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Multi Aspect Model Of Sustainable Edu-Tourism Development Based On Kelulut Honey Bee Cultivation (Trigona Spp) In Kubu Raya Regency-West Kalimantan

Hamzah [1]; Marhamah [2]; Syarif Muhammad Syaifuddin [3]
[1,2,3] Study Program of Management Faculty Of Economic Universitas Nahdlatul Ulama Indonesia
Email: [1] hamazahtawilht@gmail.com ;[2] umimarhamah6@gmail.com ;[3] syaiful@gmail.com

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ABSTRACT

The Multi Aspect Sustainability Analysis Model is employed as an analytical framework to evaluate the sustainability of kelulut honeybee cultivation in the context of Edu-Tourism development in Kubu Raya Regency. This comprehensive analysis encompasses several key aspects, including educational concepts, ecological considerations, economic implications, and strategic frameworks for promotion and marketing. The findings from this study indicate that under current conditions, kelulut honeybee cultivation is unsustainable for Edu-Tourism development. However, in Scenario 1, marked by a sustainable status, it emerges as the most favorable alternative for the progressive development of Edu-Tourism in the region. It is crucial to recognize that the development of Edu-Tourism based on kelulut honeybee cultivation requires prioritizing several key aspects: education (1), ecology (2), economy (3), and promotional strategies (4), to significantly enhance sustainability values in the Edu-Tourism development process.

INTRODUCTION

Tourism in Indonesia is one of the important supporting sectors of the economy. The field of tourism is a sector that can continue to grow every year, because of course there are developments that continue. Tourism can be in the form of objects that can attract people to see existing destinations, such as beaches or other artificial tours (Rifanjani et al., 2022). Honeybee cultivation eco-tourism in Indonesia has experienced significant development with an emphasis on the integration of sustainable ecological and economic aspects. Research shows that honeybee farming has extensive ecotourism potential to be an attraction for tourists, which not only increases local income potential but also supports environmental sustainability.

Kelulut (Trigona spp) honeybee farming has significant economic and ecological potential in Indonesia. However, increased awareness of the importance of environmental conservation and economic sustainability has driven interest in developing edu-tourism based on honeybee cultivation, especially the kelulut honeybee species “Trigona spp” (Aisyah Amini et al., 2022). By integrating aspects of education, tourism, and kelulut honeybee cultivation, this development can provide economic benefits to local communities while increasing understanding of the importance of nature conservation.

A multi-aspect analysis of the development of kelulut honeybee cultivation edu-tourism, including at the research site, aims to strengthen education and local tourism by utilizing the uniqueness of kelulut honeybee cultivation as the main attraction.

Kubu Raya Regency is a district that still has a lot of natural forests or rubber forests that have the potential to develop kelulut honeybee cultivation, the area around the forest has the potential to be used as a kelulut garden because of the availability of abundant bee food from fruiting and flowering plants in the forest (Wahyuningsih et al., 2020). Kelulut bee cultivation is very potential to be developed by rural communities as a source of additional incomeriyan (Ariyanto et al., 2021). With the potential for Edu-Tourism development based on the description above, there has been no development of an edu-tourism model based on kelulut honeybee cultivation in Kubu Raya Regency.

LITERATURE REVIEW

The comprehensive research known as Multi-aspect Sustainability Analysis is used across a wide array of disciplines, encompassing social sciences, economic theory, environmental studies, development planning, and various other interdisciplinary domains that require a multifaceted approach to sustainability. At the core of this analytical framework is the Rapid Assessment Process, which differentiates itself by utilizing respondents that are not selected from conventional sampling methods; rather, engaging key stakeholders who are subjected to thorough interviews or participate in focus group discussions, thus ensuring that their insights and perspectives are explored and understood in depth (Firmansyah, 2022).

This comprehensive eco-tourism is designed not only to generate substantial economic benefits through the commercialization of honey and its suite of processed products, but also to significantly broaden the spectrum of income-generating avenues by effectively combining and linking the agricultural domain with the tourism industry, thus fostering a more resilient and diversified economic framework within the community (Wachkoo et al., 2024).

The intricate socio-cultural dynamics that underpin the evolution and expansion of educational tourism are highly interconnected, as the various social practices and cultural characteristics that define the surrounding community can significantly impact both the allure and long-term viability of educational tourism initiatives centered around aquaculture within the agricultural sector a(Andriani, 2015; Fajri et al., 2020; Wahyuni, 2019). Such a strong aspect associated with the advancement of agricultural educational tourism not only paves the way for great opportunities that contribute to economic stability but also plays an important role in the preservation of local traditions, in addition to facilitating the exchange of knowledge and experience between visiting tourists and the indigenous communities that host them (Herawati et al., 2015).

Various aspects of promotion and marketing hold a very significant position in the development and enhancement of sustainable tourism education, as these elements contribute greatly to attracting the interest and engagement of the intended demographic, expanding market reach, and reinforcing the educational and sustainability principles that are an integral part of the experience provided by these specialized tourist destinations (Cristobal-Fransi et al., 2020; Sariguna & Kennedy, 2023). A strong and well-conceived branding strategy that emphasizes sustainability values can make Edu Tourism particularly attractive to travelers who pursue experiences that go beyond mere recreation, as they are also motivated by a deep commitment to responsible and conscientious tourism practices (Cristobal-Fransi et al., 2020; Font & McCabe, 2017).

In addition, ecological aspects significantly contribute to the advancement and improvement of educational programs related to the cultivation of kelulut honeybees, scientifically classified as Trigona species, and these encompass a wide array of interconnected

factors, including but not limited to, the promotion of environmental sustainability, the active preservation of biodiversity, and the maintenance of critical balances in various ecosystems. Moreover, the intricate relationship that exists between ecological principles and the growing field of bee tourism is characterized by several interrelated elements, which include not only specific efforts aimed at environmental preservation but also a strong framework for educating individuals about the complexities of ecosystems, in addition to contributions that advocate for and implement environmentally sustainable aquaculture practices that benefit both the economy and the environment (Khalifa et al., 2021; Maggi, 2024).

METHODS

This study utilized secondary data gathered from literature reviews and reports from various institutions associated with kelulut honeybee cultivation in Kubu Raya Regency. Primary data, on the other hand, was obtained through questionnaires conducted via direct interviews with farmer groups and key stakeholders, including agency leaders and kelulut honeybee farmers. A total of five respondents were purposively selected for this research. The selection criteria included individuals whose primary profession involved kelulut honeybee cultivation, along with government representatives and experts in business and development economics.

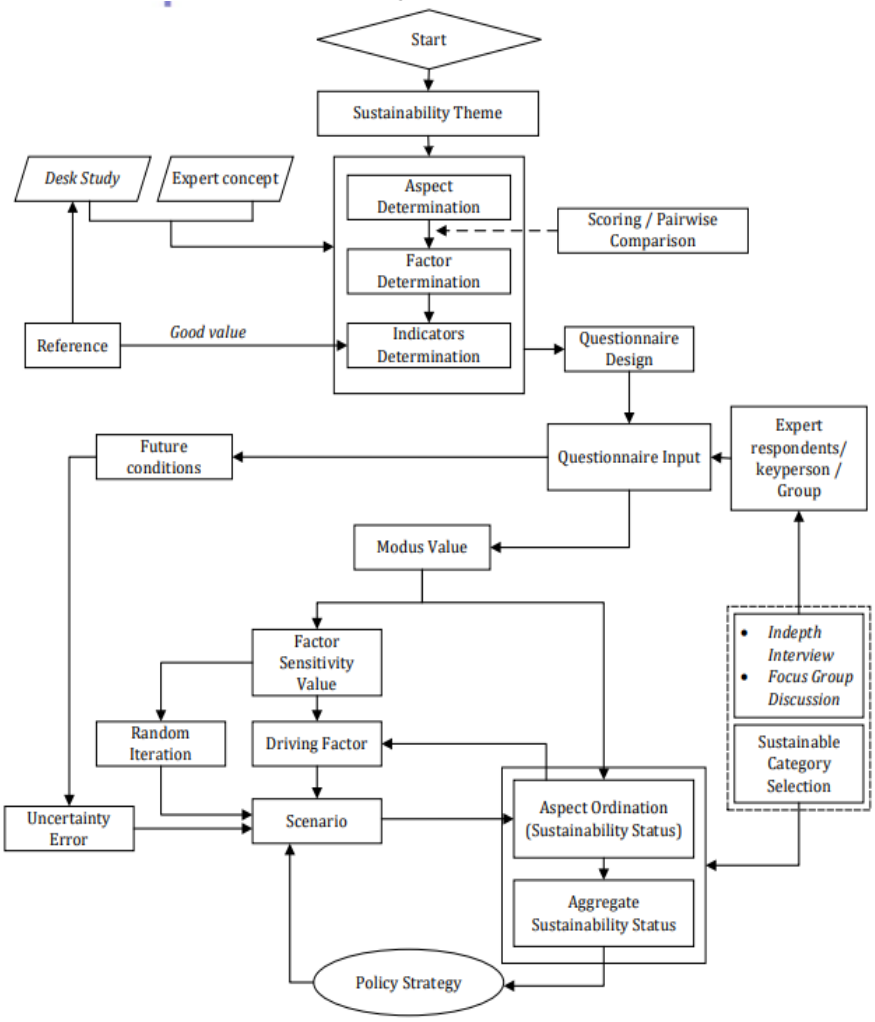
A method developed to evaluate sustainability is the multi-aspect sustainability analysis (MSA), carried out using the Exsimpro software. This software is an advancement of an earlier tool known as RAPFISH (Firmansyah, 2022). The method employs a rapid assessment principle, prioritizing the engagement of key stakeholders **(***key persons***)** rather than focusing on the sample size. Comprehensive data is collected through methods such as in-depth interviews, observations, or focus group discussions.

The application of sustainability analysis using the MSA method involves several stages, including analyzing aggregate status values, evaluating aspect status values, projecting future conditions, ordinating status values, identifying leverage factors for each aspect, estimating error uncertainty, validating through random iterations, and determining priority policy scenarios. Scenario selection in MSA sustainability analysis is based on the status values obtained. Additionally, leverage factors are utilized as a foundation for analyzing the identified scenarios. If researchers plan to perform a tiered scenario analysis, such as moderate, optimistic, and progressive scenarios, they can determine the scenarios by selecting the number of scenarios and the driving factors to be analyzed (Firmansyah, 2022).

This study utilized a multilevel scenario analysis, focusing on optimistic and idealistic scenarios. The MSA Sustainability Analysis method was employed to evaluate sustainability status values, performance indices, or metrics linked to various activities, locations, organizations, or businesses. The primary goal of this analysis is to facilitate self-assessment and gain a comprehensive understanding of current conditions and situations, enabling the development of effective strategies for future implementation (Firmansyah, 2022).

This approach is referred to as a rapid assessment method as it relies on pre-existing databases, sourced from inputs provided by experts or carefully selected respondents based on specific criteria. The process is flexible and can be revised or updated as needed when new information becomes available or when circumstances evolve.

Figure 1 Conceptual Framework Of The Multiaspect Sustainability Analysis Approach (Firmansyah, 2022)



RESULTS

The interview data were analysed using the multi-aspect sustainability analysis method using the Multiaspect Sustainability Analysis (MSA) computer software. Multiaspect Sustainability Analysis is used in various scientific fields, such as social, economic, environmental, development planning, and other multidisciplinary fields. The principle is the Rapid Appraisal Process, where respondents are not in the form of a regular sample, but key stakeholders who are interviewed in depth or through focus group discussions (Firmansyah, 2022).

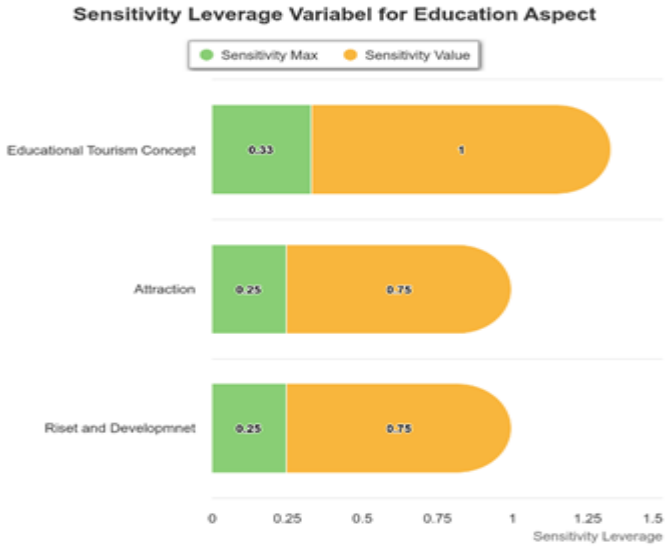
Variable Sensitivity Value Analysis

Analysis of the sensitivity value of each variable is used to select the driving factor in each aspect and also to determine the effect of variables on changes in efforts to develop edu-tourism of kelulut honey bee cultivation.

Educational Aspect

The educational component of sustainable edu-tourism development involves initiatives to enhance the knowledge, awareness, and skills of both the local community and visitors by promoting sustainability values through engaging and interactive learning activities.The following is a graph of variable sensitivity values for the Education aspect:

Figure 2 Graph of Variable Sensitivity Value for Educational Aspects



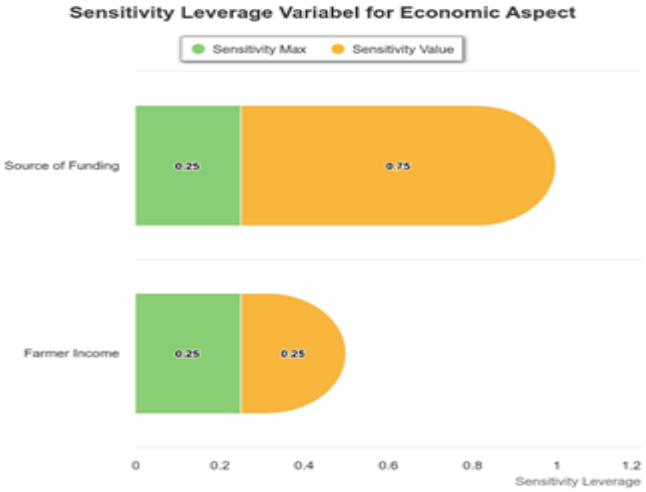
Based on the graph of the sensitivity value in the educational aspect, it is known that the value of the concept of education variable is the highest maximum sensitivity value (0.33) compared to the attraction and research and development variables. These results indicate that the concept of edu-tourism in an effort to develop edu-tourism in kelulut honey bee cultivation is one of the driving factors (driven power) in the educational aspect. In addition, the concept of edu-tourism variable also has a high sensitivity value of 1, which means that the variable needs to be changed and has a big impact if there is a change (Firmansyah, 2022).

Several other studies have also revealed that the importance of an eduwista concept or blue print that is compiled comprehensively which will later become a reference in development efforts. In addition, the existence of a comprehensive edu-tourism concept can also support other development efforts supported by an edu-tourism research and development.

Economic Aspect

The economic aspect in the development of sustainable edu-tourism based on kelulut honey bee cultivation has a significant contribution in improving the welfare of local communities. This edu-tourism programme creates economic opportunities through the sale of honey and its processed products, while expanding the variety of income sources by combining the agriculture and tourism sectors (Wachkoo et al., 2024). The following is a graph of variable sensitivity values for economic aspects.

Figure 3 Graph of Variable Sensitivity Value for Economic Aspects



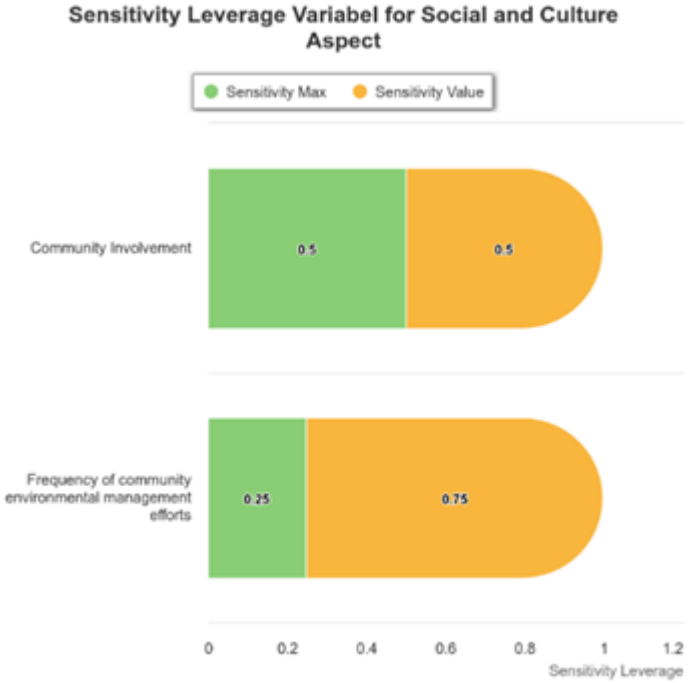
In the economic aspect, there are 2 variables in the development of Edu Tourism, including the source of funding/investment and also the income of cultivation farmers. Farmers' income is relatively not high due to high production costs, but the value of benefits is feasible to develop (Fitria Widiyanto & Yuniarno, 2015; Romi Wardoyo & Lamusa, 2016). Therefore, farmers' income affects investment capital in the development of sustainable edu-tourism (Nugroho, 2011). Based on the results of the analysis, it can be seen from the sensitivity value graph that both variables are a driving factor in the development of edu-tourism with the same maximum value. However, the funding source variable is considered to have a major influence if there is a change in the variable.

Based on the results of the analysis, it can be seen from the sensitivity value graph that the source of funding is the highest driven power compared to farmers' income to fund the development of educational tourism. The maximum value of the sensitivity of both variables is equally high, it can be interpreted that both variables have the same impact if both variables are changes.

Social and Culture Aspect

The socio-cultural relationship to the development of edu-tourism is very close, because the social and cultural elements of the surrounding community can affect the attractiveness and sustainability of cultivation-based educational tourism programmes in agriculture (Fitria Widiyanto & Yuniarno, 2015; Nugroho, 2011; Romi Wardoyo & Lamusa, 2016). Strong socio-cultural aspects with the development of agricultural edu-tourism create great opportunities for economic sustainability, preservation of traditions, and transfer of knowledge both in terms of tourists and local communities (Fajri et al., 2020). The following is a graph of variable sensitivity values for social and cultural aspects:

Figure 4 Graph of Variable Sensitivity Value for Social and Cultural Aspects



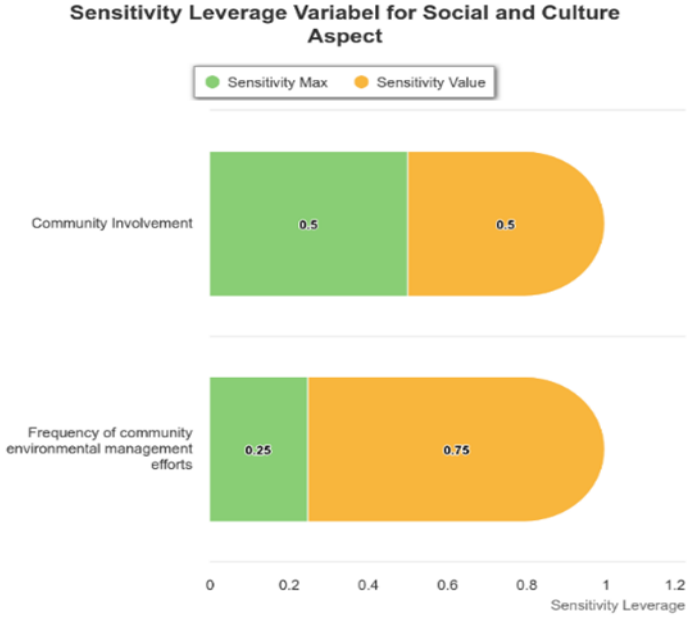
Based on the sensitivity value graph on social and cultural aspects, the variable that becomes a driving force in the development of edu-tourism is the frequency of surrounding communities in environmental management efforts. The frequency of community activities in environmental management efforts means that the community around the edu-tourism destination actively preserves the surrounding environment, so it will have an impact on the location of Kelulut honey bee cultivation in development as edu-tourism. However, the maximum sensitivity value of the frequency of the surrounding community in environmental management efforts is lower than the variable activeness/participation of community groups in the management of kelulut honey bee cultivation (maximum sensitivity value of 5.0), so changes that occur from the participation of communities groups have a major impact on eduwista development (Andriyani et al., 2015; Wahyuni, 2019). According to Keith Davis and Newstrom (1989: 232), participation is defined as the mental and emotional involvement of individuals in a group situation that stimulates them to contribute to the achievement of group goals and to share responsibility for the results. The essence of participation is active involvement, contribution and shared responsibility. Meanwhile, Isbandi (2007: 27) defines community participation as the involvement of citizens in the process of identifying problems, potentials and needs, making decisions about applicable solutions, implementing problem-solving efforts and evaluating the changes that occur in the community.

Promosian and Market Aspect

Based on the graphic image of the variable sensitivity value in the promotion and marketing aspect, the highest maximum sensitivity value and is a driving factor (driven power), namely the digitalisation of marketing education (maximum sensitivity value of 0.5). While the highest sensitivity value (1) is the number of tourism marketing partnerships so that an increase or change in these variables has a major impact or effect on the development of edu-tourism. Digital marketing allows the promotion of edu-tourism to be more efficient and able to reach a global audience at a more affordable cost than traditional marketing methods (Adeyinka-Ojo & Kamariah Abdullah, 2021; Font & McCabe, 2017; Leung et al., 2013).

The following is a graph of variable sensitivity values for the promotion and marketing aspects analysed using the Multiaspect Sustainabilty Analysis (MSA) method.

Figure 5 Graph of Variable Sensitivity Value for Promotion and Marketing Aspects

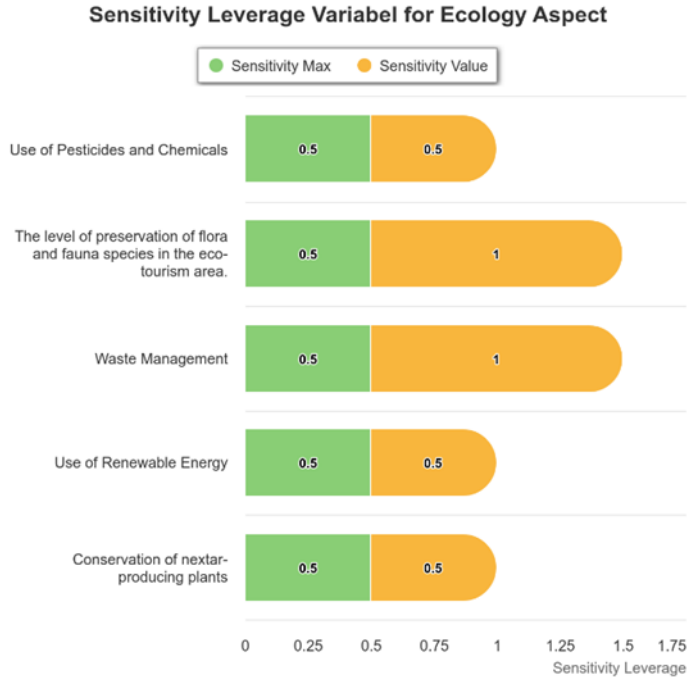


Based on the graphic image of the variable sensitivity value in the promotion and marketing aspect, the highest sensitivity value and is a driving factor (driven power), namely tourism marketing cooperation. While the highest maximum sensitivity value (0.5) is Digitalisation of Education and Marketing so that an increase or change in these variables has a major impact or effect on the development of edu-tourism. Digital marketing allows the promotion of edu-tourism to be more efficient and able to reach a global audience at a more affordable cost than traditional marketing methods (Adeyinka-Ojo & Kamariah Abdullah, 2021; Font & McCabe, 2017; Leung et al., 2013).

Ecological Aspect

Ecological aspects play an important role in the development of edu-tourism of kelulut honey bee cultivation (Trigona spp.), including aspects of environmental sustainability, preservation of biodiversity, and maintaining ecosystem balance. The relationship between ecology and the development of kelulut bee edu-tourism involves several elements, such as environmental conservation efforts, education about the ecosystem, and contribution to environmentally sound cultivation practices (Khalifa et al., 2021; Maggi, 2024). The following is a graph of variable sensitivity values for ecological aspects.

Figure 6 Graph of Variable Sensitivity Value for Ecology Aspects



Based on the results of the analysis of the sensitivity value of the variables presented in the figure above, the variables that become the driving force in ecological aspects in the development of kelulut honeybee cultivation Edu-Tourism are the management of tourist object waste and the level of preservation of flora and fauna species in the Edu Tourism area.

Sustainable tourism emphasizes reducing negative impacts on the environment. Effective waste management supports this principle by reducing pollution and reducing ecological impacts at tourist sites (Gosling & Arnell, 2016). Tourism areas that are clean of litter and implement environmentally friendly practices tend to attract tourists who care about the environment, thus adding to the attractiveness of the destination (Gosling & Arnell, 2016).

Kelulut bees act as effective pollinators for a variety of wild and cultivated plants, with kelulut bees pollinating plants around tourist attractions, thereby increasing the productivity of agricultural products and supporting the preservation of plants in nature (Khalik et al., 2022;

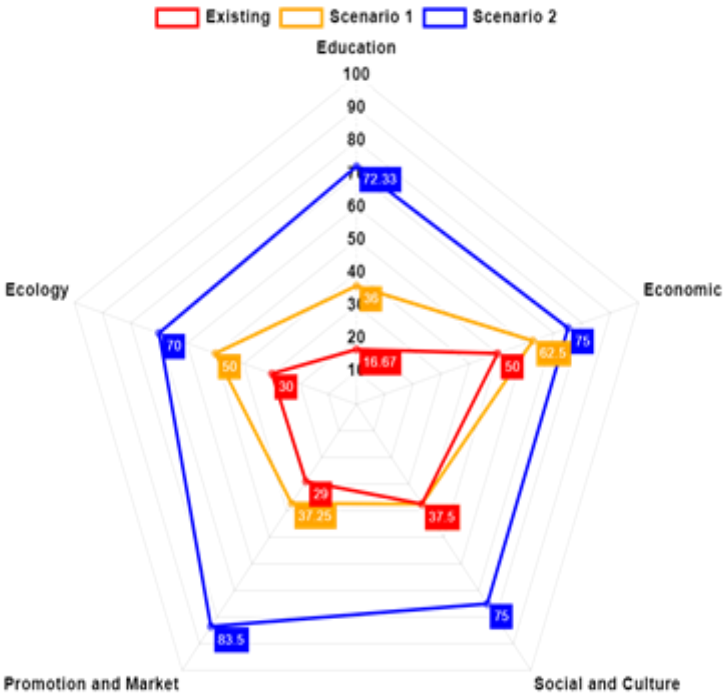
Maggi, 2024; Osterman et al., 2021). Thus, kelulut bee farming contributes to environmental sustainability and food security through optimised pollination.

DISCUSSION

Multi Aspect Sustainability Model Analysis is an approach used to assess the sustainability of a system or policy by taking into account various dimensions or factors that play a role in sustainability (Sharpley, 2000).

The sustainability index associated with kelulut honeybee cultivation in the context of sustainable edu-tourism development is illustrated through a pie chart, as presented in Figure 1. This visual representation reveals that some dimensions have an unsustainable status category, denoted by the red line. Improvements in all dimensions are essential to increase sustainability scores through improvement scenarios. The orange line signifies the sustainable scenario (scenario optimist) for each dimension, while the blue line symbolises the highly sustainable scenario (scenario idealistic) applicable to each dimension. In this framework, the two most critical factors that impact each dimension, where sustainability is evaluated, have been identified as previously articulated.

Figure 7 Circle Diagram of Sustainability Index of Edu-Tourism Development based on Kelulut Honeybee Cultivation in Kubu Raya Regency.



The value of sustainability in the existing conditions in aggregate is 32.63 with an unsustainable category where the highest aspect is the social and cultural aspect with an index value of 37.5 Lever factors are carried out in scenario simulations by taking as many as 2 lever factors in each aspect so that the value of sustainability status in scenario 1 in aggregate increases to 44.65 or falls into the sustainable category.

In scenario 2, the leverage factor simulation was carried out by adding 2 factors to each aspect so that the aggregate sustainability value increased to 75.17 or fell into the highly sustainable category. In detail, the changes in status values between scenarios can be seen in Table 1.

Table 1 Status and Sustainability Value Existing Condition and Scenario

Aspect	Existing	Scenario Optimist	Scenario 2 Idealist
Education	16,67	36	72,33
Economic	50	62,5	75
Social and Culture	37,5	37,5	75
Promotion and Market	29	37,25	83,5
Ecology	30	50	70
Total Average	**32,63**	**44,65**	**75,17**
Status Sustainability	**Unsustainable**	**Sustainable**	**Very Sustainaible**

Table 2 Sustainability Scenario Value

Aspect	ΔS1S	ΔS2S	ΔS2S/ΔS1S
Education	19,33	55,66	2,88
Economic	12,5	25	2
Social and Culture	0	37,5	0
Promotion and Market	8,25	54,5	6,61
Ecology	20	40	2
Average Scenario Priority			**2,7**

Table 2 shows the results of the scenario selection that illustrates the ease of improving the driving factors in each aspect. Scenario selection is based on a comparison between scenario 1 and existing conditions, and scenario 2 and existing conditions, where scenario 2 must have a value at least twice that of scenario 1. This indicates that scenario 2 is easier to change the driving factors to improve its status. Based on the simulation results, the comparison value between scenario 2 and scenario 1 is 2.74. Therefore, scenario 1 is considered a policy that is more sensitive to change than scenario 2.

CONCLUSION

The overarching objective of this research endeavor was to meticulously ascertain the most favorable scenario for the advancement and enhancement of Edu Tourism, particularly in relation to the practice of kelulut honeybee cultivation in Kubu Raya Regency. The findings derived from this comprehensive investigation revealed, through the lens of multi-dimensional sustainability analysis, that the first scenario, characterized by a commendable sustainability status, emerged as the optimal choice for the development of Edu Tourism; furthermore, it is imperative to prioritize several critical aspects that require improvement, which include educational components (1), ecological considerations (2), economic factors (3), and promotional and market-oriented strategies (4). Considering these results, it becomes clear that concerted efforts towards the improvement of these prioritized aspects will not only enhance the viability of Edu Tourism but will also contribute significantly to the sustainable development of the region's unique kelulut honeybee farming practices.

SUGGESTION

The development of kelulut Edu Tourism in Kubu Raya Regency is sustainable, there is a need to strengthen the concept of comprehensive education and ecological conservation efforts by maintaining the natural habitat of bees and applying environmentally friendly cultivation methods. In addition, improving economic sustainability can be done by developing value-added

processed products and providing access to funding for smallholders. Effective promotional strategies, such as digital marketing and collaboration with travel agents, need to be optimised to expand tourism outreach. Inter-stakeholder cooperation, including government, academia, local communities and the private sector, is essential to ensure targeted and sustainable programme implementation. Through these steps, Edu Tourism kelulut is expected to develop optimally, provide economic benefits, preserve the environment, and empower local communities.

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