Challenges for conserving biodiversity and developing sustainable island tourism in North Sulawesi Province, Indonesia

Luchman Hakim1,2, Marno Soemarno2 and Sun-Kee Hong3,*

1 Department of Biology, Faculty of Mathematics and Natural Sciences, Brawijaya University, Malang 65145, East Java, Indonesia
2 Graduate School of Environment and Development Studies, Brawijaya University, Malang 65145, East Java, Indonesia
3 Institution for Marine and Island Cultures (MIC), Mokpo National University, Muan 534-729, Korea

Abstract
Recent conditions in North Sulawesi Province (NSP) have become favorable for the development of tourism. In this paper, we present the recent status of biodiversity and tourism in NSP as a basic consideration towards integrative biodiversity conservation strategy. Overall, biological accounts suggest that NSP is important for the world biodiversity conservation program. NSP’s biodiversity makes the area a major nature-based tourism (ecotourism) site in the world. Development of diverse tourism programs in NSP has provided new opportunities for balancing development and conservation of regional ecosystems. However, the excessive tourism growth in some particular areas in NSP has been identified as the primary factor of environmental degradation. Nowadays, biodiversity of North Sulawesi regions are suffering from the number of tourist impacts and facilities. Based on those conditions, tourism planning and development in NSP is needed to formulate a proper strategy to protect the ecosystem and biodiversity from degradation and extinction. This will be a new challenge of sustainable island tourism development and biodiversity conservation in NSP.

Key words: biodiversity conservation, island development, North Sulawesi Province, sustainable tourism

INTRODUCTION

The term biodiversity refers to the variability of lives on earth. Biodiversity comprises all the natural resources that provide useful goods and services for mankind. While biodiversity has a number of important functions, recently, many of them have been heavily threatened due to human activities (Naumann 2001). Large-scale deforestation in many developing countries has significantly decreased the degree of biodiversity. According to Rhee et al. (2004), illegal logging and harvesting are also recognized as significant factors to rapid biodiversity extinction. Moreover, poor natural resources management and practices are continuing to decrease biodiversity in many developing countries (Fox et al. 2000, Kartodihardjo and Supriono 2000). Loss of biodiversity means loss of resources and ecosystem services and therefore threatens human sustainability in the biosphere (Cunningham et al. 2003, Rhee et al. 2004).

The Indonesian tropical rain forest exhibits a high degree of biodiversity. The total number of known higher plant species is over 23,975 species. The number of mammal species is known be about 515 species. There are 929 known species of birds from the Indonesian archipelago. A total of 745 reptile species and 278 amphibian species are known from Indonesia. Fish comprises approximately 4,080 species from marine and freshwater ecosystems (BAPPENAS 2003). Many of them are endemic to Indonesia. Unfortunately, the rate of degradation has increased dramatically (Hakim and Nakagoshi 2008). The forces...
leading to deforestation vary from place to place within Indonesian islands. However, it is clear that logging and forest conversion of tropical rain forests have caused a rapid decrease in the forest cover in Indonesia (Kartodihardjo and Supriono 2000, BAPPENAS 2003, Rhee et al. 2004).

It is generally assumed that forest degradation is related to poverty. Many communities in poor areas depend on illegal hunting for food. Poor people cut trees for sale in illegal markets. Moreover, absence of scenario for sustainable use of biodiversity also becomes the crucial factor that leads to deforestation. According to scholars, deforestation and biodiversity decrease will not improve unless the basic economic needs are improved (Roe et al. 2003, Kumar 2010). Consequently, developing effective strategies to provide jobs and increasing economic benefits for local people will bring about positive changes to biodiversity conservation. Hence, ecotourism has been proposed as an important strategy. Ecotourism has been recognized to have a significant contribution to the development of local economy (Damanik et al. 2005, Drumm and Moore 2005). Ecotourism is a form of sustainable tourism and can be particularly appropriate for developing countries. The benefits of ecotourism within the idea of biodiversity conservation are gradually being acknowledged and identified. For many tourism destinations, tourism supports the local economic development, promotion of local culture, education, and the quality of life of local people. As a sustainable business, ecotourism is a promising alternative to local and national development as well as being a clean and environmentally friendly business. Thus, ecotourism is probably the most effective strategy for many developing countries (Kinnaird and O’Brien 1996, Ross and Wall 1999, Gunn and Var 2002, Hakim et al. 2008, 2009, Hong 2011).

In the context of Indonesia, ecotourism has been studied extensively because of its economic benefits and contributions to local development. In the case of Indonesia, the main challenge is not only related to the country’s natural capital richness, but also global tourist visitation trends (Damanik et al. 2005, Hakim and Nakagoshi 2008, Hakim 2011). In the first semester of 2010, Asia was the most visited region in the world. At the same time, international tourist arrival to Bali, the main tourism destination in Indonesia, increased by 9%. Tourism to natural environments has been growing significantly. Although a number of tourism studies have been implemented, a comprehensive study related to the importance of biodiversity, tourism planning and development has not been carried out. Over time, an increasing number of tourists will be a threat to biodiversity. Recent discussions about biodiversity and tourism in Indonesia have highlighted the needs for more research and study to understand the links between biodiversity, tourism and sustainability (Hakim et al. 2008).

North Sulawesi Province (NSP) is one of the popular tourism destinations in eastern Indonesia. Tourism has been growing since the 1970’s and nowadays its contribution to provincial earnings is considered significant. Recently, favorable conditions for the development of tourism in NSP have been due to the socio-political factors. Local government plays an important role in developing tourism events, establishing new vacation sites and promoting NSP as a new world’s tourism destination (Whitten et al. 1987). Biodiversity and environmental factors contribute significantly to the tourism sector. Nevertheless, much of the research carried out on tourism has been focused on the economical aspect and less attention has been paid on the ecological aspect. Very few study of the role of biodiversity on the tourism development has been conducted in South Sulawesi. Therefore, the aims of this paper are to 1) document the recent status of biodiversity, 2) review the recent status of tourism characteristics in NSP, 3) determine the impact of tourism on biodiversity, and 4) discuss the strategy to achieve sustainable tourism development in NSP.

**BIODIVERSITY OF NSP**

The NSP located in the northern part of Sulawesi Island, Indonesia, covers an area of approximately 15,273.10 km². This province consists of the longest and thinnest peninsula in the southern part of Sulawesi Island. Small islands encompass Manado Tua, Bangka, Talise, Bunaken, Mantehage, Lembeh, Siau, Tagulandang, Karakelang, Karabuan, and Salibabu (Fig. 1). This province contains a diverse ecosystem ranging from coastal to mountainous ecosystems. The mean annual temperature is 26°C and rain fall ranges from 1,133 mm to more 1,562 per annum. This province has more than 1,837 km of coastline that incorporates many diverse types of ecosystems (Whitten et al. 1987, BPS Sulut 2009).

North Sulawesi comprises important regions of tropical rain forest in which biological diversity is extremely high. Various factors such as soil chemistry, soil water, climate, and altitude contribute significantly to diversity and composition of natural vegetation. Nevertheless, the recent continual growth of human population is reported to be the greatest threat to the luxurious forest in NSP. Since