PROCEEDINGS

MILLENNIAL TOURISM

"Creative Strategies Towards Sustainable Tourism Development in the Millennial Era"

The Second Bali International Tourism Conference
Udayana University - Bali
8th - 10th November 2018

Organised by:

Research Centre for Culture and Tourism
Udayana University
Bali-Indonesia

Ministry of Tourism
Republic of Indonesia

Master Program in Tourism
Udayana University
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UDAYANA UNIVERSITY
Bali – Indonesia
2018

Welcoming Message
Conference Chair

Om Swastyastu, May God bless us

Distinguished guests, respected keynote and invited speakers, presenters, participants, ladies and gentlemen. Welcome to Udayana University, Welcome to Bali - The Island of Gods, and Welcome to this Wonderful Indonesia.

I would like to convey my gratitude to you for taking your precious time to participate in The 2nd Bali International Tourism Conference on "MILLENNIAL TOURISM: Creative Strategies Towards Sustainable Tourism Development in the Millennial Era" at Udayana University, Bali.

In particular, I would like to extend my sincere appreciation to distinguished guests from overseas.

First of all, please allow me to express my gratitude for:

- Honourable Minister of Tourism, Republic of Indonesia
- Governor of Bali Province
- Rector of Udayana University
- Mayor of Badung Regency and Mayor of Denpasar City
- Dean of Faculty of Tourism, and Head of Master Degree Program in Tourism, and Head of Doctoral Degree Program in Tourism, Udayana University
- Keynote Speaker Dr. Chris Bottrill, Chairperson PATA Board Member
- Invited Speakers: Professor Noel Scott of Griffith University, Professor Xu Honggang of Sun Yat Sen University, Prof. Dr. I K.G. Bendesa of Udayana University, and Mr. Oliver Libutzki - Associate Vice President of Agoda.
- All presenters and participants for coming to the 2nd Bali International Tourism Conference (Bali ITC).

I hope that this conference will provide a forum for researchers to exchange research results and information in tourism, and to facilitate the sharing experiences and the building of network among tourism practitioners and policy makers for further collaboration in research

and networking of tourism worldwide, in order to promote sustainable tourism in the millennial era through various forms of tourism.

We at Research Centre for Culture and Tourism Udayana University have been focused and continued to improve tourism research to reach a world-class research university particularly in cultural and creative tourism as Bali has been very famous as cultural tourism destination. This conference is the second Bali International Tourism Conference which is undertaken in collaboration between Research Centre for Culture and Tourism, Faculty of Tourism, Master Degree Program in Tourism, and Doctoral Degree Program in Tourism Udayana University. Supports are given by the Ministry of Tourism of Republic of Indonesia and the Mayor of Badung Regency.

I would like to deliver my sincere gratitude to Ministry of Tourism Republic of Indonesia, Regency of Badung, Udayana University, and some other sponsors.

I am also thankful mostly for the endless efforts of steering and organising committee members.

Thank you very much. Om Shanti Shanti Shanti Om

Denpasar, 8th November 2018

Dr. Agung Suryawan Wiranatha

Welcoming Message
Rector of Udayana University

Om Swastyastu,

Welcome to Bali, welcome to Udayana University, and welcome to the Second Bali International Tourism Conference 2018.

We greatly appreciate your participation in attending our international conference at our university campus in Denpasar. Your presence reflects the importance of the tourism theme as well as the recognition of the strong influences of millennial era to tourism development. There are many things related the millennial era, particularly the use of information and communication technology (ICT) in tourism and the emerging potential tourism market of young people.

Tourism has become one of the centre of excellent of Udayana University as the university has already had the integrated tourism study programs, from vocational courses (diploma), bachelor degree (sarjana), master degree (magister) and doctoral degree (doktor) in tourism. This kind of integrated tourism programs is available at the only one university in Indonesia so far. Udayana University becomes the leading university in tourism study in Indonesia.

Tourism is very complex and dynamic field. Lots of interesting things emerge and there are so many complicated issues that must be understood. In this context, we greatly welcome the initiative of the Research Centre for Culture and Tourism in collaboration with the Faculty of Tourism, and Doctoral and Master Program in Tourism Udayana University to hold the Second Bali International Tourism Conference. On behalf of Udayana University, we would like to give our sincere appreciation to the Ministry of Tourism Republic of Indonesia and the Regency of Badung for their great supports to this conference. We believe this conference will generate lots of interesting and comprehensive ideas about millennial tourism in order to support tourism development towards sustainable tourism.

Udayana University is very proud to be the host of this international tourism conference. We try our best to be the good host. Congratulations to all of you, have a great conference, and enjoy Bali.

Om Shanti Shanti Shanti Om

Denpasar, 8th November 2018

Prof. Dr. dr. A.A. Raka Sudewi, Sp.S.(K)

Welcoming Message
The Governor of Bali

***Om Swastyastu* (May the Almighty God Bless Us All),**

Welcome to Bali, "the Best Island Destination in the World" and the most famous tourist destination in this Wonderful Indonesia. It is a great pleasure for me to welcome all participants of this international conference undertaken by Udayana University.

As we know that tourism is the most important economic sector in Bali. More than 23% of GDRP Bali Province was gaining from tourism sector, namely accomodations and restaurants only. The contribution of tourism sector to Bali's economy has increased gradually since the last decade, from about 19% in 2010. The increasing contribution of tourism to Bali's economy has been in line with the increasing number of foreign tourists direct arrivals in Bali from 1,664,854 foreign visitors in 2007 to 5,697,739 foreign visitors in 2017. This is a great growth of foreign direct arrivals to Bali in average of 15% annually within ten years period. However, Bali still needs some more tourists who stay longer and spend more money during their stay in Bali. This can be achieved by exploring other niche tourist markets in this millenial era, the era that is dominated by the use of digital technology. Bali still has many tourism sectors that can be explored and developed as innovative tourists attractions that will make Bali becomes evenmore loved by the tourists. Such as: village tourism, traditional medical tourism, MICE (Meeting, Incentives, Conventions, and Exhibitons), many kind of manmade tourists attractions, cultural tourism, sport tourism, agrotourism and many more. Surely, to promote the sustainable tourism in Bali, it should be supported by all tourism components: tourism industry, mass media, academists, community and the government and must refer to the life philosophy of Bali community, Tri Hita Karana (three causes to achieve happiness), those are Parahyangan (Harmonies relations between human with the Almighty God), Palemahan (Harmonies relations between human with the environment) and Pawongan (Harmonies relations among human).

Therefore, I am very happy with the initiative taken by the Udayana University to organize the 2nd Bali International Tourism Conference on "MILLENIAL TOURISM: Creative Strategies Towards Sustainable Tourism Development in the Millenial Era". In this

conference, I hope there will be a very comprehensive discussion on millenial tourism towards sustainable development. I am sure this conference will provide excellent opportunities for participants to exchange views and ideas on how we get benefits from millenial tourism.

I do hope, this international program, will bring positive result and progress to the sustainable tourism in Bali, not just contribute welfare to the Bali community, but also to protect the environment and can be handed over to the next generation.

To end my short welcoming speech, I wish you a very fruitful conference and enjoy your stay in Bali

Om Shanti, Shanti, Shanti Om.

Denpasar, November 2018

THE GOVERNOR OF BALI,

WAYAN KOSTER

Welcoming Message
The Minister of Tourism, Republic of Indonesia

Millennial tourism is among the fastest growing market segments, related to the increasing number of the population in this millennial age, and the increasing propensity to travel of this generation. Coupled with the high internet-minded lifestyles, millennial tourism has its own characteristic much different compared to the older generations. Millennial tourism is also unique in terms of travel behaviors, choice of accommodation, food and beverage, outdoor activities, etc. Nonetheless, a lot of the market profile is yet needs to be further understood, to develop effective marketing strategies to attract more millennial tourist visiting Indonesia.

With the above considerations, The Ministry of Tourism, Republic of Indonesia, strongly support the 2nd Bali International Tourism Conference, entitled Millennial Tourism.

I thank University of Udayana for the initiative in organizing this conference. Academia, as part of Pentahelix, is expected to come out with academic analysis of tourism phenomena, and more so, offers applicative solution to accelerate tourism development, which has been put as priority sector by the Jokowi administration.

In addition, l do hope that this international conference will help increase the positive image of Indonesia to the international world, especially by way of social media.

For international participants, I would like to express my warmest welcome to the Wonderful Indonesia, especially welcome to Bali, the best island destination in the World.

Have a successful conference and networking.

Salam Wonderful Indonesia,
Dr Ir Arief Yahya,

Minister of Tourism, Republic of Indonesia.

Keynote Speaker

Dr. Chris Bottrill
Chairperson PATA Board Member

Cultural Integrity Through Tourism: Protecting our Richness and Diversity

ABSTRACT

In 1987 the Bruntland Commission coined the term sustainable development. Years later forest burn, glaciers melt, cultures are lost, food and water supplies are threatened, species disappear, and the planet continues to struggle under the pressure of development and the human desire for progress. While the notion of sustainability has gone through cycles of support, cynicism, and despair, it remains our focal concept of hope for a positive future. This highly visual presentation links the notions of authenticity and human rights together as a creative strategy to address the many facets and needs for sustainable development in tourism for the millennial era. Drawing upon an acclaimed PATA Foundation community based tourism project in the Sapa region of Northern Vietnam, and a PATA/World Indigenous Tourism Alliance project on human rights and indigenous tourism in the Asia Pacific, this presentation weaves many concepts that align perfectly with at least 14 UN SDG's and illustrates how global to local thinking and actions can raise accountability, build networks, and build sustainable outcomes for tourism and future generations.

Keywords: Cultural Integrity, Authenticity, Human Rights, Indigenous Tourism, Community Based Tourism, PATA, Vietnam, Networks

Invited Speaker

Professor Noel Scott
Griffith University

Designing Tourism Experiences for Millennials

ABSTRACT

Around the globe, the millennial generations born between 1980 and 2000 are changing the nature of travel. Millennials are the first 'connected' generation and have embraced social media. In Australia, millennials want different unique and authentic experiences, are involved in social enterprises, embrace crowdsourcing, have different career expectations from the baby boomers, and may be less loyal to products or services. This paper describes findings of research into development of new types of experiences that Chinese millennials visiting Australia are interested in. Chinese millennials are more adventurous that their parents and more likely to undertake more active adventure activities such sky diving and surfing. This changing market requires a response from tourism operators to develop new and innovative experiences. Some suggestions for how to research these new types of experiences are discussed.

Keywords: tourism experiences, Chinese millennials, product development research.

Invited Speaker

Professor Xu Honggang
The School of Tourism Management
Sun Yat Sen University

The Sustainable Tourism Indicator and Monitoring: Experiences from Chinese Practice

ABSTRACT

The importance of tourism is well recognized in the UN sustainable development goals in 2015. Tourism has been regarded as one of the most important tool to facilitate the move toward the sustainability. Development of the suitable indicator and monitoring the tourism is crucial to make sure that tourism has developed in the sustainable way and makes contribution to the sustainable development of the society. Although the Guidance of Sustainable Tourism Indicator of Tourism Destination is well recognized and accepted, it had not been applied systematically in the tourism destinations. The setting up of UNWTO monitoring center in China in 2005 initiated and began the actual monitoring. Since then, 8 monitoring stations were set up. These monitoring centers cover a wide range of tourism destinations, from the metropolitan cities to historical villages. The experience gained from these destinations riches our understandings on the systematic development of indicators. It is argued that the indicators have to be based on the local issues and be relevant to the local stakeholders. However, challenges are also encountered in the process.

Keywords: Sustainable Tourism, Tourism Monitoring Indicators, China, MSCTO.

Invited Speaker

Professor Dr. I K.G. Bendesa
Udayana University

The Impact of Cultural Values on Agriculture and Tourism Development in Bali: Hindu and Protestant Ethics in Comparison

ABSTRACT

Local wisdom can be derived from religion and other sources that have formed cultural values of society. As cultural values, they have been rooted in Balinese society since along time ago; however, at the same time, Western values have also permeated to social life. This study focuses only on local wisdom based on religion, which has influenced the progress of society, they are: the values of Hinduism and the values of Protestant's ethic which is labeled the spirit of capitalism. The objective of this study is to compare the most dominant values of Hindu and Protestant which have been entrenched in Bali, they are the cultural values of work that have a great impact on economic development. The Balinese local wisdom, which is considered to have high value is called Dharma as a core value of work. On the other side, the value of work based on Protestant ethic is contradictory to the concept of Hindu's work. These two concepts of work coexist simultaneously in all segment of society. For the Balinese, the concept of work is the "work for work", while the concept of work for Protestant is the "work for outcome". The concept of "work for work" has been underway for a long period of time, especially in rural areas, which has contributed to high productivity of agriculture. On the other hand, the concept of "work for outcome" that came along with tourism has been adopted in services industry, mainly in tourism sector.

The study was conducted in the mid-2017, in Jatiluwih Village as one of Bali's province landscape that has unique rice field and strong organizational irrigation system called Subak. The grand question that will be answered in this study: whether tourism values will dominate agricultural values, western values will control traditional values, local cultural values will be eroded by foreign values, a diametrical opposite of "work for work" versus "work for

outcome" that will cause a big change to economic development of Bali. The method of analytical technique used was principal component analysis as the study was of exploratory in nature. The number of respondents were 300 farmers, which all of them lived on agriculture. The results showed that sustainability of agricultural development was due to four components, namely: visionary, loyalty, dedication, and process; and each components consisting three indicators. All components were statistically significant indicated by their loading factors whose coefficients were all above 0.70. So, it can be said that the four components have played an important role in conserving agriculture in Jatiluwih Village. As a whole it can be said that process is more important than outcomes in agriculture, because farmers chose "work for work", instead of "work for outcome".

Keywords: local wisdom, Hindu values, Protestant ethics, agriculture, tourism, sustainable development

Invited Speaker

Oliver Libutzki
Associate Vice President of Agoda

Indonesian Millenial in Indonesia Travel Industry

ABSTRACT

In the next two years, Indonesia travel industry will see the market is dominated by millennial. It is important to understand the millennial behavior in general, and specifically who are Indonesian millennial. This presentation has insights of Indonesia millennial current travel facts and future opportunities.

The Second

Bali International Tourism Conference

PROCEEDING

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Assessing of Mangrove Biodiversity for Ecotourism Area Development in West Sulawesi

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ABSTRACT

The biodiversity plays important role in performance and tourist attraction of mangrove ecotourism area. However, the threat to mangrove biodiversity such as mangrove wood cutting for fuelwood and conversion into aquaculture ponds has still occurred. Here, we investigated the mangrove composition, structure, and diversity in West Sulawesi. The mangroves of Bebanga village, Kalukku sub-District, West Sulawesi represent an ecotourism area that has not been subject to severe studies about the mangrove biodiversity for ecotourism area development. This mangrove area provides ecotourism activities such as mangrove tracking, mangrove learning and rehabilitation, fishing, and culinary for tourists. We implemented a line transect method covering five study sites for mangrove vegetation survey and used vegetation analysis equations to calculate mangrove density, frequency, coverage and Important Value Index (IVI). In addition, we used the Shannon-Wiener index for assessing the mangrove diversity. Seven species were found (*Avicennia marina, Bruguiera gymnorrhiza, Rhizophora mucronata, Rhizophora stylosa, Sonneratia alba, Sonneratia caseolaris*, and *Xylocarpus granatum*). However, mangrove area was dominated by *Rhizophora mucronata* and most mangroves in seedling growth level. In addition, relative density, frequency and coverage of mangroves at all regeneration were below 56% and found at moderate diversity. This evidence demonstrates the biodiversity of mangrove in degradation status. Therefore, improving mangroves conserve and restore should be considered. In addition, selection of woodcutting in mangrove use and aquaculture revitalization to halt the expansion of new ponds becomes a great policy for maintaining and improving the mangrove biodiversity for supporting the ecotourism area development.

Keywords: Ecotourism, mangrove, biodiversity, West Sulawesi.

1. Introduction

Ecotourism is a responsible travel to natural areas that have potentials in the conservation of the environment, supporting and enhancing education, and improving the welfare of the local people and alleviating poverty (Wood, 2002). Ecotourism is truly interesting by the tourists in the recent decades due to they can learn about the environment, culture, and contribute to conservation and preserving biodiversity, and economic development goals in destination regions, rather than just having a good time (Mondino and Beery, 2018). Furthermore, it can support for the realization of the United Nations Millenium Development Goals (UN-MDGs) (Saarinen and Rogersion, 2013).

The biodiversity is important to human welfare due to it have provides the goods and services (around 40% of the global economy is based on the biological products and process). However, the loss of biodiversity become increasingly rate than that of natural extinction due to

anthropogenic activities such as unsustainable harvesting of natural resources, land conversion development and the introduction of invasive species (Christ et al. 2003).

Mangroves are one of the important coastal ecosystems that provide variety ecotourism services (MA, 2005; Malik et al. 2015a, Malik et al. 2015b). Mangrove ecotourism areas have grown and contributed to the tourism industry in Indonesia and other Southeast Asian countries (Ly and Bauer, 2014). However, the high pressure on mangrove forests in ecotourism area for many purposes such as woodcutting and aquaculture development has been caused degraded and deforested and has serious consequences to biodiversity loss (Malik et al. 2015b; Carugati et al. 2018)

In West Sulawesi, mangroves use as an ecotourism area has been going since 2013 in Bebanga village Kalukku sub-district Mamuju district. It was pioneered by Mr. Munajib assisted by other local people (Ditpolair Polda Sulbar, 2017). This ecotourism area has been visited by tourists who want to enjoy the beauty of the mangrove and the beach (Zain, 2014). However, the mangrove woodcutting for consumption, house materials and expansion of aquaculture pond activities are still happening and caused mangrove degradation and deforestation and subsequently threat to biodiversity (Malik et al .2018). Malik et al. (2015b) demonstrated mangrove degradation and deforestation often change the composition, structure, and diversity of mangrove forest species in Sulawesi.

The relationships between biodiversity and ecosystem services such as ecotourism are often positive (Harrision et al. 2014; Cardinale et al. 2006). The biodiversity plays an important role as a tourist attraction, resources for consumption goods, natural component to support environmental survival and aesthetics (Hakim, 2017). In addition, Hakim (2017) revealed the conservation and managing the biodiversity to increase destination performance of ecotourism area is important, especially in terms of destination sustainability and competitiveness. In the meanwhile, the there is a need for assessment of mangrove biodiversity in tourism studies that rarely used in decision-making by policymakers related to the sustainability and competitiveness of tourism destinations in Indonesia and Southeast Asian countries (Hakim, 2017). It is therefore important to accurately assessing the loss of mangrove biodiversity. Here we investigate species of mangrove composition, structure, and diversity for continued development of mangrove ecotourism area in West Sulawesi.

2. Study Area

This study was conducted in mangrove ecotourism area of Bebanga Village, Kalukku Sub-District, Mamuju District, West Sulawesi Province. The study area is located at latitude 2°35'7.88" - 2°44'8.62" and longitude 118°58'32.04" - 119° 3'15.74" (Figure 1). The location is about 23 km from the capital of West Sulawesi, Mamuju.

The village covers 88.42 km2 and consists of 17 sub-villages. The area borders Makassar Strait to the north, Mamuju sub-district to the south and west, and Sinyonyoi village to the south and east. The population was 8,174 people in 2016 with a population density of 92 people per km2 (BPS Kabupaten Mamuju, 2017). Most of the population are living in this coastal area and working as fishermen and farmers (BPS Kabupaten Mamuju, 2017).

In this study, five sampling sites were selected (Figure 1). The sampling sites were chosen due to an appropriate case study as it contains a potential area for mangrove ecotourism, that remains unwell manage and develop, and also under considerable threat to degradation and deforestation.

Figure 1. Study Area: Bebanga village, Kalukku sub-district, Mamuju District and transect locations at five sites

3. Methodology

3.1. Data collection

Data on mangrove structure and diversity were collected in July 2018 using a line-transect method from the seaward edge to the landward margin with transect length depending on the thickness of the mangrove patch (English et al. 1997; Malik et al. 2015b). Transect measurements were conducted at five sites (Figure 1). For each transect, we established 3 terraced plots of 10 m x 10 m for tree level, 5m x 5 m for sapling level, and 2 m x 2 m for seedling level using measuring tape and plastic ropes and marked the position using Global Positioning System (GPS) (English et al. 1997; Malik et al. 2015b). The distance between plots was around 30 m depending on the specific vegetation characteristics and the landscape (Malik et al, 2015b). In addition, we recorded the species name with reference to book for identifying mangrove species and individual number of mangrove trees, saplings and seedlings inside each plot using a tally counter and measured all trees with stem diameter >5 cm and recorded diameter at breast height

(DBH) 1.3 m above soil surface or 30 cm above the highest prop root for Rhizophora spp. (Malik et al. 2015b).

3.2. Data analysis

The Density of species (D), Relative density of species (RD), Frequency of species (F), Relative frequency of species (FR), and coverage of species (C) and Relative coverage of (RC) was calculated by the formula 1 - 7: (Malik et al. 2015b)

$Di = \frac{ni}{A}$ (1), and $RDi = \frac{ni}{\sum n} \times 100\ \%$ (2)

where:
- Di : density of species i (individual/m^2)
- RDi : relative density of species i (%)
- ni : number of counts per species i
- Σn : total number of counts for all species
- A : total area of the sample observed (m^2)

$Fi = \frac{Pi}{\sum p}$ (3), and $FRi = \frac{Fi}{\sum F} \times 100\ \%$ (4)

where:
- Fi : frequency of species i
- RFi : relative frequency of species i (%)
- pi : number of the plots where species i occurs
- ΣF : total number of occurrences for all species
- Σp : total number of plots observed

$Ci = \frac{BA}{A}$ (5), and $RCi = \frac{Ci}{\sum C} \times 100\ \%$ (6)

where:
- Ci : areal coverage for species i
- BA : $\pi DBH^2 / 4$, where BA = Basal Area (cm) and DBH= Diameter at Breast Height (cm)
- A : total area of the plot (m^2)
- ΣC : total area coverage for all species
- RCi : relative coverage of species i (%)

To express the dominance level of individual mangrove species, the Importance Value Index (IVI) was calculated by the sum of Relative Density, Relative Frequency, and Relative Coverage (formula 7): (Malik et al. 2015b)

$IVI = RD + RF + RC$ (7); the range of IVI = 0 - 300

The diversity of mangrove species (H') was calculated using formula 9 with reference to the Index of Shannon-Wiener: (Malik et al. 2015b)

$H = - \sum Pi \ln (Pi)$; $Pi = (ni/N)$ (8)

The range of H = 0 - >3 (< 1 = low diversity; 1< H'≤3 = moderate diversity; H' > 3 = high diversity), where ni is number of individual species i and N is total number of species.

4. Results

4.1. Mangrove Composition and Structure

A total of 2750 standing live mangrove trees recorded at the five sites, containing mature trees 851, saplings 747 and seedlings 1152 (Table 2). Seven species were identified, including Avicennia marina (Am), Bruguiera gymnorrhiza (Bg), Rhizophora mucronata (Rm), Rhizophora stylosa (Rs), Sonneratia alba (Sa), Sonneratia caseolaris (Sc), and Xylocarpus granatum (Xg). These species belongs to four families, including Avicenniaceae, Rhizophoraceae, Sonneratiaceae, and Meliaceae. In each site, the number of species between four and five, but Bruguiera gymnorrhiza, Rhizophora mucronata, and Rhizophora stylosa were found at all sites (Table 1).

Table 1. List of mangrove species identified

Family name	Species name	Local name	Sampling Site				
			I	II	III	IV	V
Avicenniaceae	*Avicennia marina*	*Pajapi*	✓	-	-	✓	✓
Rhizophoraceae	*Bruguiera gymnorrhiza*	*Tanjang*	✓	✓	✓	✓	-
Rhizophoraceae	*Rhizophora mucronata*	*Pangkang*	✓	✓	✓	✓	✓
Rhizophoraceae	*Rhizophora stylosa*	*Pangkang*	✓	✓	✓	✓	✓
Sonneratiaceae	*Sonneratia alba*	*Padada*	✓	✓	-	✓	✓
Sonneratiaceae	*Sonneratia caseolaris*	*Padada*	-	-	✓	-	-
Meliaceae	*Xylocarpus granatum*	*Buli cella*	-	-	✓	-	-
	Number of Species		5	4	5	5	4

✓ Present, - Not present
Source: Research observation, 2018

The density of Rhizophora mucronata was the highest at all growth levels of mangrove, followed by Sonneratia alba for mature trees, whereas saplings and seedlings, Rhizophora stylosa was the highest. The frequency of mangrove was dominated by Rhizophora mucronata and Rhizophora stylosa at all growth stages, followed by Bruguiera gymnorrhiza and Sonneratia alba. The coverage of mangrove was dominated by Bruguiera gymnorrhiza, followed by Rhizophora mucronata. Furthermore, the Important Value Index (IVI) shown Rhizophora mucronata was the dominant species at all growth levels, followed by Sonneratia alba for mature species, and Rhizophora stylosa for saplings and seedlings (Table 2).

Table 2. Important Value Index (IVI) of mangrove species

Growth level	Species	ni	D	RD	F	RF	C	RC	IVI
Mature tree	Am	36	0.02	4	3	13	3.52	8	26
	Bg	53	0.04	6	4	17	8.75	21	44
	Rm	480	0.32	56	5	22	6.53	15	94
	Rs	102	0.07	12	5	22	2.35	6	39
	Sa	118	0.08	14	4	17	8	19	50
	Sc	52	0.03	6	1	4	7.97	19	29
	Xg	10	0.01	1	1	4	5.06	12	18
Total		851	0.57	100	23	100	42	100	300
Sapling	Am	47	0.03	6	3	13	-	-	19
	Bg	83	0.06	11	4	17	-	-	29
	Rm	313	0.21	42	5	22	-	-	64

	Rs	162	0.11	22	5	22	-	-	43
	Sa	79	0.05	11	4	17	-	-	28
	Sc	34	0.02	5	1	4	-	-	9
	Xg	29	0.02	4	1	4	-	-	8
Total		747	0.50	100	23	100	-	-	200
Seedling	Am	88	0.06	8	3	13	-	-	21
	Bg	116	0.08	10	4	17	-	-	27
	Rm	512	0.34	44	5	22	-	-	66
	Rs	244	0.16	21	5	22	-	-	43
	Sa	124	0.08	11	4	17	-	-	28
	Sc	42	0.03	4	1	4	-	-	8
	Xg	26	0.02	2	1	4	-	-	7
Total		1152	0.77	100	23	100	-	-	200

Am: *Avicennia marina*, Bg: *Bruguiera gymnorrhiza*, Rm: *Rhizophora mucronata,* Rs: *Rhizophora stylosa*, Sa: *Sonneratia alba*, Sc: *Sonneratia caseolaris*, Xg: *Xylocarpus granatum* (Xg). D: density, RD: relative density, F: frequency, RF: relative frequency, C: coverage, RC: relative coverage, IVI: Important Value Index.
Source: Primary data analyzed, 2018

4.2. Mangrove Diversity

The highest index value of mangrove diversity was found at sapling level (1.62), followed by seedling (1.56) (Figure 2). The mangrove diversity at all growth levels was moderate category.

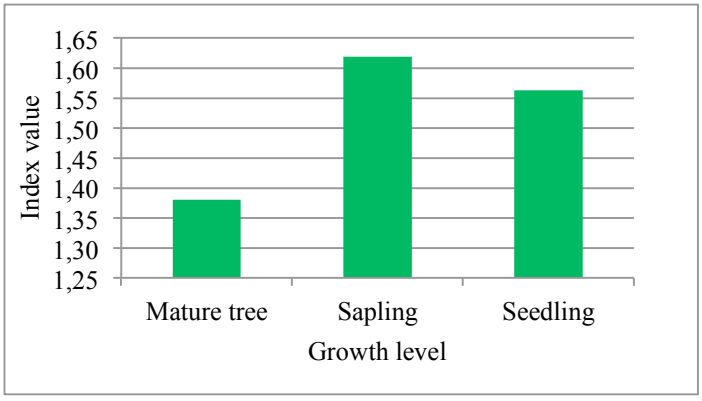

Figure 2. Diversity index (H') of mangrove

5. Discussion

This study presents an assessment of mangrove biodiversity from mangrove ecotourism area of Bebanga Village, West Sulawesi including composition, structure, and diversity. We found that the composition of true mangrove species contained 26% and 16% of the total mangrove species in Sulawesi Island (27 species) and Indonesia (43 species) (Kusmana, 1993). In early 1990s Nurdin (1994) recorded that the western coast of South Sulawesi contained 12 true mangrove species (In 1994 coast of Mamuju District was included in the administrative area of South Sulawesi province, but since 2005 was included in West Sulawesi). It is demonstrating that

there have been declines in the mangrove species number over the last two decades. The species composition reduction corresponds to similar studies in South Sulawesi as reported by Malik et al. (2015b) and Nurkin (1994).

In addition, the disturbance of this forest has been causing instability of the ecosystem where one of the species (Rhizophora mucronata) in all level regeneration become dominant, almost 70% of mangrove composition dominated by sapling and seedling (Table 2), and diversity of mangrove in moderate category (Figure 2). Furthermore, relative density, frequency, and coverage of mangroves no more than 56%, representing there are many areas of mangrove in degradation status (Table 2).

Overcutting for timber and fuelwood and clearing of mangrove for aquaculture ponds has become the driving force behind degradation and deforestation of mangrove in this area. From 2013-2018, mangroves decreased from 95 ha to 82 ha, whereas aquaculture ponds increased from 205 ha to 212 ha and have taken places along the coast of this area (Malik et al. 2018). When mangrove vegetation is removed, it has a consequence to biodiversity loss and subsequently impacts to performances (such as loss of mangrove panorama and associated fauna) and tourist attractions (such as watching and hearing birds chirping) in a mangrove ecotourism area. Since ecotourism depend on biodiversity, the loss of biodiversity can suffers not only to the communities who have high dependent on this industry, but also tourism industry, as well as on other the ecotourism-related businesses such as transportation, hotels and accommodations, food and restaurants, banking, and various leisure and entertainments services (Habibullah et al. 2016).

Thus, in order to reduce the loss of biodiversity for the continued development of the ecotourism industry, the preservation of intact mangrove and restoration of disturbed mangrove are important actions. Malik et al. (2015a) report that in Sulawesi Island, aquaculture businesses frequently abandon ponds as soon as revenue decreases (often after only 5 years). Therefore, the restoration of abandoned ponds by re-planting mangrove with a variety of species should be considered as a viable option for improving mangrove biodiversity and development of ecotourism area. Brown et al (2014) demonstrated that mangrove restoration project for 43 ha of abandoned ponds have been successful to increase level of mangrove biodiversity in Tanakeke Island of South Sulawesi (averaging 2171 plants/ha and 3 species within 32 months after restoration in 2010) that have consequence to the community livelihoods and mangrove ecosystem services. In addition, conserving biodiversity cannot be separated from major social and economic development issues. Therefore, a balance between mangrove consumption and capacity of mangrove resources through selection cutting on mangrove harvesting, and aquaculture revitalization program to prevent expansion of new ponds by clearing mangrove area should be considered.

6. Conclusion

The results presented in this study demonstrate the assessment of mangrove biodiversity for ecotourism development in West Sulawesi, Indonesia. Mangrove use for wood cutting and aquaculture development become the driver of mangrove biodiversity decreased and impact to performance and tourist attraction of ecotourism area. More attention from stakeholders and decision-makers is needed to conserve and restore mangrove areas lost to over-exploitation in this area. It is of high priority to maintain and possibly increase the mangrove biodiversity and the ecotourism development strategy.

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