

Cultural Keystone Species: New Approach To Developing Eco-Cultural Tourism In Kerinci Seblat National Park

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Abstract:

Background: Indigenous people rely primarily on natural resources such as animal and plant species for their living needs. Species that play a significant role in culture are known as Cultural Keystone Species (CKS). CKS can be used to develop tourism so that its existence can encourage community participation in biodiversity conservation efforts. The objectives of this study are to identify the perceptions and preferences of indigenous peoples in using CKS for tourism development and to determine CKS as a tourism product.

Materials and Methods: The research methodology was conducted through field observation, participatory mapping, literature and nonprobability sampling interviews with 90 respondents and eight informants representing three hamlets in the village of Lempur Mudik using ADO-ODTWA guidelines have been adapted and modified. The interview was conducted using questionnaire instrument containing 8 statement for perceptions and 4 questions for preference about using CKS for tourism.

Results: The perception indicates that most of the community members (95.6%) agreed to participating in tourism development. The Cultural Keystone Species (CKS) of Lekuk 50 Tumbi consist of eight flora and three fauna, among which Payo Rice (*Oryza sativa var-glutinosa*) and Buffalo (*Bubalus bubalis*) obtained the highest assessment scores. The evaluation of CKS as tourism products, based on the assessment of ADO-ODTWA, considering elements of tourist attractions, accessibility, and image, positions the *Nepenthes ampullaria* Jack as CKS with a highest-score value (high potential) for development as a tourism product. Meanwhile, based on community preferences, *Nepenthes ampullaria* Jack and the Mahseer fish (*Tor douronensis*) are identified as the most potentially CKS for tourism product development.

Conclusion: The results showed that most people agreed to participate in tourism development. *Nepenthes ampullaria* Jack has CKS with the highest score (very potential) to developed as a tourism product based on assessment and indigenous people's preference.

Key Word: Conservation, Indigenous People, Lekuk 50 Tumbi

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I. Introduction

Indigenous peoples exhibit a significant dependency on forests and their ecosystems [5], marked by the utilization of species within a culture known as Cultural Keystone Species (CKS) [19]. The greater number of species that hold significant value within indigenous cultural contexts, the higher its level of biodiversity in a region [14]. This is demonstrated by their ability to protect nearly 80 percent of the world's biodiversity, despite comprising only five percent of its population [6]. Their proximity to biologically diverse areas can be utilized as conservation efforts [10], one of them is through tourism [25].

Tourism that emphasizes ecological and cultural aspects can create captivating experiences for tourists, known as eco-cultural tourism [26]. If indigenous peoples manage eco-cultural tourism, the outcomes will be superior in ecology, economy, and culture [4; 23; 9; 11]. However, at present, indigenous peoples in Indonesia are precisely synonymous with poverty, including those around the Kerinci Seblat National Park [24]. This is attributed to the community's suboptimal engagement, whereas indigenous people's involvement in national park tourism should also yield positive economic impacts [13] in order to enhance well-being [1; 2]. The emergence of a novel approach involving the utilization of CKS in the development of eco-cultural tourism represents a strategic measure in safeguarding cultural heritage, while simultaneously contributing to environmental sustainability and enhancing revenue generation within the tourism sector.

Tourism development is also driven by public perception and preferences [21]. The perception reflects the extent of societal support provided for tourism development [16]. Meanwhile, preferences constitute a propensity to opt for something more favored, providing input in tourism development [15]. Hence, this article

addresses the following inquiries: 1) How indigenous people perceive the use of CKS to support tourism development?; 2) Which CKS elements can be cultivated as tourism products?; 3) What are the societal preferences in harnessing CKS for eco-cultural tourism purposes?

II. Material And Methods

This research was carried out in Lempur Mudik Village in the Gunung Raya District of Kerinci Regency, Jambi Province, specifically in the customary area of Lekuk 50 Tumbi and the Kerinci Seblat National Park (KSNP) from March to April 2023. Lempur Mudik Village was chosen because it is part of the Lekuk 50 Tumbi customary area, the oldest of the other 12 villages. It has many tourist attractions that can be developed and is a buffer village of KSNP, which indigenous people are presumed to use CKS more in the national park area.

Tools and materials: The tools that will be used in this study are field notebooks, voice recorders (recorders), cameras, avenu maps and laptops to process data. The instruments used questionnaires and interview guide.

Data collection: The informant in this study had the criteria of someone with knowledge about using species in culture. Depati Agung, the traditional leader of the Lekuk 50 Tumbi community, was chosen as the first informant. Furthermore, the determination of informants using the snowball method so that eight other informants were obtained. Meanwhile, respondents in this study have criteria for the people of Lempur Mudik Village with a minimum age of 17 years, and there is no maximum limit. The number of respondents was 30 representing each hamlet, so the total number of respondents amounted to 90 people. The determination of village respondents is due to whether there are differences in the influence of perceptions and preferences among the community, as stated by Dumaz and Diyarbakirliohlu [7] that the environmental situation will affect community perception. Men and women have an equally important role in Kerinci society, so their knowledge related to CKS is assumed to be the same. The Selection of the respondents themselves used a *convenience sampling* technique. This method was adopted based on accessibility, comfort, proximity, and the relationship between respondents and the researcher [27]. This research has also obtained ethical clearance from the research ethics committee involving human subjects at IPB (739/IT3.KEPMSM-IPB/SK/2022).

Data were collected: 1) In-depth interviews were conducted with informants to obtain data related to CKS (intensity, frequency, and extent of utilization; utilization in the field of terms, dance, songs, and symbols; persistence; utilization in traditional ceremonies, position and the level of uniqueness, economic empowerment or commercial value.) as well as customary rules while interviews with respondents used questionnaire instruments to obtain data on community characteristics (gender, age group based on the Ministry of Health of the Republic of Indonesia 2009, recent education, source of income, marital status and amount of income), perceptions, and preferences using ADO-ODTWA guidelines have been adapted and modified; 2) Field observations encompassed active participation by cohabitating with the community in question and engaging in their daily activities, involving the documentation of species utilization both directly and indirectly; 3) Participatory mapping involves informants and respondents to find out the location of CKS and tracking to determine the distance and road conditions; then coordinates are carried out using GPS at the location of the CKS; and 4) literature review was employed to compile data on the utilization of CKS in arts, customary proverbs, and cultural rituals from journals, books, oral traditions, and ancient manuscripts.

Data analysis: This study used quantitative methods with frequency analysis and cross-tabulation in SPSS applications. Frequent analysis and cross-tabulation employed the SPSS application to clarify community perceptions. Frequency analysis describes the percentage of community perception associated with using CKS to support tourism development. Cross-tabulation is used to establish the relationship between perceptions and characteristics of the respondents. The importance of the perceived relationship of respondents is a function of their chi-square values and confidence intervals. The chi-square value <0.05 signifies a significant effect, whereas the *chi-square* value <0.01 signifies a very significant effect. A 95% confidence interval was used for 95% of the samples collected to contain the original parameter values.

The analysis of CKS is conducted through a quantitative approach employing scoring based on identification criteria, referencing the modified framework of Garibaldi and Turner [10], namely the Index of the Identified Cultural Influence of Cultural Keystone Species. A species is designated as a CKS if the total score equals or exceeds 12. The rationale for this threshold lies in surpassing more than half of the cumulative total score, which amounts to 18. In order to as certain CKS that can be designated for tourism products, the CKS will be evaluated based on aspects of attraction, accessibility, and image, drawing upon the concept of tourism products as outlined by Midleton *et al.* [17], utilizing the guidelines of the Analysis of Operational Areas-Object and Natural Tourism Attraction (ADO-ODTWA) from the Directorate General of PHKA in 2003 [8], which have been adapted and modified. Modifications were implemented on the sub-elements to align them with the CKS conditions as the assessed tourist attraction. The weight values for each criterion were determined based on the assessment guidelines of ADO-ODTWA, along with modifications where the total assessment outcomes of each

criterion were classified into three categories: less potential for CKS with low scores (315-620), potential for CKS with moderate scores (621-925), and highly potential for CKS with high scores (926-1,230). CKS designated as tourism products attain moderate and high scores within the potential and highly potential classifications.

III. Result and Discussion

Community Perception of Cultural Keystone Species (CKS) for Tourism Development

Perception is influenced by the characteristics of respondents. The results showed that The proportion of female respondents is higher (63.3%) than to males (36.7%). This outcome also signifies that women within the Lekuk 50 Tumbi community are receptive to new information and innovations within their village. Respondents within the age range of 26 to 45 years old constitute the majority at 45.6%, indicating that a significant portion of the productive-age population resides in the village, which is advantageous for the utilization of tourism. Similarly, concerning the characteristic of respondents based on occupation, most are farmers (62.2%), whose lives are closely intertwined with nature. Farmers interact directly with the utilization of plants and animals within their culture.

Most respondents' highest level of education is Senior High School (65.6%) and Bachelor's degree holders (22.2%). A higher level of education indicates the readiness of the community to embrace innovations. Respondent characteristics based on marital status reveal that a significant portion is married (66.7%), with the highest monthly income range being between 2.5 to 3.5 million Indonesian Rupiahs (IDR) (47.8%). This relatively high monthly income is attributed to multiple sources of livelihood. The community engages in farming while supplementing their income through secondary occupations such as trading commodities like coffee, cinnamon, and rice. Conversely, individuals earning less than 1.5 million IDR rely solely on a single job for income.

The research findings indicate that most of the community agrees (51,1%) and strongly agree (44,4%) to participate in tourism development, as stated in Statement 1 (Table 1). The characteristics influencing perceptions regarding participation in tourism development are age group and highest level of education. The age group most in agreement, including both 'agree' and 'strongly agree' responses, is the 26-45 age group (adults). The 26-45 age group is considered productive and plays a significant role in preserving traditional knowledge to be passed down to the next generation. Their knowledge related to CKS and their involvement in tourism development plays a crucial role in preserving the sustainability of CKS. On the other hand, the group with a high school level of education provided the highest number of 'agree' and 'strongly agree' responses (65.5%). Education level does not solely indicate an individual's intelligence but rather the ease of accepting innovation and knowledge. Higher education would facilitate the community's acceptance of tourism development and make them more receptive to education.

Table 1 Public Perceptions of Cultural Keystone Species (CKS) Utilization in Tourism Development

No	Statements	%				Influential Characteristics	Chi-square Marks
		SA	A	DA	SDA		
1	Agree to participate in the advancement of tourism development	44,4	51,1	4,4	0	AG EL	0,00 0,00
2	CKS plants are utilized for the advancement of tourism	45,6	54,4	0	0	IS	0,03
3	CKS animals holds the potential for the advancement of tourism development	24,4	71,1	3,3	1,1	-	-
4	The development of tourism will have a positive impact on species conservation	23,3	74,4	2,2	0	GD IS	0,01 0,03
5	The utilization of CKS flora will have a positive impact on the community's economy	41,1	58,9	0	0	GD EL MS IS	0,04 0,01 0,02 0,01
6	The utilization of CKS animals will yield favorable impacts on the community's economy.	21,1	78,9	0	0	GD	0,00
7	The empowerment of CKS plants will have a favorable impact on culture	12,2	87,8	0	0	GD MS	0,00 0,03
8	The empowerment of CKS animals will yield positive impacts on culture	7,8	92,2	0	0	GD IS	0,47 0,02

Description: SA (Strongly Agree), A (Agree), DA (Disagree), SDA (Strongly Disagree), GD (Gender), PT (Educational Level),AG (Age Group), IS (Income Source), MS (Marital Status), MI (Monthly Income), RS (Residence).

Based on Table 1 in the second statement, income sources influence respondents' perceptions. The respondents who predominantly agree the most are those engaged in farming occupations. It can be attributed to farmers direct interaction with the environment. Most of the community cultivates crops such as cinnamon, coffee, and rice, where the harvest can only be enjoyed slowly. It makes them suitable agricultural commodities for

tourism development due to their longevity. It aligns with Hermawan's study [12], which acknowledges that the community recognizes the positive contribution of tourism to augmenting income alongside agricultural activities. Meanwhile, in the third statement, no discernible characteristics have an impact. This demonstrates the community's hesitation in utilizing CKS for tourism development. The buffalo, Mahseer fish, and tiger are three species considered CKS within the Lekuk 50 Tumbi community. The community perceives that the Mahseer fish and buffalo could still be developed for tourism, but the tiger cannot be directly promoted as a tourism asset, primarily due to safety concerns.

The perception regarding environmental impacts in statement 4 demonstrates that the level of positive perception within the community towards species conservation is quite substantial. Respondents engaged in agricultural occupations indicated more agreement than those in other professions. The community's daily reliance on agricultural pursuits, which extensively utilize various species, influences this trend. The populace is firmly committed to preserving pivotal species within their culture [22], driven by their adherence to customary norms.

Gender is the most dominant characteristic and influences perceptions regarding environmental impacts (Statement 4), economic effects (Statements 5 and 6), and cultural influences (Statements 7 and 8). It is because female respondents are more engaged in using plants and animals that can have implications for the environment, economy, and culture, including culinary utilization. Rice, pitcher plants, coconuts, water buffaloes, Mahseer fish, are among the types of biodiversity resources that are extensively utilized as culinary elements in cultural activities such as weddings and communal feasts (*kenduri sko*) [22]. The environmental context, in the form of community activities, constitutes one of the factors influencing the public's perception of the utilization of CKS for tourism development. Communities directly engaged in the utilization of CKS in their daily lives possess a positive perception of its development for tourism purposes. Economic motivations also play a role in shaping public perception. It aligns with Santri's [20] research, which asserts the profound economic impacts of the tourism sector. This circumstance arises due to limited benefits or positive economic outcomes perceived by individuals working as farmers in tourism. The tourism development centered around essential plants and animals is anticipated to augment community income.

Cultural Keystone Species of Lekuk 50 Tumbi Community as Tourism Product

The Lekuk 50 Tumbi community in Lempur Mudik Village generally recognizes 162 species in their vicinity, consisting of 91 plants and 71 animals. The scoring results indicate the presence of eight plants and three animals with scores equal to or greater than 12 as Cultural Keystone Species (Table 2). The Cultural Keystone Species of Lekuk 50 Tumbi community around KSNP area are predominantly plant species, as most of the community engages in subsistence farming and cultivation, resulting in a greater utilization of plants than animals. Similarly, Azmi's study [3] conducted on communities surrounding Alas Purwo National Park, which are primarily engaged in farming, aligns with the findings of this CKS study. In contrast, Wello's CKS research [28] conducted on the Sumba community at Manupeu Tanadaru National Park reveals a higher dominance of animals as Cultural Keystone Species, influenced by hunting activities and livestock maintenance.

Table 2 Recapitulation of Cultural Keystone Species Scores in the Lekuk 50 Tumbi Community

No	Cultural Keystone Species	Cultural Keystone Species Indicators						Total
		A	B	C	D	E	F	
1	Bamboo/Bambu (<i>Bambusa</i> sp)	3	2	2	2	1	2	12
2	Pitcher Plant/ <i>Kantong Semar</i> (<i>Nepenthes ampullaria</i> Jack)	2	1	2	2	2	3	12
3	Payo Rice/ <i>Padi Payo</i> (<i>Oryza sativa</i> var. <i>glutinosa</i>)	3	2	2	3	3	3	16
4	Coconut/ <i>Kelapa</i> (<i>Cocos nucifera</i>)	3	1	2	3	2	2	13
5	Betel/ <i>Sirih</i> (<i>Piper betle</i>)	2	1	2	3	3	3	14
6	Coffee/ <i>Kopi</i> (<i>Coffea arabica</i>)	3	1	2	3	1	3	13
7	Cinnamon/ <i>Kayu Manis</i> (<i>Cinnamomum burmanii</i>)	3	1	3	3	1	2	13
8	Areca/ <i>Pinang</i> (<i>Areca catechu</i> L)	2	2	2	2	3	3	14
9	Buffalo/ <i>Kerbau</i> (<i>Bubalus bubalis</i>)	3	2	3	3	2	3	16
10	Sumatran Tiger/ <i>Harimau Sumatra</i> (<i>Phantera tigris sumatrae</i>)	1	3	2	1	2	3	12
11	Mahseer Fish/ <i>Ikan Semah</i> (<i>Tor douronensis</i>)	3	2	1	3	1	2	12

Explanation: A= Intensity, frequency, and extent of utilization, B= Utilization in the field of terms, dance, songs, and symbols, C= Persistence, D= Utilization in traditional ceremonies, E= Position and the level of uniqueness, F= Economic Empowerment or Commercial Value.

The assessment of CKS as a tourism product is conducted using the modified guidelines of the Analysis of Object Operation Area and Natural Tourism Attraction (ADO-ODTWA). The assessment results are presented in Table 3.

Table 3 Assessment results of CKS as a tourism products

No	Cultural Keystone Species	Values and Classification of Tourist Attractions	Values and Classification of Accessibility	Values and Classification of Image	TOTAL	Classification
1	Bambu (<i>Bambusa</i> sp)	360	200	60	620	Low
2	Kantong Semar (<i>Nepenthes ampullaria</i> Jack)	480	350	120	950	High
3	Padi Payo (<i>Oryza sativa var. glutinosa</i>)	420	250	60	730	Moderate
4	Kelapa (<i>Cocos nucifera</i>)	300	250	60	610	Low
5	Sirih (<i>Piper betle</i> L)	240	250	60	550	Low
6	Kopi (<i>Coffea arabica</i>)	420	250	60	730	Moderate
7	Kayu Manis (<i>Cinnamomun burmanii</i>)	360	250	60	670	Moderate
8	Pinang (<i>Areca catechu</i> L)	240	250	60	550	Low
9	Kerbau (<i>Bubalus bubalis</i>)	420	300	60	780	Moderate
10	Harimau Sumatra (<i>Phantera tigris sumatrae</i>)	300	225	120	645	Moderate
11	Ikan Semah (<i>Tor douronesis</i>)	360	300	120	780	Moderate

Table 3 shows that the CKS with high values based on assessment is *Nepenthes ampullaria* Jack, which has a high potential for development as a tourism product. Meanwhile, CKS with moderate scores are Payo rice, coffee, cinnamon, buffalo, Sumatran tiger, and Mahseer fish, all of which fall under the potential category. These CKS with high potential classifications are the ones that can be developed as tourism products for the Lekuk 50 Tumbi community.

The Community Preferences in Utilizing Cultural Keystone Species (CKS) as Tourism Products

The community’s preferences are observed through their engagement and interest in utilizing CKS as tourism products. Most respondents indicated their need for more involvement in utilizing CKS as tourism products in response to question 1 (Table 4). Among those respondents who have engaged with CKS, a significant proportion have primarily participated in performing arts. Conversely, respondents who have not engaged with CKS attribute their lack of involvement to their primary occupational engagement outside tourism. The societal preferences and influencing characteristics are presented in Table 4.

Table 4: Societal Preferences and Influencing Characteristics

No	Questions	Percentage of Responses		Characteristics that influence and Value the Chi-square
		Yes	Not Yet	
1	Have you been engaged in the utilization of CKS as a tourism product?	17,8%	82,2%	EL (0,005)
2	If so, what field are you engaged in?	8,9% Engaged in Performing Arts and Culinary Endeavors		AG (0,08), EL (0,49), MI (0,04), IS (0,014), MI (0,17)
3	If you have not been involved, why?		33,3 % Having primary occupation (Farming)	AG (0,000), EL (0,000), IS (0,000), IS (0,034), MI (0,008)
4	Do you wish to partake in the advancement of CKS as a future tourism product?	Yes (96,7%)	Not interested (3,3%)	GD (0,000), AG (0,012), MS (0,003)

Description: GD (Gender), EL (Educational Level), AG (Age Group), IS (Income Source), MS (Marital Status), MI (Monthly Income), RS (Residence)

Based on Table 4 in question number 4, most of the community desires to engage in the development of CKS as a tourism product (96.7%), with only 3.3% indicating disinterest in involvement due to age-related factors. The percentage of community interest towards the CKS, which is to be developed as a tourism product, is illustrated in Figure 1.

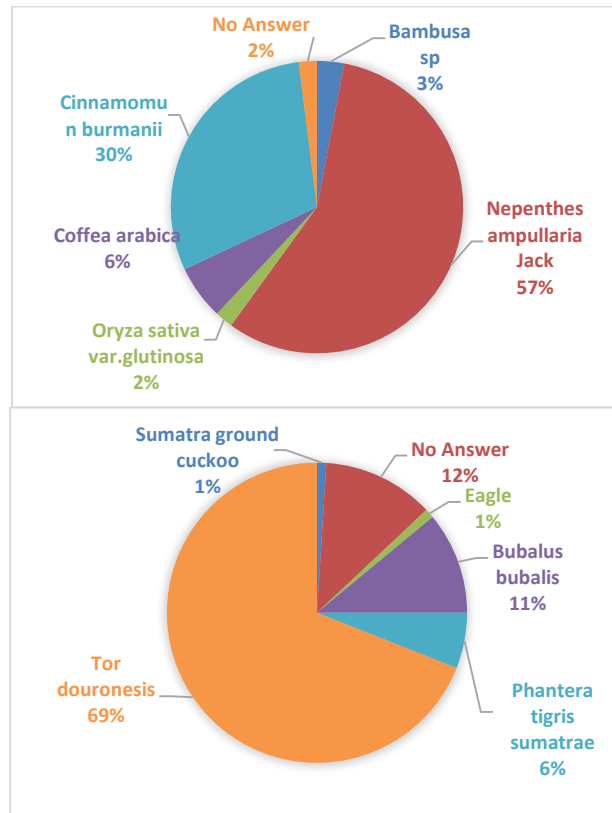


Figure 1 Public Interest Preferences Towards Potential Tourist Destination Development Sites

Based on Figure 1, the *Nepenthes ampullaria Jack* is the most sought-after type of CKS plant to be developed as a tourism product (56.7%). It is due to its unique characteristics, which are exclusive for Kerinci regency and not found in other regions. Additionally, the *Nepenthes ampullaria Jack* has the potential for various tourism-related products, encompassing educational tourism traditional culinary experiences. This traditional culinary offering could become a prominent tourist attraction, contributing to the overall tourist experience (Zahrulianingdyah, 2018). Meanwhile, *Tor douronesis* has been chosen as an animal species with the potential to be developed as a tourism product, given its non-threatening nature, suitability for food processing, and market value. Other CKS species that exhibit high levels of community interest in tourism product development include *Cinnamomun burmanii* (30%) and *Bubalus bubalis* (11%).

The community interest preferences towards the local potential products intended for tourism development (*Nepenthes ampullaria Jack*, *Tor douronesis*, *Cinnamomun burmanii*, and *Bubalus bubalis*) align with the evaluation outcomes presented in Table 3, which categorize these four local potential products as having a high potential (*Nepenthes ampullaria Jack*) and moderate potential (*Tor douronesis*, *Cinnamomun burmanii*, *Bubalus bubalis*) to be developed as tourism products within the Lekuk 50 Tumbi community.

IV. Conclusion

The perception indicates that most of the community members (95.6%) agreed to participating in tourism development. The Cultural Keystone Species (CKS) of Lekuk 50 Tumbi consist of eight flora and three fauna, among which Payo Rice (*Oryza sativa var. glutinosa*) and Buffalo (*Bubalus bubalis*) obtained the highest assessment scores. The evaluation of CKS as tourism products, based on the assessment of ADO-ODTWA, considering elements of tourist attractions, accessibility, and image, positions the *Nepenthes ampullaria Jack* as CKS with a highest-score value (high potential) for development as a tourism product. Meanwhile, based on community preferences, *Nepenthes ampullaria Jack* and the Mahseer fish (*Tor douronesis*) are identified as the most potentially CKS for tourism product development.

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