Identifying management strategies for the development of wildlife-based ecotourism: A study case of Sulawesi bear cuscus (*Ailurops ursinus*) inhabited the Educational Forest of Hasanuddin University, Maros

Identifying management strategies for the development of wildlife-based ecotourism: A study case of Sulawesi bear cuscus (*Ailurops ursinus*) inhabited the Educational Forest of Hasanuddin University, Maros

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Abstract. The educational forest of Hasanuddin University is intended to be developed as ecotourism spot with various physical and biological tourism attractions including bear cuscus (*Ailurops ursinus*). However, the concrete management strategies required have not been fully explored and examined. This research aimed to identify and formulate management strategies of wildlife-based tourism for bear cuscus in the area by examining bio-ecological of the species and analyzing community's perceptions and attitudes towards bear cuscus and its conservation in the area. Data on the biology and ecology of *A. ursinus* and its habitat were gained from literatures while the perceptions were obtained directly from questionnaire distribution to all relevant stakeholders as respondents. SWOT analysis was used and further analyzed by using AHP (Analysis Hierarchy Process) to determine quadrants and priority levels. There were 11 strengths and 4 weaknesses found as internal factors and 5 opportunities and 3 threats for the external. The IFAS matrix score were 1.82 with the weighted total value of 3.29 and the weakness' score of 1.47. For the EFAS matrix, the total opportunities score was 2.95 and the total threats score of 1.00. The high priority strategy to be implemented in the context of ecotourism management was located in Quadrant I which indicates that the opportunity for the bear cuscus' ecotourism is favorable.

1. Introduction

Cuscus is known as marsupial mammals from the family of Phalangeridae [1] and has limited distribution in the world. The species of this family can only be found in the eastern parts of Indonesia (Papua, Maluku, and Sulawesi), Australia, and Papua New Guinea with the total of 6 genera (Ailurops, Phalanger, Spilocuscus, Stigocuscus, Wyulda, and Trichosurus) [2,3]. In Indonesia, only four genera existed: Ailurops, Phalanger, Spilocuscus, and Stigocuscus [4].

Sulawesi bear cuscus (*Ailurops ursinus*) of the Genus Ailurops is one of the endemic marsupials in the Wallacea region. The species is strictly distributed in Sulawesi and small islands adjacent to the mainland such as Peleng, Muna, Buton, and Togean [1,4,5]. Based on the assessment conducted by the International Union for Conservation and Nature (IUCN), the species has been categorized as *Vulnerable* due to decreasing number of mature individuals in the wild [1].

Currently, rapid population declines from many places were reported due to high threats from illegal hunting and trading as well as habitat loss and destruction, reasons behind the activities were related to the use of species for food and protein intake resources, rituals and special occasions by local people, also to be sold as pets in the local markets [6-8]. However, this species is not regulated under CITES (Convention on International Trade of Endangered Flora and Fauna Species). Meanwhile, at the regional level, previously all species under the Family of Phalangeridae were protected under the Government Regulation No. 7/1999 regarding the preservation of flora and fauna, but then in the revised version enacted by the Ministry Regulation No. 92/2018 on list of Indonesian's protected species, *A. ursinus* is no longer mentioned [9]. This means both at the national and international levels, the protection for the species is not well guaranteed.

Wildlife-based ecotourism is one way of non-consumptive utilization of the animal species for sustainable use of natural resources. Wildlife tourism offers various experiences not only to observe but also to have direct involvement with the animals in real-life situation which can be difficult as they considered threatened, endangered, or even rare and with wildlife-based tourism this can be made possible [10-13]. Although wildlife ecotourism has not been well developed in Indonesia, but it has been proven in some developed countries to have positive long-term impact for the conservation of wildlife and their habitats [12,14].

In wildlife-based ecotourism management, the role of the community in supporting conservation efforts is very important. The community, especially those who live in the vicinity of the wildlife habitat, needs to participate directly to maximize the potential benefits of this type of tourism [15]. The form of community participation can be seen from the perceptions and attitudes shown towards the presence of these wild animals [16]. Perceptions and attitudes regarding ecotourism management are required in order to build a positive attitude to the sustainability of tourism development as well as to change perceptions of the community into more positive direction towards wildlife to enable more effective conservation particularly for problematic keystone species and species in conflict with human [17].

The educational forest of Hasanuddin University (Unhas) is identified as one of the habitats of *A. ursinus* in the region [18]. The forest is intended to be developed as ecotourism spot with various physical and biological tourism attractions including bear cuscus (*A. ursinus*). Some studies on the species have been conducted focusing on daily behavior, nesting habitat, type of diets, diet preferences, and potential of diet's distribution across the forest [19-24]. However, the concrete management strategies required have not been fully explored and examined. In particular, no information was gathered on the community's views on both bear cuscus and its conservation, as well as on the idea of developing wildlife-based ecotourism. Therefore, this research aimed to identify and formulate management strategies of wildlife-based tourism in particular bear cuscus in the educational forest of Unhas by examining the bio-ecological of the species and analyzing the community's perceptions and attitudes towards bear cuscus and its conservation in the area.

2. Materials and methods

2.1. Study Area

This study was conducted in four months between September to December 2020. The study site was located in the Educational Forest of Hasanuddin University, Maros Regency (South Sulawesi) around 65 km from the capital city of South Sulawesi Province (Makassar) (Figure 1). Geographically, the area lies between 119°44''34' - 119°46''17'E and 04°58''07' - 05°00''30'S. The average rainfall occurred in the area was 162.5 mm with daily temperature ranging from 18.4°C to 38.3°C and relative humidity of 76.25%.

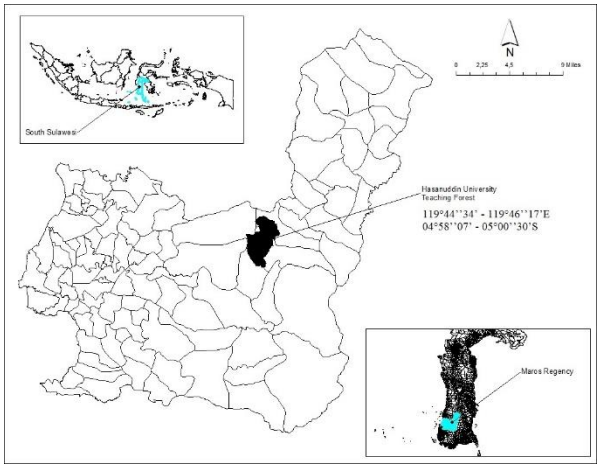


Figure 1. Study site located in the Educational Forest of Hasanuddin University, Maros Regency

2.2. Data Collection and Analysis

This study consisted of three parts: 1) examining biological and ecological conditions of Sulawesi bear cuscus (*A. ursinus*) and its habitats; 2) analyzing public perceptions towards *A. ursinus*; and 3) identifying and formulating management strategies for the development of wildlife-based ecotourism with Sulawesi bear cuscus as the main attraction. Data on the biology and ecology conditions of *A. ursinus* as well as the habitats were gained through exploration of various literatures while the perceptions were obtained directly from the field through questionnaire distribution to all relevant stakeholders as respondents (local community nearby the site, the management of educational forest, government institutions related with the issues, and potential tourists).

The local community sampled nearby the area was 30 respondents selected based on the encounter opportunities and interactions with *A. ursinus*. Information from the management of the educational forest was gained from the main actor (the manager). The government institution interviewed was represented by 7 respondents. Potential tourists were also surveyed to overview the development of wildlife-based ecotourism in the area (34 respondents).

Once the data on biological-ecological conditions and the habitat of *A. ursinus* and public perceptions were compiled and analyzed, the next step was to identify and formulate management strategies by using SWOT analysis. In this particular section, the first step was to identify internal and external factors influencing the management which was continued by scoring and rating the factors. Then, the results were analyzed to later composing matrices of IFAS (Internal Factors Analysis Strategy) and EFAS (External Factors Analysis Strategy). Then, each factor identified was further analyzed by using AHP (Analysis Hierarchy Process) method to determine the priority level. There were 3 respondents who were academicians involved and are experts in the relevant field. This was used to determine quadrants and build the SWOT matrix.

3. Result

3.1. Eco-biology Condition and Habitats of A. ursinus

The educational forest of Hasanuddin University (Unhas) is a designated forest area established for specific purposes granted by the Ministry of Forestry to the Forestry Faculty of Unhas in 1980 based on the decree N0. 86/Menhut II/2005. With the total of 1,400 ha, the area has been used as the main learning source and conducting practicals for students from the faculty. Apart from that, limited recreational activities have been also applied in the area.

The site has become the habitats for some endemic Sulawesi fauna including bear cuscus (*Ailurops ursinus*). Based on the literatures, the individuals of the species were commonly found in Block 37-38 of the educational forest or nearby Rompegading Village. Number of individuals recorded were less than 10 individuals per km2 with more than 50% of daily activities of each individual contributed for

resting. The species was also known to be restricted in the secondary and pine forests with close distance movement (78m2-357m2). As an arboreal animal, *A. ursinus* utilized 10 species of trees for nesting and 9 species of foraging sources. Potential trees with >15 m height for both nesting and foraging can be considered sufficient for the above population with around 49 individuals/0.6 ha of diet trees and 89 individuals/0.6 ha (Table 1).

Table 1. Bio-ecological conditions and habitat of *A. ursinus* in the Educational Forest of Unhas

Criteria Assessed	Indicators	Sources
Bio-ecology Conditions of *Ailurops ursinus*		
Number of population	7 - 8 individuals/ km^2	Achmad et al. (2016); Jathi, (2020)
Dominant daily behavior	Resting behaviour 97% (52-85%)	Mangalla (2014); Jathi (2020)
Dominant activity budget	Resting behaviour 22% (85-92.22%)	
Species movement	78 m^2 – 357 m^2	Achmad et al. (2016); Fauzan (2020)
Homer range	Secondary Forest and Pine Forest of Teaching Forest Area	Fauzan (2020)
Habitat conditions of *Ailurops ursinus*		
Status of the area	Forest Area for Specific Purpose	The decree of Ministry of Forestry No.86 / Menhut II / 2005 concerning changes to the Decree of the Director General of Forestry No. 63 / Kpts / BS / 1/1980 dated March 31, 1980
Habitat conditions	Natural habitat	Alamsyah (2015); Fauzan (2020)
Land cover	Mixed forest (primary and secondary forest) Secondary Forest and Pine Forest	
Forest ecosystem type	400 - 700 m above sea level included in lowland forest (<600 asl) and sub montane forest (600 - 900 asl)	Ground check
Vegetation density at tree level	89 ind/0.6 ha	Hidayat (2015); Aziz (2020)
Diet tree density (tree diameter)	49 ind/ 0.6 ha	
Species of Diet tree	9 species (*Mangifera indica, Palaquim obovatum, Dracontomelon dao, Diospyrus celebica, Spondias pinnata, Ficus sp., Cinnamomum sp., Arthrophyllum diversifolium* and Liana)	
Species of nesting tree	10 species (*Aleurites moluccana, Arthrophyllum diversifolium, Bauchanania arborescens,*	Alamsyah, (2015); Fauzan (2020)

Criteria Assessed	Indicators	Sources
	Cinnamomum inner, Dracontomelon dao, Diospyrus celebica, Ficus sp, Myristica fragrans, Palaquium obovatum, and *Pinus merkusii*)	
Position of *A.ursinus* on the tree stratum	Stratum c	
Nesting tree characteristics	Tree with the height between 15 m to 25 m, diameter > 0,5 m, tree canopy width of 86,54 m²-455,93 m²	
Distance from water sources	No influences of individual cuscus distances to water sources	Dimomonmau (2000) in Fauzan (2020)

3.2. Public Perception and Attitudes towards A. ursinus

3.2.1. Characteristics of Respondents. To obtain information on public perceptions and attitudes towards A. ursinus and its conservation, 30 respondents living nearby the educational forest were questioned along with 7 respondents from the government agencies. There were also 34 prospective tourists interviewed to gain information on the potentials of wildlife-based ecotourism in the area. The manager of the educational forest of Unhas was also included as key informant. In general, the community nearby the area mostly only completed their elementary schools (n=22 respondents). In contrast, 76% of the respondents from prospective tourists were graduated from colleges (n=26 respondents). All respondents of the government agencies and the educational forest held undergraduate or master's degrees (Figure 2a). Around 70% of the local people interviewed worked as farmers. While the prospective tourists had various occupations but were dominated by college students (38.2%) (Figure 2b). All respondents from government agencies and the educational forest were civil servants.

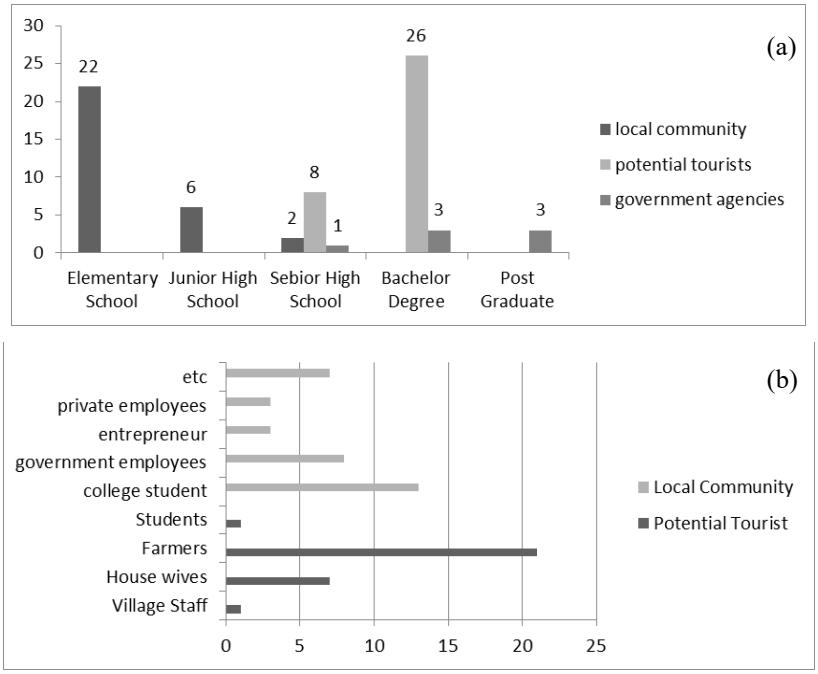


Figure 2. Profile of respondents based on (a) educational level; (b) types of occupation

3.2.2. Local Community Nearby the Study Area. From the interview sessions with the local community, it was revealed that more than 50% of the respondents had basic knowledge on bear cuscus as an endemic species, changes in its population over time, and the impact on the existence of bear cuscus. However, there was 83.3% of the respondents had no knowledge on the important of bear cuscus to the environment. More than half of the respondents also had limited understanding on conservation including the conservation of bear cuscus (Figure 3a).

In term of attitudes of local community nearby the habitat of bear cuscus, there were 96.7% of the locals had stated that they never involved in hunting activities on bear cuscus. Even though more than 90% of respondents had an understanding that bear cuscus can be consumed and hunted. All respondents have been recorded to agree with conservation activities but only 83.3% agreed to be involved in the activities. In general, most of the respondents (96.7%) approved with the idea of having bear cuscus as part of ecotourism activities in the area (Figure 3b).

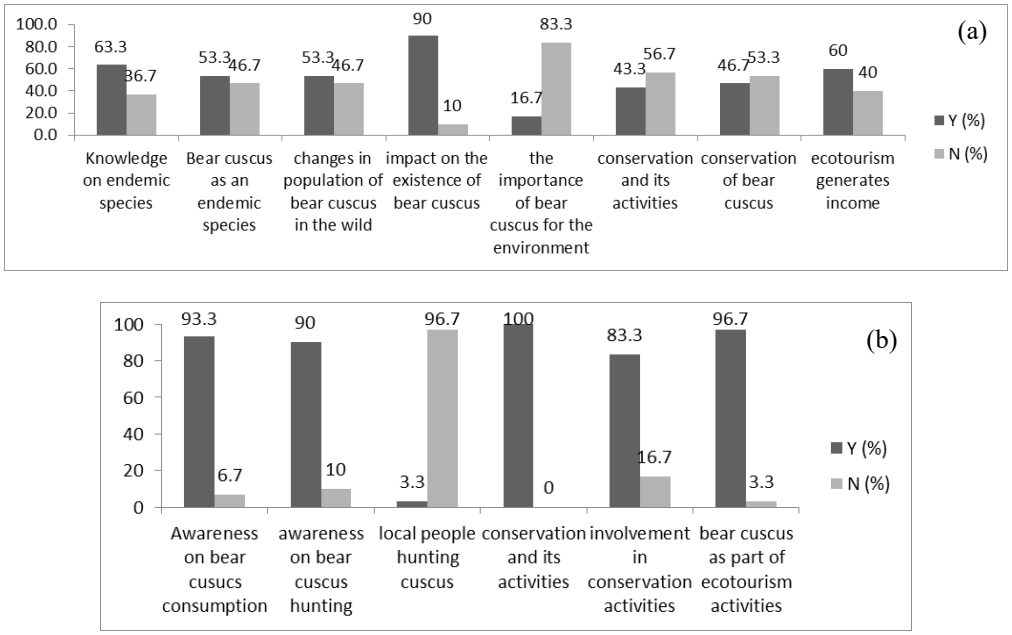


Figure 3. Local community's perceptions (a) and attitudes (b) towards knowledge on bear cuscus existence and conservation in the Educational Forest of Hasanuddin University, Maros

3.2.3. Potential Tourists. In relation with the development of wildlife-based ecotourism with the bear cuscus as the centre of attractions, some questions were also asked to potential tourists on basic knowledge related with the species and its conservation. Almost the majority of respondents were well equipped with on basic knowledge of bear cuscus (>90%) although not all of the respondents had sufficient information regarding the changes of its current population (only 70.6%). Surprisingly, around 85.3% had known the educational forest as one of the habitats for bear cuscus in the region [Figure 4a]. For the attitudes of prospective tourists, it can be seen that all respondents agree with the conservation of bear cuscus and ecotourism development plan (100%). However, only around 3-8% of the respondents had disagreed on the idea of making the bear cuscus and animal as tourism objects [Figure 4b].

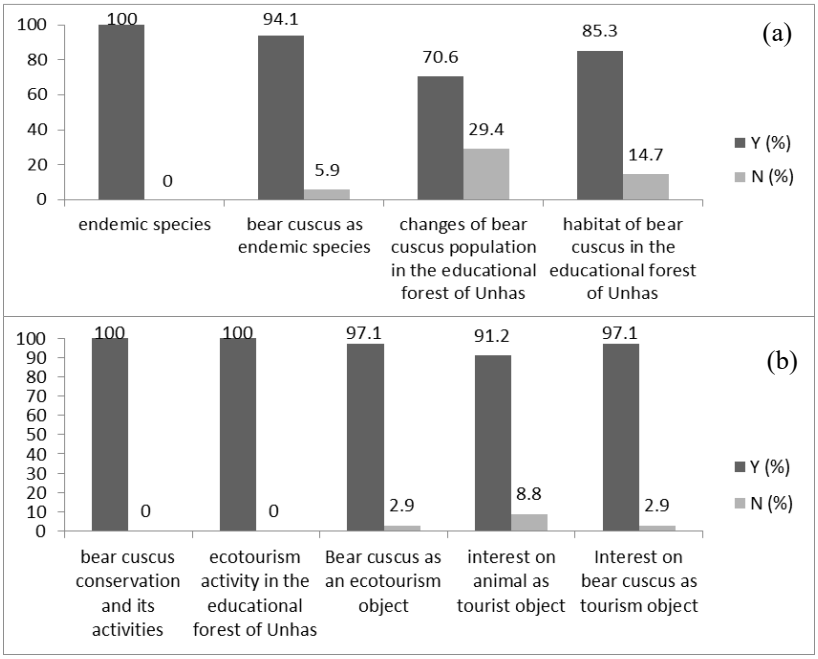
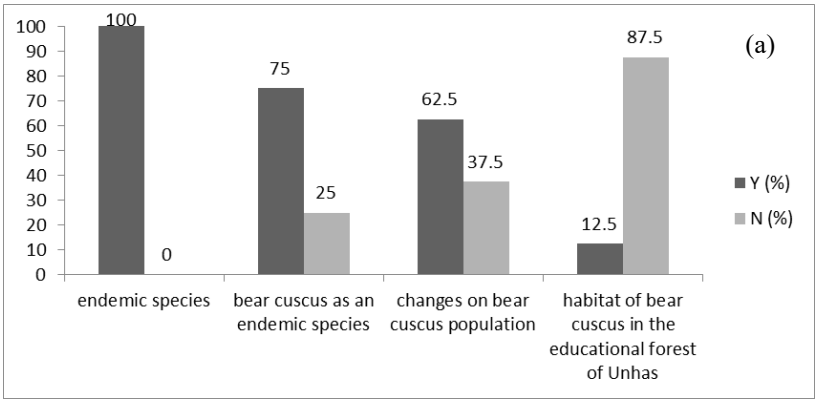


Figure 4. Perceptions (a) and Attitudes (b) of potential tourists on bear cuscus, its conservation and ecotourism development

3.2.4. Government Institutions. To portray on the stakeholders, some staff of relevant government institution were interviewed. In term of knowledge about endemic animals, 100% of respondents had fully understanding on the matter but only 75% had been aware that bear cuscus as endemic animals. Only 62.5% of the respondents had knowledge on changes occurred in wild bear cuscus population and around 87.5% have not heard the educational forest of Unhas as one of the habitats for bear cuscus in the province [Figure 5a].

Different with both the locals and potential tourists, all staff interviewed had agreed to be involved and contributed to the conservation of bear cuscus (100%). While 87.5% have agreed the idea of ecotourism development plan in the educational forest of Unhas with only 50% supported the activities and made the bear cuscus as an object of ecotourism [Figure 5b]



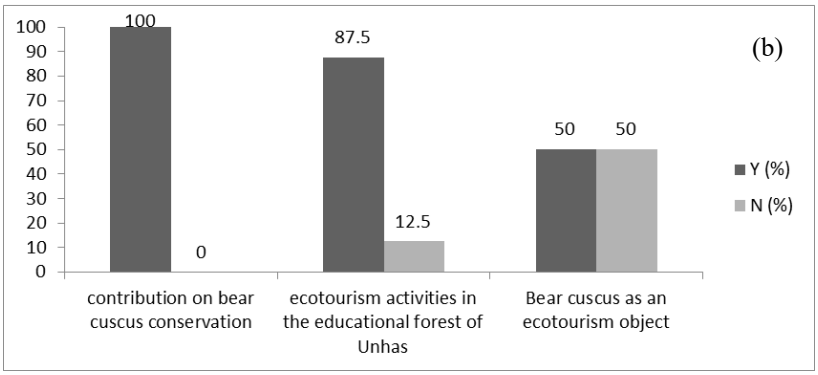


Figure 5. Perceptions (a) and (b) Attitudes of government institutions towards bear cuscus, its conservation and ecotourism development

3.2.5. Management of the Educational Forest. In order to further implement the idea of developing ecotourism in the educational forest of Unhas with bear cuscus as the main attraction, supporting data related with the management of the area were needed [Table 2]. The data were gained from a deep interview with the manager of the educational forest of Unhas. In general, the management of the Educational Forest of Unhas had agreed on the idea of ecotourism development in the area including making bear cuscus as the main attraction. This also strengthen with some facts that some contribution have been made by the management which also involved various intensive research, internal management policy, the availability of human resources, including facilities and infrastructure. However, there were no networking established and no collaboration have been made in accordance with the plan.

Table 2. Supporting data by the Educational Forest of Unhas, Maros

Indicators	Y	N
Contribution on conservation activities of Sulawesi bear cuscus	√	
Attitude on ecotourism activities in the Educational Forest of Unhas	√	
Attitude on the idea of bear cuscus as the main object of ecotourism	√	
The availability of internal policies on ecotourism management	√	
Networking and collaboration with other stakeholders specific on bear cuscus		√
The availability of human resources	√	
The availability of basic facilities and infrastructures for ecotourism	√	
Specific records on number of tourists visit bear cuscus in the Educational Forest of Unhas	√	
The availability of previous programs for the local community to support the development of ecotourism	√	

3.3. Ecotourism Management Strategies

In this research, ecotourism management strategy of cuscus was determined by using a SWOT analysis. The formulation process of management strategies was consisted of three stages: 1) identification stage of internal factors (IFAS) and external factors (EFAS); 2) analysis stage; and 3) decision-making stage. In the first stage, internal factors were used to measure the extent of the strengths and weaknesses of the eco-biological conditions and habitat of bear cuscus as well as the perceptions and attitudes of forest managers. While then, the external factors were used to summarize and evaluate on opportunities and threats related with the perceptions and attitudes of all involved actors (local community nearby, potential tourists and government agencies) in the development of ecotourism. There were 11 strengths

and 4 weaknesses found as internal factors (Table 3). For the external factors, 5 opportunities and 3 threats were identified (Table 4).

Table 3. Internal Factors Identified and Internal Factors Analysis Strategy (IFAS) Matrix of Wildlife-based Ecotourism Development in the Educational Forest of Unhas

	Internal Factors	Weight (B)	Rating (N)	Score (BXN)
	Strength factors			
S1	Stable bear cuscus population	0.10	3.7	0.35
S2	Resting behavior as the dominant daily behavior performed by bear cuscus	0.09	3.3	0.29
S3	Data on the species of diet plants consistently consumed by bear cuscus	0.07	3.3	0.25
S4	Data on nest tree species consistently used by bear cuscus including its nest tree criteria	0.11	3	0.33
S5	Information on the habitat inhabited by bear cuscus	0.07	4	0.30
S6	Sufficient foraging plants based on the vegetation survey	0.07	3.3	0.25
S7	No land cover change occurred in the habitat of bear cuscus	0.07	4	0.30
S8	The availability of internal policy regarding ecotourism management in the Educational Forest of Unhas	0.10	3	0.31
S9	The availability of human resources for ecotourism management in the Educational Forest of Unhas	0.10	3	0.31
S10	Sufficient facilities and infrastructures for supporting ecotourism activities in the Educational Forest of Unhas	0.10	3	0.31
S11	Data on visitors to the Educational Forest of Unhas	0.10	3	0.31
	Total	1.00		3.29
	Weakness factors			
W1	Limited number of bear cuscus individuals found in the area	0.22	1	0.22
W2	Irregular homerange of bear cuscus	0.31	1	0.31
W3	No networking and collaboration established with the management of the Educational Forest of Unhas on bear cuscus ecotourism	0.23	2	0.47
W4	No specific infrastructures built for bear cuscus wildlife-based ecotourism (e.g. observation deck/tower)	0.23	2	0.47
	Total	1.00		1.47
	Score Strengths - Weaknesses> IFAS =			1.82

Table 4. External Factors Analysis Strategy (EFAS) Matrix of Wildlife-based Ecotourism Development in the Educational Forest of Unhas.

	External Factors	Weight (B)	Rating (N)	Score (BXN)
	Opportunity factors			
O1	High percentage of local community agreed to make bear cuscus as an object of ecotourism	0:21	4	0.82
O2	Positive response of the community to get involved in ecotourism management	0.21	4	0.82
O3	No hunting on bear cuscus occurred by the local community	0.21	4	0.82

	External Factors	Weigh t (B)	Rating (N)	Score (BXN)
	Opportunity factors			
O4	High interests of potential tourists for ecotourism and in particular bear cuscus as the main attraction	0.22	4	0.87
O5	Support from government agencies towards the development of ecoutourism	0.16	3.7	0.61
	Total	1.00		3.95
	Threat factors			
T1	The local community been aware the possibility of bear cuscus to be hunted and consumed	0.33	1	0.33
T2	Low public perception on the importance of bear cuscus for the environment	0.33	1	0.33
T3	Low community perception on the concept of ecotourism	0.33	1	0.33
	Total	1.00		1.00
	Score of Opportunity - Threats> EFAS =			2.95

After identifying the internal and external factors, the weight of the internal and external factors were calculated in order to determine the quadrant which later also decide the priority focus of bear cuscus ecotourism management strategies. The calculation of the factor weight was done by tabulating the IFAS - EFAS (Internal - External Strategic Factor Analysis Summary) score [Tables 3 and 4].

The results of the identification have shown that the management of bear cuscus ecotourism in the Educational Forest of Unhas had 11 advantages as summarized in Table 2. The highest ranking gained from the greatest strength aspects which were the stable population of bear cuscus and the presence of consistent bear cuscus' nest tree species information. While the weaknesses were found to be limited individuals of bear cuscus and the irregularity of its home range.

Meanwhile, the management strategies based on external conditions were identified by five opportunities and three threats, each with total threats scores lower than the opportunity score [Table 3]. The results of the IFAS matrix analysis were 1.82, including the weighted total value with an average score of 3.29 and weaknesses of 1.47. For the EFAS matrix analysis, the total opportunities score was 2.95 from the total score value of 3.95 and the total threats score of 1.00. This shows that these factors need to be considered, especially in the quality of conditions for ecotourism purposes.

Determination of the priority of strategies for the management of bear cuscus ecotourism in the Educational Forest of Unhas can be seen by using a graph gained from SWOT analysis, which combines the two weighted values of the values obtained from the internal factor analysis (IFAS) for the horizontal axis and the analysis of external factors for the vertical axis (EFAS) [Figure 6].

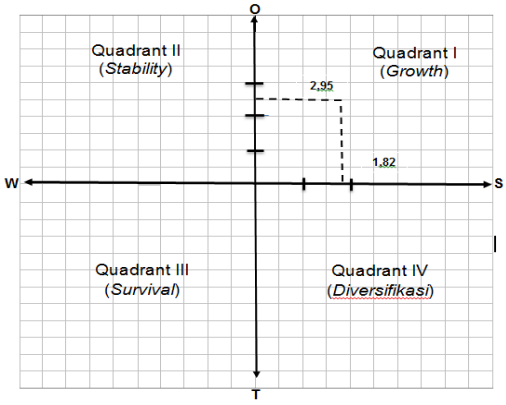


Figure 6. Quadrant SWOT Analysis for prioritizing management strategies for future ecotourism development in the Educational Forest of Unhas

Based on the quadrant position formulation in Figure 6, the high priority strategy to be implemented in the context of ecotourism management was located in Quadrant I or laid between internal strengths and external opportunities (growth strategy). The quadrant describes a strong internal condition with a supportive environment so that the appropriate direction, goals and strategies was progressive or in the S - O position. The growth strategy in the quadrant can be interpreted as having the opportunity to grow and develop by exploiting the existing potentials and opportunities. This gives an indication that the opportunity for the bear cuscus' ecotourism management strategy is in a favorable condition, where in addition to have very large strengths (3.29) from weaknesses (1.47), it also has a great opportunity (3.95) compared to the existing threats (1.00).

4. Discussion

The Educational Forest of Unhas as one of main habitats of Sulawesi bear cuscus (*Ailurops ursinus*) has an infinite potentiality to be wildlife-based ecotourism site. The area lays on 1,400 ha dominated by secondary tropical lowland forest where it has become an ideal place for the population of Sulawesi bear cuscus. Sequential studies on eco-biological of the species in the area have been conducted since 2014 and from the studies, there were no changes found on the population of the bear cuscus. This will benefit the idea of wildlife watching activities for wildlife-based ecotourism development. Combined with the resting behaviour as dominant characteristics of the animals and slow motion behavior, have made this species to be easily spotted and followed.

However, it was revealed that the population of the species in the area was too small and sparsely distributed (irregular home range). Living solitarily in higher canopy cover and spends most of its time above the ground [25] can make difficulties for wildlife watching activities if the population number is continuously very low. Animal populations are important information in ecotourism attractions because animal population information can determine the ease of encounter and distribution of animals [26]. This will become a challenge for both tourists and management in the implementation of wildlife-based ecotourism in the area.

Apart from population and home range issues, it has been highlighted in the findings that internally, there were some concerns related with the development of wildlife-based ecotourism. No networking and collaboration established in the management of the species were also need to be addressed by the internal party. To support the wildlife-based ecotourism development plan, specific infrastructure for bear cuscus tourism had to be initiated to support the ecotourism in the area. Other concerns are related to possibilities of bear cuscus to be hunted and or consumed by the locals due to low public perceptions on the importance of this animal as well as the concept of ecotourism.

Therefore, after the SWOT analysis, several alternative programs and activities are recommended to optimize the management strategies of bear cuscus in the area. The SO strategy is used as a priority strategy as its position in Quadrant I. The alternative program and activities proposed are:

4.1. S - O strategy

4.1.1. Managing habitat of bear cuscus. Sufficient information on diet and nesting plants as well as habitat type in the area have already been identified and therefore, this can be used to support the management in conducting habitat enrichment and protection. Furthermore, as found in the results of SWOT analysis, management is required to guarantee the species welfare. The welfare of the species could guarantee the lifelong of both conservation and the business of ecotourism [27]. In order to optimize the development plan, the welfare of bear cuscus inhabited the area becomes important. This can be conducted by improving eco-biological conditions and its habitat. Efforts to improve the habitat quality of bear cuscus are needed by increasing the productivity of natural food species in order to elevate the bear cuscus population. This habitat quality improvement program is expected to increase population density in the future which will later also increase the chances of encountering with that animal.

4.1.2. Take advantage on community support in maintaining eco-biological conditions and habitat of bear cuscus through direct and active involvement in ecotourism activities. High support for both conservation of bear cuscus (A. ursinus) and ecotourism by the local community nearby the site and potential tourists is one of the strength shown from the analysis. The support in particular those who live nearby the site can become a vital capital to maintain the eco-biological conditions and habitat of bear cuscus as well as in safeguarding the conservation of the species in the future. The support provided by the community through ecotourism practices can become an effective tool for wildlife conservation [28].

The community must actively take part in ecotourism development and management by becoming actors in the development of wildlife ecotourism. Community-based management can be an effort to improve environmental conditions in the area. However, in order to achieve the goal, direct involvement in any activities can be implemented including a series of capacity building. Ecotourism-based interventions provide benefits to the local and thus, has triggered more positive perceptions on even towards conflicting wildlife species [17]. This can also elevate the low perceptions occurred in the community as well as educating the community to later on increase the awareness and change their attitudes.

4.1.3. Cooperating with research institutions, government agencies and NGOs. One of the highlight was to extend more collaborations with research institutions, government agencies and NGOs in the field of research and funding. Collaboration can be carried out to explore the potential in the ecotourism area, development of facilities and infrastructure as well as conservation campaigns regarding the preservation of flora and fauna in the area. A study in Sempu Island (East Java) on the opportunities of ecotourism business also revealed that in order to minimize negative impacts generated from the ecotourism, collaboration must be established within the community and to other involving stakeholders [29].

4.2. W - O strategy

There is a need for habitat protection and fostering to increase the population of bear cuscus. Take advantage of community support in preventing factors from decreasing bear cuscus population through intensive monitoring to avoid hunting activities towards bear cuscus. Habitat management is required to protect the habitat of bear cuscus from any destructions and also to prevent hunting efforts. As it is informed that the species has become a target for wildlife trading to Java in large numbers [9]. This was also worsened by weak law enforcement in tackling illegal hunting and trade of bear cuscus [30]. It has become a crucial issue in conserving the species where the species has not been protected by any laws or regulations in particular at the national level. In fact, according to some informants, permissions have been released to one commercial breeder so it can be used a breeding stock supply [31]. There is a need for finding funding sources through expanding network and collaboration in order to build adequate facilities and infrastructure for bear cuscus.

4.3. S – T Strategy

Developing conservation education activities for the community to change the perception not only to the nearby community but also in the wider context so that the protection and conservation of bear cuscus can be achieved. In the future, it will unavoidable to have free impacts from wildlife-based ecotourism in particular to the conservation of wildlife. Therefore, communicating the issues to the local community as well as to the potential tourists as a form of education are urgently required to anticipate the tourism activities that might harm the animal [31-33]. Increasing the level of awareness among people in regards to the importance of wildlife and its role towards the environment. Develop training activities and dissemination of the concept of ecotourism to all relevant stakeholders.

4.4. Strategy W - T

Establishing several discussion forums for the community and government to gain continuous support in the management of bear cuscus ecotourism. It is proven that building communication among

stakeholders and elevates the level of relationship, for example: by considering the tourists involved in the ecotourism activities as partners including discussing any constraints existed and providing consistent message in conducting interactions with wildlife, have been known as successful wildlife-based tourism [34].

5. Conclusion

The high priority strategy to be implemented in the context of ecotourism management was located in Quadrant I which indicates that the opportunity for the bear cuscus' ecotourism is favorable. To be the target area of wildlife-based ecotourism, the educational forest of Hasanuddin University (Unhas), have to recognize carefully internal and external factors in developing an ecotourism plan. Though the journey to accomplish the idea could still be a long road but identifying those factors may provide guidance to prepare better for the development of ecotourism in the area. And to the fact, that the strategies proposed were constructed from not only strengths, weaknesses, but also from viewing the availability of opportunities and threats by examining bioecological of the species and analyzing the community's perceptions and attitudes towards bear cuscus and its conservation in the area could provide a comprehensive and complete picture of what should become a priority in developing the plan.

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