

Systematic Review on Ecosystem Services (ES) of Ecotourism in South-East Asia (ASEAN)

Przegląd usług pełnionych przez ekosystemy (ES) w kontekście ekoturystyki w Azji Południowo-Wschodniej (ASEAN)

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Abstract

Ecotourism ecosystem services can rarely be identified specifically in detail. Hence, little is known about interactions and relationship between ecotourism and its services. We have chosen South-East Asia (ASEAN) as our case studies because of its multi-diverse ecotourism ecosystem. We conducted a systematic review of studies that aim to understand the relationship and interaction between the ecotourism ecosystem and its services to summarize research from this emerging topic and to identify the patterns for ecotourism ecosystem services in ASEAN from different case studies. The results show that 7 out of 10 ASEAN countries have studied on ecotourism ecosystem services. Most studies indicated the importance of the services provided by the ecotourism sector as cultural (aesthetic, scientific research and recreational) and supporting (habitat conservation). Our review also found some limitations of this study: first, no data gathered from 3 countries (Brunei Darussalam, Vietnam and Myanmar) and second, the study only focused on monetary methods (WTP etc.) and third, calls for more studies and comparative studies to identify services provided by ecotourism sector in ASEAN. Finally, we discuss how our review fits into the Pakse Declaration 2016 and policy development to address climate change.

Key words: ecosystem services, ecotourism, ASEAN, Sustainable Development Goals, environmental management

Streszczenie

Trudno szczegółowo określić usługi pełnione przez ekosystemy ekoturystyczne. Niewiele więc wiadomo na temat interakcji i związków między ekoturystyką a jej usługami. W naszych badaniach wybraliśmy kraje Azji Południowo-Wschodniej (ASEAN), ze względu na ich różnorodny ekosystem ekoturystyczny. Przeprowadziliśmy systematyczny przegląd, który miał na celu zrozumienie relacji i interakcji między ekosystemem ekoturystycznym i ich usługami, aby zidentyfikować wzorce usług ekosystemów ekoturystycznych w ASEAN na podstawie różnych studiów przypadku. Wyniki pokazują, że 7 na 10 krajów ASEAN przeprowadziło badania dotyczące ekoturystycznych usług ekosystemowych. Większość badań wskazywała na znaczenie usług świadczonych przez sektor ekoturystyki jako kulturowych (estetycznych, naukowo-badawczych i rekreacyjnych) oraz wspierających (ochrona siedlisk). W naszym przeglądzie występują także pewne ograniczenia. Po pierwsze, brak danych z 3 krajów (Brunei Darussalam, Wietnam i Mjanma). Po drugie, badanie dotyczyło tylko metod pieniężnych (WTP itp.). Po trzecie, przeprowadzone badania sugerują konieczność prowadzenia dalszych prac porównawcze w celu określenia

usług świadczonych przez sektor ekoturystyki w ASEAN. Na koniec omawiamy, w jaki sposób nasz przegląd wpisuje się w Deklarację Pakse z 2016 r. i rozwój polityki dotyczącej zmian klimatycznych.

Słowa kluczowe: usługi pełnione przez ekosystemy, ekoturystyka, ASEAN, Cele zrównoważonego rozwoju, zarządzanie środowiskiem

1. Introduction

Ecosystem services (ES) defined as the benefits that humans obtain from their surrounding ecosystems by The Millennium Ecosystem Assessment. Ecosystem services can be separated into four categories of ecosystem services, where supporting services are regarded as the basis for the services of the other three categories (Reid et al., 2005). Such ecosystems include, for instance, agro-ecosystems, forest ecosystems, urban ecosystems, grassland ecosystems, montane ecosystems and aquatic ecosystems. Holistically, these benefits are known as *ecosystem services*, and are often integral to the provisioning of raw meat from chicken and cow, the production of oxygen by the forests, and the natural pollination of crops and other plants (Monaco and Prouzet, 2014). There are so many arguments among experts and scientists on how human value ecosystem services are crucial for policy makers to conceptualize the contribution of ecosystems to human society, for undertaking trade-off analyses of development and conservation, for understanding the size of economic activity in relation to its ecological life support capacity and for providing financial compensation to preserve these services (Callesen, 2016).

Ecotourism is one of the major semi-natural ecosystems in the earth's biomes (France, 2016). Ecotourism is a form of tourism involving visiting fragile, pristine, and relatively unexplored natural areas, intended as a low-impact and often small scale alternative to standard commercial mass tourism. This means traveling responsibly to natural areas that protect the environment and improve the well-being of local people (Brophy, 2015). When it comes to pristine, fragile and undisturbed ecosystems, it is well known that the ASEAN region has it all. ASEAN consists of 10 states, which are Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam (Heather, 2006). ASEAN's ecotourism mainly based on their multi-diverse tropical ecosystem, with forests have been by far the most extensively studied ecosystem, followed by wetlands, coastal ecosystems (combinations of coral reefs, mangroves and sea-grasses), and mangroves (Hornoiu, 2016). In terms of the ecosystem services, provisioning services, particularly food and raw materials, have been the most extensively valued, along with cultural services, particularly for the opportunities provided by nature areas for recreation and tourism (Church et al., 2017). Regulating services, such as flood and storm protection, have received relatively little attention, although these ecosystem services are likely to

increase in importance over time in the context of climate change (Halkos and Managi, 2017). Understanding the ecotourism ecosystem services will help ASEAN in achieving The Millennium Development Goals (MDGs) which explicitly stated that one of its goals is to *ensure environmental sustainability* (UN, 2015a). Acknowledging the importance of ecotourism ecosystem services in a country not only will increase the attraction from tourists but also will improve the ecosystem's quality.

The Sustainable Development Goals (SDGs) developed by the United Nations (UN), with contributions from governments, businesses and civil society, aim to take crucial action to battle climate change and its impact while guaranteeing that everyone is well-accounted (UN, 2015b). The Sustainable Development Goals not only establish a stronger link between environment and development outcomes, but also absorb ecotourism ecosystem services to achieve the goals. Unfortunately, ecotourism is only indirectly affected in all its goals and still needs to be fully emphasized. From the perspective of ASEAN, ecotourism ecosystem services have become the main focus of the tourism industry. Since 2016, ASEAN has recognized ecotourism in the 2016 Pakse Declaration. Since then, ecotourism has been widely known among ASEAN experts, and the organization has conducted extensive research and discovered new knowledge (Pakse Declaration, 2016). There are so many frameworks discussing the ecotourism for example, Framework of Sustainable Ecotourism: Costa Rica (Jain and Courvisanos, 2012) which shows the relationship between tourism sector, environment, and the community, which significantly affecting towards each other.

Lately, there is an elevation number of scientific studies that used systems-based approaches to assess the relationship between ecotourism and ecosystem services. However, although ASEAN has a lot of research on ecotourism ecosystem services, it has not been evaluated from the perspective of ASEAN. These studies aim to establish a link between research gaps to understand how ecotourism ecosystem services are perceived from an ASEAN perspective. This paper also provides a systematic review of how these studies have explained, operationalized and valued ecotourism ecosystem services in ASEAN countries. Based on the review, we also have hypothetically proposed a concept of an *ecotourism ecosystem services-ASEAN nexus* that seeks to comprehensively detail how ecotourism ecosystem services have been evaluated, reviewed and discussed in ASEAN. We also discuss how the findings of this review can adjunct existing ecotourism eco-

system services in ASEAN's policy. This summary can mount further debates on ecotourism, ecosystem services and ASEAN, help pursuit on the ecotourism sector in ASEAN, plus it also can deepen practitioners' potential to better plot conservation procedure for the ecotourism in ASEAN with financial and/or cultural incentives. The structure of this review paper is organized as follows; the methodology section, which introduces the materials and method, the results' section that presents the literature review, and the subsequent sections present the debates, critics, and conclusions.

2. Methodology

Our review was based on articles published in the SCOPUS database. SCOPUS is one of the biggest and largest abstract and citation database of scientific journals; peer-reviewed literature, books and conference proceedings. Delivering a comprehensive overview of the world's research output in the fields of medicine, technology, science, social sciences, arts, and humanities, SCOPUS features smart tools to track, analyze and visualize research (Aldred and Jacobs, 2000). First, we searched publications from 1900 until August of 2018 in the *TOPIC* section with the term *ecosystem service*, which yielded 35,635 articles. Then, we searched publications with the same criteria, but using specifically gendered terms including {ecosystem services and Ecotourism}, {ecosystem service and Ecotourism}, {ecosystem valuation and Ecotourism}, {ecosystem services and ecotourism and}, {ecosystem service and ecotourism and <ASEAN Country>} and {ecosystem valuation and ecotourism and <ASEAN Country>}. There are 89 articles in total in this second search. This event means that less than 1% (i.e., 0.7%) of the state-of-the-art research on ecosystem services had examined ecotourism from ASEAN. According to Ravnborg et al. (2007), less than 5% of the *Payment for Ecosystem Services* literature had address's social issues. We then conducted a comprehensive review of these 89 papers and rejected irrelevant research (e.g., research on non-relative humans, research on business ecosystems, and studies focusing on ecology rather than ecosystem services). The final sample from the systematic review consisted of 33 ES-Ecotourism for ASEAN papers that highlighted type of ecotourism, perceptions, knowledge, preferences, willingness to pay (WTP) and awareness of different ecotourism ecosystem services.

We recognize that this methodology has several restrictions, plus the focus on English language publications (e.g., we have identified one non-English paper among all 89 papers which was disbarred in the 33 final papers), publication bias in the literature towards discoveries that are deemed relevant, and a lack of recognition of publications not included in the SCOPUS database, including grey literature like unpublished reports by NGOs or government agen-

cies. Even so, this approach allows us to focus on making the research area public in the academic field. Google Scholar, database would be a great alternative method to be used (Villamor et al., 2014). However, since the scientific definition of ES is still under debate and the term *ecosystem services* is considered a *buzzword* by some (Boyd and Banzhaf, 2005), using the Google Scholar database would have resulted in a formidably large amount of publications that are not focused on his, her, their, etc. actual ecosystem service studies. Hence, we chose to focus on the papers listed in the SCOPUS database.

3. Results

3.1. Ecotourism Ecosystem Services from ASEAN: Temporal and spatial distribution

Figure 1 (a) shows the temporal distribution of the 33 core papers. Most studies were published after 2005. This finding resonates with the popularization of the term *ecosystem services* which was established in 2005 as a part of the Millennium Ecosystem Assessment. However, there is a paper by Nallakumar (2003) that already touched on the ecotourism ecosystem services in ASEAN before 2005. This paper explicitly discussed the importance of conservation and preservation in the ecotourism sector, making this paper the earliest paper among the 33 papers reviewed. The number of paper confirms that an increasing number of researchers are paying attention to the ecotourism ecosystem services in ASEAN. Since this article was written in September 2018, the number only shows results from 2003 to August 2018. For record, few papers also had been published after August 2018.

Figure 1(b) shows the spatial distribution (geographic focus) of this Ecotourism Ecosystem Services-ASEAN studies. Figure 1(b) shows that 67% of these studies were located in Malaysia and Indonesia and no study have been conducted in Brunei Darussalam, Myanmar and Vietnam. It's very important to acknowledge that countries with more than one paper are known as a country with many ecosystem diversity (such as Indonesia, Thailand, Malaysia, and Philippines). Countries with diverse ecosystems tend to use their blessed countries for profitable areas, such as the ecotourism sector, while countries with limited ecosystem types will focus more on urban tourism than ecotourism. Countries in ASEAN such as Singapore, Brunei Darussalam and few others developing their tourism sector based on their urban ecosystem's structure.

3.2. Ecotourism ecosystem services in ASEAN: Contextual issues

In this part, we go through on the details of the type of ecotourism ecosystems studied, the number of ecotourism ecosystem services analyzed, and the methods used for all 33 core papers. Fig. 2 (a) shows that most of the papers reviewed focus on ecotourism

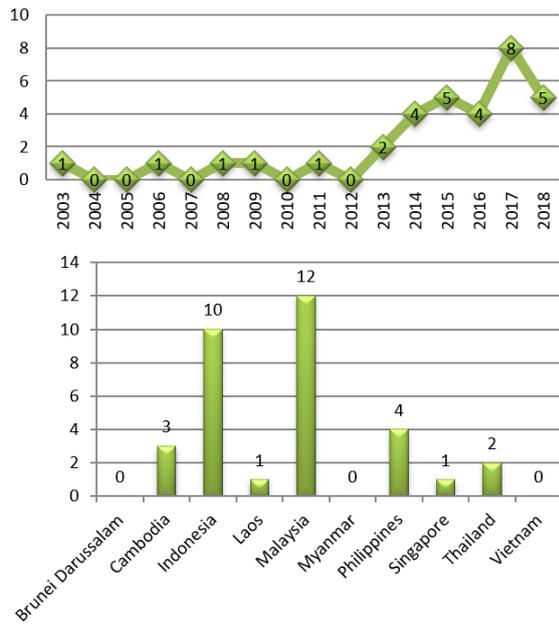


Figure 1. (a) Number of Ecotourism ES in ASEAN papers from 2003-2018; (b) Geographic focus of Ecotourism ES in ASEAN papers

in a tropical forest ecosystem (10 in total). Ecotourism ecosystem services in mangrove forests were the second most common (7 in total). Respective of one paper discusses several ecotourism ecosystem services such as coastal, ocean, island, and cave. Figure 2 (b) shows the number of ecosystem services analyzed in each paper. Of the 33 papers, only 13 (39%) focus on a single ecosystem service. Most of the papers (20 in total) examined 2 or more ecosystem services in their papers. From the 13 papers which focused on single ecosystem services, 8 papers discussed cultural ecosystem services (e.g., recreational, spiritual and tourism), followed by provisioning ecosystem services (e.g., food, freshwater and timber) and supporting ecosystem services (e.g., habitat conservation and maintaining biodiversity) with 2 papers. Only one paper examined the regulation of ecosystem services. Figure 2 (c) shows the main methods used in these studies. Survey (including online, postal or face-to-face) and In-depth interviews are the two most common methods. More than half of these papers (22 in total) used surveys and 9 papers used in-depth interviews. While the other 2 papers used focus group discussions and choice experiments.

3.3. Ecotourism ecosystem services in ASEAN: Substantive issues

The contents of 33 Ecotourism ES in ASEAN have been summarized and categorized based on a different types of ecosystem services. Table 1 lists the four main categories of ecosystem services in the first column and the different types of services studied in the second column. The third column summarizes briefly how different each of the ASEAN’s country perceives the specific ecosystem service for their

ecotourism sector. The purpose of the table is to provide an overview of how ecotourism in ASEAN intersects with ecosystem services and to offer guide for practitioners to recognize the potential degree of ecotourism in ASEAN surrounding certain ecosystem services designing policies (Pakse Declaration, 2016).

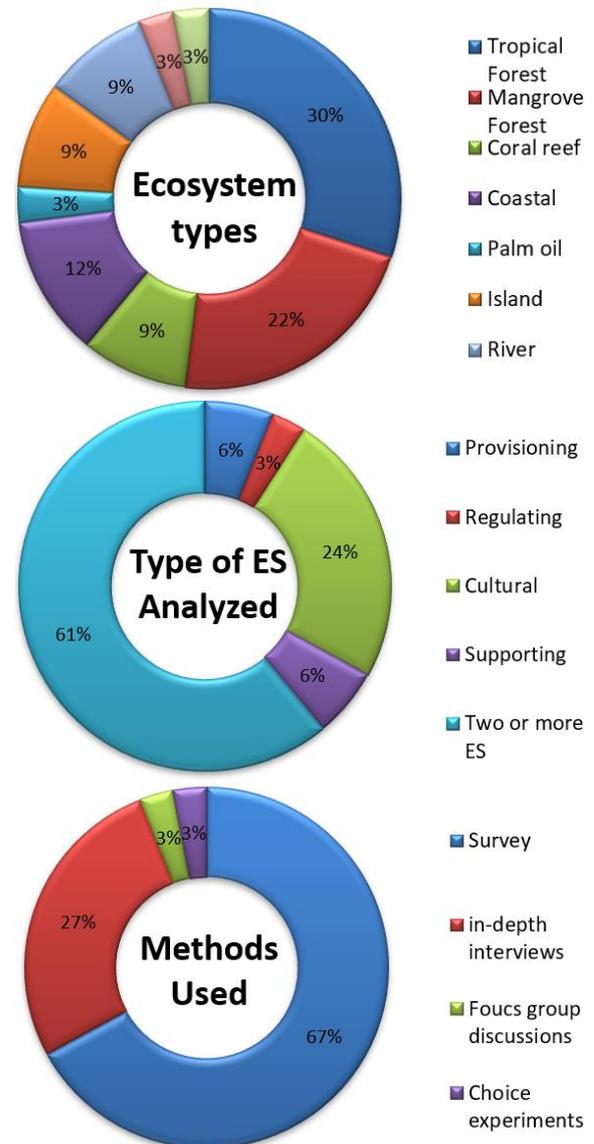


Figure 2. (a) Types of ecosystems studied in Ecotourism ES in ASEAN papers; (b) Type of ES analyzed in Ecotourism ES in ASEAN papers; (c) Methods used in Ecotourism ES in ASEAN papers, own study

The following section provides detailed description of each reviewed ecosystem service’s type and its relationship with ASEAN’s ecotourism.

3.3.1. Provisioning

Provisioning ecosystem services consist of all the products obtained from ecosystems. It’s been summarized from the 33 Ecotourism ES ASEAN papers, the most common are: Food, Fuel and timber, and Water supply.

Table 1. Summary of findings for Ecotourism ES in ASEAN, own study

ES category	ES type	Link with ASEAN's Ecotourism
Provisioning	Timber	Only two countries (Indonesia and Philippines) of ASEAN discussed on fuel and timber's services from their ecotourism ecosystem. (De Leon and Kim, 2017; Mudiyarso et al., 2015).
	Food	Three countries have research on their local food in term of ecotourism. (Carandang et al., 2013; Heber Dunning, 2015; Kibria et al., 2017; Tamayo et al., 2018; Tanalgo et al., 2016; van Oudenhoven et al., 2015)
	Water supply	Three countries (Cambodia, Malaysia and Indonesia) have discussed on the fresh water supply and its quality importance in order to attract tourist. (Clements and Milner-Gulland, 2015; Heber Dunning, 2015; Kibria et al., 2017; Mukrimah et al., 2016)
Regulating	Extreme events mitigation	Only two countries done a research on how the ecotourism sector gives extreme events mitigation to the ecosystem. (Mudiyarso et al., 2015; Mukrimah et al., 2016; Oudenhoven et al., 2015; Yusoff et al., 2006)
	Water quality control	Three countries have done researches that focused on the water quality control as one of the service provided by the ecotourism sector. (Kibria et al., 2017; Mukrimah et al., 2016; Oudenhoven et al., 2015; Yusoff et al., 2006)
	Erosion control and soil formation	Three countries analyzed the importance of ecotourism in order to control the erosion and soil formation. (Hwang and Roscoe, 2017; Kibria et al., 2017; Yusoff et al., 2006)
	Carbon sequestration	Three countries have studied on how the ecotourism ecosystem acts as carbon storage area. (Hwang and Roscoe, 2017; Kibria et al., 2017; Mudiyarso et al., 2015; Oudenhoven et al., 2015).
Cultural	Recreation	Five countries have studied on the recreation's services provided by ecotourism sector to the tourist. (Carandang et al., 2013; Clements and Milner-Gulland, 2015; Clements et al., 2010; Eshoo et al., 2018; Heber Dunning, 2015; Kibria et al., 2017; Kurniawan et al., 2016; Kusmana and Suswika, 2018; Kuvaini et al., 2017; Muhamad et al., 2012; Mukrimah et al., 2016; Thompson, 2018; Trialfhianty, 2017; Yusoff et al., 2006).
	Aesthetic	Seven countries in ASEAN have studied on the aesthetic values of ecotourism and its services to the tourist. (Abu Bakar et al., 2016; Bhuiyan et al., 2013; Clements and Milner-Gulland, 2015; Clements et al., 2010; Eshoo et al., 2018; Heber Dunning, 2015; Hwang and Roscoe, 2017; Junsongdang et al., 2017; Kibria et al., 2017; Kurniawan et al., 2016; Mohd Shahwahid et al., 2013; Tamayo et al., 2018; Trialfhianty, 2017)
	Scientific research	Three countries have studied on ecotourism being a scientific sites and the attraction to the foreign researchers. (Abu Bakar et al., 2016; Din et al., 2015; Heber Dunning, 2015; Kibria et al., 2017; Kusmana and Suswika, 2018; Kuvaini et al., 2017; Mudiyarso et al., 2015; Trialfhianty 2017).
	Education	Only Malaysia has studied ecotourism ecosystem as an educational place for kids. (Saumi and Zolkepli 2017).
Supporting	Habitat conservation and maintaining biodiversity	Five countries in ASEAN have studied on how ecosystem of ecotourism provided the habitat of very unique flora and fauna. (Abu Bakar et al., 2016; Aziz et al., 2017; Clements et al., 2010; Eshoo et al., 2018; Heber Dunning, 2015; Hwang and Roscoe, 2017; Kurniawan et al., 2016; Kusmana and Suswika, 2018; Nallakumar, 2003; Ramli et al., 2018; Tamayo et al., 2018; Teuscher et al., 2015; Trialfhianty, 2017; Wunder et al., 2008).

3.3.1.1. Timber

Rainforest products such as timber were perceived in two countries from ASEAN. Studies in Indonesia and the Philippines have shown that this type of ecotourism ecosystem service is essential to maintaining its economic development, especially the rapid development of tourism. Timber was famous as the main materials in the *homestay sector*. This event

helps homestay operators to maintain the authenticity and culture of their host families (De Leon and Kim, 2017; Mudiyarso et al., 2015).

3.3.1.2. Food

Generally, the uniqueness and delicacy the food from ASEAN's countries are undeniable. The food is one of the main attractions for the tourist to come

the ASEAN. In Cambodia, studies have concluded that exotic menus such as Tarantula, fire ants and other insects (provided by the ecotourism industry) are the main attractions for attracting tourists and attracting local tourists to earn income from their ecotourism industry (Kibria et al., 2017). Other studies in Thailand and Philippines showed the price for the ecotourism ecosystem services (seafood, exotic food, and others) played an important role in attracting the tourist (Tamayo et al., 2018; Tamayo et al., 2018; van Oudenhoven et al., 2015).

3.3.1.3. Water supply

Traditionally, ASEAN ecotourism has directly used natural freshwater and this ecosystem service has attracted tourists from many developed countries. Studies in Malaysia, Indonesia, and Cambodia showed that tourists willing to pay more for a trade to have a fresh water supply during their stay (Kibria et al., 2017; Mukrimah et al., 2016; Oudenhoven et al., 2015; Yusoff et al., 2006).

3.3.2. Regulating

Regulating ecosystem services is the benefit gained from the process of regulating ecosystem services. This article focuses on mitigating extreme events, controlling water quality, controlling erosion, soil formation and carbon sequestration.

3.3.2.1. Extreme events mitigation

Mitigating the effects of extreme events. Countries such as Malaysia and Indonesia have studied and highlighted how their ecotourism sectors (such as mangroves) provide services to mitigate extreme events such as tsunami and typhoons. This ecosystem benefits not only tourists but also local man-made benefits. The preservation of this ecosystem, may as well improve the surrounding's community's security (Mudiyarso et al., 2015; Mukrimah et al., 2016; Oudenhoven et al., 2015; Yusoff et al., 2006).

3.3.2.2. Water quality control

Water is a major necessity for the people, especially the ASEAN people. The quality of water also played an important role in the ecotourism sector according to studies in three countries in ASEAN. This ecosystem services provided by ecotourism definitely benefits the operator in saving their money for the water management (Kibria et al., 2017; Mukrimah et al., 2016; Oudenhoven et al., 2015; Yusoff et al., 2006).

3.3.2.3. Erosion control and soil formation

Most of the studies reviewed show that local residents of ASEAN rely on ecotourism, such as Fraser Mountain in Malaysia, Komodo National Park in Indonesia and Preah Vihear in Cambodia. This service brings many benefits in the field of plateau and forest ecotourism. It also provided more security to the tourists and the locals (Hwang and Roscoe, 2017; Kibria et al., 2017; Yusoff et al., 2006).

3.3.2.4. Carbon sequestration

Forests ecosystem is one of the largest ecotourism ecosystem that ASEAN's countries have. As we all know, forests are a pool of carbon captured from the atmosphere. Studies have shown that such ecosystem services help reduce carbon in the air and reduce heat and pollutants. Forests such as Danum Valley in Malaysia and Kalimantan's rainforest served as the carbon storage in ASEAN (Hwang and Roscoe, 2017; Kibria et al., 2017; Mudiyarso et al., 2015; Oudenhoven et al., 2015).

3.3.3. Cultural

Cultural ecosystem services include cultural services, life-fulfilling functions, information functions, cultural and amenity services, and socio-cultural fulfillment. We highlight several common disease sources identified from the 33 ecotourism ecosystem services in the ASEAN paper.

3.3.3.1. Recreation

Most studies indicate that ASEAN ecotourism mainly provides leisure activities, such as water sports, jungle trekking, fruit bats, and so on. ASEAN is known for the uniqueness of its ecotourism landscape. Hence, various events can be held and it is possible to attract tourists from all over the world. This ecosystem services gave huge benefits for the governing body by increasing the tourism sector's annual income (Carandang et al., 2013; Clements and Milner-Gulland, 2015; Clements et al., 2010; Eshoo et al., 2018; Heber Dunning, 2015; Kibria et al., 2017; Kurniawan et al., 2016; Kusmana and Suswika, 2018; Kuvaini et al., 2017; Muhamad et al., 2012; Mukrimah et al., 2016; Thompson, 2018; Trialfhianty, 2017; Yusoff et al., 2006).

3.3.3.2. Aesthetic

Seven countries have studied the aesthetic services provided by ASEAN Ecotourism. This event is the most significant ecosystem service from the ecotourism sector. Studies show that tourists' willingness to pay increases with the aesthetic value of ecotourism. Island ecotourism sector has the highest WTP, followed by forest and national park, agricultural areas, and mangroves (Abu Bakar et al., 2016; Bhuiyan et al., 2013; Clements and Milner-Gulland, 2015; Clements et al., 2010; Eshoo et al., 2018; Heber Dunning, 2015; Hwang and Roscoe, 2017; Junsong-dang et al., 2017; Kibria et al., 2017; Kurniawan et al., 2016; Mohd Shahwahid et al., 2013; Tamayo et al., 2018; Trialfhianty, 2017).

3.3.3.3. Scientific research

Some ecotourism ecosystems provide services for scientific research. New scientific discoveries from the ecotourism sector, such as mountain forests, island forests, etc. Studies have shown that foreign researchers have come to Malaysia's Danum Valley and Royal Belum Forest for very specific research

due to the uniqueness of their ecosystem (Abu Bakar et al., 2016; Din et al., 2015; Heber Dunning, 2015; Kibria et al., 2017; Kusmana and Suswika, 2018; Kuvaini et al., 2017; Mudiyarso et al., 2015; Trialfhianty, 2017).

3.3.3.4. Education

Studies have shown that ecotourism is a place for children's education in Malaysia. Studies also have shown that most children prefer learning activities in the ecotourism ecosystem compared to the classroom. Ecotourism also provides services to educate these children about how to maintain the ecosystem and how it benefits locals and the country (Saumi and Zolkepli, 2017).

3.3.4. Supporting

Supporting ecosystem services are the services that allow the other ecosystem services to be present. Of the 33 ecotourism ecosystem services listed in the ASEAN documents, the most common are habitat protection and biodiversity maintenance.

3.3.4.1. Habitat conservation and maintaining biodiversity

Generally speaking, most of the reviewed studies have concluded that all ASEAN ecotourism ecosystems can protect habitats and maintain flora and fauna in their ecosystems. The flora and fauna found in the ecotourism ecosystem are veritable endemic species. In addition, due to its rich biodiversity, tourists are even more attracted by some kind of ecotourism. Hence, maintaining the biodiversity and conserving its habitat are extremely important (Abu Bakar et al., 2016; Aziz et al., 2017; Clements et al., 2010; Eshoo et al., 2018; Heber Dunning, 2015; Hwang and Roscoe, 2017; Kurniawan et al., 2016; Kusmana and Suswika, 2018; Nallakumar, 2003; Ramli et al., 2018; Tamayo et al., 2018; Teuscher et al., 2015; Trialfhianty, 2017; Wunder et al., 2008).

4. Discussion

4.1. Ecotourism ecosystem services in ASEAN: Researches for the future

In this section, everything will be summarized, including issues, limitations and concerns related to ASEAN Ecotourism Ecosystem Services that were revealed during the review of those papers. Note that this section focuses only on the prospect for ASEAN ecotourism ecosystem services. In addition, this study attempts to highlight the research gaps that emerged from the studies have been reviewed.

There are several limitations that have been found in this study, the most common is there is no non-monetary approaches in calculating and measuring on how importance the services provided by the ecotourism ecosystem to the tourist or to the local. Non-monetary valuation for ecosystem services has

started to proliferate only recently. The methods usually used for non-monetary valuation (not only for other ecosystem service's valuation but for environmental or biodiversity assessment in general) vary from in-depth interviews and focus groups (Kaplowitz and Hoehn, 2001) through participatory modelling (Videira et al., 2009), scenario workshop (Peterson et al., 2003; Caille et al., 2007), deliberative visioning (Kallis, 2009), and citizens' jury (Aldred and Jacobs, 2000) to mixtures of quantitative and participatory techniques such as the valuation workshop (Álvarez-Farizo et al., 2009) or participatory multi-criteria evaluation (Salgado et al., 2009). It is important to have a specific method on non-monetary valuation for ecotourism ecosystem because ecotourism is a part of tourism that conserves environment in the same time. The main reason why tourists come and visit a place because of its cultural uniqueness and aesthetical value that literally cannot be measured and calculated using monetary value (Malovics and Kelemen, 2009).

Another issue that needed to be highlighted in this section is the spiritual elements that an ecotourism ecosystem must provide. Ecotourism monuments such as Batu Caves in Malaysia, Borobudur in Indonesia and Angkor Wat in Cambodia have promoted huge spiritual symbols in ASEAN (Isa et al., 2015). Various festivals were held annually in these places and have attracted tourists from all over the world. However, in this study, it's been found that the spiritual elements classified as cultural ecosystem services have not been studied and perceived. It is to be believed that spiritual elements have been frequently studied in any other perspective, but they have not been studied in the context of ecotourism ecosystem services.

Based on Fig. 2, It is known where the research gap is greatest. In countries such as Brunei Darussalam, Myanmar and Vietnam, more research should be carried out because research on ecotourism ecosystem services is still lacking and zero papers have been published on the SCOPUS website. These three countries must have their own ecotourism ecosystem service methods, which are different from other ASEAN countries. Finally, different approaches and methods in perceiving the ecotourism ecosystem services in ASEAN are needed especially on how to determine the patterns of similarities and differences between ASEAN's countries.

4.2. Ecotourism ecosystem services in ASEAN: facing climate change and achieving SDGs

ASEAN's countries such as Indonesia, Philippines, Malaysia, and Thailand are prompt to natural disasters due to rapid climate changes. Disasters such as Aceh Tsunami in 2004, Typhoon Haiyan in 2013, and Kelantan Big Flood in 2014 have killed thousands of people in ASEAN. Climate change would bring more frequent and more severe storms that

could cause more flooding. The increased precipitation would also make the destructive lahars (strong mudflows of ash and debris) more often. Climate-induced ocean acidification, and coral bleaching events, also would threaten the food security of coastal residents. Moreover, warmer temperatures would also reduce the entire region's agricultural productivity. These risks would compound the ever-present threats of typhoons and volcanic eruptions (Rasiah et al., 2018).

Geographically, ASEAN's countries are located in the Tropical Rain Belt and very near to the Ring of Fire. ASEAN's countries should take effective and immediate measures to reduce and mitigate the impact of climate change. Resilience to climate change will protect the ASEAN environment from degradation, and ensure that tourism will remain a profitable sector. The ecotourism-based economic boom has alleviated poverty, encouraged more resilient development, and allowed the government to create a world-renowned disaster-risk reduction strategy. Improving ecosystem services for ecotourism will not only benefit in terms of economic value, but will also provide support services for locals, such as coastal protection and storm buffering provided by mangroves (Rasiah et al., 2018).

In Pakse Declaration, it's been clearly stated that ASEAN should be shift its tourism sector greener (Pakse Declaration, 2016). Shifting a tourism sector into the new paradigm of ecotourism would need to follow three basic principles, which are; a) contributing to the conservation of the natural and cultural resources, b) involving the locals as beneficiaries of the project and, c) follow sound and ethical business practices (Hornoiu, 2016). In order to achieve a sustainable tourism, which placing an emphasis on Goals 8, 12 and 14, ASEAN needs to speed up the ecotourism agenda and movement. The concept of ecotourism should not only be reduced to the scope of tourism based on natural or semi-natural ecosystems, but also to artificial ecosystems (Elfithri et al., 2018). A Man-made ecosystem, such as urban ecosystems, are the main factors that generate waste and discharge pollution to the surrounding environment. The transformation of city-based tourism into eco-based tourism will not only achieve sustainable tourism, but also help cities move towards sustainable cities.

5. Conclusion

In order to ensure that the Pakse Declaration can achieve its goals, research on ASEAN ecotourism ecosystem services has surged in recent years. These studies have applied quantitative and systems-based approaches to evaluate the ecotourism ecosystem services in ASEAN. A systematic review has been conducted for these previous studies to confirm this emerging research topic, to analyze the research method used and ecosystem services targeted, to

summarize the ecotourism ecosystem services relativeness in ASEAN from different case studies and to highlight common limitations identified in these studies. Overall, from the literature been reviewed, ASEAN ecotourism is more focused on aesthetics and entertainment services. What's more, several studies also highlighted the importance of ecotourism in ASEAN as the habitat for unique and diverse flora and fauna.

This review also summarized the concerns and limitations from previous studies about the need to consider the intersection of ecotourism with the other ecosystems, the inadequacy of indicators used for assessing ecotourism ecosystem services in ASEAN. It is needed to urge for more case studies and comparative studies to identify the ecotourism ecosystem services in ASEAN not only using monetary value but also non-monetary value such as indices and standards. It is to be believed that these efforts will help scientists and practitioners to better understand the ecotourism ecosystem services in ASEAN, hence lead for a more sustainable tourism.

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