

An Exploration of Geotourism Characteristics: A Case Study of the Hummanaya Blowhole in Kudawella, Sri Lanka

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Abstract

Geotourism is knowledge-based tourism that contributes to sustaining the geographical character of a place while contributing to uplifting the living standards and wellbeing of local communities. Geotourism is considered a panacea to solve socio-economic issues such as poverty, underdevelopment, and to conserve natural features for future generations. Hummanaya is a well-known blowhole located at Kudawella, Tangalle area on the Southern Coast of Sri Lanka. However, the destination characteristics of Hummanaya have not been evaluated based on geotourism characteristics explained in geotourism literature. Hence, the main objective of the research was to evaluate the geotourism characteristics that Hummānaya possesses to be a geotourism destination. To achieve this objective, secondary sources were used to identify the characteristics of a tourist destination to be recognized as a geotourism destination. Then, the characteristics of the Hummānaya tourist destination were evaluated using primary and secondary data. Primary data was collected based on field observation and key informant interviews. The interpretative and descriptive methods were used to analyze the data. Tourism characteristics of the destination were evaluated based on four criteria/characteristics that a tourism destination should possess to be a geotourism destination: based on geoheritage, providing economic benefits to local communities and local community participation, tourism infrastructure, and building awareness on abiotic, biotic, and cultural attributes of the destination among tourists and hosts, and contributing to sustainability. The research finding revealed that Hummānaya is the only well-developed non-igneous blowhole in Sri Lanka. The study revealed that the environment of Hummanaya vicinity is made up of three attributes: abiotic, biotic, and cultural (ABC) attributes. The economy of the study area today depends on the coastal fishery resources and tourism activities with the blowhole. Therefore, the economic potential of this destination is enormous.

The results of the study revealed the optimistic characteristics for the above four criteria in Hummanaya to identify the site as a geotourism destination.

Keywords: Blowhole, Geoheritage, Geotourism, Geosite

1. Introduction

Since the 1980s, new types of tourism activities and destinations have emerged in the world as alternative tourism destinations to mass tourism destinations. Geotourism is one such alternative to mass tourism. The term geotourism has been created by merging two terms, Geo and Tourism. Here, Geo is a term that means the Earth. Tourism is a process in which a person travels to a place outside of his place of residence without the intention of earning income and returns to his place within not more than a year, and it is also a process that includes the provision of facilities for travelling. As per Dowling & Newsome (2006), “Geotourism encompasses wider geographical, socioeconomic and cultural contexts which sit under the umbrella of geographical tourism”.

According to National Geographic (2022), the core geotourism characteristics are not to harm nature or society, to protect and conserve its most valuable assets (ABC), to respect the local customs and history, to aim for quality, not quantity, to ensure local community participation, to educate both visitors and hosts, to contribute to local economic enhancement, to maintain the integrity of the place, and to provide an unforgettable experience to enthusiastic visitors. A blowhole is a vent on the earth’s surface which permits the escape of air, gas, or water. In general, they occur in areas where there are lava tubes or in rocks with fault lines and caves. According to Whittow (2000), a blowhole is “a vertical or near vertical cleft in a coastal cliff linking a sea cave with the cliff top and through which columns of spray are violently injected”. Hummānaya is a well-known blowhole located in Kudawella, on the Southern Coast of Sri Lanka. As per visitor comments (google reviews) and some websites (such as Tripadvisor, 2022 and Geocoching, 2022), Hummānaya blowhole which is located at Kudawella in Sri Lanka is considered the largest blowhole in Asia and the second largest blowhole in the world. Although there is not enough scientific

evidence to confirm this fact, it is clear that the above-mentioned sense of place greatly affects the attraction of tourists to this tourist destination. Other famous blowholes in the world are Kiama (NSW, Australia), Nakalele (Maui, Hawaii), Alofaaga (Palauli, Samoa), and La Bufadora (B. California, Mexico).

A blowhole is a coastal landform that consists of a cave, liniments (cracks), and a hole in the roof of the cave. Along with the rhythm of coastal waves, the water level in the sea cave rises and falls. When sea water enters the cave, the entrance of the cave is completely closed by the sea water, and thus the air pressure inside the cave increases. The air and water under high pressure in the cave flow rapidly through small holes and cracks in the cave. The flux of air and water rising through the cracks and holes of the rock ejects into the sky and scatters as a water flower. As the action of the ocean waves increases, so does the height of the water flux that ejects out of the blowhole. This is a fascinating scene that captivates the viewers. Therefore, places with blowholes have become tourist destinations. These destinations are known as geotourism destinations as the tourist attraction is mainly due to geomorphological peculiarities.

It is worth mentioning here that many of the geotourism destinations (geoparks or geosites) in the world are not nationally protected areas (Farsani et al., 2012). In the case of Sri Lanka, there are some geo-morphic features protected under different rules and regulations. Even Hummanaya blowhole is located in the coast conservation area, it has not been identified and protected as a geosite. Therefore, it is essential to understand and document the nationally and internationally important geotourism sites, such as Hummānaya.

Further, it is essential to pay attention to developing geotourism in Sri Lanka because it is one of the rapidly developing niche markets in world tourism. It can be identified from the number of geoparks (geotourism destinations) registered under UNESCO. According to Farsani et al. (2012), the number of registered geoparks under UNESCO was 20 in 2004, and 77 in 2010. It has grown to 177 in 2022 (UNESCO, 2022).

Geotourism can be considered as a panacea to solve socio-economic issues such as poverty and underdevelopment and as a regional development tool.

The main objective of the research was to identify the geotourism characteristics that Hummānaya possess to be a geotourism destination. To achieve the main objective several secondary objectives were envisaged to be achieved. The secondary objectives were as follows:

- to extract a series of criteria to evaluate geotourism characteristics based on geotourism principles,
- to evaluate the destination characteristics of the Hummānaya area based on extracted criteria.

2. Methodology

Hummānaya blowhole, that is reputed as the largest and most well-developed natural blowhole in Sri Lanka, attracts a considerable number of domestic and foreign visitors. Apart from its tourism potential, the geotourism characteristics of Hummānaya have not been fully researched. This intellectual gap has led to degrade the tourism allure of the destination. Hence, the destination characteristics of Hummānaya have to be evaluated with respect to the geotourism principles. The blowhole is located in the Kudawella fishing village situated on the coast between Tangalle and Dickwella. Its coordinates are 5.9780° N, 80.7377° E. Hummānaya and the village is administered under the Tangalle Divisional Secretariat Division, Matara. Hummānaya is located 1.5km away from the Matara-Tangalle main road.

The conceptual framework of the study was built by considering the following steps:

- Collecting the geotourism characteristics based on the literature
- Extracting a series of criteria to evaluate geotourism destinations
- evaluating the characteristics of Hummanaya destination based on the criteria (geoheritage, local economic contribution, tourism infrastructures, building awareness, and sustainability)

Qualitative research methods were used to achieve the aforementioned objectives. The study was primarily based on a literature survey, field observations, and key informant interviews. Seven key informants were purposively selected and the interviews and field observations were conducted to clarify the findings of the literature survey. The primary data were collected from June to October 2022. The interpretative and descriptive methods were used to analyze the data.

3 Literature Review

In the research literature, there are two traditions in geotourism. The first is the England and Australian tradition (geological tradition) which emphasizes geotourism as essentially geological tourism. The second is the National Geographic Society's tradition (geographical tradition) which promotes "a broader 'geographic' view of geotourism that embraced a broader remit and included a range of niche forms of tourism such as cultural tourism and ecotourism" (Dowling, 2013).

The first definition of geotourism was made by the English geological historian Dr. Thomas Hose in 1995 (Dowling & Newsome, 2010). According to his definition (refer to Table 1), geotourism is a kind of geological and geomorphological attraction-based tourism (Hose, 1995). However, Geo is more than geology; it involves geographical (both human and physical) and geomorphological earth systems (Farsani et al., 2012). Thus, as can be seen in Table 1, the first definition of geotourism was later refined by scholars to include many meanings of the term Geo and even the revised definitions emphasize geographical peculiarities (Dowling & Newsome, 2006). In other words, geotourism is under the umbrella term Geographical Tourism, which provides opportunities to experience and understand the spatial variation and uniqueness of places and facilitates those travel to such destinations.

According to Sadry (2009), geotourism is a sister category to ecotourism. "From a broad sense, ecotourism is defined as nature visitation (sightseeing and facilitating those who visit the natural areas) for enjoying and appreciating nature (including present and past socio-culture, wildlife, natural features, and natural history of the

destinations). At the same time, from the definite meaning, ecotourism is defined as a nature-based specific type of nature visitation that targets nature conservation, nature-based education, and provides benefits to the local community (supporting locals to solve their socio-economic issues and ensuring their human rights)” (Pathmasiri, 2019). In general, ecotourism and geotourism try to understand, appreciate, and integrate nature and any existing cultural features. However, unlike ecotourism, “geotourism may occur in either a natural or an urban setting” (Dowling, 2013). In addition, ecotourism deals with ecology and biotic properties in the environment while geotourism deals with geomorphology and focuses on abiotic properties in the environment. Hence, as per Sadry (2009), geotourism can be distinguished from ecotourism.

According to some other researchers, geotourism as a sub-type of ecotourism adds the abiotic environment to ecotourism. As per Newsome & Dowling (2010), the environment is made up of three attributes: abiotic, biotic, and cultural (ABC) attributes. At the outset of ecotourism, it mostly focuses on understanding, appreciating, and interpreting the biotic properties of nature. Then, ecotourism incorporates cultural dimensions (such as socio-cultural, economic practices, and values) into its sphere. However, abiotic attributes such as geomorphological features and processes have been relatively ignored or neglected in ecotourism. Therefore, it can be said that geotourism has the ability to emphasize the three dimensions of ecotourism, i.e., ABC and helps in understanding the three dimensions of nature.

Table 1: Geotourism Definitions

Author	Definition
Hose, 1995	“The provision of interpretive and service facilities to enable tourists to acquire knowledge and understanding of the geology and geomorphology of a site (including its contribution to the development of the Earth sciences) beyond the level of mere aesthetic appreciation”.
Dowling & Newsome, 2006	“Geotourism encompasses wider geographical, socioeconomic and cultural contexts which sit under the umbrella of geographical tourism”.

Sadry, 2009	“Geotourism is a knowledge-based tourism, an interdisciplinary integration of the tourism industry with conservation and interpretation of abiotic nature attributes, besides considering related cultural issues, within the geosites for the general public”.
Newsome & Dowling, 2010	“A form of natural area tourism that specifically focuses on landscape and geology. It promotes tourism to geosites and the conservation of geo-diversity and an understanding of Earth sciences through appreciation and learning. This is achieved through independent visits to geological features, use of geo-trails and viewpoints, guided tours, geo-activities and patronage of geosite visitor centers”.
Charou et al., 2010	“Geotourism is a form of cultural-environmental tourism that can be developed in areas with important geological monuments, which are exploited in order to attract visitors with special interests”.
Hose, 2012	“The provision of interpretative and service facilities for geosites and geomorphosites and their encompassing topography, together with their associated in-situ and ex-situ artifacts, to constituency-build for their conservation by generating appreciation, learning and research by and for current and future generations”.
Farsani et al., 2012	“The new concept of geotourism as a new niche market with a special interest in the geo - geology, geomorphology, geodiversity, and geography - can add opportunities to cultural sustainability and rural development”.
National Geographic, 2022	“Geotourism is defined as tourism that sustains or enhances the geographical character of a place - its environment, culture, aesthetics, heritage, and the <i>well-being</i> of its residents”.

Theoretically, geotourism is a form of sustainable tourism or a branch of sustainable tourism. Geotourism follows sustainability principles and thus it can be said that geotourism is under the umbrella of sustainable tourism (Farsani et al., 2012). It allows tourists to travel to sites to enhance, learn from, and enjoy the earth’s heritage. It contributes to sustaining the ABC attributes while contributing to uplift the living standards of local communities and providing opportunities for visitors to understand and appreciate nature and any existing culture. The first code of ethics of geotourism is not to harm (National Geographic, 2022) the ABC of the destination.

Considering the traditions of geotourism and debates on defining geotourism, the International Congress of Geotourism, under the auspicious of UNESCO, said that geotourism should be defined “as tourism which sustains and enhances the identity of a territory, taking into consideration its geology, environment, culture, aesthetics, heritage and the well-being of its residents. Geological tourism is viewed as one of the multiple elements of geotourism” (International Congress of Geotourism, 2011; Dowling, 2013).

Dowling (2013) has identified a key difference between the two traditions of the definitions. The geological tradition focuses on geotourism as a type of tourism while the geographical tradition views geotourism as an approach to tourism. As per him, the National Geographic view of geotourism seems to simply be the application of sustainable tourism principles combined with the element of an area’s ‘sense of place’.

Geotourism, from the point of view of geography, basically depends on the unique characteristics of destinations. Hence, it is a way of marketing spatial variation. The properties of geotourism destinations can broadly be categorized into three categories, abiotic, biotic, and cultural (Newsome & Dowling, 2010). To some extent, on the one hand, the uniqueness of a destination is created by the ABC properties of the destination. The combination of abiotic, biotic, and cultural properties varies from place to place. In some places, dominant properties of the uniqueness of the place are related to abiotic attributes, such as Hummānaya while in some other places, biotic attributes or socio-cultural attributes may be dominant. In other words, elements of the place (location, locale, and sense of place) are created by the combination of ABC properties of the destination. On the other hand, geotourism places attention on marketing the tangible and intangible wealth of the destination to develop the living standards of local communities while conserving the wealth for future generations. In addition to that, while geotourism unfolds over the destinations, they are influenced by other geographic principles, such as territory, scale, and networks positively and/or negatively. The irresponsibility of tourists, state-centered agencies, tourism facilitators, etc. would negatively affect the tourism attraction of the destination. It

means that the ABC properties of a destination are causes for and effects of spatial variation. Thus, geotourism helps us to understand the causal relationship between ABC phenomena. In such circumstances, the study emphasizes that geotourism is a form of tourism that sustains or enhances the geographical characteristics of a place, such as its environment, culture, aesthetics, heritage, and the well-being of its residents while paying specific attention to geomorphological Form (landform and landscape), Process (how the landscape/landform originated and transformed) and Time (when these processes occurred and how long they lasted).

Geotourism can be further described based on the various essential characteristics. Same as in other forms of sustainable types of tourism, geotourism practices several core principles. As per Farsani et al. (2012), geotourism helps visitors to broaden their knowledge of natural resources, the host community's cultural identity, and ways of preserving the tangible and intangible assets of destinations. As mentioned above, geotourism follows the principles of sustainable development (Farsani et al., 2012), hence, it can be reinterpreted as geotourism principles as well. Theoretically, it can be said that geotourism follows the triple bottom lines of sustainability: preserving and restoring the health of the living system, achieving economic growth to deliver long-term prosperity to everyone from present to future, and social equity and equality.

According to Dowling (2013), five principles are fundamental to geotourism: First, geotourism should be based on the earth's geoheritage. It means that geotourism should be based on geological and geomorphological peculiarities. Second, geotourism should contribute to sustainability. In other words, geotourism should be an activity that is economically viable and community-enhancing while fostering geo-conservation. Third, geotourism should be an educational activity. It means that geotourism should build awareness of the destination's geography, geology, geomorphology, and geodiversity. Fourth, geotourism should provide benefits to local communities to uplift their socio-economic status and strengthen social harmony and integrity. To ensure the sustainability of geoheritage, local community participation is essential. To get local community participation, geotourism should be

able to provide economic benefits to local communities. Thus, UNESCO has identified geotourism as a new gateway to rural development (Farsani et al., 2012). Fifth, the same as other forms of tourism, geotourism should generate visitor satisfaction, in other words, confirm the expectation of tourists.

According to UNESCO (cited in Farsani et al, 2012), six basic characteristics must be met for any tourist destination to be recognized as a geopark:

- “Alic geopark must have enough surface area to serve local economic and cultural development,
- initiative to a geopark must come from local communities with a strong commitment to develop and implement a management plan,
- a geopark must foster sustainable socio-economic development,
- a geopark must provide and organize support tools and activities to communicate geoscientific knowledge and environmental concepts to the public,
- a geopark must contribute to the conservation of significant geological features,
- a geopark must provide a platform of cooperation and exchange between experts and practitioners in geoheritage matters”.

According to Dowling (2013), “geotourism comprises the geological elements of ‘form’ and ‘process’ combined with the components of tourism”. Geomorphological forms that geotourism interests are landforms (such as volcanic landforms, coastal landforms, aeolian landforms), landscapes (such as fluvial landscapes), features (such as glacial features, karst features), sediments and sedimentary environments, rocks (such as rock outcrops and regolith sections), and minerals, etc. Tectonic activity, igneous processes, weathering, erosion, and deposition are the main types of processes that geotourism places specific attention on. Dowling (2013) identified a list of processes of interest to geotourism. Those processes are mountain ranges, volcanism, lava flows, weathered profiles, landslides, ice sheets, glaciers, waterfalls, coastal cliffs, river valleys, deltas, and mudflats.

In geotourism, the aforementioned geotourism attractions are combined with the components of tourism (Dowling, 2013) and marketed to geo-tourists and other

travelers. Any service element (tangible or intangible) that a tourist consumes or buys from the time that he leaves home to the time he returns can be considered a tourism product (Middleton, 1989 cited in Farsani et al., 2012). As per Dowling (2013), the geotourism products consist of six components: attractions (macroscale eg. Grand Canyon-USA, mesoscale eg. Wave Rock-Australia, microscale eg. fossil beds-UK), accommodations (geolodges, georesorts), tours (scenic flights, organized vehicular guided tours, self-guided tours, drive and/or hiking), activities (site locality, visitor centers, virtual tours), interpretations (visitor centers, guided and self-guided trails, pamphlets), and planning and management (geoconservation, site designs for tourism, visitor management).

As per Reynard (2008, cited in Farsani et al., 2012), geotourism products and services can be classified into two categories as original offers and derived offers. Original offers consist of a set of geosites and geo heritages, especially unique features, landforms, etc. The derived offers consist of transportation and accommodation equipment/facilities (such as carts, hotels, cabanas, retail shops, restaurants, etc.), scientific goods (such as leaflets, books, digital documents, souvenirs, maps, etc.), interpretation services (such as museums, visitor centers), etc. Further, Farsani et al. (2012) say that geoproducts should be made of local or regional products, a symbol of the geoheritage of the territory, commercial and pedagogical tools, local traditional products, and earth-friendly (sustainable) products.

4. Results and discussion

This section consists of two subsections. The first section explains the characteristics of geotourism according to the literature. The second section places attention to evaluate the tourism characteristics that Hummanaya processes to be a geotourism destination.

Based on the research literature described above, it is possible to construct some basic characteristics that must be met to consider any travel destination as a geotourism destination. As mentioned above, some of the criteria are identified by Dowling (2013) as characteristics of geotourism.

- Being based on geoheritage (ABC significance)
- Providing economic benefits to local communities and local community involvement
- Tourism Infrastructure and building awareness on ABC among tourists and hosts
- Contributing to sustainability (protection and conservation of ABC)

Among these determinants, Dowling (2013) has identified the first three characteristics as essential characteristics of a geotourism destination. Based on the above determinants, it is possible to determine whether Hummanaya is a geotourism destination by evaluating the characteristics of the tourism in the destination.

4.1 Being based on geoheritage

The combination of the ABC attributes creates the geoheritage of the destination, but the geomorphological heritage is more dominant than others. The blowhole at Hummanaya is considered the second largest blowhole or pseudo geyser in the world. Although there is not enough scientific evidence to confirm this fact, it is clear that the above-mentioned sense of place greatly increases the attraction of tourists to this tourist destination. Thus, it is a heritage not only to Sri Lanka but also to the world. Blowholes in the world are classified into two types: igneous blowholes and non-igneous blowholes. Igneous blowholes are called geysers, and non-igneous blowholes are sometimes called shadow geysers. Geysers are fed by groundwater, while shadow geysers are fed by seawater. Geysers are a rare natural phenomenon, but non-igneous blowholes are even rarer. There is no igneous blowhole in Sri Lanka, and Hummanaya is the only well-developed non-igneous blowhole in Sri Lanka.

Several processes cause non-igneous blowholes, mainly shoreline erosion, and biological and anthropogenic processes. However, shoreline erosion is widely believed as the cause behind the formation of the blowhole at Kudawella. Based on the findings of the literature survey and field observation, the geomorphologic process of blowhole development can be divided into four main steps:

- Erosion of weak rock layers on a rocky shore by ocean waves and formation of sea caves/cracks.
- Expansion of sea caves/vertical cracks by further erosion of weak rocks. The entrance to the cave or tunnel should be at sea level so that the entrance to the cave/tunnel opens and closes with the rise and fall of the ocean water level in accordance with the rhythm of the ocean waves.
- Converting the cave or tunnel into a cave-like structure with a hole in the roof. This can happen in two ways. The first mechanism is the erosion of the roof of the cave and the formation of a hole in the roof to expose the interior of the cave to the surface. The second mechanism is the falling of rock boulders into the vertical tunnel which convert the tunnel or part of it into a cave-like structure.
- Due to the action of ocean waves, water and air under high pressure inside the rocky cave are rapidly forced out through a blowhole. Hummanaya blowhole is located about 13 meters above the mean sea level. Hummanaya blowhole usually reaches up to 10 - 12 meters in height from the mean sea level.

Hummanaya and its environs have geomorphological value with significant rock formations along a pre-Cambrian fault or joint (Sumanapala et al., 2021). It is an example of the coastal erosion process which is controlled by geological structures (Adikaram et al., 2018). “Relatively narrow sea cave at the top of the Kudawella cliff is formed by wave erosion along a faulted or jointed pre-Cambrian rock in the margin of highland and Vijayan rock complexes, which water and spray are forced when waves are driven against the coast” (Katupotha et al., 2000). The Kudawella headland and its environs (Hummanaya cliff and cave) are mainly formed by undifferentiated metasedimentary rocks and charnockites (Cooray, 1984).

According to Katupotha & Ranasinghe (2000), the changes in sea level during the Holocene have influenced the formation of Hummanaya Point blowhole, and other related landforms. During the Mid- and Late-Holocene epoch, the sea level was about 3 meters higher than the present sea level and because of the lowering of the sea level during the Late-Holocene period, the basic background (headlands, rock outcrops with cliffs and points, cave, etc.) necessary for the creation of Hummanaya has been

created. Because of the aforementioned geomorphological processes, Hummanaya headland is elevated approximately 30 meters above mean sea level (Katupotha & Ranasinghe, 2000).

Not only geomorphological factors but also climatological factors affect the process of the blowhole. Higher ocean waves are caused by strong winds blowing in one direction for long periods. The sea is rough when there are high wind waves. However, it is during such times that a more charming scene can be seen in connection with Hummanaya. In Sri Lanka, during the South-Western Monsoon season, strong winds blow from the South-West and create higher wind waves. During the season, the pressure inside the sea cave also increases, so the water flux can be seen rising to a height of 25 - 30 meters in the sky. Therefore, the best time to visit Hummanaya at Kudawella is in June - September.

No scientific study has been identified on the height of the water columns ejected by the Hummanaya blowhole, but some assumptions can be found in some sources. R.L. Brohier is recognized as the researcher who first mentions the Hummanaya blowhole in the literature. In the book *Being Ceylon* (1965), written by him, it has been mentioned about the Hummanaya as follows: “The hoarse gurgling roar gathers the volume then suddenly, a pillar of water churns to a dazzling whiteness gush out somewhere up the cliff, and for the moment you stand against” (Brohier, 2012). He assumes that the water columns rose about 60 feet. It is not clear whether he is stating the height of the water columns rising from the sea level or the distance that the water travels in the air from the vent where the water is ejected from the Hummanaya. De Livera (2022) states that he has seen it rise to 120 feet of the water column. Tourists can see a fascinating water flower usually every 10 - 15 minutes.

There are several reasons why this blowhole is known by the Sinhalese as *Hummanaya* (and sometimes called as *Huma*, a shortened form of *Hummanaya*). Two prominent ideologies were identified in the study (Key Informant Interviews, 2022).

- The term *Hummanaya* is derived from the term *hoo-mānaya*. The ‘*hoo*’ refers to the sound of air escaping from the blowhole as the air-mixed water flux ejects

into the sky. ‘*Mānaya*’ refers to distance. Hence Hummanaya means the sound heard at some distance.

- ‘*Hoomāniya*’ is an onomatopoeic name imitating the rumble before an eruption ‘*hoo*’, the explosion ‘*mā*’ of the fountain, and then the calmer rush of the spray ‘*niya*’.

It is clear from these travel notes that the tourist community is aware of the legends about Hummanaya from residents and tour guides. It means that the tourists not just visit the destination to see the abiotic properties of the destination, but also cultural properties. Apart from Hummanaya, sometimes it is referred to by the local community as Karijjamala (a flower of salt water).

Besides the abiotic properties of the destination, Brohier has mentioned biotic and cultural properties in the vicinity of Hummanaya that contribute to converting the site into a geoheritage.

“They call the spot Valle-Kale, meaning the jungle on the sea-shore. Nonetheless, this stretch of beach is a veritable hive of industry. Fishing-nets and boats, and various other types of fishing gear lie scattered about, telling too plenty that the prosperity of the inhabitants of the nearby village depends entirely on what the bay and fishing banks further out have to offer” (Brohier, 2012).

According to the Field Observations (2022) and the Tourism Development Plan for Hummanaya blowhole developed by Tangalle Pradeshiya Sabha (2021), Hummanaya blowhole vicinity (approximately 1.0724ha) harbours a few flora species, such as Katupenda (*Najas Marina*), Lunuwila (*Bacopa monnieri*), Olu (*Nymphoides indica*), Kekatiya (*Pygeum zeylznicum*), Jabara (*Eichhornia crassipes*), Diya Siyambala (*Aeschynomene indica*), Beru gas (*Indigofera tinctoria*).

In addition to that, the environment provides a home to many reptiles and other animal species (Field Observation, 2022; Tangalle Pradeshiya Sabha, 2021), such as Kabaragoya (*Varanus salvator*), Katussa (Genus: *Caletos*), Kiri Ibba (*Lissemys punctata granosa*), Gal Ibba (*Melanochelys trijuga themalis*), Diya Naya (*Natrix*

piseator asperrimus), Kunakatuwa (*Agkistrodon hypnale*), Mapila (*Boiga fortent*), Naya (*Naja naja naja*), Aharakukka (*Natrix stolata stolata*), Hal Danda (*Dendrelaphis bifrenalis*). Not only that, Hummanaya habitat attracts about 16 migratory bird species (Field Observation, 2022; Tangalle Pradeshiya Sabha, 2021), namely Sudu medi-koka (*Mesophoyx intermedia*), Pala-koka (*Butoridesstratus*), Kana-koka (*Ardeola grati*), Punchi Eli-koka (*Egretta garzetta*), Muhudu lihiniya (*Sterna sp.*), Kirala (*Vanellus sp.*), Kalupiya Ipalpava (*Himantopus himantopus*), Punchi diyakawa (*Phalacrocorax niger*), Indu Diyakawa (*Phalacrocorax fuscicollis*), Layasudu Korawakka (*Amonorruiis phoenicurus*), Ahikawa (*Anhinga melanogaster*), Podu Dam-kitala (*Porphyria poliocephalus poliocephalus*), Manatudu Medi Pilihuduwa (*Halcyon capencis*), Paththaya (*Anser anser*), Mal-seruwa (*Nettapus coromandeleanus*), Silibillo (*Tringa sp.*).

4.2. Providing economic benefits to local communities and local community involvement

The “recent exposure of the blowhole and other natural splendors in the Kudawella area to the public by the electronic media have transformed the surrounding area into a busy tourist attraction” (Katupotha et al., 2000). According to Katupotha & Ranasinghe (2000) estimation in 1999, approximately 375,000 to 400,000 local tourists visit Kudawella blowhole annually. Further, they have identified a clear difference between visitation rates between weekdays and weekends as well as seasonal visitation rates. “On average 520 visitors have arrived during weekdays while 2300 people have visited during the weekend” (Katupotha et al., 2000). They have identified 4 tourism seasons in the area: April to June as the very high visitation rate season, August to November as the high visitation rate season, December to January as the average visitation rate season, and February to March as the low visitation rate season. According to unpublished Financial Data of the Tangalle Local Council, between 2015 and 2019, about 221,000 domestic tourists and 9,600 foreign tourists bought tickets to visit Hummanaya. An adult local tourist has to buy a ticket of 20 rupees and a foreign tourist has to buy a ticket of 250 rupees to enter the premises to visit Hummanaya. In 2018, the income of the local council from the sale

of tickets to visit the Hummanaya for tourists was about 8 million rupees. If we consider the last 8 years, about 64% of the total revenue has been earned by selling tickets to domestic tourists.

Tourists from the Northern and Eastern provinces of Sri Lanka and districts other than Polonnaruwa and Mannar have visited Hummanaya in 1998. Colombo (14.5%), Hambantota (14%), Kalutara (12.5%), Gampaha (12%), and Matale (11%) districts have been identified as the districts with the highest number of tourists visiting Hummanaya (Katupotha et al., 2000). The field observations made by the authors confirmed that tourists from almost all provinces of Sri Lanka visit this place at present.

Tourism activities of Hummanaya produced economic opportunities for the local community. As per Williams (1998), any form of tourism has the ability to produce three types of economic effects: direct effects (the initial injection of revenue to the local economy by the tourist), indirect effects (represented by a second round of spending by the recipients of initial expenditures in purchasing the goods and services demanded by the tourist), and induced effects (spending by the beneficiaries of the direct and indirect effects on goods and services for their consumption).

According to Katupotha & Ranasinghe (2000), by 1998, the economy of the Kudawella area was almost totally dependent on the coastal fishery resources and the tourism activities connected with the blowhole. The economic potential of this site is enormous. They have calculated the annual recreational value of the blowhole as around Rs.10 million in 1998 prices using the travel cost method.

However, on the one hand, the majority of those engaged in tourism businesses earned less than Rs. 200 on weekdays, with a few vendors earning up to Rs. 500 on weekends. The difference between weekday and weekend income may be partly due to differences in visitation rates (Katupotha et al., 2000). Also, they noted that the local economic commitment of tourists is very low; as they observed, visitors do not spend money in this area, except for parking fees and some drinks. On the other hand, blowhole-based tourism activities have produced job opportunities and contributed

to diversifying the income sources of the local community. Katupotha et al (2000) have identified that 54% of those engaged in tourism-related economic activities had been unemployed before, and 31% have engaged in tourism-related economic activities as an additional income source. The SAM project emphasizes the need to create more economic opportunities for the local community through various activities.

4.3. Tourism infrastructure and building awareness of ABC attributes among tourists and hosts

As identified by Katupotha & Ranasinghe (2000), by 1998, there were no sufficient tourism facilities in the destination. The area was suffering from poor educational levels, poor transportation services, poor quality of the road system, lack of drinking water, and communication services, etc. At the same time, population growth and rapid growth of tourist arrivals to the destination had put significant pressure on Kudawella village and its environment. All those causes created and spread socio-cultural issues (such as addiction to drugs, alcohol, and other abuses), conflicts among local communities and visitors, and negative impacts (such as dumping of solid waste, unauthorized constructions, and destruction of coastal vegetation) on the scenic beauty of the destination and environment. The lack of public awareness of the value of the fragile natural resources in the destination had created a difficult situation in implementing the rules and regulations efficiently.

For solving the aforementioned characteristics of the destination, the following four key policies were proposed by the SAM project (Katupotha & Ranasinghe, 2000)

- “Promote and extend economic benefits that can be gained from the blowhole and its environs among the residents of the area.
- Encourage nature-based planned tourism and recreational facilities
- Preserve cultural identity and stabilize the social condition of Kudawella fishing communities.
- Maintain and protect the sound relationship between villagers and visitors.”

Apart from policies, the SAM project for Kudawella proposed the following eleven strategies to mitigate the above-mentioned issues while ensuring visitor satisfaction. It is noteworthy that the SAM project proposed actions that need to be implemented under each strategy (Katupotha et al., 2000).

- “Design and implement a proper action plan for public awareness and education.
- Carry out effective enforcement and monitoring procedures for regulating development activities.
- Improve the environmental and scenic quality of the blowhole, the peripheral area, and the entrance point at Kudawella junction
- Introduce and implement design guidelines for constructions in the vicinity of the blowhole
- Launch an environmental and education programme to maintain the scenic quality of the blowhole and its immediate environment
- Establish a proper collection system for solid waste and waste oil management
- Ensure continuous financial provisions for a sustainable waste management system
- Curtail the use of non-biodegradable materials especially plastic and polythene in the vicinity of the blowhole
- Establish and encourage the introduction of a new water supply scheme with the construction of a storage tank.
- Minimize waste and unnecessary uses of current drinking water supplies by adopting water conservation measures
- Initiate a programme to upgrade and maintain the condition of the road network”.

As a result of the aforementioned efforts, infrastructure, tourist facilities, and some tourist attractions, such as the visitors’ information center on Hummanaya and marine life, safe viewing platform, and walking path of Hummanaya have been largely developed through the contribution of The Hambantota Integrated Coastal Development Project, the former Ministry of Fisheries and Aquatic Resources, the Ruhunu Tourism Bureau and the Southern Development Authority (Waidyasekera, 2009). Observation of the present research also confirmed that some of the other

tourism infrastructures have been developed. Hummanaya Visitor Center has drinking water taps and water-shield toilets (about 7) for tourists. However, there is a lack of educational opportunities (Pathmasiri & Fernando, 2023).

4.4. Contributing to sustainability (protection and conservation of ABC attributes)

On the one hand, Hummanaya blowhole has been identified as one of the high-priority recreational, scenic, and protected sites within Sri Lanka's coastal zone Coast Conservation Department (CCD, 1990; CCD, 1997), and is therefore protected under the Coastal Conservation Acts and policies. CCD (1997) suggests several measures to maintain and improve the quality of Hummanaya, such as requiring an EIA or IEE for development activities that may adversely affect the area; identifying, demarcating, and, where possible, acquiring areas of high scenic and recreational value; preparation of development and conservation guidelines for development activities around Hummanaya; and develop and implement plans for coastal and marine parks in collaboration with private and public sector stakeholders.

On the other hand, the rapid growth of tourist arrivals to the destination is putting significant pressure on Kudawella village and its environment. Thus, as identified by Katupotha & Ranasinghe (2000), promoting and strengthening the socio-economic status of the local community was a must to get local participation to sustainably manage the destination. Therefore, the Hummanaya blowhole is managed under the Small Area Management Project, SAMP (Katupotha and Ranasinghe, 2000). The Kuduwella SAMP was a collaborative process and was initiated in 1998. Local community members (such as Fishery Society, Blowhole Protection Society, Fisherman's Co-operative Society, Death Donation Society), State-centered institutions (such as CCD, Ministry of Fisheries and Aquatic Resources, Tangalle Pradeshiya Sabha and Divisional Secretariat, Sri Lanka Tourism Development Authority, Southern Development Authority) financial institutions (such as Janahita Bank and Sanasa), NGOs (such as Sarvodaya) were involved in preparing the management plan. The goal of SAMP is to 'conserve and manage the coastal

resources of the Kuduwella (and Mawella) area by improving the resource base and environmental quality to promote and strengthen the social and economic status of the communities' (Katupotha and Ranasinghe, 2000).

5. Conclusions

Geotourism is knowledge-based tourism that contributes to maintaining or enhancing the geographic character of a place while contributing to enhancing the wellbeing of the local community. The main objective of the research was to identify the geotourism characteristics that make the Hummanaya blowhole and its vicinity processes to be a geotourism destination. For a destination to be a geotourism destination, the destination must have the following four attributes: based on geoheritage (ABC importance), providing economic benefits to local communities and local community participation, tourism infrastructure, and building awareness on ABC among tourists and hosts, and contributing to sustainability (protecting and conserving ABC). With the combination of abiotic, biological, and cultural attributes of Hummanaya and its vicinity, this place can be considered a geo heritage not only for Sri Lanka but also for the world. Tourism activities in Hummanaya created economic opportunities for the local community and raised funds for the preservation and development of the destination's tourism facilities and attractions. Also, the tourist attraction of the destination is preserved under several conservation policies and regulations. Apart from this, tourism infrastructure, tourism facilities, a visitor information center on Hummanaya and marine life, viewing platform, and tourist attractions such as Hummanaya walkway have been developed largely with the contribution of various agencies. Therefore, it can be concluded that the Hummanaya destination has met the basic requirements to be considered a geotourism destination. Thus, necessary measures have to be taken to conserve and develop the destination as a geosite and geotourism site.

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