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ENVIRONMENTAL EFFECTS OF ECOTOURISM IN INDONESIA

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Abstract

The ecotourism is global issues who most talked lately in Indonesia, it is one of the activities special tourist interest which low impacts on natural tourism. The presence of ecotourism in the era of sustainable and tourism development mission should be minimum negative impacts, both on the environment resources and on socio-cultural local values. Ecotourism activities were more oriented on the utilization of natural resources, the natural ecosystems and have not been polluted yet. However, when all of tourism development can not be separated from the negative impacts, such as ecosystem distress in ecotourism object when visited by large number of tourists, there are many conflicts of interest between the ecotourism management with local communities, especially regarding the benefits sharing and its accessibilities. The purpose of this paper is to identify the environmental impacts arising as a result of ecotourism activities and to find out alternative efforts in mitigating the environmental impact of ecotourism activities. Carrying capacity of ecotourism is not just limited to the number of visits, but also covers other aspects, such as: (1) ecological capacity that is ability of natural environment in providing the needs of tourists, (2) physical capacity, that is ability of facilities and infrastructure in providing the needs of tourists, (3) social capacity, that is ability to absorb tourism activities without the negative impacts on the local communities, (4) the economic capacity, that is ability to absorb destination commercial efforts and accommodate any interests of the local economy.

Keywords: Ecotourism, environmental impacts, carrying capacity.

INTRODUCTION

Indonesia is a country rich in natural and cultural resources. Area of this country consists of more than 17,000 islands and small islands that stretch along the 6400 km from west to east, and about 3,000 km from north and south, and therefore naturally suggest the high diversities. Indonesia has the diverse flora and fauna resources. "Asia" fauna is available at the Greater Sunda Islands (Sumatra, Kalimantan, Java and Bali). Lesser Sunda Islands (East of Bali) have been affected by the "Australia" fauna, the greatest effects are in the shallow Sahul (Ambon, Seram, Aru). There are also several unique species in certain places that are not found in other places such as Komodo dragons (*Varanus komodoensis*). About 60 % of Indonesia's land consists of many types of forests and vegetations. Ethnic groups have its own culture, language, customs and ceremonies of their own special showing Indonesia's cultural diversity.

The issue of Indonesian tourism is a high concentration of activities in the most developed provinces, such as Jakarta, Bali, Yogyakarta, and several places in North Sumatra, North Sulawesi and South Sulawesi. These facts show that there are still many other provinces which have a

ecotourism resources and unique traditional culture but have not been utilized properly. Tourism objects, such as heritage tourism, traditional small town, down-town and the coastal cities and water front cities, natural landscapes and wildlife flora and fauna are scattered throughout the country.

Ecosystem diversity suggests the biodiversity of flora and fauna in this country. Indonesia is the second country after Brazil in their biodiversity (Primack et al., 1998). The biodiversity of flora, fauna and ecosystems, and cultural diversity are the potential attractions for tourism development in this country. Ecotourism and nature-tourism are suitable to improve the tourism standing, based on their nature and heritage tourism, the local social capital, and its tourism carrying capacity. As nature tourism activities that have a specific purpose and responsibility, the ecotourism communities more and more popular as a fun tourism activities. This trend is signed by the increasing number of "the nature-lover" among the Indonesian people who perform various activities in the form of cross-country (hiking), rock climbing, rafting, camping grounds, rising bicycle, enjoy the natural amenities and uniqueness of local traditional culture.

Indonesia suggests the high potencies of ecotourism attractions, include the nature ecosystems and its resources, nature biodiversity

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and traditional values spread in various regions of archipelagoes. However, management of these ecotourism attractions are actually undeveloped in many tourism destinations. Its activities are really still limited to certain nature areas. According to UNEP (2003), the ecotourism planning and management are the most effective tools in conserving biodiversity at the long term. The main ecotourism attractions are based on nature flora and fauna (90%), and local traditional culture (10%). For Indonesia, the ratio may be the nature resources of 60% and traditional culture of 40%, because this country is very rich in traditional culture (Sudarto, 1999). The nature and traditional culture are the main ecotourism attractions in Indonesia, people need to conserve nature resources in order to sustain any ecotourism objects and attractions. These activities are not so easy because Ryan and Crotts (1997) reported that the impacts of tourism are relatively complex and it is difficult to be managed (Hvenegaard and Dearden, 1998).

This suggests that ecotourism has an important role in the context of sustainable development, because it offers the high potentials for the private sectors to develop and utilize the natural resources potentials, and to support community economic development, particularly in rural areas surrounding the ecotourism destinations (Eagles, 2002).

In this paper it is described the ecotourism potentials from various regions in Indonesia, it provides general information about the existing economic and social development. In the perspective of ecotourism, it is identified environmental impacts due to the tourism activities and the impact prevention and its mitigation are discussed in order to support the goals of sustainable tourism and preservation of natural resources development program.

1. What is Ecotourism

The definition of ecotourism was introduced by the The International Ecotourism Society (IES) in 1990 (Fandeli, 2000), which states that ecotourism is a form of travel into the natural areas aimed in conserving the environmental resources and preserve biodiversity, and improve the local communities livelihood. Ecotourism is a form of tourism that is responsible in preserving the nature areas, to create economic benefits and maintain the cultural integrity of local communities, which is also a form of special tourism interest (Fandeli, 2003).

A tourist activities can be regarded as ecotourism if it has met three dimensions: (1) conservation dimensions, namely tourism activities are helping local conservation efforts with minimum negative impacts, (2) educational dimensions, namely the tourists who follow the activities of these tours will get knowledge about ecotourism, unique local biological and socio-cultural lives, and (3) social dimensions, namely the local people who have been key actors in implementing any tourism activities (Hafild, 1995).

Data suggest that among various types of ecotourism, the nature attractions are quite interested or about 10% of the overall tourism enthusiasts (WTO, 2000). In the future looks more positive with the declaration of 2002 as the year of the International Ecotourism, the positive responses have been suggested by more than 93 countries in the world. Indeed, to develop ecotourism is not easy because it must meet the international standards and rules. However, it is not expensive and very profitable in terms of nature conservation and local community empowerment.

Ecotourism based on this criteria is ecological tourism, which is a model of responsible tourism development in an undisturbed nature areas or areas that are managed by the specific rules to enjoy and appreciate any ecosystem services and all forms of traditional culture that support conservation, involving educational elements, has a low impacts of socio-economic and active involvement of local communities.

Ecotourism is a form of tourism that very closely with the principles of the environmental conservation. In developing the strategy of ecotourism it is used the sustainable ecosystem management. Thus ecotourism is very feasible in maintaining the sustainability of ecosystems. Directly and indirectly, activities of ecotourism also play a significant role in efforts to protect and manage the natural habitats and species that are found in them, and creates economic benefits for the surrounding communities.

2. Ecotourism Development in Indonesia

In Indonesia, tourism started to become an important concept from 1995, when there is a national seminar and workshop organized by the Pakta Indonesia and WALHI at Bogor city. In order to strengthen Indonesian ecotourism movement, participants in the Second National Workshop on Ecotourism held in Bali on 1 to 5 July 1996, declared the Ecotourism Society of

Indonesia (Indonesian Ecotourism Society, IES). Activities of this community among others are to increase awareness about the need for nature conservation, to develop the environmental education for the tourists who visit ecotourism destination, and create economic benefits for local communities. Since 1996, tourism discussions, workshops on ecotourism strategic planning and implementation of ecotourism in Indonesia have been performed. The IES was encouraged the first meeting (1997) in Flores city, and second meeting (1998) in Tana-Toraja, South Sulawesi (Sudarto, 1999).

Development of ecotourism in Indonesia was originally driven by non-governmental organizations (NGO), community services and environmentalist. It is more based on a commitment to the environmental preservation, economic development and empowerment of local communities in a sustainable way. Sometimes that commitment is not supported with the professional management, so that there are areas of ecotourism are not sustained. Meanwhile, private sectors have not been interested in doing business in this field, as it must take into account the social costs and the ecological costs (Ditjen PKKH, 2001).

To support the ecotourism development in Indonesia, tourism communities should understand any constraints in ecotourism management. Several constraints have been identified include forest logging (e.g. in the Tanjung Putting), uncontrolled mining (e.g. in the Tanjung Putting) and illegal hunting (generally in Bali). Other threats include flood disasters, social conflicts and environmental insecurities (Sudarto, 1999).

In 1993, tourism in the Asia Pacific regions have contributed U.S. \$ 950 billion and 10% comes from ecotourism activities. Because Indonesia is rich in biodiversity and culture attractions, there are chances for this country to get 10% of this amount. If this happens, Indonesia will get U.S. \$950 million from the ecotourism sub-sector. A potential market for ecotourism is the United States, about 43 millions people ready to do ecotours (Sudarto, 1999).

However, there are five basic principles of ecotourism that should be implemented in Indonesia, i.e.: (1) supporting program in nature conservation, (2) involving the local communities in ecotourism activities, (3) provide economic benefits for the tourism communities, (4) preserve social values, local traditional cultural

and religious communities, and (5) comply with regulations related to tourism and nature conservation (Anonymous, 1997; Anonymous, 1998).

One real example that can be described is ecotourism in Bali, it is supported by the Prudential Foundation, which provides funds to empower people in adopting eco-tourism in their village; e.g. the Pelaga - Turn Sidan, Sibetan, Tenganan and Ceningan. These initiatives are likely to slow the development of mass-tourism which can generate any problems of environmental degradation and social disorders (Carroll and Turpin, 1997).

Development of ecotourism in Indonesia should be supported by an active role of local communities by way (Ditjen PKKH, 2001): (1) developing any relationships of partnership with the local communities, (2) involving any local communities in the process of planning, implementation, monitoring and evaluation, (3) creating the local community aspirations and initiatives for the development of ecotourism, (4) having regard to the specificity of local and traditional wisdom, and (5) providing business opportunities and job opportunities for the local community.

3. Potential Tourism Objects

Objects and attractions (tourist attraction) are the geographical formation, supporting activities and facilities, which can attract tourists to visit the specific place (Spillane, 1985). In Act. No 9 /1990, it is stated that the objects and attractions are all things that a tourist target. Tourism activities in this trip is voluntary and temporary to enjoy the objects and attractions of tourism.

There are three basic elements in all the objects and attractions of tourism (Nyoman, 1990), namely: (1) places, which are the special places that can be visited by tourists, (2) signs or symbols that are visible and indicate the high value of tourism, and (3) physical borders that limits the physical objects or environmental attractions. All of attractions are the main attractions someone came to visit due to their authenticity of objects and uniqueness of attractions, it should be maintained.

However, the most important in developing tourism attraction is the tourism carrying capacity. The tourism carrying capacity have been influenced by numerous factors of tourist motivations and environmental properties in the ecotourism locations. Carrying capacity of ecotourism is not just limited to the number of

visits, but also covers other aspects, such as: (1) ecological capacity, that is ability of natural environment to satisfy the tourist needs, (2) physical capacity, that is ability of supporting facilities and infrastructure to satisfy the tourist needs, (3) social capacity, that is ability to accept any tourism destination sites with no negative impacts on local communities, (4) economic capacity, that is ability to absorb destination commercial efforts while still accommodate interests of the local economy.

The nature attractions can be either climatic conditions (clean air and cool temperatures, sunshine that are comfort and quiet), landscapes (the typical panorama of beautiful mountains, waterfalls, lakes and rivers), and healthy water resources (mineral-water and hot-water). Man-made tourist attractions include the facilities or infrastructure, heritage and culture, traditional lifestyle and green open spaces or parks for recreation or sports.



Figure 1. The Mountainous Landscape (a-b), one of the ecotourism destination in North Sulawesi, Indonesia (Source : Personal Documentation , 2011).



Figure 2. The agricultural tourism destinations in EastJava and the Coastal Tourism object in Lombok Island, Indonesia (Source :Personal Documentation, 2012).

4. Carrying Capacity of Tourism

Tourism carrying capacity is the ability of area (region) to provide any tourists needs without changing the physical properties and environmental qualities and without losses of ecosystem services quality perceived by tourists during the tourist activities. This means that the carrying capacity of tourism according to the concept of Mathieson and Wall (1982) was oriented to satisfy the tourist needs and minimize any environmental impacts.

Classifying tourists based on their preferences to enjoy a tourism attractions in the particular place and time can be used as informations on tourism carrying capacity. In other words tourism carrying capacity is manifested in the number of tourists who visit a tourist attraction per unit area per unit time (Soemarwoto,1997,in Lubis, 2006). The tourism carrying capacity is determined by the tourist destination and it is also influenced by their biophysical environment. The socio- cultural values also play an important role in the preserving carrying capacity at the long terms.

In general, tourist destination into the tourism attractions are to do various kinds of tourism activities. Among these are the leisurely walks, camping, hiking, and learning - observing - researching or a combination of its activities. Through a variety of tourist activities, someone hoping to enjoy any entertainment and recreation services. Through their recreational activities, it is expected that either physical and psychological disorders can be recovered well. Environmental attractions consists of various biological and physical components interrelating each and others. Biological components are the endemic flora and fauna and

its wildlife habitat. Physical components such as topography, soil qualities, the climatic tourism indexes (air temperature and relative humidity), supporting facilities and infrastructure, and the time needed to perform any tourist attractions (Douglass, 1978, in Lubis, 2006).

As for the appeal of a tourist attraction located on: any resource that can give rise to a happiness senses, beautiful, comfortable and clean; the existence of a high accessibility to be able to visit; the existence of distinctive features/specifications of uniqueness; availability of supporting infrastructures to support tourists, and natural objects which offer a high recreational values e.g. a beautiful views of the mountains landscapes, rivers, beaches, sand dunes, forests and others (Suwanto, 1997, in Lubis, 2006).

5. Environmental Impacts of Ecotourism Activities

Based on the research findings of Roe et al. (1997), impacts of tourism development can be categorized into three aspects: (1) environmental aspects, (2) socio-cultural aspects, and (3) economical aspects. Ecotourism activities in addition to generate the positive impacts, it can also generate negative impacts on the nature environment, as well as impacts of tourism attractions on the local socio-cultural values. Environmental impacts can also occur in the form of changes to the initial value of environment, but that appears unexpectedly. If it is uncontrolled, the negative impacts on the environment can lead to environmental pollution or environmental degradation.

Environmental degradations include the destruction of landscapes, destruction of vegetation community, wildlife, coral reefs and piled of garbages. Other negative impacts may occur as a result of tourism management plans that are less good, it less attention on environmental capacity and lack of knowledge and awareness of the local community and tourists in preserving the nature environment (Anonymous, 1995).

The negative consequences on the physical, chemical and biotic aspects include the soil erosion due to the high frequency of visits, the destruction of vegetation due to changes in nature landscape, increase the volume of garbages, and noise pollution due to the motor vehicles. There are also any negative consequences of socio-economic and culture, which are the occurrence of imitating behavior by the local community, the materialistic

attitude, increase the unorderly peddler, moral disorders in local communities, decrease of income, reducing interest in traditional artistic design (such as traditional souvenirs), decrease rate of the tourism magnetism, include the traditional culture attractions, decline of people's creativities in some historical and religious festivals or celebrations (Musaneff, 1995).

Various positive impacts generated as a result of ecotourism activities (Hadinoto, 1996), are: (1) ecotourism can provide economic benefits to the government and local communities. These benefits can be observed through the expenditure of tourists (tourist expenditures), 'the multiplier factor', and development linkages. The concept of the multiplier factor is that the expenditure of tourists can be done directly (primary): for example, purchases of goods and services, and indirectly (secondary): e.g. provision of employment that result in local income improvement, (2) synergism between ecotourism and nature environment, where tourists and local communities appreciate and understand each of ecosystem issues and the need for environmental preservation, (3) provide incentives to the governmental agencies, private sector and individuals which are introducing, planning and managing natural resources in a sustainable ways, (4) provide public education about the nature resources, (5) provide education to visitors about the nature and culture assets in the destination sites, (6) offers research opportunities, (7) provide employment opportunities to local communities, and (9) developing areas which are under-developed.

The impacts of ecotourism activities are multi dimensional. The negative and positive impacts can be seen in Table 1, 2 and 3.

It is shown the environmental components and its related negative and positive impacts. Based on ecotourism development activities, these impacts emerging from various aspects including physical, biological, economic, social, cultural and political aspects. For physical and biological aspects of the nature environment, ecotourism development suggest any chance in inducing ecosystem succession into the man-made ecosystem. In large-scale development, succession occurs in the ecosystem as a whole and all of a sudden. As for the social, economic and cultural impacts on changes in traditional lifestyle and the local community income.

Table 1. Potential Negative Impacts of Tourism on Natural Environment

Component of Environment	Negative Impacts	Tourism Activities which have induced Negative Impacts
Flora and Fauna	Breeding Disorders	<ul style="list-style-type: none"> ■ Bird Observations ■ Motion path
	The loss or extinction of animals	<ul style="list-style-type: none"> ■ Poaching ■ Animals were preserved or souvenirs made from animal body parts ■ Special Cuisine ■ The natural environment is crowded with visitors
	Changes in migration patterns of animals	<ul style="list-style-type: none"> ■ Tourism activities in the migration path
	Damage to vegetation	<ul style="list-style-type: none"> ■ Development of new tourism facilities ■ Tourist activities in protected areas
Pollution	Water Pollution	<ul style="list-style-type: none"> ■ Liquid waste ■ Spills (oil or other hazardous chemicals) ■ Disposal of solid waste into water bodies
	Air Pollution	<ul style="list-style-type: none"> ■ Motor Vehicles emission
	Noise pollution	<ul style="list-style-type: none"> ■ Motor vehicles ■ Traffic jam ■ Unbridled nightlife
Erosion	Erosion of surface soil	<ul style="list-style-type: none"> ■ The traffic is too dense
	Landslide	<ul style="list-style-type: none"> ■ Built environment of unbridled ■ Deforestation
	Damage to the riverbank area	<ul style="list-style-type: none"> ■ Tour boating unbridled ■ Riverside area is too crowded with occupants / visitors
Natural resources	Depletion of ground water and surface water	<ul style="list-style-type: none"> ■ Too many wake region ■ Damage to water sources
	The high possibility of fire	<ul style="list-style-type: none"> ■ Uncontrolled fire ■ Tourist irresponsible
Impacts scenery	Regions wake –looking	<ul style="list-style-type: none"> ■ There is no planning and control (landscape)
	Dirty Landscape	<ul style="list-style-type: none"> ■ Garbage ■ Cleanliness unguarded

Table 2. Potential Negative Impacts of Tourism on Built Environment

Component Environmental	Negative Impact Phenomena	Tourism Activities Negative Impact
Urban Environment	Improper land use	<ul style="list-style-type: none"> ■ The location of tourism facilities that are not true ■ Implementation plan Ineffective land use ■ There is no planning
	Changes in hydrological patterns	<ul style="list-style-type: none"> ■ Uncontrolled urban development
Impacts scenery	Change city skyline	<ul style="list-style-type: none"> ■ New architectural style ■ Growth wake region
	Changes in lifestyle in the city	<ul style="list-style-type: none"> ■ Changes in behavior ■ Changes in demographics ■ Changes in economic life
Infrastructure	Infrastructure too heavy burden	<ul style="list-style-type: none"> ■ High Density ■ Development of infrastructure supporting tourism activities are not adequate
	Utilization of facilities incorrectly	<ul style="list-style-type: none"> ■ There is no urban environmental management
Urban form	Changes in land use	<ul style="list-style-type: none"> ■ Shifting the location of residential and workplace ■ Inappropriate tourism resources
	Social changes in the urban communities	<ul style="list-style-type: none"> ■ Changes in work and community customs ■ Changes in patterns of social interaction

Component Environmental	Negative Impact Phenomena	Tourism Activities Negative Impact
istoric sites	Damage of archeological assets	<ul style="list-style-type: none"> ■ Building not maintained ■ The buildings are too many on display (exposed) ■ Inadequate maintenance
	The use of historic buildings is not true	<ul style="list-style-type: none"> ■ The lack of working space in the area ■ Help (conflict) of interest ■ Commercialization that ignore historical and cultural value
	Restoration of historic buildings is not true	<ul style="list-style-type: none"> ■ Application of architectural styles that do not fit ■ The lack of understanding of cultural elements ■ Too commercialized

Table 3. Potential Negative Impacts of Tourism on Cultural Environment

Component Environmental	Negative Impacts	Tourism Activities which have induced any Negative Impacts
Values and beliefs	Adoption of the values and beliefs that do not fit	<ul style="list-style-type: none"> ■ Intensive interaction with local residents ■ Hedonist lifestyle
	Not heeding customary values	<ul style="list-style-type: none"> ■ No respect for local customs ■ Not understanding the local customs
Moral	Prostitution	<ul style="list-style-type: none"> ■ Promotions unofficial negative ■ Tourists who like to become prostitutes
	Drunk	<ul style="list-style-type: none"> ■ Adoption of a bad drinking habits of tourists ■ Easily obtain alcoholic beverages
Behavior	" Westernized " behavior	<ul style="list-style-type: none"> ■ Modernization obscures with the behavior of Westerners ■ Western lifestyle interesting
	Ignoring the Indonesian characters	<ul style="list-style-type: none"> ■ Conduct an attractive stranger ■ The behavior of tourists who " free to do anything "
Arts and crafts	Losses of indigenous arts	<ul style="list-style-type: none"> ■ Commercialization art ■ Original indigenous art form is not attractive to tourists
	Damage and loss of cultural objects	<ul style="list-style-type: none"> ■ Bad actions tourists ■ Cultural objects are not well protected ■ Uncontrolled access to cultural objects ■ The lack of care
Legal and dicipline	Increased lawlessness	<ul style="list-style-type: none"> ■ Criminals attract tourists ■ Narcotics and other drugs ■ Tourists as a courier gang /criminal group ■ Not understanding the legal system Indonesia
History	Miss-perception on nation history	<ul style="list-style-type: none"> ■ Inaccurate historical facts ■ Historical facts are ignored ■ Distorted historical facts

It is shown the environmental components and its related negative and positive impacts. Based on ecotourism development activities, these impacts emerging from various aspects including physical, biological, economic, social, cultural and political aspects. For physical and biological aspects of the nature environment, ecotourism development suggest any chance in inducing ecosystem succession into the man-made ecosystem. In large-scale development, succession occurs in the ecosystem as a whole and all of a sudden. As for the social, economic and cultural impacts on changes in

traditional lifestyle and the local community income.

Research results of Kumurur (2002), show that the existence of development activities in the Lake Tondano has resulted in a decline in water quality of the Lake. This is because the fertilization in paddy fields is excessive, so the drainage water from the paddy-fields are rich in nutrients. This paddy-fields wastewater with surface runoff from the settlement are finally entered the Lake Tondano. Surface runoff from the settlement areas contain household wastes (e.g. detergent wastes, animal wastes and human

wastes). Input water rich in organic and inorganic materials contributing to this enormous decline of water quality of Lake Tondano. It ultimately have implications on human health who have utilized the lake water for everyday purposes.

Different things have been described by Butarbutar (2008), that there are positive impacts of ecotourism activities in the Tondano Lake areas (Villages of Laleko, Tataaran I, Koya and Paleloan) suggest the increase income of local communities, recreational facilities and adequate accommodation for tourists, the people's creativities in producing souvenirs from water hyacinth (*Eichhornia crassipes*), and tourism attractions such as fishing and water bikes. Utilization of the water hyacinth materials as the souvenir products, have increased population of this aquatic plant. However, there are also negative impacts due to the tourism activities, that are amount of solid wastes(garbages) from the tourist antivities, the low level of security around the tourist sites, declining cultural and ethical values in the local communities.

The research findings (Siagian, 2006) suggested that development activities in the Lake Toba areas generated many negative impacts on nature environment. Physical characteristics of the Lake Toba has been changed, whereby an increase in the death of goldfish in the "Karamba Jala Apung" (KJA) in the lake water. In addition, no involvement of local communities in these activities so that local wisdom is becoming obsolescence and public attentions on local cultural are declining. In the socio-economic aspects, according to Noferi (2007) in his research, ecotourism activities on the Maninjau Lake also suggest the impacts on local communities livelihoods, incomes, employment and public health. It also has induced many kinds of social changes in surrounding society.

The activities of tourism has led to the socio-economic impacts in the local communities of Jayapura District. The positive impact of tourism activities in terms of socio-economics is the increase income of local communities and increase of rural employment. Conversely, there are negative impacts, such as ecosystem degradation due to the development of a tourist attraction and any social conflicts involving local communities (Lumintang, 1996).

Any activity of ecotourism have been impacted on various aspects of the nature environment. The occurrence of changes in biological aspects, physical, social, economic and

cultural are impacts of tourist activities. Therefore all parties should be more concerned about maintaining the nature sustainability: learning to know and understand the natural environment, expand employment opportunities and involving the local communities in each activities.

6. Sustainable Ecotourism

The success of ecotourism is determined by the role of stakeholders of ecotourism: tourism industry, tourists, local communities, governments, non-governmental agencies, and researchers. Ecotourism is an industry that is based on the natural environment sustainability and the success of promoting ecotourism programs related to flora, fauna, and their ecosystems. Eco-tourists is very caring towards environmental sustainability. The local community is involved in the planning, implementation and supervision of the management of ecotourism. The Government was instrumental in the making of the regulation on the development of ecotourism facilities so that doesn't happen the exploitation of nature environment. Researchers study the ecotourism and implementation the ecotourism principles management.

The sustainable ecotourism development can be a successful if the stakeholder role is played in accordance with the role, working holistically among stakeholders, the deep understanding and awareness on nature conservation, and ensure the sustainability of ecotourism activities (France, 1997, in Lubis, 2006).

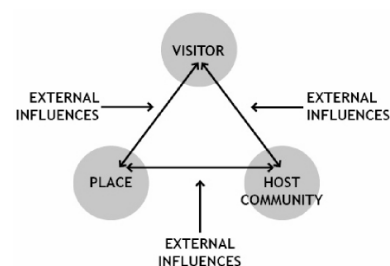


Figure 4. Sustainable Tourism Development Model (Burn and Holden, 1997).

The principles of Sustainable Tourism Development are : (1) the environment has intrinsic value that can also be a tourism asset. Utilization not only for the short interests, but also for the future generation benefits, (2) tourism should be introduced as a positive activity by providing mutual benefits for local communities, the nature environment and the

tourists themselves, (3) the relationship between tourism and the nature environment must be managed toward the sustainable environment, (4) tourism activities must be concerned about the scale or size of the nature and sites properties where the activities are held; (5) synchronizing among the needs of tourists, the place / environment, and local communities; (6) in a dynamic world, adaptation to change principles should be implemented; (7) tourism industry, local government and non-governmental organizations (NGOs), and environmentalists all have a duty to care about the above principles and work together to implement it (Burn and Holden, 1997).

The development of tourism in Indonesia should not cause any local communities lost its traditional "skills" which had owned previously. If that were the case, then in addition to loss of local wisdoms, the local communities can also threatened job losses or other sources of income. Therefore, development of tourism should be adapted to the characteristics of employments that already exists (Antariksa, 2011). When in a tourist destination is the main livelihood of the local population are farming, then the agro-tourism should be developed.

In an effort to realize sustainable ecotourism as mentioned by The Ecotravel Center (Anonymous, 2002), there are seven important things that must be performed by ecotourism operators, namely: (1) reduce negative impacts on the environment that serve as the object of ecotourism, (2) increase the contribution to the development of ecotourism around the object and support sustainable development programs, (3) minimize reduction of local wisdom in the local communities, (5) give priority to supporting businesses owned ecotourism activities by local communities, (6) supports the efforts environmental - preservation efforts, and (7) contribute to the biodiversity conservation in the ecotourism objects (I Nengah Subhadra, 2007).

Sustainable tourism development in Indonesia, which ensures that the optimum benefit will be gained in a sustainable way, can only be realized with a comprehensive and integrated approaches. The main element in the implementation of the sustainable tourism is a good leadership (Antariksa, 2011). Leadership is "the recipes" that can change a situation which might be "impossible" into "the possible". The leaders of tourism (Government and non-government) must understand that a destination

can not be developed on an ongoing basis indefinitely. Restrictions on the number of tourists who visit on the tourist destinations or tourist attractions at any given time (carrying capacity) is very important in the development of sustainable tourism.

7. General Discussion

Ecotourism includes ecology, economy and local communities. Aspects of ecology means that ecotourism suggest any positive contributions toward the nature conservation. Economic aspect means it is a tool for economic development. Public policies needs to empower the ecotourism communities, in the economic senses by providing a role in ecotourism for local communities, and by increasing their participation in nature conservation (Sudarto, 1999).

The tourism industry can reduce the level of poverty due to the characteristics of its activities (Antariksa, 2011a): (1) the tourists come to the destination sites so as to open up opportunities for the local communities to offer a wide range of tour products and services; (2) local economic diversification opportunities open up that can be accessed by the marginal groups; (3) open up opportunities for economic ventures labor-intensive accessible by the poor people; and, (4) not only depends on the financial capital, but also accentuate the cultural capital and natural capital which is often a poor people's assets.

Any development activities, anytime and anywhere, will surely generated the numerous impacts. Positive impacts of ecotourism development are: (1) the increase of local communities prosperity and welfare, (2) local economic activities gradually have increased, (3) the increasing ability of local community to adopt innovative technologies in any productive activities, (4) enlarging the employment opportunities, (5) support the regional economic development.

The positive impact of development on the nature environment are pests and diseases control, availability of clean water, controlled flooding, and others; while the negative impacts due to physical constructions on the environmental performance are environmental pollutions, which affect any biological aspects of nature environment. In addition, changes in local community attitudes that tends to consumerism is also the other negative impacts of development. It required an in-depth planning and related development activities for the

implementation of development to achieve the sustainable goals outlined.

Furthermore Drumm (2002) states that in any ecotourism activities should have a minimum impacts on natural resources that serve as tourist attractions. It should involve any stakeholders (individuals, communities, eco - tourists, tour operators and relevant government and non government) in the planning stages , development, implementation and supervision. These stakeholder involvement should be in accordance with cultures and local traditions, resulting in a reasonable and sustainable income for local communities, stakeholders and local tour operators.

To mitigate negative impacts generating from any tourism activities , the efforts should be done to anticipate negative impacts, among others, doing relevant cooperation between sectors involved in ecotourism activities of both governments, private sectors, local communities, researchers and tourists; enable more wisdom local communities; are brought together to improve environmental comfort by planting trees; provide incentives for additional workers; fines for visitors who throw wastes; give a gift or reward for the people who make souvenirs and woven from local-natural materials in traditional ways ; preserve local traditional culture, improve quality of recreational facilities and accommodations; transportation infrastructure must be improved to facilitate sites accessibility. The business can run well when it is supported by all of stakeholders.

The successful of efforts in minimizing impacts of ecotourism can be achieved if there is good coordination among all parties concerned to realize a cross-sectoral integration in order to avoid conflict of interests among sectors. Given the tourism sector is the tertiary sector, where the tourist preferences is largely determined by the level of environmental comfort, the supporting facilities and infrastructure, to improve site accessibilities are absolutely necessary. Thus the preservation of nature environment scan be preserved and maintained for the sustainability of ecotourism in Indonesia.

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KAJIAN JENIS - JENIS BURUNG DI DESA NGADAS SEBAGAI DASAR PERENCANAAN JALUR PENGAMATAN BURUNG (*Birdwatching*)

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Abstrak

Penelitian ini dilakukan dengan tujuan untuk mengetahui jenis-jenis serta sebaran spasial burung-burung yang ada di desa Ngadas. Penelitian ini dilaksanakan pada bulan Agustus 2010- Maret 2011 di Desa Ngadas, Kecamatan Poncokusumo, Kabupaten Malang. Pengamatan burung dilakukan dengan menjelajahi jalur pengamatan yang telah ditentukan sebelumnya. Daerah yang dijadikan lokasi pengamatan adalah hutan disekitar Desa Ngadas, wilayah lahan yang diolah serta daerah pemukiman. Data yang diambil dalam pengamatan burung tersebut meliputi data jenis burung, jenis vegetasi dimana burung dijumpai serta posisi koordinat dan lokasi perjumpaan dengan burung. Data mengenai jenis dan jumlah burung pada masing-masing karakter lahan ditabulasikan dengan menggunakan *Microsoft Excel 2007*, untuk selanjutnya dibuat diagram yang menunjukkan perbandingan antara jenis burung yang ditemukan pada masing-masing karakter lahan. Sementara untuk posisi koordinat burung tersebut dijumpai ditabulasikan dengan menggunakan *Microsoft Access 2007*, yang selanjutnya akan diolah dengan menggunakan *software ArcGIS 9.3* untuk dibuat peta sebaran burung Desa Ngadas. Berdasarkan pengamatan yang dilakukan di Desa Ngadas, diketahui bahwa setidaknya ada 13 famili dan 23 spesies burung yang ada di Desa Ngadas. Ketiga belas famili burung ini tersebar di seluruh wilayah desa Ngadas, namun jumlah famili paling banyak ditemukan di wilayah hutan sekunder, kemudian diikuti oleh wilayah ladang serta daerah pemukiman. Dengan melihat keragaman burung serta distribusinya di Desa Ngadas, perencanaan kegiatan *Birdwatching* memiliki potensi besar untuk dilaksanakan sebagai salah satu upaya konservasi dan pengenalan akan pentingnya melestarikan dan menjaga keberadaan burung.

Kata kunci: birdwatching, desa Ngadas, sebaran

Abstract

The purposes of this research were to know bird species and its distributions in Ngadas village, malang Regency. Research was done at August 2010 to March 2011. The Bird's observation was done by exploring the areas which were determined before, it was settlement area, agricultural field and also secondary forest area. The data which were collected in this research include birds species, vegetation in the area where the birds was found, and the coordinate position of bird which was found. Data about species and number of birds in each area will tabulated using Microsoft Excel 2007, the data about coordinate position of bird, was tabulated using Microsoft Access 2007, and proceed using software ArcGIS 9.3 to produce the map of bird distribution in Ngadas. Based on the, there were 13 family of bird and 23 species which found in three type of areas. Those 13 family were sdistributed in all around area in Ngadas. The most area with highest number of bird family was in secondary forest area, followed by agricultural field. The fewest area was settlement area. From the output which showing the number of birds and their diversity, we can conclude a design of Birdwatching in Ngadas.

Keywords: Bird, birdwatching, Ngadas, distribution

PENDAHULUAN

Burung merupakan kelompok hewan dari kelas Aves yang memiliki beberapa karakteristik yang membedakannya dari kelas-kelas yang lainnya. Kebanyakan burung hidup diurnal, meskipun demikian, ada pula burung-burung yang nocturnal. Banyak burung dikenali dari kemampuannya terbang, meskipun ada

beberapa spesies yang tidak memiliki kemampuan tersebut. Burung tersebar hampir di seluruh daerah di muka bumi. Di seluruh kawasan Jawa, jumlah total dari jenis burung yang tercatat adalah 494 jenis yang mewakili setengah dari suku burung di dunia. Sebanyak 24 jenis merupakan endemik Jawa, 16 jenis terbatas di Jawa, 1 jenis terdapat di Bali dan 7 jenis terdapat di kedua pulau tersebut, 366 diantaranya adalah jenis penempat dan 128 lainnya sebagai pengunjung / pengembara (migran) [6].

Keberadaan burung-burung di suatu tempat sangat dipengaruhi oleh ketersediaan makan, vegetasi serta aktivitas manusia [7].

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Sebagai salah satu kawasan yang dilindungi, Taman Nasional Bromo Tengger Semeru (TNBTS) memiliki keanekaragaman vegetasi yang memungkinkan tersedianya habitat yang sesuai bagi berbagai jenis burung. Sebagai salah satu desa yang berada dalam kawasan TNBTS, desa Ngadas memiliki peranan dalam dinamika keberadaan burung-burung yang ada di kawasan TNBTS. Hal ini terutama disebabkan semakin banyaknya penduduk desa Ngadas yang melakukan praktek pembukaan hutan untuk dijadikan daerah pertanian, meskipun saat ini praktek tersebut sudah dilarang oleh pemerintah. Keberadaan lahan pertanian yang menggantikan fungsi hutan tersebut tidak diragukan lagi menyebabkan beberapa jenis burung yang bergantung terhadap keberadaan vegetasi hutan kehilangan habitat aslinya [2].

Dalam rangka untuk mengatasi masalah tersebut, diperlukan suatu pemecahan yang bisa memberikan keuntungan, baik dari segi konservasi terhadap jenis-jenis burung yang ada di kawasan TNBTS, maupun bagi masyarakat desa Ngadas yang tinggal di kawasan tersebut. Salah satu cara yang bisa dilakukan adalah dengan mengarahkan Desa Ngadas sebagai salah satu daerah tujuan wisata alam *Birdwatching*.

Birdwatching merupakan salah satu kegiatan pengamatan burung di alam. Kegiatan wisata alam *Birdwatching* ini, di satu sisi bisa memberikan manfaat ekonomi bagi masyarakat sekitar karena banyaknya wisatawan yang akan melakukan kunjungan ke daerah tersebut, di sisi lain juga bisa memberikan manfaat konservasi bagi jenis-jenis burung yang ada di kawasan TNBTS. Namun, yang menjadi kendala saat ini adalah kurang tersedianya informasi tentang distribusi spasial burung yang ada di Desa Ngadas. Keberadaan informasi ini akan sangat membantu terlaksananya kegiatan wisata *Birdwatching* serta untuk mempermudah proses konservasi terhadap burung-burung yang ada di kawasan tersebut. Oleh karena itu penelitian ini penting untuk dilaksanakan agar informasi mengenai sebaran spasial burung-burung yang ada di Desa Ngadas bisa terpenuhi dengan pembuatan peta sebaran spasial burung-burung yang ada di Desa Ngadas menggunakan aplikasi Sistem Informasi Geografis, sehingga peta sebaran bisa digunakan sebagai gambaran rancangan pembuatan jalur untuk pengamatan burung (*Birdwatching*) di Desa Ngadas.

METODE PENELITIAN

Waktu Dan Tempat

Penelitian dan pengolahan data dilakukan pada bulan September 2010 – Maret 2011. Penelitian lapang dilaksanakan di Desa Ngadas Kecamatan Poncokusumo, Kabupaten Malang. Sedangkan pengolahan data dilakukan di Laboratorium Biokomputasi dan Informatika, Jurusan Biologi, Fakultas Matematika dan Ilmu Pengetahuan Alam, Universitas Brawijaya, Malang.

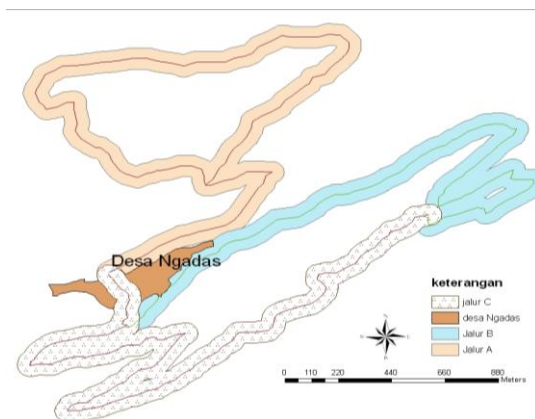
Deskripsi Area Studi

Penelitian dilakukan di Desa Ngadas yang terletak di koordinat 112°53'50" BT-112°5'10"BT dan 07°59'40" LS - 07°58'20"LS [5]. Secara administratif Desa Ngadas masuk ke dalam wilayah Kecamatan Poncokusumo, Kabupaten Malang. Desa Ngadas termasuk ke dalam kawasan Taman Nasional Bromo Tengger Semeru (TNBTS), dengan keadaan topografi bergelombang dengan lereng yang landai sampai berbukit dengan derajat kemiringan yang tegak. Dalam penelitian ini, lokasi yang diamati meliputi daerah pemukiman, ladang dan hutan yang membatasi Desa Ngadas dengan wilayah TNBTS. Berdasarkan tipe vegetasinya, desa Ngadas dibedakan menjadi 4 tipe ekosistem, diantaranya ekosistem hutan sekunder, Ladang dan daerah pemukiman.

Teknik Pengamatan Burung

Pengamatan burung dilakukan secara jelajah pada jalur pengamatan yang telah ditentukan sebelumnya. Daerah yang dijadikan lokasi pengamatan adalah hutan disekitar Desa Ngadas, wilayah lahan yang diolah dan daerah pemukiman. Daerah-daerah ini diambil karena dianggap mewakili 3 tipe ekosistem yang ada di desa Ngadas. Pengamatan dilakukan pada tiga pembagian waktu, dimana waktu pertama dimulai pukul 06.00-09.00 (pengamatan pagi), kemudian pukul 10.00-13.00 (pengamatan siang), serta pengamatan sore 13.00-17.00. Dalam proses pengambilan data ini dilakukan pengulangan sebanyak 5 kali. Pengamatan burung dilakukan dengan menggunakan bantuan binokuler dengan lensa 10 x 50 mm. Selanjutnya burung yang diperoleh dideskripsikan secara morfologis dan diidentifikasi dengan menggunakan Buku Panduan Lapangan Pengenalan Burung-Burung, antara lain *Panduan Lapangan Burung-Burung di Sumatera, Jawa, Bali dan Kalimantan* (McKinnon, 1992), *A Photographic Guide to The Birds of Indonesia* (Strange, 2001). Identifikasi dilakukan hingga tingkat spesies jika memungkinkan. Selain

itu, dalam pengamatan yang dilakukan, jumlah burung yang ditemukan dihitung jumlahnya serta difoto jika memungkinkan. Lokasi dimana burung-burung tersebut ditemukan selanjutnya dicatat posisi koordinatnya dengan menggunakan bantuan GPS (MAP 60CSx GARMIN). Pengamatan dilakukan di sepanjang jalur yang telah ditentukan pada radius ± 10 -100 meter sisi kiri dan kanan jalur pengamatan. Pengamatan juga dilakukan terhadap tipe vegetasi yang tumbuh di sekitar burung dijumpai, vegetasi tersebut dicatat jenis serta habitusnya.



Gambar 1. Jalur Pengamatan Burung di Desa Ngadas

Analisis Data

Proses analisis yang dilakukan dalam penelitian ini adalah dengan melakukan analisis statistik deskriptif, dimana data-data yang diperoleh dikelompokkan berdasarkan kepentingannya masing-masing. Data mengenai jenis burung, jumlah burung dan tipe vegetasi dalam masing-masing habitat ditabulasikan dengan menggunakan *Microsoft Excel 2007*, untuk selanjutnya dibuat diagram yang menunjukkan perbandingan antara jenis burung yang ditemukan pada masing-masing habitat, serta untuk mengetahui dominansi dari jenis-jenis burung yang ditemui pada masing-masing habitat tersebut. Sementara untuk data mengenai ketinggian tempat dan sebaran burung yang diperoleh berdasarkan posisi koordinat burung tersebut dijumpai, ditabulasikan dengan menggunakan *Microsoft Access 2007*, yang selanjutnya akan diolah dengan menggunakan *software ArcGIS 9.3* untuk dibuat peta sebaran burung-burung yang ada di Desa Ngadas. Berdasarkan *output* yang diperoleh dari masing-masing proses pengolahan, selanjutnya dilakukan analisis secara deskriptif sehingga bisa ditarik

kesimpulan mengenai jenis-jenis burung yang ada di Desa Ngadas beserta persebarannya.

HASIL DAN PEMBAHASAN

1. Famili Burung yang Ada di Desa Ngadas

Desa Ngadas memiliki keanekaragaman jenis burung yang bisa lebih dioptimalkan dalam kegiatan *Birdwatching*. Jenis-jenis burung tersebut ditemukan pada 3 karakter lahan yang ada di desa Ngadas yakni wilayah pemukiman, ladang serta hutan sekunder. Jenis vegetasi yang banyak terdapat pada masing-masing karakter lahan tersebut juga berbeda.

Keberadaan jenis-jenis vegetasi tersebut beserta faktor-faktor lainnya baik biotik maupun abiotik pada masing-masing karakter lahan di Desa Ngadas secara fungsional akan memberikan dukungan bagi keberadaan burung berupa ketersediaan pakan, air, tempat berlindung dari panas dan pemangsa serta tempat untuk bersarang, beristirahat dan memelihara anaknya.

Berdasarkan pengamatan yang telah dilakukan diperoleh beberapa famili yang diketahui berada di wilayah Desa Ngadas antara lain *Turnicidae*, *Motacilidae*, *Apodidae*, *Picidae*, *Passeridae*, *Pycnonotidae*, *Nectaridae*, *Zosteropidae*, *Accipitridae*, *Sylviidae*, *Phasianidae*, dan *Columbidae*.

Turnicidae merupakan suku burung yang memiliki ukuran yang kecil, berekor pendek dan umumnya bertubuh gempal. Sekilas menyerupai burung puyuh dari suku *Phasianidae*, namun tidak memiliki jari belakang [6].

Motacilidae merupakan kelompok suku yang cukup besar dan tersebar luas. Terdiri dari burung darat yang bertubuh ramping dan berjalan dengan anggun. Kebanyakan pipit yang merupakan salah satu jenis dari suku ini secara sepintas mirip dengan brajangan, namun memiliki ciri khas tungkai lebih panjang dan paruh lebih ramping [6].

Apodidae merupakan suku burung pemakan serangga. Memiliki kemampuan terbang yang cepat dan tersebar di seluruh dunia. Memiliki ciri khas sayap panjang dan runcing, menunjuk ke belakang saat terbang, ekor pendek atau persegi atau panjang menajam, kaki sangat kecil, jarang bertengger di pohon, biasanya beristirahat di pohon, karang, atau tembok dengan menggunakan kukunya yang tajam [6].

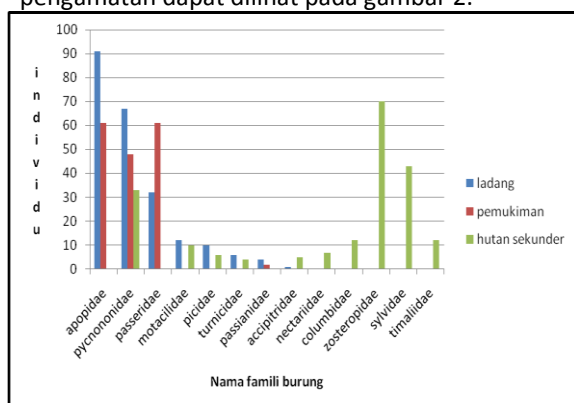
Picidae merupakan suku dengan beranggotakan banyak jenis burung dan dikenal baik. Memiliki ukuran tubuh sedang dengan paruh yang panjang dan kuat untuk melubangi

kayu. Semua jenis menggunakan batang dan cabang pohon sebagai tempat untuk mencari makan. Terbang dengan gerakan membungkuk yang tidak tetap, dan bersuara keras tidak selaras [6].

2. Sebaran Spasial dan Temporal Burung Desa Ngadas

2.1 Distribusi Spasial Burung di Desa Ngadas

Berdasarkan penelitian yang telah dilakukan pada 3 jalur pengamatan dengan ulangan data sebanyak 5 kali, diperoleh 592 individu yang terbagi atas 23 species dan 13 famili. Jumlah dan nama famili burung-burung di Desa Ngadas berdasarkan pembagian daerah pengamatan dapat dilihat pada gambar 2.



Gambar 2. Jumlah Burung yang Ditemukan di Desa Ngadas Berdasarkan Lokasi Pengamatan

Sementara nama family, nama spesies serta nama lokal dari burung-burung yang ada di Desa Ngadas bisa dilihat pada tabel 1. Keberadaan burung di Desa Ngadas dipengaruhi oleh beberapa faktor, terutama akibat aktivitas manusia. Fragmentasi habitat, degradasi serta rusaknya habitat menyebabkan semakin berkurangnya keberadaan burung-burung di habitat aslinya [3]. Keberhasilan burung untuk hidup di suatu habitat sangat ditentukan oleh keberhasilannya dalam memilih dan menciptakan habitat yang sesuai baginya [8].

Persebaran burung berdasarkan lokasi pengamatan menunjukkan hasil dimana diversitas burung lebih banyak berada pada lokasi hutan sekunder, diikuti daerah ladang kemudian pemukiman. Perbedaan diversitas burung yang ditemukan pada masing-masing lokasi pengamatan terutama disebabkan oleh ketersediaan pangan, aktivitas, waktu pengamatan serta kondisi habitat tersebut. Odum (1994) menjelaskan bahwa, tingkat ketersediaan makan bagi burung menyebabkan perbedaan keanekaragaman jenis burung yang ada pada suatu habitat.

Tabel 1. Nama Latin, nama lokal dan famili burung

No	Nama Famili	Nama Spesies	Nama Lokal
1.	Accipitridae	<i>Ictinaetus malayensis</i>	Elang Hitam
		<i>Spizaetus bartelsi</i>	Elang Jawa
2.	Phasianidae	<i>Melanoperdix nigra</i>	Puyuh hitam
		<i>gallus gallus</i>	Ayam hutan merah
3.	Turnicidae	<i>Turnix sylvatica</i>	Gemak tegalan
		<i>Turnix suscitator</i>	Gemak loreng
4.	Collumbidae	<i>Ducula lacernulata</i>	Pergam punggung hitam
		<i>Collumba livia</i>	Merpati batu
		<i>Geopelia striata</i>	Perkutut jawa
5.	Appopidae	<i>Collocalia vukanorum</i>	Walet gunung
6.	Picidae	<i>Picoides mollucensis</i>	Pelatuk besi
		<i>Dinopium Javanense</i>	Pelatuk lurik
7.	Pycnononidae	<i>Picnonotus aurigaster</i>	Cucak kutilang
		<i>Picnonotus goiavier</i>	Merbah cerukcuk
8.	Sylviidae	<i>Phylloscopus borealis</i>	Cikrak
		<i>Cisticola exilis</i>	Cici merah
9.	Nectariidae	<i>Aethopygia eximia</i>	Burung madu gunung
10.	Zosteropidae	<i>Zosterps palpebrosus</i>	Kacamata biasa
		<i>Zosterops flavus</i>	Kacamata jawa
		<i>Zosterops everitti</i>	Kacamata belukar
11.	Timaliidae	<i>Malacopteron cinereum</i>	Asi topi sisik
12.	Motacilidae	<i>Anthus novaeseelandiae</i>	Apung tanah
13.	Ploceidae	<i>Passer montanus</i>	Burung gereja

Burung yang ditemukan di Desa Ngadas tersebar di hampir semua tempat, baik wilayah pemukiman, ladang, maupun hutan sekunder. Jika dilihat dari pola penyebarannya dan jenis family yang terdapat di wilayah-wilayah tersebut terlihat bahwa daerah hutan sekunder memiliki jenis family yang lebih banyak dibandingkan dengan wilayah lain, meski jumlah perjumpaannya tidak sebanyak di wilayah ladang. Penyebaran ini diperkirakan sangat dipengaruhi

oleh ketersediaan makanan serta tempat hidup bagi jenis-jenis family burung tersebut.

2.2 Distribusi Temporal Burung di Desa Ngadas

Dari 13 famili burung yang ditemukan, sebanyak 12 famili ditemukan aktif di pagi hari. Umumnya burung lebih banyak melakukan kegiatan di pagi hari. Hal ini disebabkan oleh beberapa faktor diantaranya pada pagi hari kondisi angin relatif lebih lemah. Menurut Dahlan, dkk (2009), aktivitas burung dalam mencari makan lebih banyak dilakukan pada pagi hari, antar pukul 05.00 sampai pukul 09.00 dan pada sore hari pada pukul 15.00 sampai dengan 18.00 bersamaan dengan perubahan cahaya matahari dan pergantian menjadi malam hari yang merupakan waktu bagi burung untuk pulang ke sarang dan melanjutkan aktivitas untuk esok hari, sedangkan pada siang hari lebih banyak digunakan untuk bertengger dan berlindung di pohon-pohon karena cuaca yang panas dan banyak terdapat aktivitas manusia, seperti kegiatan pertanian, pencarian kayu bakar atau rumput, dan lain-lain [4]. Menurut Balen (1999) keberadaan aktivitas manusia di sekitar habitat burung senantiasa disinyalir sebagai penyebab utama terhadap timbulnya gangguan terhadap keberadaan burung [1].

Dengan mengetahui pola distribusi temporal dari jenis-jenis burung di Desa Ngadas bisa diperoleh gambaran tentang kegiatan Birdwatching yang akan dilakukan. Informasi berkaitan dengan sebaran temporal dari jenis-jenis burung di Desa Ngadas bisa dijadikan pedoman kapan waktu pengamatan yang paling sesuai dan

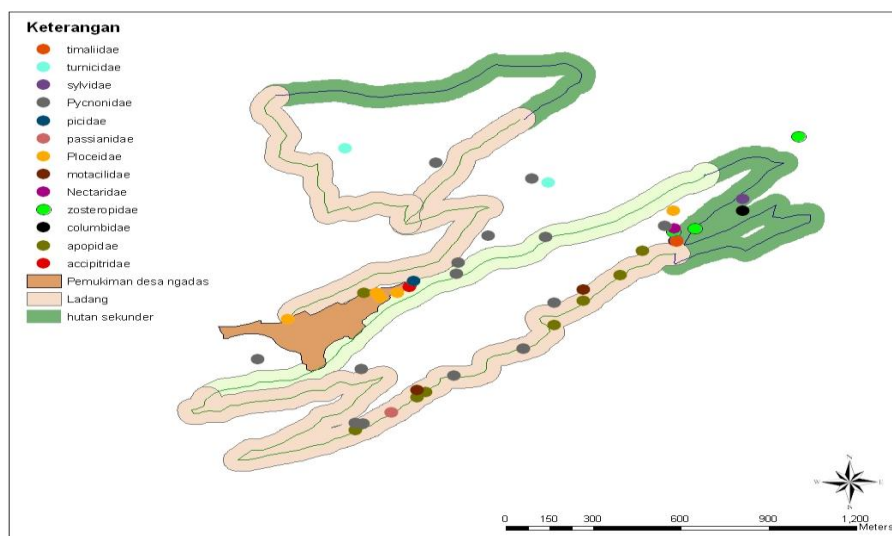
menguntungkan dalam pengamatan burung (*Birdwatching*), sehingga dalam kegiatan Birdwatching pengamat memiliki kesempatan yang lebih besar untuk mengamati jenis-jenis burung yang ingin diamati.

Berdasar pola sebaran temporal dari burung di Desa Ngadas tersebut dapat dilihat bahwa burung lebih banyak melakukan aktivitas pada pagi hari, sehingga disarankan kegiatan Birdwatching dilakukan pada pagi hari, dengan waktu pengamatan antara pukul 06.00-10.00, seperti waktu pengamatan yang dilakukan oleh peneliti. Pada waktu-waktu tersebut burung-burung lebih aktif bergerak, dan mencari mangsa sehingga frekuensi dan peluang perjumpaan dengan jenis-jenis burung tersebut lebih besar. Selain di pagi hari, pengamatan pada sore hari dimana burung-burung hendak kembali ke sarangnya juga bisa dijadikan alternatif pelaksanaan kegiatan *Birdwatching* ini.

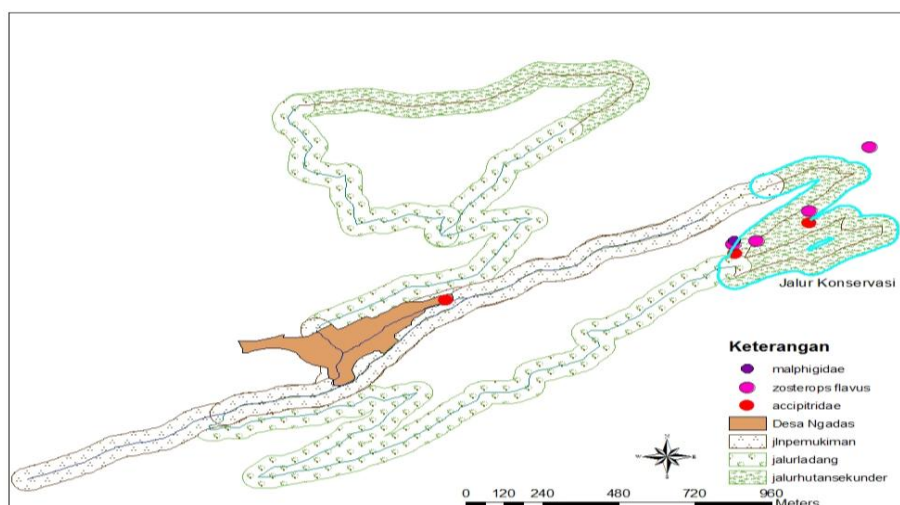
2.3 Perencanaan Jalur Pengamatan Burung dan Wilayah Konservasi

Perencanaan yang matang mengenai jalur pengamatan, waktu dan lokasi yang digunakan dalam kegiatan *birdwatching* akan sangat membantu terlaksananya kegiatan ini. Dengan memperhatikan hal-hal tersebut dengan seksama kegiatan *birdwatching* yang dilakukan bisa membawa keuntungan bagi pelaksana, pengamat maupun bagi masyarakat sekitar.

Dengan demikian upaya untuk melaksanakan upaya konservasi burung melalui kegiatan *birdwatching* yang juga bisa memberikan nilai tambah bagi ekonomi masyarakat sekitar bisa terlaksana.



Gambar 4. Peta Distribusi Burung di Desa Ngadas



Gambar 5. Peta Jalur pengamatan dan Zona konservasi di desa Ngadas

Pepohonan yang banyak terdapat di jalur konservasi antara lain Danglu (*Engelhardia spicata*), Cemara gunung (*Casuarina junguniana*), Mentigi (*Vaccinum Sp.*), Kemlandingan (*Albizia lophanta*), Akasia (*Eucaliptus*), serta jambu wer (*Prunus persica*). Jalur konservasi yang berada di hutan sekunder dalam kawasan Taman Nasional Bromo Tengger Semeru tersebut dipilih pada lokasi yang letaknya tidak terlalu jauh dari kawasan desa Ngadas dengan pertimbangan untuk menjaga jumlah serta jenis burung yang berada dalam kawasan desa Ngadas dengan menyediakan tempat untuk berkembang biak. Selain itu pertimbangan lain yang diambil adalah bahwa pada daerah tersebut dijumpai burung-burung dengan status NT (*Near Threatened*) atau jenis burung yang berada dalam kategori terancam mendekati kepunahan yakni *Zosterops flavus* atau dikenal juga dengan nama burung kacamata jawa. Serta burung yang berada dalam kondisi terancam punah (EN) yakni elang jawa atau *Spizaetus bartelsi*. Keberadaan burung-burung ini menjadi salah satu dasar pembuatan zona konservasi di jalur hutan sekunder. Dengan adanya jalur konservasi ini, maka pengamatan burung yang dilakukan di jalur ini harus dilakukan dengan aturan yang lebih ketat. Jalur Konservasi pada Gambar 5 ditandai dengan garis biru muda yang mengelilingi jalur pengamatan.

Dengan adanya aktivitas ekowisata *Birdwatching* ini diharapkan dapat memberikan penambahan ilmu pengetahuan, pengalaman, informasi, dan keterampilan bagi wisatawan. Selain itu, memberi keuntungan masyarakat lokal dalam peningkatan kesejahteraan mereka. Hal ini dilakukan dengan melibatkan mereka dalam

kegiatan wisata, misal sebagai pemandu wisata, pengelola (fasilitas wisata), fasilitator, atau mereka dijadikan objek/atraksi dari wisata yang akan dihadirkan tersebut.

KESIMPULAN DAN SARAN

Kesimpulan

Desa Ngadas memiliki setidaknya 13 famili dan 23 spesies burung. Spesies-spesies tersebut diantaranya adalah *Ictinaetus malayensis* dan *Spizaetus bartelsi* yang merupakan anggota dari Famili Accipitridae, *Melanoperdix nigra* dan *Gallus gallus* dari Famili Phasianidae, *Turnix sylvatica* dan *Turnix suscitator* yang merupakan anggota dari famili Turnicidae. *Ducula lacernulata*, *Collumba livia*, dan *Geopelia striata* dari Famili Collumbidae. *Collocalia vukanorum* dari famili Appopidae. Spesies *Picoides mollucensis* dan *Dinopium Javanense* dari famili Picidae. *Picnonotus aurigaster* dan *Picnonotus goiavier* dari famili Pycnononidae. *Phylloscopus borealis* dan *Cisticola exilis* dari famili Sylviidae. *Aethopygia eximia* merupakan anggota dari Nectaridae, *Zosterps palpebrosus*, *Zosterops flavus* dan *Zosterops everitti* dari famili Zosteropidae. *Passer montanus* dari famili Plocidae, *malacopteron cinereum* dari Famili Timaliidae, dan *Anthus novaeseelandiae* dari famili Motacilidae.

Perencanaan kegiatan *Birdwatching* dapat dilaksanakan sebagai salah satu upaya konservasi dan peningkatan kesadaran masyarakat awam akan pentingnya mengenal dan mencintai burung. Jalur yang bisa digunakan untuk kegiatan pengamatan burung (*Birdwatching*) di desa Ngadas adalah dengan

mengikuti jalur setapak di hutan sekunder dan daerah ladang pada pagi dan sore hari, sementara jalur konservasi dibuat berdasarkan lokasi dijumpainya burung-burung yang berada dalam status *Endangered* dan *Near Threatened*.

Saran

Saran yang bisa disampaikan berdasarkan analisis yang dilakukan adalah penelitian ini bisa dilanjutkan dengan upaya untuk melaksanakan ekowisata *Birdwatching* di Desa Ngadas sehingga keberadaan burung di wilayah desa Ngadas bisa dijadikan salah satu daya tarik tersendiri bagi kegiatan wisata di desa Ngadas, selain itu dengan memberikan pendidikan dan pelatihan tentang pengelolaan kegiatan wisata *birdwatching* bagi masyarakat setempat akan memberikan nilai tambah bagi pelaksanaan kegiatan wisata *Birdwatching* di desa ngadas ini.

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REVIEW: TAXONOMIC CONTRIBUTION FOR ECOTOURISM DEVELOPMENT IN INDONESIA

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ABSTRACT

This paper describes about the role of taxonomic in ecotourism development in Indonesia. Development and management of ecotourism in Indonesia recently are still quite slow and inadequate. It is due to the lack of knowledge of local community about the information of flora and fauna which is used as ecotourism attraction. Therefore the taxonomical science needs to be applied to the development of ecotourism in Indonesia. In addition, some species which are used as tourist attractions needs to be identified and classified to preserve the resource. Implementation of taxonomy related to survey, documentation, data collection, identification and classification to establish the identity of a species for ecotourism attraction. Methods are commonly used for the implementation of taxonomy in the ecotourism development, i.e. (1) morphological observation, (2) vocalizations and (3) molecular analysis. Morphological observations can be applied by qualitative and quantitative observations. Qualitative observation is an observation of a species, which is related to morphology and coloration, and comparison with other species which are suspected related. Quantitative observation is a morphometric analysis, which is a concept of quantitative analysis of the species that related to the size and shape of a species. Vocalization method is applied by determining the vocal character of a species, by comparing the data, which has obtained, with the data vocals from other species which are suspected related. Molecular analysis is commonly used to support the identification of morphological and vocalization of the species. Molecular methods, which are commonly applied for species identification, are usually hybridization, DNA sequencing, restriction mapping, chromosome banding and immunological method

Keywords: taxonomy, ecotourism, Indonesia, morphological observation, vocalization, molecular identification

INTRODUCTION

Ecotourism is nature-based tourism. Based on the principles of green productivity and ecology, it has low impact to the environment [1]. Ecotourism is an activity, which is considered as sustainable tourism. Ecotourism has specific characteristics. These specific characteristics are the concern to the environmental conservations and providing economic benefits to local community. Therefore, every ecotourism activity should be based on the principles of sustainable management. These principles are based on the nature, focus on conservation activities, focus on the development of sustainable tourism, relate to the education development activities, accommodate local culture and provide benefits to the local economy [2].

Indonesia is an archipelago that has ecosystem and species diversity. The diversity of flora, fauna and their ecosystems, as well as cultural diversity, are potential for ecotourism attraction because it can attract tourists to visit an area [3]. The diversity of flora and fauna found in the area can be seen from the survey that

describes what species are there in the region. Taxonomy is one of knowledge that is important in ecotourism development. By knowing the species that exist in a region, we can identify the rare or endangered species. The existence of rare or endangered species will attract the tourists to visit the region and causing the tourism activities that provide economic benefits to local community. In addition to attract tourists visit, a rare or endangered species in a region will lead researcher to conserve it. By applying the taxonomy, the local community also can learn these rare or endangered species and how to preserve it so that there is a contribution from the local community to conserve it.

One of environmental communities has implemented taxonomy was Coral Cay Conservation. Coral Cay Conservation had implemented taxonomy for survey and species identification. Coral Cay Conservation is an organization working in ecotourism sector. These organization sent volunteers to survey the most endangered coral reefs and tropical forests [4]. Survey, identification and classification that were part of taxonomic assessment were useful for establishing the identity of the species [5]; [6]; [7]; [8]. By applying it, a new species and their distribution, which can determine the level of diversity of fauna in the area and conservation status of the species, can be known [6]; [9]; [10];

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[11]; [12]; [13]. Ecotourism requires taxonomic information because ecotourism is not limited to recreation, landscape, and scenery. Ecotourism also related to the ecosystem diversity that reflects the diversity of flora and fauna [14]. The diversity of flora and fauna in an area should be studied to obtain information.

Basic information and other scientific information is an absolute requirement for any sustainable management of natural resources. This paper aims to describe the role of taxonomic in ecotourism development. It is particularly important because numerous biodiversity forms for tourism attraction need to be identified and classified to ensure the sustainability use of such resources.

BIODIVERSITY AND TAXONOMY

Biodiversity is a term that describes the diversity of whole life on earth, from the smallest and simplest, such as microorganisms, to which has a complex system, such as the rain forest, including the describes of the diversity of habitats and ecosystems that support a whole life on earth and the interaction forms of life and the rest of the environment [15]; [16].

Based on the hierarchy, biodiversity can described through the three concepts, i.e. genetics diversity, species diversity and ecosystem diversity [15]; [16]. Genetics diversity depends on genetics variation inherited within and between populations of organisms. Genetics variation will be arises in individuals if there are gene and chromosome mutations, and in organisms with sexual reproduction it can be inherited through the recombination. Species diversity is a concept explaining about species richness in a habitat and represents biodiversity. It can be said like that because species is a unit of fundamental descriptive of life. Ecosystem diversity is a concept obtained through analysis of component species diversity which is involve assessment of the relative abundance of different species. it means that species abundance is directly proportional to the area or habitat of the species. If there more area or habitat diverse, many species found in there will be equally abundant [16].

Biodiversity is essential to support human life because it may provide goods and services. Components of biodiversity can be used directly as food, medicines, building materials, and etc. Moreover, biodiversity also provides more benefit indirectly, in the form of environmental regulation, soil conservation, and pollution

control. It is estimated that 40 percent of the global economy is based on biological products and processes. Percentage of biodiversity can be affected by several factors; one of them is the rapid development of the tourism industry. It is due to its role to global gross domestic product (GDP), generate the number of occupations so it can reduce the number of unemployed, and also serve the number of clients [17].

Scientists implement some sciences to analyze the percentage of the biodiversity in an area. one of them is taxonomic science. Taxonomy is one of sciences that learn about observation, nomenclature and classifying species or organisms of the world. Scientists identify species or organisms and classify them based on the characteristics of morphological, behavioural, genetic, biochemical and etc. Taxonomy is a tool used to identifying, naming, describing and calculating the components of biological diversity. it provides basic knowledge to support biodiversity management and implementation of the convention on biological diversity [4].

DEVELOPMENT OF ECOTOURISM IN INDONESIA

In 1995, ecotourism sector started to become public attention in Indonesia. At that time, there were national seminar and workshop organized by Pact-Indonesia and WALHI (Indonesian Forum for the Environment) in Bogor. Based on these meeting, there was an opinion had proposed, i.e. local community should be involved in every ecotourism activities. The involvement of local community could be through the management of ecotourism proportionally [3]; [18].

The second national workshop of ecotourism was held in Bali in 1996. These workshop had aim to strengthen the ecotourism movement in Indonesia through the formation of Indonesian Ecotourism Society (MEI). This community was formed with some purposes, i.e. (1) to increasing the awareness about potential natural resources conservation as ecotourism attractions in Indonesia, (2) to evolving the quality of environmental education for tourists and (3) to providing economic benefits for local community around tourist's area. The activities of ecotourism society have increased since 1996. It caused MEI to organize the first meeting in 1997 in Flores (NTT) and in 1998 in Tana Toraja, Sulawesi Selatan [19] as cited in [3]. At that time, there were several areas in Indonesia were trying to develop ecotourism because these areas have

several ecotourism attractions, e.g. Kalimantan, Sumatra, West Java and Bali.

In Kalimantan, development of ecotourism was undertaken in 1990-1997 by Kalpataru Adventure. It was proposed in Tanjung Puting National Park due to flora and fauna found in Tanjung Puting National Park could be used as ecotourism attractions. For example, the presence of orangutans and proboscis monkeys have increased tourists visitation in Kalimantan. However ecotourism development in Tanjung Puting, at that time, has some obstacles, e.g. smoke from fires, economic crisis, political instability, and concerns about the safety of travel in Indonesia [19] as cited in [3].

In Sumatra, the idea of ecotourism development was proposed at Mei meeting in 1996. The project was built up in Dusun Pamah Simelir because it had unique attractions, e.g. water rafting, bird watching, the presence of orangutan, deer and siamang. However, during the development, the project had some obstacles, e.g. a plane accident, forest fires, political riots which were reducing international tourists visitation, and economic crisis which was increasing the price of agricultural products. These obstacles were leading to changing the efforts of local community, from ecotourism sector to the agriculture. The new ecotourism project was developed after the project in Dusun Pamah Simelir. It was developed in Dusun Sayum Sabah because Sayum Sabah also has some ecotourism attractions, e.g. the river, local fruits, the culture and tradition of the Karo ethnic group and an ancient castle [19] as cited in [3].

The development of ecotourism in Gunung Halimun National Park (TNGH), West Java Province, was conducted in 1994-1999. These project was built up to socialize the conservation of flora and fauna and the sustainable benefits through the empowerment and involvement of local community. It was done because in addition to conserve the environment, this project also provide economic benefits to local communities. Promotion of ecotourism in Gunung Halimun National Park was conducted by direct promotion and indirect promotion. Direct promotions were carried out by distribution of flyers, trekking maps, video promotions, slides and posters. Indirect promotions were carried out by press releases, articles, host seminars and distribution of information to the research centers, NGOs and conservationists. However, the economic crisis caused tourist visitation to Gunung Halimun

National Park decreased in 1998 [19] as cited in [3].

Ecotourism development in Bali started in 1980s by Ida Ayu Agung Mas [19] as cited in [3]. Bali is one of the international tourist destinations in Indonesia because of some reasons, e.g. traditional culture of Balinese [20]. Therefore Ida Ayu Agung Mas has created Sua Bali to build up a tourist resort whose activities are based on the relationship of dynamic, balanced and harmonic between human, spirituality and environment [19] as cited in [3].

Development of ecotourism since the early 1990s until the end of 1999 is still very slow. Many ecotourism policies that have been generated, but ecotourism products in Indonesia are still limited. Many things that cause slow development of ecotourism in Indonesia, i.e. [18]:

1. There are no guidelines which can encourage ecotourism to be the nature conservation and sustainable economic.
2. Understanding of ecotourism by the various stakeholders, which can be considered as supporter and implementer of ecotourism activities, are still low.
3. The truth of the concept of ecotourism, which could be used as a sustainable economic activities and empowerment of local communities, is still in doubt.

One of the examples from successful ecotourism development was undertaken by a group of anglers, in the Serangan Village, Bali through the sea horse breeding and the development of ecotourism floating zone. It was conducted based on the anglers concern to the environmental damage. The activity began in 2000 with the prevention of fishing or catching other marine animals in an unwise way, like coral mining and using of cyanide. In 2001, the anglers began educating elementary and junior high schools children to planting (transplantation) of coral reefs. Around 2003-2004, they formed Anglers Group, Karya Segara, that had primary goal for environmental remediation program. In addition, they began working with the Ministry of Marine and Fisheries. They got support in the form of seed as much as 2,000 colonies of coral reefs, which consists of 3 types of coral reefs, i.e. massive, sub-massive and acropora. At the end of 2005, they received support from NGOs Samdhana as much as Rp 45 million for the development of the seeds. Through Yayasan Bahtera Nusantara, they were supported to

undertake cultivation and conservation activities, including community capacity building. They began to cultivate two species of sea horses in 2006, i.e. *Hippocampus kuda* and *H. histrix*, through independent research. In 2009, they began to associate with the travel agency, Pro Bali Pandu Wisata, and proposed the idea to sell a package of eco-tourism program, i.e. adopt coral reef. At the end of 2009, they associated with PT Poros Nusantara to make an activity, The Coral Day, that made people think of coral reefs in a day. The Program was better in 2010 and started a lot of tourist visitation from China. In 2012, they made associate with Pro Bali Pandu Wisata to create a floating information center as well as assembled as ecotourism program. Anglers group, Karya Segara, was not only doing the rehabilitation in Serangan Village, but also almost all over the coast of Bali. They also not only cooperated with the government in Bali but also in some locations such as Lombok, Sulawesi, NTT (Kupang, Alor and Rote) and Halmahera [21].

Taxonomic Implementation for Ecotourism Attraction in Indonesia

Taxonomy has an important role in the development of eco-tourism attraction in Indonesia. It is related to the survey, documentation, data collection, identification and classification which serve to establish the identity of a species. The tourists with a variety of ecotourism activities, such as bird watching, wildlife viewing, game fishing, diving and snorkeling, need data of flora and fauna found in the tourist area. With the availability of the data of flora and fauna in a tourist area, will facilitate the tourists to recognize the species, both rare and endangered and new species, which are, be the main attraction in the area. In addition to the data of flora and fauna in the area, it is known the diversity of species present in the area, which can also be used as an attraction in an area.

Taxonomic role has potency in determining the degree of biodiversity that found in Indonesia. Taxonomy by applying the principle and the stages of implementation, from identification, understanding of the content of units that is identified, a complete analysis, to sharing information about the unit that is worked, so the utilization and preservation can be designed with maximum results. Taxonomic information is also needed in the field of tourism. For example is a wealth of information about natural, attractive treading, where and when the emergence, in what form, the content of appeal

which can be expected, at the level of species, ecosystems, and other germplasm [14].

Based on the statement of Mardiasuti et al. [22], taxonomy is needed to record the number of species that found in Indonesia. Taxonomy plays a role in the process of collection of certain species, where the survey results will be compiled in the form of documents. The documents have been arranged expected to be used as a reference in carrying out field activities which are often carried out by NGOs, practitioners of conservation biology and ecotourism. In the study also explained that, in order to ensure the establishment of data collection system and high-quality information, inclusive, accessible, transparent, trustworthy and reliable to take important decisions, must reach several requirements, one of them is to strengthen the baseline study for the taxonomy. The statement is also supported by Eprilurhman et al. [23] whose research has focused on the diversity of reptiles and amphibians in the area of ecotourism. It is essential for a tourist area to have the data of fauna, because each of fauna, including herpetofauna has an important role in maintaining the balance of ecosystems and the sustainability of the tourist area. In addition, these data can be an attraction and benefit in an ecotourism area.

One of the examples of the taxonomic contribution that used for tourism development, i.e. identification of bird species as the basic information for the bird watching race in Tahura Ngurah Rai Bali as a means of environmental education for students. According to Sudaryanto et al. [24], one of the types of activities that is quite a lot of attention and is a new trend, is ecotourism. One of them is bird watching activity while the observation of the bird race is called Bird watching Race. Bird watching is one of the efforts to increase awareness of students on the environment, especially birds, and to promote ecotourism. According to the statement of BirdLife International Indonesia Programme (BIIP) in Sudaryanto et al. [24], bird watching activity is a tourism activity that can increase the income. Some countries such as Kenya, Costa Rica, Nepal, India, Thailand and Malaysia are countries that have made bird watching activity as a business in the tourism sector. Many travel agencies in Europe and the United States, which organize bird watching tour, bringing tourists to these countries though these countries do not have as much as diversity of bird species in Indonesia [24]; [25].

In addition to bird watching activity, another ecotourism activity that implements taxonomy to collect the data of species is marine tourism. One of the regions in Indonesia that held Marine tourism is Bali. Bali's rich marine resources have long been an important economic asset to the island, both as a source of food security for local community and also as a focus for marine tourism. Marine tourism has some attractions, i.e., diving and snorkeling attractions in Nusa Penida, Candi Dasa, Menjangan Island (Bali Barat National Park), and the Tulamben [13].

Fish and coral reef diversity in the sites can attract tourist's visitation to try some ecotourism attractions, e.g. diving, snorkeling and game fishing. Therefore it is needed data that represent fish and coral reef diversity in the site so survey and species identification is needed to collect the data. Based on the statement of Allen and Erdmann [9], the principle aim of the species survey was to provide a comprehensive report of the species that found in the site. Such as reef fish survey that has conducted by Allen and Erdmann [9]. They have recorded 805 fish species for the survey. Combined with previous survey efforts by them, primarily at nearby Nusa Penida in 2008, the current total for the Bali region is 977 species in 320 genera and 88 families.

Besides these surveys provide a comprehensive report of the species, it also can identify new species that found in the site. Such as coral reef survey that has conducted by Turak and DeVantier [13]. Based on this survey, they discovered the presence of local endemic coral reef, *Euphyllia* sp. in Bali, and other apparently local endemic corals, notably *Acropora suharsonoi*. Uniqueness of coral which they found in Bali, suggests that the region does have a degree of fauna uniqueness, possibly related to the strong current flow through Lombok Strait [13]; [26].

WWF Indonesia also implemented taxonomy while it developed ecotourism jungle track, in Punggualas. This organization aimed to determine the location and the line of interpretation of transects/ jungle track ecotourism based on biodiversity potential, identification of species dominance to the biodiversity in line area, provide the biodiversity information in the form of nomenclature as initial capital to create and develop ecotourism in Punggualas [27].

Mangrove is one of the important coastal and marine ecosystems, in addition to coral reefs and seagrass beds. Mangrove has several benefits

such as ecological and economic benefits. Mangrove in Nusa Penida bring many benefits to the local community as the object of mangrove tour ecotourism, coastal protection, preventing seawater intrusion into coastal and place spawn and breed for fish and other marine life. To protect mangroves, coral reefs, seagrass beds and other marine biota Nusa Penida is beneficial for community, and then this time the establishment of Marine Protected Areas (MPA) Nusa Penida is underway. Hopefully with the MPA's coastal and marine resources Nusa Penida can be managed in a sustainable manner, including mangroves and sustainable. In order to collect data and information in order to provide input for the establishment of MPA and sustainable mangrove management, then the identification of mangrove species that exist on Nusa Lembongan and Nusa Ceningan important to do. By knowing, the types of mangrove management can be done [28].

METHOD FOR TAXONOMIC IMPLEMENTATION IN ECOTOURISM ATTRACTION

Taxonomy can be applied to analyze the diversity of flora and fauna, and identify new species of flora and fauna in an area as a tourist attraction. Some of the methods that were generally used were (1) Morphological observation [6]; [28]; [29]; [30]; [31]; [32]; [33]; [34], (2) vocalization [6]; [31] and (3) molecular analysis [35].

Based on the types of data, morphological observations were divided into (1) qualitative morphological observation and (2) quantitative morphological observation. Qualitative morphological observation was conducted by observation overall morphology and coloration of the species and comparison with another species which was presumably still have the relationship. For example is mangrove identification in Nusa Lembongan and Nusa Ceningan. It was done by direct observation in the field at some point of observation. Observations were made in the outer zone, the middle and closest to the mainland. Observations were made by observing the difference of roots, leaves, flowers and fruits of mangrove [28].

Quantitative morphological observation is commonly performed using morphometric methods. Morphometric method is a quantitative concept that describes of species by using statistical analysis of body size (part of body) of the species. Morphometric methods could be applied to quantify the trait of evolutionary

significance, analyzing of fossil record, impact of mutations on shape of species, developmental changes on shape of species, covariance between ecological factors and shape of species, estimating quantitative-genetic parameters of shape of species [36]. For example is identification of six new species of squaloid shark of the genus *Etmopterus* [10]. These identification used morphopmetric methods through the differences of body shape, vertebral counts and the size and shape of luminescent markings on the flank, caudal peduncle and caudal fin [10]. Allen and Erdmann [37] also conducted morphological analysis and made identification key to identify a new species of whiptail (Pisces: Nemipteridae) from eastern Indonesia.

Vocalization was conducted by determine vocal character of the species through the comparison the vocal data with vocal data of another species [6]; [31]. Vocal character of the new species was also identified through the implementation of taxonomy. Vocal data was analyzed through the quantification of distinctiveness of the birdsong in relation to other bird species within the clade. Researchers conducted a discriminant analysis (DA) based on the comparison of birdsong recordings. Based on the each recording, they calculated mean values of the following variables, i.e. notes/strophe, length (in seconds) of longest note (one per strophe), strophe length (seconds), maximum and minimum fundamental frequencies (one each per strophe), number of strophes per phrase, length of interval between phrases (in seconds) and, for phrases with more than one strophe, interval between strophes and length of phrase (in seconds); we also calculated bandwidth (maximum minus minimum fundamental frequency within a given strophe), strophe pace (number of notes per strophe/strophe length) and, for phrases with more than one strophe, phrase pace (phrase length/ strophes per phrase) [6].

Molecular analysis is commonly needed to support another identification methods. There are several molecular method for taxonomic identification, i.e. (1) hybridization, (2) DNA sequencing, (3) restriction mapping, (4) chromosome banding and (5) immunological method [35]. Hybridization is a fusion of two single-stranded of DNA or RNA or one of each to form complementary bonds (double-stranded nucleic acid). Related species will be known by the higher percentage of hybridization. DNA

sequencing is a comparison of DNA sequences of species are sequenced from one end to another's. Related species will have similarity DNA sequences. Restriction mapping is conducted by restriction of DNA strand that produce segments of DNA are isolated from different species and form restriction mapping. Related species will have more similar restriction map. Chromosome banding is conducted by observation of chromosomes obtained from different species, through the certain staining techniques; resulting transverse bands appear on chromosomes. The most common methods of dye based chromosome banding are (1) G-(Giemsa), (2) R-(reverse), (3) C-(centromere) and (4) Q-(quinacrine) banding. Immunological method is conducted by testing of Antibodies to recognize the macromolecules on the cell surface of different species. Related species usually have macromolecules which are recognized by the same antibodies [35].

CONCLUSION

Based on the analysis, Taxonomy can help identifying and classifying species for reference data that can be used as ecotourism attraction and environment conservation. The identification method can be applied in several ways, i.e. (1) the morphological observations; (2) vocalization; and (3) molecular analysis.

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ECO-HOMESTAY: DEVELOPMENT CONCEPT ON RURAL TOURISM-BASED CONSERVATION MODEL

(Study Case of Sidomulyo Village, Silo District, Jember Regency)

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Abstract

The purposes of this research were to assess the concept of Eco-Homestay in conservation-based tourism in rural area. A case study was set up at Sidomulyo Village, Silo District, Jember. A qualitative method in the form of in-depth interviews was performed as a tool to generate models. Informants in this study included the staff of the Department of Forestry and Plantation, lecturer of the Faculty of Agriculture and Polytechnic of Jember, State University of Jember, and Sidomulyo community in Silo Districts, Jember. The result showed that the purposes of eco-homestay can be reached by managing the structure of integrated development, structure of organizational management, structure of financial management, marketing strategies, operational strategies and physical building.

Keywords: conservation, eco-homestay, rural tourism, Sidomulyo

INTRODUCTION

Conservation village is one of the community-based model of biodiversity conservation that provides opportunities for surround communities near the protected areas. Such models actively involved community in efforts of conservation. This model also provides opportunity for the communities to gain secure access of land uses. Conservation village model ensure their long-term commitment to support forest conservation [1].

Involving rural area in conservation program is important. The number of villages in Indonesia are about 73.067 (Permendagri No. 6, 2008) [2]. Such rural area is potential to be developed into a tourism village, especially rural tourism. Rural tourism development able to support the efforts of rural poverty reduction by empowering local communities during the village's tourism development. In addition, tourism is a sector that holds crucial role in the region development process, i.e. contributing to the local and community income. This contribution give local governments an additional income in developing projects and other activities in the area [3,4].

Jember is an area which rich of tourism attractions. Rural area in Jember is home of numerous tourism attractions. The tourism attraction ranging from natural landscapes, culture and arts. Tourism potentially can

addressed to increase human prosperity. However, Jember significantly facing serious problems in human standards of live. This data supported by fact that of the 38 districts/cities in East Java, Jember occupied the highest number of poor people, reaching 237.700 inhabitants [5].

The dynamics of tourism development lead to some words to express the relationship of tourism to solve environmental problems and economic development. It is encompasses sustainable tourism development, village tourism and ecotourism [6]. These terms have similar meaning with protecting biodiversity and involving community in tourism development. The main realized formulation of rural tourism is the tourism village's lifestyle and life quality of society. Authenticity is one of the crucial issues and it is also influenced by economic, physical and social conditions of the rural areas (e.g. spaces, cultural heritage, agriculture activities, landscape, history and culture tourism services, and a unique and exotic experience typical of the region). Thus, modeling of community-based rural tourism in rural area in Jember is essential. The basic principles of such approach lies on the creatifity to continue development which are able to maintain the identity or characteristic of the regions without overlook the sustainable environmental aspects. Therefore, we assessed the concept of Eco-homestay in the development concept of rural tourism-based conservation model. A case study was conducted at Sidomulyo Village, Silo District, Jember.

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ECO-HOMESTAY

Eco-homestay is an accommodation facility in the area of local eco-tourism destination that nuanced natural, clean, healthy, safe, orderly and environmental friendly. Development of eco-homestay attempts to diversify the income of local communities by implement limitations on the concept of ecotourism development [7]. Considering the operational strategy, the development of this accommodation is a technique to increase the number and the period of tourist visits. Furthermore, if eco-homestay managed properly, it will produce a positive additional value on the tourism marketing within the area.

Socialization of eco-homestay to the community started from provide counseling on the significance of clean and beautiful living environmental [7,8]. Many rural dwellers basically have poor understanding on the ecolodge principles and applications. Therefore, an intensive training and coaching to the community about the advantage of the eco-homestay management should be implemented periodically. However, few problems model of ecolodge is available. Some rural community has been established and tested the implementation of eco-homestay, but less has been reported.

MATERIAL AND METHOD

We used qualitative methods and obtained data by in-depth interviews, the process of obtaining information for research purposes in the form of questions and answers between the interviewer and the informant with or without the interview guideline. Informants in this study included the staff of the Department of Forestry and Plantation, lecturer of the Faculty of Agriculture and Polytechnic of Jember, State University of Jember, and Sidomulyo community, Silo Districts, Jember. In every interview, the informant was interviewed about 30-45 minutes. Interviews were conducted in Madurese, Javanese or Bahasa Indonesia depends on the informant background. Interviews data was recorded and stored for further descriptive analysis.

We enrich the discussion with a number of literature and supporting documents obtained from various sources, encompasses library of Meru Betiri National Park and Office of Agriculture, Jember Regency. The data is analysed using interactive model of Miles and Huberman [9] that consisted of four stages: data

collection, data reduction, data display and conclusion.

RESULT AND DISCUSSION

Profile and Potential of Sidomulyo

Vision and Mission

The vision of the villages is the creation of creative, clean and respectable civil services realizes a prosperous, religious and beneficial society. The mission action to realize the vision operationally, include:

1. Organize best governance practices
2. Empowering the education and improving the community health
3. Optimally developing the potential of the village
4. Reducing the level of poverty and unemployment
5. Strengthening the facilities and infrastructure of the development

Sidomulyo Community

In Sidomulyo, the majority of ethnics come from Madurese and Javanese. There are also Chinese and Arabic ethnic, but the number is quite low. Most of the populations are Moslem; therefore plenty boarding schools and mosques were easily found to hold Islamic religious education. The community is traditional peasant with medium and small size of agricultural lands.

Geographical and Physical Conditions

Sidomulyo is the 9th village in Silo District; a fraction of the Garahan Village in 1990 and became the definitive village in 1994. Sidomulyo village lies at altitude of 560 m above sea level. Sidomulyo Village area is a mountainous region, and mostly consists of dry land. The topography of the village consists of an area of 2357 ha of plains, hills and mountains of 2636 hectares. Sidomulyo is the center of the coffee, avocado and petai plantation crops. The rainfall of the area is 2000 ml per year [9].

Village Potential

1. **Trade and Industry;** Trading sector strongly support Sidomulyo village because the local market was in the village center, Krajan Sub-village. Besides marketing their tofu and soy cake to surround village, they also breed goat and broilers.
2. **Small and Medium Enterprises (SME);** sufficiently developed SME is Household Industry of Chips made of Cassava, Gadong and Bananas in Krajan Sub-village.

3. **Agriculture**; Paddy are the major agriculture commodities besides corn, soybeans and peanuts. There are also vast tobacco field found in Sidomulyo
4. **Orchards product**; encompasses coconut, coffee. For fruits, Sidomulyo is a supplier of avocado, coffee and coconut which marketed to Jakarta [9].
5. **Livestock and Fisheries**; local chickens especially preferred as popular livestock besides goats and cows.



Figure 1. Accessibility to Sidomulyo Village, Silo District to Meru Betiri National Park [10]

Description: → = Sidomulyo Village; → = Meru Betiri National Park.

Eco-Homestay Concept in Sidomulyo

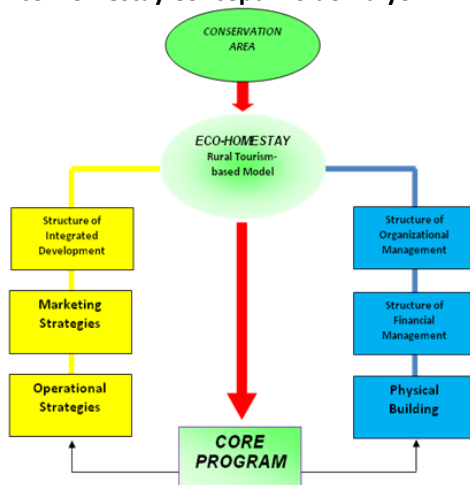


Figure 2. Eco-homestay Concept in Sidomulyo

Core Program

Sidomulyo has abundant potential resources. Located nearby the Meru Betiri National Park (MBNP), the establishment of eco-homestay programs in such village's area becomes strategic. In order to developed eco-homestay program, several point which are related to community activities are found during this study.

These is called core program of activity. Such programs of community development included agro tourism, agriculture, crafts, education and natural reforestation.

The initial stage of eco-homestay development can be started from community member as voluntary activity. These will become the pilot project for next eco-homestay in the village. Establishing pilot project is not an easy activity. The key success is close to the commitment of rural people who are a member of conservation society in the villages. In Sidomulyo, the existence of conservation society is related to the effort of government, particularly Meru Betiri National Park, to involve local community in national park conservation programs. As far, there is benefit with the society conservation program to enhance the biodiversity conservation in Meru Betiri national Park [11].

The assistance of numerous parties, including staff of Meru Betiri National Park can be important. The program is to educate community to build home that natural, clean, healthy and environmental friendly. When the house established, the house can generates fund. The owner can earn money from the rental of rooms for tourists. In addition, the rest of the home-garden area could be planted with short period crops such as vegetables, cassava and maize that also support the income of the plantation sector. This program is an application of the conservation values on the environment.

The role of the guide (MBNP officer) only acted as a facilitator for the management, marketing and other related to monitoring systems and evaluation activities. The staff of Meru Betiri National Park actively establish workshop on tourism development and management whit the objectives to increase capability of Sidomulyo villages as tourism destinations. Transportation groups also should be prepared to manage their member in rental vehicles for tourists to go to the main attractions of MBNP, while the guide were provided in ccooperation with Meru Betiri officer.

Structure of Organizational Management

The community members choose 5 persons in every 3 months to act as:

1. Front office and cashier.
2. Food and Beverage and housekeeper.
3. Maintenance and environment monitoring.

Structure of Financial Management

Funds for the development come from local community members self. 50% funds can be used as an operating cost and the remaining 50% must be saved as backup [11] to the development/ construction of others eco-homestay. Any revenue from eco-homestay should be set aside for cash contributions of local community groups.

It is expected in a couple of years later, members of the group can have its own eco-homestay in their each homes with the same concept but different services (e.g. an eco-homestay provides *garahan pecel* rice diet, while the other provides roasted rice, etc).

Physical Building

Building for the development of eco-homestay highlighted special features of the local community. Therefore, if the eco-homestay will be built in the Sidomulyo village – which is majority Madurese and Javanese – the building should be designed with Madurese and Javanese architectural and equipped with a balcony to enjoy the outdoors scenery.

The concept to accommodate and use local architectural style in eco-homestay is one of the principal spirits of ecotourism implementation in the world [6]. Through the promotion of local architectural building, there is benefits aspect in tourist education to know the local traditions.

Operational Strategy

On the operational strategy, the eco-homestay was operationalized following three ecotourism principles, namely:

1. Promoting the consistency on the definition of ecotourism and environmental carrying capacity study in its implementation
2. Increase facilities and attractions for the activities, to increase the tourist number and length of tourist visits
3. Improving the quality of the human resources with intensive training in an attempt to excellent service for visitors

Marketing Strategy

Marketing is the principals of sustainable business, and developing competitive marketing is crucial in order to generates consuments [12]. Following the basic principles of marketing, the marketing strategy was run following basic strategy:

1. Establish partnerships with existed and abroad operators in the market
2. Networks utilization of existing information and marketing

As far, these strategies seem effective to generate market. Number of visitor is still limited, but in the first stage of development it is become crucial to attract community to develop eco-homestay which is able to support biodiversity conservation.

Support from various parties to build community's interest and motivation to start business in tourism sector is necessary. Besides contain the concept of travel, it also includes the values of environment conservation. Therefore, socialization of eco-homestay development and management should be aggressively done by involving various stakeholders [11], so that the benefits of eco-homestay can be reviewed from various perspectives.

Opportunities for Other Regions

The concept of eco-homestay can be applied in other villages that have the potential of natural plantations, scenery and other potentials that can be developed based on the conservation aspect to foster conservation-based sustainable rural tourism.

CONCLUSION

Development of eco-homestay is useful to develop local revenue while maintaining the concept of ecotourism development and environmental conservation. In terms of operational strategy, the development of this property is a technique to increase the number and duration of tourist visits and invites tourists for further potential areas through natural nuanced conservation. If the eco-homestay is managed by professionals, it would be positive impacts on the implementation of tourism-based conservation within the area.

SUGGESTION

Government were expected to give more attention and provide pro-community policies and open market access and investment to explore the potential areas that would ultimately impact on improving people's welfare via conservation-based eco-homestay program.

Academics were expected to contribute sustainable new ideas and mediate community with government, the community to marketing actors and financial institutions. Community could strengthen their entrepreneur spirit with potential in their region, to improve their welfare by the concept of eco-homestay in line with the aspects of environmental conservation.

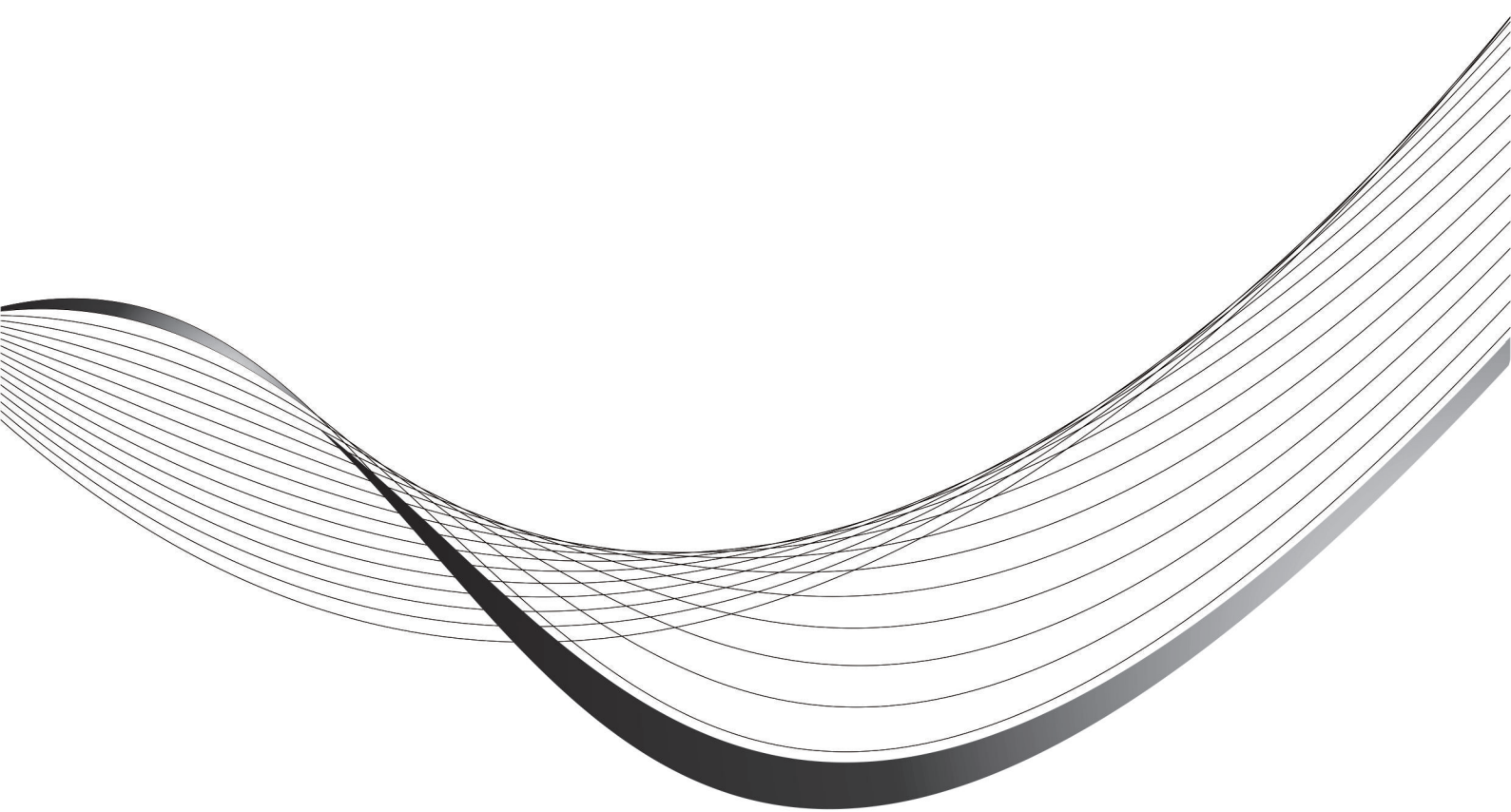
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