a source of carbohydrates. By the Biak tribe, the fruit of lindur (*Bruguiera gymnorrhiza* (L) Lamk) can be used as a food ingredient that has carbohydrate content obtained by extracting its patinya content. The diameter of the twig is 0.2- 0.4 cm. Leaves: petiole length 1-2 cm, distance between petioles 2-7 cm, leaf layout crosswise, leaf shape, 4.5-9.5 cm long, 2-5 cm wide, rounded tip, menirus base, smooth upper surface, rough lower surface, warty edges, pinnate leaf repetition, number of leaf bone branches 38-42, degree of inclination of leaf bone branches 50 °-55 °. Flower: compound flower type, number of petals 4, petal color green. Hypocotyl: Serrated surface, 0.3-0.5 cm in diameter, 13-15.5 cm long.

2.2. Methodological Approach

The organoleptic test carried out is a hedonic test to determine the level of preference for de.ruju products. This test is carried out to determine product quality and whether de.ruju products have high market demand or vice versa. The organoleptic assessment used 30 panelists consisting of 10 trained panelists, 10 semi trained panelists and 10 untrained panelists. Panelists will be given de.ruju samples and then fill out a questionnaire. The questionnaire assessment uses a Likert scale. The test is carried out using several variables which include appearance, texture, aroma, taste and color.

The data in this study serves as an organoleptic test, which is to find out how the panelists like de.ruju products. The data collection was carried out using observation, documentation, interviews and online questionnaire distribution techniques. The interview method was carried out by asking questions to panelists directly to obtain qualitative data in the form of opinions about their liking for de.ruju tea. The documentation method is used as a complement to the observation and interview methods in order to obtain data that has high credibility ([Mulyadi, 2011](#)). Observation, documentation and interview activities were carried out while still observing applicable health protocols. Data obtained from observations, documentation and interviews are qualitative data. Meanwhile, the data from the online questionnaire serves as quantitative data.

Data processing in this study was carried out in a qualitative and quantitative way. Qualitative data processing includes data obtained from observations, interviews or field notes. Qualitative data that has been obtained is then processed by sorting or categorizing the data to facilitate the analysis process. Furthermore, the data is presented in the form of statements and finally conclusions are drawn. The analysis carried out in this study is SWOT analysis (Strength, Weakness, Opportunities, and Threats), where the data is collected from distributing questionnaires. The calculation of strength and weakness values serves as the basis for knowing the strength of the product. While the calculation of the value of opportunities and threats to determine the value of opportunities from de.ruju products. The data processing was carried out using Microsoft Excel software. Quantitative data processing includes scores from filling out online questionnaires on the level of panelists' liking for de.ruju tea products. Data presentation is carried out in the form of tables and bar charts ([Nasution, 2017](#)).

3. Result and Discussion

De.ruju "De Authentic Taste of Mangrove", a unique, authentic, high-precision and healthy tea product because it is processed from selected leaves of *Acanthus ilicifolius*, *Ceriops tagal* and *Bruguiera gymnorrhiza* which are efficacious to reduce fat absorption in the body. Mangrove tea itself is an herbal tea based on local wisdom and culture of coastal communities that is still being used and developed today. This will create a good brand image, so that it can answer the problem due to the effects of mangrove utilization while maintaining its sustainability and environmentally friendly. In addition, 5% of De.Ruju's sales will be allocated for mangrove conservation. Because in addition to enjoying mangrove products, we also need to preserve the existence of mangroves so that they do not become extinct. By setting aside the proceeds from sales as a mangrove conservation sustainability fund, it means that we also provide more economic value to coastal communities.

The organoleptic test carried out is a hedonic test to determine the level of preference for de.ruju products. This test is carried out to determine the quality of the product and whether de.ruju products have high market demand or vice versa. This organoleptic assessment was carried out by 25 panelists. Panelists will be given a sample of de.ruju and then fill out a questionnaire with the parameters tested in the rating test including appearance, texture, aroma, taste and color. The assessment score used in the formulation has 4 levels, namely 4 = very like, 3 = like, 2 = less like, and 1 = dislike. The highest recapitulation result was identified as the best

result. Product organoleptic tests on de.ruju which have been carried out on campus and off campus with a total of 30 panelists consisting of 10 trained panelists, 10 semi trained panelists and 10 untrained panelists. The average results of the assessment of color, taste, texture, aroma, and appearance attributes were 3.1; 3.4; 3.06667; 3.16667 and 2.6, respectively. This indicates that de.ruju products are suitable for consumption and commercialization.

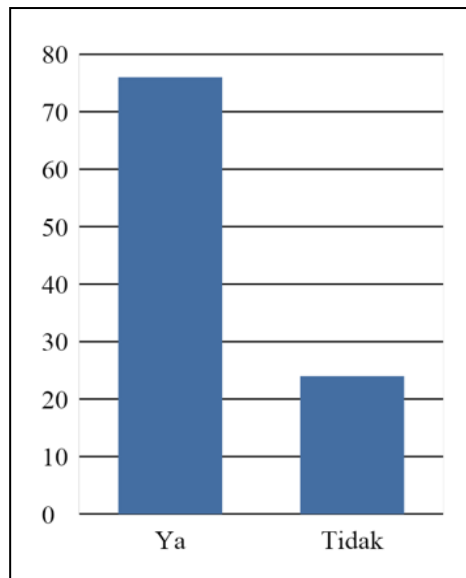


Figure 1. percentage of panelist interest

IFAS is Internal Factors Analysis Summary, which is an analytical conclusion of various internal factors that affect the sustainability of the company. From the results of data processing through the questionnaire, the total strength score is 3.97640449438202 and the total weakness value is 1.2032 so that the x-axis value is 2.7732 which is rounded to 3, according to the IFAS matrix score table, the value of 3 means that the internal situation of the organization or company is very good and has higher advantages than weaknesses.

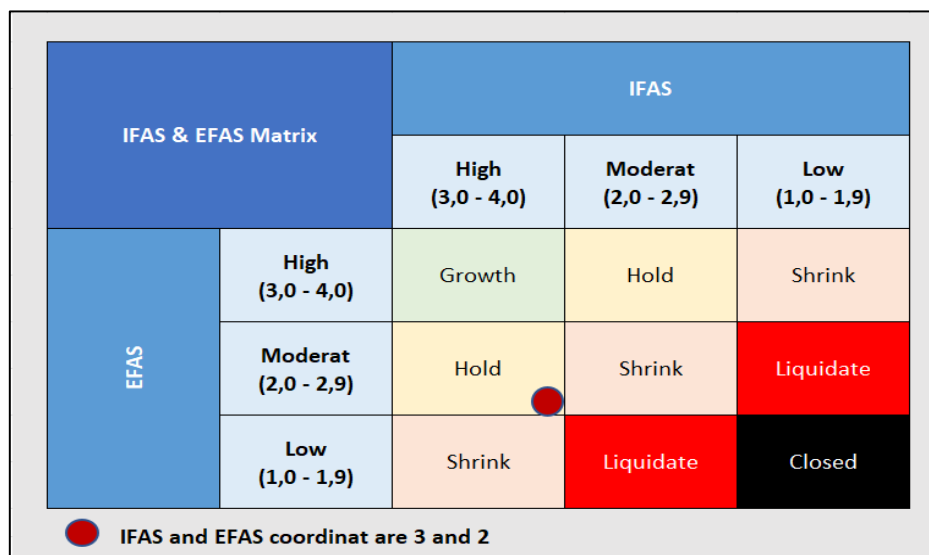


Figure 2. IFAS and EFAS matrix

EFAS is External Factors Analysis Summary, which is an analytical conclusion from various external factors that affect the sustainability of the company. From the results of data processing through the questionnaire, the total opportunity score is 3.0164 and the total threat value is 0.9388 so that the y-axis value is 2.0776 which is rounded to 2, according to the EFAS matrix score table, value 2 means that the organization or company is able to take advantage of opportunities to avoid threats from the environment.

4. Conclusion

The production of de.ruju mangrove tea starts from taking raw materials from the leaves of *Acanthus ilicifolius*, *Ceriops tagal* and *Bruguiera gymnorrhiza* then preparing the tools then taking mangrove leaves, removing leaf thorns, washing, drying, partially fermented, drying, mashing then packaging and selling de.ruju products. Processing mangrove leaf raw materials into functional food as tea improves the economic level of the Tambakrejo Village community by increasing profits by 112%. From the Organoleptic test results, it is concluded that de ruju products have taste, texture, appearance are in the good phase and are suitable for marketing. From the results of the SWOT analysis, it is found that de.ruju products have an IFAS matrix value of 3, which means that the product situation is very good and has higher advantages than weaknesses and an EFAS matrix of 2, which means that the product is able to take advantage of opportunities to avoid threats from the environment.

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