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Analysis of the ecotourism potential of the Mount Mekongga Protected Forest, North Kolaka Regency, Southeast Sulawesi Province

Yusran, Tutut Sunarminto, Rachmad Hermawan

Tropical Biodiversity Conservation Study Program, Faculty of Forestry and Environment, IPB University, Bogor, 16680, Indonesia

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Corresponding Author:
Yusran
Tropical Biodiversity Conservation Study Program, Faculty of Forestry and Environment, IPB University;
Phone: +6282349825860
Email: yusraniccang1995@gm ail.com

Abstract*. The protected forest of Mount Mekongga is the headwaters of three major rivers which flow into Kolaka and North Kolaka Regencies, play an important role in the lives of the surrounding communities. The current condition is that the community is carrying out inappropriate area utilization activities. This is a threat that will cause forest area degradation in the future. This study aims to identify and assess the potential of tourism resources in the protected forest of Mount Mekongga. Data collection was carried out in March–July 2022, the data collection method was carried out by means of field observations, and in-depth interviews were conducted with the community and managers, as well as a literature study. Data analysis was carried out by evaluating tourist objects based on established criteria. The results of the assessment of ecotourism resources obtained from the protected forest area of Mount Mekongga have several natural tourist attractions. Natural phenomena get the highest score above >4 in the uniqueness and beauty aspects, the type of flora is endemic to Sulawesi orchids, one of which is the Sorume orchid (*Dendrobium utile*), and the endemic fauna of Sulawesi, including mountain anoa (*Bubalus quarlesi*) and hornbill (*Rhyticeros cassidix*). Therefore, this potential needs to be packaged in a special interest tourism program (ecotourism, as the main attraction of the Mount Mekongga Protected Forest area).*

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INTRODUCTION

Tourism has now succeeded in turning on the pulse of the world economy and is considered one of the most profitable industries (Baral and Rijal 2022). However, often the carrying capacity of the environment does not get serious attention. The principle is the more visitors, the more profitable. As a result, the quality of the environment decreases, water, soil, and air become polluted. The volume of waste becomes uncontrollable, the landscape is damaged, and the original cultural patterns of the people are increasingly being eroded (Alikodra 2020a). This experience has brought caution in various countries when developing tourism areas.

The rapid development of conservationism with consistent campaigns to protect and preserve nature has paved the way for ecotourism (Alikodra 2020b). Ecotourism development has become an important part of the modern conservation concept, and this concept can bring economic benefits to the country and people's welfare without sacrificing the natural resources themselves (Kuswanda et al. 2018). Indonesia, especially the island of Sulawesi, has good prospects in developing ecotourism because it has a uniqueness and natural beauty.

Sulawesi Island is the most geographically complex island in the world, consisting of four peninsulas. Each peninsula has a beautiful landscape, which is a combination of marine, forest, and mountain ecosystems (Mustari 2020). These three ecosystems are tourism resources which are often referred to as tourism supply (Muntasib et al. 2018). This tourism supply is a huge potential to be explored and developed in accordance with global tourism market trends where modern society nowadays prefers to fill their free time with activities in nature (back to nature). This interest is an opportunity for the development of natural resource-oriented tourism. One of the natural resources that has a beautiful natural landscape is the protected forest of Mount Mekongga.

Mount Mekongga Protected Forest (HLGM) is a highland karst landscape with an altitude of 2,620 m above sea level, spanning two districts, namely Kolaka Regency and North Kolaka Regency. The area is a protected forest SK.211/MENLHK/SETJEN/PLA.0/5/2018 with an area of ± 126,792.15 ha, consisting of ecosystem types of lowland tropical forest, high mountain forest, and sub-alpine forest types (Widjaja and Potter 2014). This area has function as a hydrological system in regulating the water system, which plays an important role in the life of the surrounding community (Gunawan and Sugiarti 2015).

The life of the community around the forest area cannot be separated from the existence of the forest as a source of life (FAO and UNEP 2020). Community interactions around the HLGM area in utilizing forest resources tend to be influenced by ecological and economic aspects. The ecological aspect is the main water catchment area for irrigation of agricultural land and water supply for household needs, while the economic aspect, the community uses the area to open plantation land (Arafah et al. 2015). Community activities around the HLGM area will certainly have positive and negative impacts on the sustainability of forest ecosystems.

The HLGM area is vulnerable to disturbances and threats because its physical condition is cast mountains which are sensitive to erosion (Gunawan and Sugiarti 2015). The current conditions are that people are making inappropriate use of land by opening cocoa plantations, illegally logging trees for both household and commercial needs, and people's habit of hunting wild animals (Arafah et al. 2015). This condition is very concerning because the Southeast Sulawesi Province has experienced the largest deforestation compared to other provinces on Sulawesi Island. Land cover change from 1999–2018 was 0.85% annually (Supriatna et al. 2020). This will lead to the degradation of forest areas in the future.

Communities carrying out activities in the HLGM area may be due to a low understanding of the function of HLGM as a hydrological system. On the other hand, the community knows but has no other source of income (Ullah et al. 2022). Even though the HLGM area has various tourism potentials, the community does not have knowledge about proper utilization, so they do not understand how this forest area can generate economic value without exploiting it. It is interesting to study how to use it properly by utilizing environmental services, namely ecotourism. According to Alikodra (2011), ecotourism is the most appropriate solution in reducing damage to natural resources and biodiversity while improving the socio-economic conditions of local communities. Based on this thought, it is considered necessary to carry out research to identify and assess the potential of tourism resources in HLGM activities that are economically profitable without changing its main function as a protected area. The benefit of this research is to produce data and information as consideration for managers for community empowerment.

METHOD

Location and Time of Research

The research was carried out in the HLGM area, North Kolaka Regency, Southeast Sulawesi Province. The research was limited to the Tinukari Village because it has the closest access to the HLGM area and has utilized the forest area for subsistence needs. The time of research was conducted in March–July 2022.

Method of Collecting Data

The research subject is the manager of the HLGM area. The object studied was the HLGM area, North Kolaka Regency, Southeast Sulawesi Province (Figure 1). The types of data collected in this research are secondary data and primary data. Secondary data is data that is not obtained directly from the source but through the HLGM area manager and data obtained through references such as books and journals. Primary data in the study were obtained and collected directly from the research location, namely tourism resources (flora, fauna, natural phenomena).

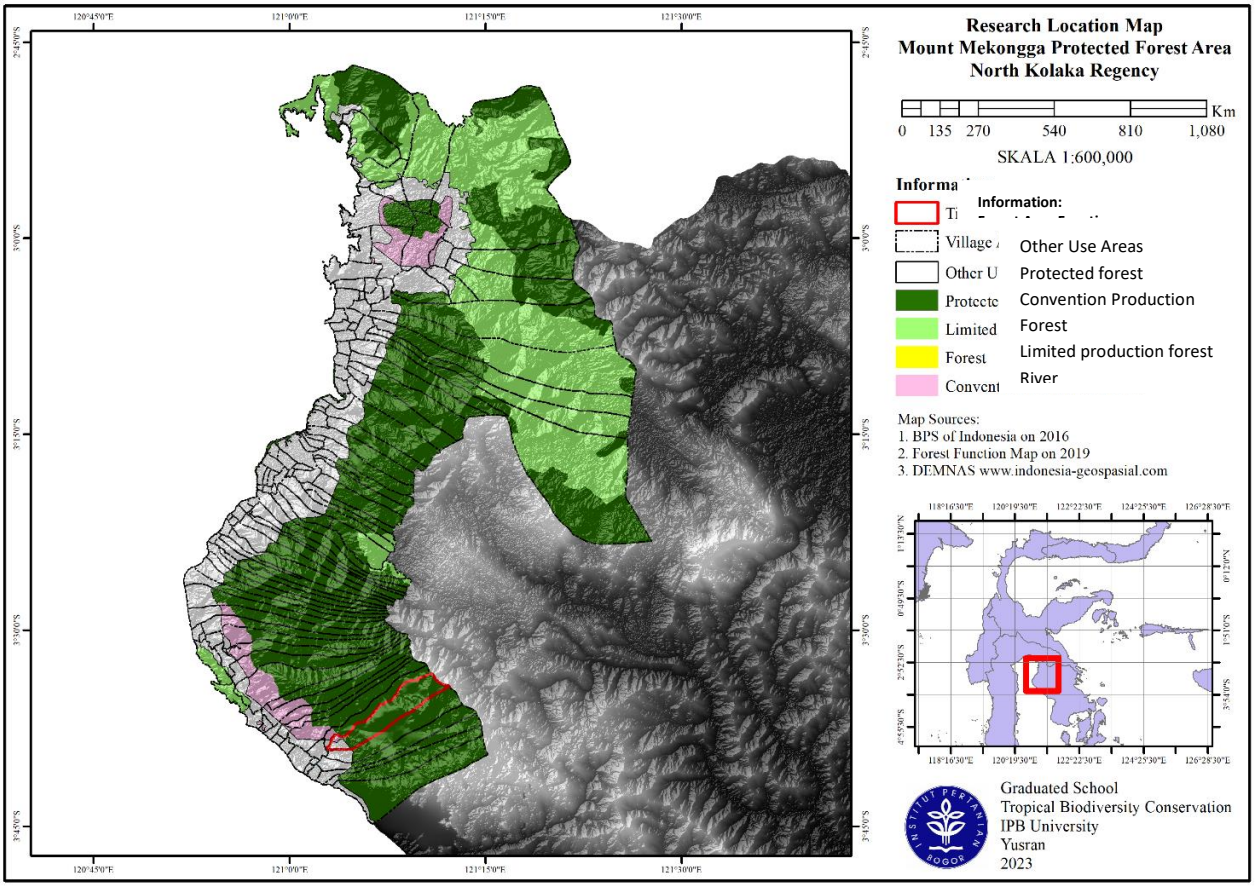

Figure 1 Map of research locations

The collection of data on flora and fauna species was carried out through direct observation using the rapid assessment method. Rapid assessment is a method used to collect and record quickly and accurately the flora and fauna found at tourist sites (Bismark 2011). This method is used to determine the types of flora and fauna that are at the observing site, for animals in the morning and evening, and the collection of data on natural phenomena is carried out by direct observation in the field to identify objects using the ground check method. The data obtained from object identification is in the form of recording the physical condition of natural phenomena, tracking conditions, and documentation.

Data Analysis

Data analysis was carried out descriptively by describing all data, including tourism potential (flora, fauna, natural phenomena), and analyzed according to the type of data and the purpose of the data used. Assessment of tourism potential is carried out qualitatively with a scoring system. The instrument for assessing tourism potential is to use a closed-ended questionnaire with a scoring system following the One Score One Indicator Scoring System pattern. Referring to Avenzora's (2008) assessment criteria include seven associative criteria,

namely; 1) uniqueness, 2) rarity, 3) beauty, 4) seasonality, 5) accessibility, 6) sensitivity, and 7) social function. Details are presented in Table 1. In this study, the tourism resources assessed included symptoms, flora, and fauna around tourist destinations. The assessment was carried out by 3 (three) experts who have competence in the fields of tourism science and combat science, as well as ecotourism practitioners.

Table 1 Ecotourism assessment criteria

No	Assessment criteria	Explanation
1	Uniqueness	Describes the existence value of an object or event in the tourism context
2	Scarcity	Comparative representation of an intangible tourist attraction against other similar objects
3	Beauty	Extrinsic and intrinsic values possessed by an object in providing a tourist satisfaction in seeing the object
4	Seasonality	Describes the right time to observe the object
5	Accessibility	Describe the conditions and progress that tourists must make to visit the tourist object to be visited.
6	Sensitivity	Describes the resistance of an object to visitors
7	Social function	Describes when the public knows the object

RESULTS AND DISCUSSION

The HLGM area has potential ecotourism resources that can be developed as an ecotourism attraction. These potentials include flora, fauna, and natural phenomena. The results of the natural symptom assessment identified four types of natural phenomena, namely the Tinukari River, the peak of Mount Mekongga, Tappareng Cave, and Coca Cola Lake, presented in Table 2. This average value means that all natural phenomena are not in optimal conditions to be utilized. However, when viewed from the uniqueness and beauty aspect, all natural phenomena score more than 4, which means they have the potential to be developed as tourist attractions. If these natural phenomena are to be developed, the seasonality aspect must be increased. Seasonality constraints, such as certain times and places to be able to enjoy natural phenomena with interesting characteristics. Accessibility must be improved, starting from the arrangement of roads, especially Coca Cola Lake and the peak of Mount Mekongga, which are synonymous with adventure tourism with activities in the form of trekking so that all visitors or tourists can more easily reach them at any time.

Table 2 Results of natural symptom assessment

No	Natural symptoms	A	B	C	D	E	F	G	Average
1	Tinukari River	4	2	5	2	5	5	4	3.86
2	The peak of Mount Mekongga	5	3	6	3	2	3	3	3.57
3	Tappareng Cave	4	3	5	3	2	5	1	3.29
4	Coca Cola lake	4	3	5	2	4	3	1	3.14

Description: A = uniqueness, B = scarcity, C = beauty, D = sonality, E = sensitivity, F = accessibility, G = social function

Flora

The results of the flora observations identified 31 species consisting of 6 epiphytic species and 25 tree species, of the 31 species, it was assessed that they were the most frequently encountered. The results of the flora potential assessment are presented in Table 3. The results of the flora assessment are presented in Table 3. With an average value of less than < 4, it means that all types of flora are not in optimal conditions to be utilized and developed as tourist destinations. However, when viewed from the uniqueness and beauty aspect, it has a value above 4 is a type of epiphyte. But among the types of epiphytes, Sorume orchids have the highest selling value when packaged in a special interest tourism program. When described, the Sorume Orchid

(*Dendrobium utile*) is part of the Wallacea biodiversity, which is endemic to Sulawesi. The flowers consist of a yellow crown and petals that are narrow and elongated in shape and have a distinctive floral scent, while the social function aspect of the Tolaki people uses the Sorume Orchid as a raw material for making mats, *songkok*, and other crafts, related to paying attention to aspects of sensitivity and accessibility.

Tabel 3 assessment of flora potential

No	Local name	Latin name	Habitus	A	B	C	D	E	F	G	Average
1	*Anggrek mawar*	*Eria flavescens*	Epiphyte	5	2	5	2	3	3	1	3.00
2	*Anggrek sorume*	*Dendrobium utile*	Epiphyte	5	3	5	2	3	3	4	3.43
3	*Anggrek merpati*	*Dendrobium crumenatum*	Epiphyte	5	2	4	2	3	3	1	2.86
4	*Anggrek bibir*	*Coulogyne speciosa*	Epiphyte	4	1	4	2	3	3	1	2.57
5	*Anggrek perahu*	*Cymbidium finaysonianum*	Epiphyte	4	1	4	2	3	3	1	2.57
6	*Eha*	*Castanopsis buruana Miq*	Tree	2	1	3	1	5	2	2	2.29
7	*Bitti*	Vitex cofassus	Tree	2	2	3	1	5	2	2	2.71
8	*Kalapi*	*Kalappia celebica*	Tree	3	4	2	1	5	2	2	2.71
9	*Uru*	*Elmerillia ovalis*	Tree	2	1	2	1	5	2	2	2.14
10	*Kandole*	*Diplokema oligomera*	Tree	3	3	3	1	5	3	2	2.86

Description: A = uniqueness, B = scarcity, C = beauty, D = sonality, E = sensitivity, F = accessibility, G = social function

Fauna

The results of the fauna observations identified 24 species of fauna consisting of 4 species of mammals, 15 species of birds, 1 species of insects, 2 species of amphibians, and 2 species of reptiles. Then assess the most frequently encountered. The results of the fauna potential assessment can be seen in Table 4.

Table 4 Results of a final assessment

No	Local name	Latin name	Class	A	B	C	D	E	F	G	Average
1	*Anoa gunung*	*Bubalus quarlesi*	Mamalia	6	6	6	2	2	1	4	3.86
2	*Babirusa*	*Babyrousa celebensis*	Mamalia	5	6	5	2	2	2	1	3.29
3	*Monyet yaki*	*Macaca nigra*	Mamalia	5	6	5	2	2	2	1	3.29
4	*Kus-kus*	*Aliurops ursinus*	Mamalia	5	6	6	1	3	3	2	3.71
5	*Serendit paruh merah*	*Loriculus xlis*	Aves	5	5	6	1	2	3	2	3.33
6	*Cirik-cirik paruh merah*	*Meropongan foresteni*	Aves	4	4	5	2	2	2	2	3.00
7	*Rangkong*	*Rhyticeros cassidix*	Aves	6	5	6	2	2	3	2	3.71
8	*Elang Sulawesi*	*Nisaetus laceolatus*	Aves	5	5	6	1	3	3	2	3.57
9	*Delimukan*	*Gallicomba tristingmata*	Aves	5	4	6	1	1	3	1	3.00
10	*Pergam tutu*	*Ducula forestani*	Aves	4	5	6	1	1	3	1	3.00

Info: A = uniqueness, B = scarcity, C = beauty, D = sensuality, E = sensitivity, F = accessibility, G = social function

With an average value of less than < 4, it means that the fauna is not yet in optimal condition to be developed as a tourist attraction. However, if viewed from the uniqueness, rarity, and beauty aspects of all types of fauna with a value above > 4, it means that all types of fauna have the potential to be developed as tourist attractions, especially endemic species of Sulawesi such as hornbills. This bird's beauty has various contrasting colors on its physical body and sharp sound. The body is black, the tail is white, the beak is large and yellow. The existence of this bird is easy to detect, apart from its large body size, its distinctive voice, and the audible flapping of its wings (Mustari 2020). Thus it is necessary to package special interest tourism programs, namely animal watching for mammals and bird watching for bird species.

CONCLUSION

The protected forest area of Mount Mekongga has natural tourism resources in the form of natural phenomena, flora, and fauna.

1. The results of the assessment of natural phenomena, including the Tinukari River (3.86), the peak of Mount Mekongga (3.57), Tappareng Cave (3.29), and Coca Cola Lake (3.14) obtain relatively the same value less than a score < 4. That is, all natural phenomena are not in optimal conditions to be utilized as tourist attractions. However, when viewed from the uniqueness and beauty aspect, all natural phenomena score more than > 4, which means the potential for exposure as a tourist attraction. Suppose this natural phenomenon is to be utilized. In that case, accessibility must be improved through road arrangement, especially the road to the top of Mount Mekongga, which is synonymous with adventure tourism with activities in the form of trekking, so that it can be more easily reached by all visitors.
2. The results of the assessment of the type of flora in the HLGM forest area, when viewed from the uniqueness and beauty aspect, have a value above > 4, which is an epiphytic (orchid) type. But among the types of orchids, Sorume orchids have the highest selling value when packaged in a special interest tourism program. When described the Sorume Orchid (*Dendrobium utile*) is part of the Wallacea biodiversity, which is endemic to Sulawesi and has a high social function, especially the Tolaki people who use the Sorume orchid as a raw material for making mats, songko, and other crafts. Concerning its use, paying attention to the sensitivity aspect is necessary.
3. Assessment of fauna species in the HLGM area when viewed from the aspect of uniqueness, rarity, and beauty of all types of fauna with a value above > 4 means that all types of fauna have the potential to be developed as tourist attractions, especially endemic species of Sulawesi such as hornbills and mountain anoa. Thus it is necessary to package special interest tourism programs, namely animal watching for mammals and bird watching for birds.

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