

Plant diversity and its conservation status in the Gunung Pujut Ancient Mosque Area, Lombok Island, Indonesia

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ABSTRACT. Gunung Pujut Ancient Mosque is one of the cultural heritages in Lombok Island. This study aims to determine the diversity and conservation status of plants in the Gunung Pujut Ancient Mosque area. The research was conducted through direct observation, calculation of diversity index and dominance index, and tracing the conservation status of plant species. There are 29 families, 31 genera, and 34 plant species in the Gunung Pujut Ancient Mosque area. This is a stable ecosystem because it has a high diversity of plants. This shows that the cultural heritage area of the Gunung Pujut Ancient Mosque is a suitable habitat for the growth and development of various plant species and plays a role in supporting biodiversity conservation. There is no ecological pressure in this area because it has low plant dominance index.

Keywords: cultural heritage; plant species; religious tourism; sacred site, Sasak tribe

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INTRODUCTION

Archaeological site is a spot (or locus) where remnants of human activity from the past can be found, encompassing elements or components with cultural heritage value, where archaeology has contributed to the discovery, recognition, and/or research of these cultural values (Sullivan & Mackay, 2012). According to Nilson & Thorell (2018), UNESCO defined cultural heritage is the legacy of tangible artifacts and intangible characteristics of a group or culture that are passed down from previous generations, preserved in the present, and given for the benefit of following generations. The older structures, particularly those that have been classified as cultural heritage monuments, are incredibly prone to harm (Rilatupa & Mangani, 2020), such as Gunung Pujut Ancient Mosque, so it needs to be preserved.

Gunung Pujut Ancient Mosque is one of the cultural heritages in Lombok Island. Lombok is an island in the Lesser Sunda Islands chains, located between Bali and Sumbawa. Geographically, Lombok is in West Nusa Tenggara Province, Indonesia (Central Bureau of Statistics for West Nusa Tenggara Province, 2024). Sasak tribe is the original people of Lombok Island, including those who inhabit the area around the Gunung Pujut Ancient Mosque. Gunung Pujut Ancient Mosque was founded in 1008 H = Caka year 1509 = 1587 AD, around the 17th century AD when the spread of Islam in Lombok Island was occurred. Currently, this mosque is no longer used as its function. This mosque is part of the cultural veil. However, this site is considered to be a dead monument. Gunung Pujut Ancient Mosque building shows the existence of local wisdom in the relationship between humans and plants. The function of the Gunung Pujut Ancient Mosque reflects the religious aspects

and traditional values. This needs to be studied so that local knowledge and culture could be maintained.

Cultural heritage is a form of cultural landscape. According to Shen & Chou (2021), the interaction between community and the natural environment creates a cultural landscape. Today, many cultural landscapes are under threat (Rossler & Lin, 2018). Pressures and threats to the existence of cultural landscapes are getting higher, including rapid development, conversion of cultural landscapes into other forms of use, deforestation, exploitation of natural resources, socio-ecological changes, loss of components of the cultural landscape, decreasing of the younger generation understanding and appreciation of the cultural landscape, and loss of knowledge about the biological component in cultural landscape (Jung & Ryu, 2015; Rahmi & Setiawan 2021; Pora *et al.*, 2022).

Therefore, it is necessary to make efforts to preserve cultural heritage. According to Malik *et al.* (2023) cultural heritage helps preserve people's history and traditions, providing a sense of identity for present and future generations. This aims to ensure a balance of interests, protect and enhance resources, and, meet the needs of all parties involved (current and future) (Vukovic & Ruzicic, 2017). Several studies have been conducted at the Gunung Pujut Ancient Mosque, including: Analysis of the Potential of the Gunung Pujut Ancient Mosque as a Cultural Tourism Destination (Rahman *et al.*, 2024), Conversion of the Function of the Gunung Pujut Ancient Mosque in the Sengkol Village Community, Pujut District, Central Lombok Regency (Darmurtika *et al.*, 2021), Accuracy of the Qibla Direction of the Bayan Beleg Ancient Mosque and the Gunung Pujut Ancient Mosque on the Island of a Thousand Mosques (Wafiroh, 2019).

Plants are a crucial component of cultural heritage because they provide various benefits, including site preservation, aesthetic enhancement, and supporting the livelihoods of surrounding communities. Appropriate plant arrangement can enhance the sustainability of cultural heritage structures and buildings and add value to the area. However, until now there has been no study that focuses on the diversity and conservation status of plant species in the Gunung Pujut Ancient Mosque area. Therefore, this study aims to determine the diversity and conservation status of plant species in the Gunung Pujut Ancient Mosque area. The implications of this study include providing essential baseline data for the sustainable management of cultural landscapes, supporting environmental and cultural heritage conservation efforts, and encouraging local community involvement in the preservation of plant species with ecological and historical value. The findings of this research may also serve as a reference for vegetation restoration planning, ecotourism development, and biodiversity-based cultural site protection policies.

MATERIALS AND METHODS

This research was conducted in the Gunung Pujut Ancient Mosque cultural heritage area, Sengkol Village, Pujut District, Central Lombok Regency, West Nusa Tenggara Province, Indonesia. Research through field observation. Observation in data collection was conducted through systematically recording research objects. Field observations were made to obtain a direct picture of the building structure, plant used and plant diversity. Plant identification referred to several identification books, including the following: Van Steenis (2008), Henderson (2009), and Setyawati *et al.* (2015)). Scientific names of plants are based on the International Plant Names Index (2025).

The plant diversity index and dominance index were calculated in this study. The Shannon-Wiener diversity index was utilized for the analysis of plant diversity.

$$H' = - \sum P_i \ln P_i$$

Where H' = Shannon-Wiener diversity index, P_i = Proportion of the number individuals of a plant species (n_i/N), n_i = abundance of a plant species, N = total abundance of all plant species. Results of Shannon Wiener diversity index calculation should be categorized below (Odum & Barrett, 2009), there are three levels of biodiversity: high ($H' > 3$), medium ($1 \leq H' \leq 3$), and low ($H' < 1$).

Dominance is analyzed using Simpson's Dominance Index.

$$C = \sum (P_i)^2$$

Where C = Simpson dominance index, P_i = Proportion of the number individuals of a plant species (n_i/N). According to Odum & Barrett (2009) that the range of Dominance index values (C) is between 0-1. If the Dominance index value (C) is close to 0, it means that there are no dominant species, but if the Dominance index value (C) is close to 1, there are dominant species.

The plants that have been identified are then tabulated including families, vernacular names, scientific name, and conservation status. These various data were then analyzed using descriptive and qualitative approaches.

RESULTS AND DISCUSSION

Plant diversity in the area of Gunung Pujut Ancient Mosque. In the outside of the Gunung Pujut Ancient Mosque building (Fig. 1), there are various plant species, as seen in Table 1.



Fig. 1. The outside of the Gunung Pujut Ancient Mosque

Table 1. Plants species in the area of Gunung Pujut Ancient Mosque

Family	Species	Vernacular Name	Conservation Status
Acanthaceae	<i>Justicia gendarussa</i> Burm.f.	Gandarusa	Not Evaluated
Adoxaceae	<i>Viburnum lutescens</i> Blume.	Viburnum	Least Concern
Annonaceae	<i>Cananga odorata</i> (Lam.) Hook.f. & Thomson	Kembang Sandat	Least Concern
Apocynaceae	<i>Plumeria alba</i> L.	Jepun	Least Concern
Araceae	<i>Amorphophallus paeoniifolius</i> (Dennst.) Nicolson	Gawok	Least Concern
Araliaceae	<i>Polyscias fruticosa</i> (L.) Harms	Policias	Not Evaluated
Araliaceae	<i>Polyscias scutellaria</i> (Burm.f.) Fosberg	Mangkakan	Least Concern
Arecaceae	<i>Arenga pinnata</i> (Wurmb) Merr.	Enau	Least Concern
Asteraceae	<i>Conyza sumatrensis</i> (Retz.) E. Walker	Pupak	Not Evaluated
Bignoniaceae	<i>Bignonia capreolata</i> L.	Anggur silang	Not Evaluated
Caricaceae	<i>Carica papaya</i> L.	Gedang	Data Deficient
Clusiaceae	<i>Calophyllum inophyllum</i> L.	Nyamplung	Least Concern
Compositae	<i>Cosmos sulphureus</i> Cav.	Kenikir Sulfur	Not Evaluated
Cornaceae	<i>Nyssa javanica</i> (Blume) Wangerin	Hirung, Waru	Not Evaluated
Dioscoreaceae	<i>Dioscorea esculenta</i> L.	gading	Not Evaluated
Euphorbiaceae	<i>Euphorbia neriifolia</i> L.	Gembili	Not Evaluated
Euphorbiaceae	<i>Euphorbia neriifolia</i> L.	Euforbia	Least Concern
Fabaceae	<i>Leucaena leucocephala</i> (Lam.) De Wit	Seputre	Least Concern
Fabaceae	<i>Tamarindus indica</i> L.	Bagek	Least Concern

Leguminosae	<i>Phaseolus vulgaris</i> L.	Buncis	Least Concern
Malvaceae	<i>Ceiba pentandra</i> (L.) Gaertn.	Kapuk Randu	Least Concern
Moraceae	<i>Artocarpus heterophyllus</i> Lam.	Nangke	Not Evaluated
Moraceae	<i>Ficus benjamina</i> L.	Bunut	Least Concern
Moraceae	<i>Ficus virens</i> Aiton	Bunut	Least Concern
Oleaceae	<i>Jasminum sambac</i> (L.) Aiton	Melati	Not Evaluated
Phytolaccaceae	<i>Petiveria alliacea</i> L.	Singawalang	Not Evaluated
Piperaceae	<i>Piper betle</i> L.	Lekok	Not Evaluated
Piperaceae	<i>Piper umbellatum</i> L.	Lekok-lekoan	Not Evaluated
Poaceae	<i>Bambusa vulgaris</i> Schrad.	Treng Aur	Not Evaluated
Portulacaceae	<i>Portulaca grandiflora</i> Hook.	Krokot Mawar	Not Evaluated
Salicaceae	<i>Flacourtia jangomas</i> (Lour.) Raeusch.	Kerukup	Not Evaluated
Sapindaceae	<i>Schleichera oleosa</i> (Lour.)	Kesambik	Least Concern
Solanaceae	<i>Capsicum frutescens</i> L.	Sebie Kodek	Least Concern
Verbenaceae	<i>Duranta erecta</i> L.	Sinyo Nakal	Least Concern
Zingiberaceae	<i>Hedychium gardnerianum</i> Sheppard ex Ker-Gawl	Jae Lili	Not Evaluated

In the outside of the Gunung Pujut Ancient Mosque building, there are 29 families, 31 genera, and 34 species (Fig. 2). Based on the analysis it can be seen that the plants in the area of the Gunung Pujut Ancient Mosque have a high diversity index (3,173). According to Odum & Barrett (2009) an ecosystem's stability is similar with diversity. An ecosystem's condition is stable when its diversity is relatively high (Odum & Barrett, 2009). This means that the environmental condition of Gunung Pujut Ancient Mosque is stable. This shows that the cultural heritage area of the Gunung Pujut Ancient Mosque is a suitable habitat for the growth and development of various plant species and plays a role in supporting biodiversity conservation. According to Hakim (2014), conservation is the act of using resources in a sustainable manner. Conservation is protecting species, studying and using natural and biological resources wisely. Conservation is currently an important issue for the world community because it is one of the hopes in preserving global biodiversity for human life in the future (Hakim, 2014). Based on research by the IUCN, the conservation status of plants in the Gunung Pujut Ancient Mosque area falls into three categories: 51.4% are classified as Least Concern; 2.9% are Data Deficient; and 45.7% are Not Evaluated.

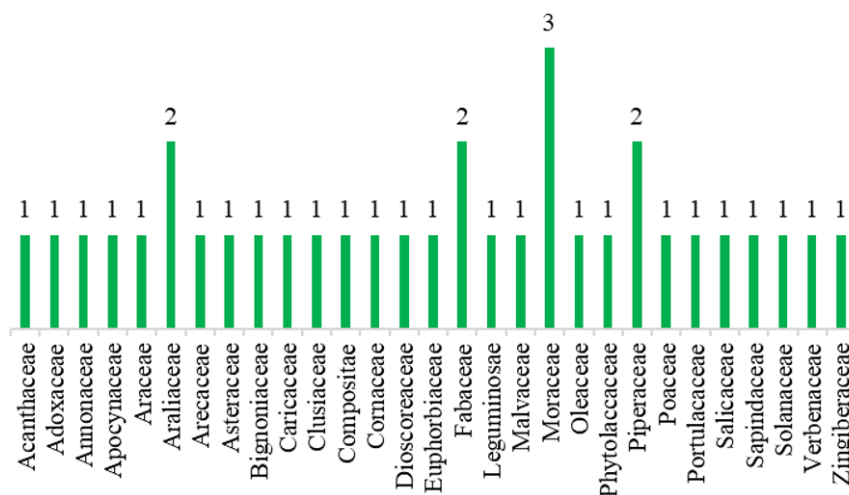


Fig. 2. Number of species of each family

Dominance index range between 0-1. Dominance index categories according to Ludwig & Reynold (1988), to be specific: low dominance ($0 < C \leq 0.5$), moderate dominance ($0.5 < C \leq 0.75$), and high dominance ($0.75 < C \leq 1,0$). Based on the Simpson dominance index analysis, the environment of Gunung Pujut Ancient Mosque has a low plant dominance index (0.065). This

indicates that there is no species that dominate other species in an extreme, that the environment is stable, and that there is no ecological pressure.

CONCLUSION

Gunung Pujut Ancient Mosque has a distinctive building structure as a local identity for the Sasak people. There are 29 families, 31 genera, and 34 plant species in the Gunung Pujut Ancient Mosque area. This area has a high diversity of plants. This shows the stability of the ecosystem and there is no ecological pressure on Gunung Pujut Ancient Mosque area.

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