



Original research article

Vulnerability assessment of small islands to tourism: The case of the Marine Tourism Park of the Gili Matra Islands, Indonesia



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HIGHLIGHTS

- Tourism is one of the actors that is responsible for environmental depletion on small islands, due to the constructions of buildings and tourism activities.
- Gili Matra Islands have a vulnerability status from low into moderate, ranging from 2.25 to 2.75.
- Tourism activities in Gili Matra Islands already at a critical position.
- Vulnerability index which built from coastline, coral reef, live coral, and development area was applicable to assess small island vulnerability in Indonesia, especially for coral island.

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ABSTRACT

The Indonesian government is currently directing its focus of development on the optimum uses of marine and coastal ecosystem services including the marine and coastal tourism. One of the main locus of coastal and marine tourism is the small islands tourism such as Gili Matra Islands among others. Small islands tourism is one of the favourite touristic activities because the destination provides beauty, exotism, aesthetic and a diversity of natural habitats including the warm, clear and attractive water. Tourism is being considered as a development instrument in order to boost a country's economy and has become part of the global industry. However, tourism is also one of the actors that is responsible for environmental depletion, due to the constructions of buildings and tourism activities. This paper aims to study the level of vulnerability in small islands to tourism as a basis of integrated small islands management in Indonesian conservation area. The group of islands in this study consists of three islands namely Gili Ayer Island, Gili Meno Island and Gili Trawangan Island (known as Gili Matra Islands) that were observed using Small Islands Vulnerability Index (SIVI). The results indicate that Gili Matra Islands have a vulnerability status from low into moderate, ranging from 2.25 to 2.75. Gili Ayer Island has the highest

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vulnerability with SIVI of 2.75 (Moderate), followed by Gili Meno Island with SIVI of 2.50 (Low) and Gili Trawangan Island with SIVI of 2.25 (Low). The driving factor of vulnerability is the intensive utilization of marine tourism activities. Tourism is the sole stress to Gili Matra Island's ecosystem due to its direct damaging impact and reducing its environmental quality. The vulnerability index which was built from the coastline, coral reef, live coral reef, and development area was applicable to assess the small island's vulnerability in Indonesia, especially for coral island.

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1. Introduction

As the largest archipelagic state in the world, Indonesia has registered amount of 13,466 islands¹ in 2014. Among them are grouped into small islands such as Seribu Islands, Kapoposang Islands, Togeang Islands, Wakatobi Islands, Padaido Islands, Waigeo Islands, Raja Ampat Islands, Gili Matra Islands and many others. Similar to other Small Island Developing States (SIDS), small islands in Indonesia are also vulnerable to natural disasters and human activities, such as destructive fishing practices (poison fishing and bomb- or blast fishing), boat anchoring, coral- and sand mining. Small islands are usually high in coastal and marine biodiversity. Thus, detrimental activities are threatening the ecological-, socio and economic sustainability of small islands. Faced with such challenges, the Indonesian government has considered efforts to conserve coastal and marine resources, particularly for the small outermost islands in Indonesia. The Indonesian government is currently directing its focus on the development of small islands as conservation areas in conjunction with tourism industry. These efforts can be seen at Nusa Lembongan Island (Bali), Trawangan Island (Lombok), Pramuka, Macan, Untung Jawa and Pari Island (Jakarta), Asu Island (Nias), Weh and Rubiah Island (Aceh), Banda Island (Maluku), Enggano Island (Bengkulu), Derawan Island (Kalimantan Timur), Moyo Island (Sumbawa), Karimunjawa (Central Java), Bunaken Island (Manado), Waigeo Island (Raja Ampat), etc. Generally, tourism plays an economically significant role as a source of income and employments for the inhabitants of the small islands.

In many small islands worldwide, tourism is considered as a development instrument to boost the economy of a country (Croes, 2006) and as part of the global industry (Eligh et al., 2002; Daby, 2003; Teh and Cabanban, 2007). The preference for small islands is closely related to such factors as their beauty, exoticness, aesthetic, diversity of natural habitats (coral reef, sandy beach and sand dune), the warm, clear and attractive water (Daby, 2003). Compared to other tourism industries, marine tourism industry has grown enormously and become one of the biggest industries in the world (Hall, 2001; Mvula, 2001; Eligh et al., 2002; Gössling, 2002; Pickering and Hill, 2007).

Tourism has provided significant benefits in terms of economy and has led to an increase of community awareness in protecting the ocean environment especially the marine conservation area (Pelletier et al., 2005; Fabinyi, 2008; Abecasis et al., 2013). This can particularly be seen in countries such as: Indonesia in Nusa Lembongan Island (Long and Wall, 1996) and Trawangan Island (Yulianto et al., 2007; Bottema and Bush, 2012; Hampton and Jeyacheya, 2014), Malaysia in Banggi Island (Teh and Cabanban, 2007), Caribbean in Barbados Island (Bunce, 2008) and St. Lucia Island (Barkes and Roberts, 2004), Spain in Gran Canaria Island (García-Falcón and Medina-Muñoz, 1999) and Philippines in Calamianes Islands (Fabinyi, 2008) and Apo Island (Hind et al., 2010). However, tourism is also one of the main contributors that is responsible for environmental depletion, due to building constructions and tourism activities (Pickering and Hill, 2007; Fabinyi, 2008; Hannak et al., 2011). As mentioned by Peng and Guihua (2007), human activities bring implications for quality and quantity of natural resource, such as: (1) the establishment of hotels and resorts, port constructions and boats utilization, (2) reef-walking, snorkelling and diving, (3) fishing, and (4) land-based pollution and sedimentation (Barkes and Roberts, 2004; Hutabarat et al., 2009; Parolo et al., 2009; Hannak et al., 2011).

Those aforementioned developments, commonly found in developing countries were made without any regards to nor consideration that small islands have limited land and clean water making them vulnerable to the extensive pressures (Falkland, 1993; Gössling, 2001, 2002; Tompkins, 2005). Theoretically, according to an ecological resilience perspective, all ecosystems are vulnerable and easily disturbed (Lauer et al., 2013). Kaly et al. (2002) and Tompkins (2005) stated that vulnerability and resilience can be viewed as interconnected systems. Another theory stated that vulnerability is defined as a level in which the human- and nature system experience loss due to external disturbances or pressures (Janssen and Ostrom, 2006), whereas resilience is described as a degree of disturbances that can be absorbed by a system (Holling, 1973) and the recovery time for a system to reach its balance point (Brand and Jax, 2007). Campbell (2009) and Lloyd et al. (2013) stated that vulnerability is the tendency of disturbed and damaged system, while resilience is regarded as the ability of the system to adapt. This means that the less vulnerable the level of the system is, the more resilience it is, and vice versa; this is known as contradictory spectrum.

¹ Kementerian Kelautan dan Perikanan, Indonesia/Ministry of Marine Affairs and Fisheries, Republic of Indonesia (KKP), 2013. *Jumlah Pulau Kecil di Indonesia, Statistik Pulau-pulau Kecil/Number of Small Island in Indonesia, Statistic of Small Islands*. http://statistik.kkp.go.id/index.php/statistik/free/388/?entitas_ =345&filter=Lihat+Data+%C2%BB.

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