The Economic Impact of Mount Agung Eruption on Bali Tourism

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Abstract— This study aims to analyse the economic impact of Mount Agung eruption in 2017 on Bali tourism. This study uses a qualitative research approach. Data was collected through interviews with hotel managers and tourism stakeholders in Bali. The research sample was determined by purposive sampling technique. The results show that most respondents said that they experienced drastic income decline after the closure of Ngurah Rai airport due to Mount Agung eruption. The decrease in hotel room occupancy in December 2018 even reaches 20-30%. This is very significant because December is usually peak season in Bali and hotels can achieve 100% room occupancy in normal conditions. Hotel revenues which declined significantly resulted in a decrease in the income of hotel employees and other tourism workers. Conditions gradually improved in March and almost recovered in April 2018. However, the earthquake in Lombok in June 2018 and the Tsunami in Palu in September 2018 was predicted to affect tourist visits to Bali due to travel warnings issued by several countries to visit Indonesia.

Keywords - economic impact, eruption, Mount Agung, tourism.

I. Introduction

Bali is a small island that very vulnerable to the impacts of climate change and natural disasters ((Stocker *et al.*, 2013) stated with great confidence - at least 90% the true possibility - that small islands "are very vulnerable to the impacts of climate change and natural disasters such as sea level rise, floods, landslides, high winds, earthquakes and other extreme events ". In addition, Mason (2012) argues that Bali's excessive dependence on the tourism industry can lead to an economic crisis in the future. According to Bali Tourism Satellite Account 2007, tourism in Bali accounts for more than 40% of the province's gross domestic product (Central Statistics Agency [BPS]) and the Ministry of Culture and Tourism [DCT], 2009). Most people in Bali who work directly or indirectly in the tourism industry, the impacts of climate change and natural disasters will have a direct impact on the tourism sector which will automatically place all people in crisis positions.

The International Panel on Climate Change (IPCC) recommends two types of strategies: macro and micro (Stocker et al., 2013). The macro strategy involves increasing macro-scale adaptive capacity, such as: improving education

and training, improving health services and income distribution to improve a country's ability to deal with climate change and other pressures. The micro strategy involves increasing micro-adaptive capacity, such as: planning sea level rise and designing water conservation to overcome future droughts, thereby modifying the management of community and economic sectors that are most sensitive to climate change and natural disasters. The tourism sector is one sector that is very sensitive to climate change and natural disasters.

The threat of Mount Agung eruption has provided a direct example of how natural disasters shock Bali tourism. The closure of Ngurah Rai Airport for two days has resulted in a shock for tourists and tourism managers. 16 Airlines canceled flights to Bali. Thousands of tourists were affected by the closure of Ngurah Rai airport. Overall, it is estimated that all of Bali suffered a loss of 18 million dollars in just a few days. This had an impact on tourist visits in December 2017, 15 thousand tourists had canceled their vacation to Bali.

Research on the impact of the Mount Agung eruption is very important to find out how much economic loss is experienced by the tourism industry. The results of this analysis will be very useful for policy making in terms of risk management and policy provision for industries that have experienced economic difficulties since the occurrence of the Mount Agung eruption. Based on the explanation of the above background, this study aims to analyse the economic impact of Mount Agung eruption in 2017 on Bali tourism.

II. Literature Review

2.1 Natural disasters and their impact on the tourism sector

The tourism industry as an industry that depends on climate, is very vulnerable to the threat of natural disasters. A large amount of literature has been published on the impact of climate change on the tourism industry (Becken, 2013; de Freitas, 2009; Hernandez & Ryan, 2011; Kajan & Saarinen, 2013; Moreno & Becken, 2009). Coastal tourism is

threatened by the effects of climate change. Physically, coastal infrastructure is threatened by rising sea levels and more frequent storms (Berger, Fischer, Lema, Schmitz, & Urban, 2013; Wilkinson, 1996). Beaches around the world experience accelerated erosion and loss of extensive coastal wetlands, not only because of rising sea levels but also because of storm surges and high waves (Becken, 2013). Research by Scott, Simpson, and Sim (2012) found that 50% of coastal properties in five countries (Anguilla, Belize, British Virgin Islands, St. Kitts and Nevis, and Turks and Caicos Islands) were among Caribbean countries that suffered damage, loss of inundation and dependence on the tourism industry will bring more losses. In addition, climate change will lead to substantial coral mortality (Cinner et al., 2012).

Extreme weather changes and sea level rise are two symptoms of climate change that have been felt by people in tourism areas. Irregularity in rainfall and long dry periods that cause water shortages during the dry season. If there is a prolonged drought, the community will experience a water crisis and disrupt agriculture. While the high rainfall intensity in the rainy season causes floods and landslides to occur in disaster-prone locations.

For Indonesia, a report prepared by the United Nations Development Program [UNDP] (2013) has provided information on current and future climate risks. This report mentions three major climate change trends observed in Indonesia, namely: (1) increase in temperature; (2) the average sea level rise for the 1993-2008 period was 0.6 cm per year; and (3) significant increase in rainfall in December-January and a significant decrease in June - August in most regions. In addition, this report provides a projection of climate trends in Indonesia, as follows: (1) temperatures in Indonesia are expected to increase from 0.021 ° C to 0.034 ° C per year; (2) a shorter rainy season but with heavy rain will occur in South Sumatra, Java, and Bali, and this will increase the risk of flooding. The longer the dry season increases the risk of drought. Figure 2.1 shows possible rainfall patterns in

Java and Bali; and (3) sea level is predicted to rise to 29 cm by 2030, also with the sinking of nearly 2,000 small islands as quoted from Sakya (2009).

For the island of Bali, research by Rahmawati (2017) reports that people have begun to feel the effects of climate change. The results of interviews with tourism stakeholders (28 respondents) reported extreme weather changes and sea level rise were two symptoms of climate change that had been felt significantly by the people in the tourism area. Irregularity in rainfall and long dry periods cause water shortages during the dry season. If there is a prolonged drought, the community will experience a water crisis and disrupt agriculture. While the high rainfall intensity in the rainy season causes floods and landslides to occur in disaster-prone locations.

In addition to cyclones, floods and landslides have become a regular agenda in every rainy season. Some flood-prone areas are Bali's tourism centers, such as Bedugul, Kuta, Denpasar, Sudaji Village (Buleleng) and Tabanan. There is no official data regarding the impact of natural disasters on the tourism sector. There has never been a study that discusses the impact of natural disasters on the tourism sector. Therefore, this research is important to do because it will be the basis for policyholders to conduct an evaluation of what policies should be carried out related to the tourism sector and natural disasters.

Bali's tourism vulnerability to the impacts of natural disasters has serious implications for both the tourism sector and the local community. Rahmawati (2017) found the unpreparedness of tourism stakeholders in facing the risk of climate change, such as water crisis, disruption of food security, sea level rise and health problems. This indicates the need for more pro-environment policy changes and the government's bias in dealing with the risks of climate change and disaster management in tourism destinations.

2.2 Strategy to increase tourism community resilience to natural disasters

Increasing community resilience in tackling climate change and disasters is a challenge for governments at national and regional levels. Smith and Pilifosova (2003) suggest that increasing the ability of communities to address the risks of climate change and natural need requires studies related to local vulnerabilities, the involvement of local stakeholders and adaptation initiatives that are in line with current decision-making processes. As stated by Lindseth (2004), reducing the impact of global climate change must be done at the local level because the consequences of climate change events (such as floods, landslides and cyclones) are mostly felt at the local level. Therefore, building community adaptation capacity to be resilient and face climate change is important. Several previous studies have found that efforts to improve the ability of community adaptation depend on the scale (national, regional and local scale).

Engle (2011) suggests two approaches/strategies for building community adaptive capacity. The first approach is taken from vulnerability assessments (such as loss of property, number of deaths and injuries during extreme events, damage to ecosystems). The second approach is taken from a resilience framework that focuses on evaluating the ability of the system to overcome extreme challenges or events.

The International Report Panel on Climate Change (IPCC) recommends two types of strategies: macro and micro (McCarthy, et.al. 2001). The macro-strategy involves increasing macro-scale adaptive capacity, such as: improving education and training, increasing wealth, and improving health care and income distribution to improve a country's ability to tackle climate change and other pressures. The micro-strategy involves increasing micro-scale adaptive capacity, such as planning sea level rise and designing water conservation to deal with future droughts, thereby modifying the management of the sectors of society and the economy that are most sensitive to climate change.

A more practical strategy has been applied by the local government in Washington, USA, in King County (Saavedra & Budd, 2009). This regional government focuses on building public awareness and increasing sharing knowledge through the release of guidebooks that prepare for climate change and distribute the Green Tools CD Room to help other communities in building green building programs. In addition, such communication plays an important role in involving the public to adopt a low-carbon lifestyle and stimulate grassroots action. Other studies by Petheram, Zander, Campbell, High, and Stacey (2010) note several practical strategies suggested by indigenous people in NE Arnhem Land (Australia), such as: temporary relocation in extreme events, improved communication, involvement and sharing of climate knowledge change, improvement of infrastructure and public health, and utilization and promotion of traditional knowledge. Similarly, Ockwell, Whitmarsh, and O'Neill (2009) argue that opening access to information and communication can enhance adaptive capacity through effective and rational commitments to address climate change. In this way, the tourism industry can take part in communicating climate change information and building community adaptation capacity in their CSR initiatives.

III. Research methodology

3.1 Research Design

A qualitative approach is a type of scientific research that involves gathering information from research participants and stakeholders to reveal the meaning and understanding of the issues under study. Much of the data is expressed by stakeholders in their own words, unstructured, ambiguous (Dwyer, Gill, & Seetaram, 2012; Ercan Sirakaya-Turk, 2011; Guest, Namey, & Mitchell, 2013)

3.2 Research Location

The study was conducted in eight tourist destinations in Bali such as Sanur, Kuta, Nusa Dua, Seminyak, Ubud and Tulamben. The above location is chosen because some of it is a trend setter of tourism in southern Bali and northern Bali. Comparison of the results of data analysis after the closing of Ngurah Rai airport due to the eruption of Mount Agung can be an important research result for the development of future disaster management and crisis policies.

3.3 Types and Data Sources

1) Data Type

The types of data to be taken are primary data and secondary data. Primary data is data taken directly from the research location. As for the primary data to be taken, among others: data of tourist visits taken directly from the hotel, the results of interviews on the economic impact felt by tourism stakeholders in the research location. Secondary data is data taken from data published by the government, industry and mass media. Secondary data that needs to be taken are data on tourist visits before the disaster and the impact of the great volcanic eruption for tourism stakeholders.

3.4. Subjects and Research Objects

The subject of this study was the manager of hotels and restaurants in the research location and tourism stakeholders. The object of this research is the economic impact of natural disasters for the tourism sector in Bali.

3.5 Data collection techniques

1) Interview

The main idea behind the interview is to reveal people's perspectives and experiences about a particular context. The interview is an exchange of ideas or perspectives between researchers and respondents regarding the topic under study (Jennings, 2010).

The interview technique is used in this study because: (1) allows researchers to collect rich and solid empirical data about the topic being studied (Geertz, 1973, as quoted by Jennings, 2010); (2) can ensure its validity and accuracy (Dwyer, Gill, & Seetaram, 2012); and (3) interviews allow researchers to observe the surrounding environment, ask

questions longer and achieve high response rates compared to survey methods (Neuman, 2012).

Researchers managed to conduct interviews with 15 hotel managers and 15 tourism stakeholders spread across several tourism destinations in Bali. The results of the interview are supplementation of the results of data analysis through content analysis to ensure the validity of the data presented in this study.

2) Content analysis

Content analysis can be defined as "a research method that uses a set of procedures to make valid conclusions from text" (Weber, 1990, as quoted in Dwyer, Gill, & Seetaram, 2012, p. 443). Content refers to words, symbols, ideas, images or anything that can be used as visual and audio communication media for human interaction (Neuman, 2012). In addition, secondary data can include academic journals, books, conference papers, government publications, newspaper articles, reports, theses, statistics, and websites (Gray, 2009). This study also uses Google as a search engine using the keywords "tourism and the great mountain eruption". From the results of the search, 30 articles were selected that were truly related to the economic impact of the great Gunung eruption on Bali tourism in 2017.

3.6 Sampling Techniques

This study uses purposive sampling technique to identify key informants in this study. Patton (2002) explains that purposive sampling is a way to select study participants based on their involvement in research and to choose from which researchers can learn the most about major problems or investigations. Criteria for sampling selection by purposive sampling, respondents were chosen because of their ability to provide rich information about the topic under study (Sirakaya-Turk, 2011).

3.7 Data Analysis

The data collected in this study will be analyzed with qualitative data analysis techniques. The thematic approach is used to analyze data. In thematic analysis, after data has been collected, the code is encoded to look for similar themes and patterns and then explore how categorization is presented by code from case to case, from settings to settings (Füssel, 2007). Veal (2006) mentions that the main activity of qualitative analysis is reading notes, documents and transcripts, listening to interviews and observation notes, copying data, and encoding, sorting and managing data.

IV. Research Results

The island of Bali is a small island that is naturally prone to natural disasters. Various natural disasters have occurred in Bali such as floods, landslides, droughts, strong winds, earthquakes, and volcanic eruptions. In addition, Bali has two active volcanoes namely Mount Agung and Mount Batur. In the area of Mount Agung recorded around 23,037, 58 Ha of land will be affected by the flow of lava, lava and hot clouds. In addition, Bali is also located between the Indo-Australian Plate and the Eurasian plate. This caused Bali to be prone to earthquakes and tsunamis.

Chart 4.1 Trends in Disasters in the past 10 years

Source: http://bnpb.cloud/dibi/laporan4 , 2018

Among the disaster data described above, the 2017 Gunung Agung eruption has a significant impact on the tourism sector.

Mount Agung eruption occurred on November 26, 2017. Mount Agung spewed smoke and volcanic ash with an altitude reaching an altitude of 3,000 meters from the summit.

The eruption was also accompanied by loud explosions and sounded to a radius of 12 kilometers. Responding to this situation and to prevent accidents in flight then Officially, Ngurah Rai Airport was closed since Monday (11/27/2017) at 7:00 a.m. until Tuesday (11/28/2017) with the release of Notamr A4274 / 17 Ad Clsd Due to Agung Volcanic Ash. The Meteorological Watch Office publishes news for flights according to observational information from the Darwin VA Advisory, namely that the volcanic ash burst from Mount Agung has reached a height of 25,000 feet (about 7,620 meters) moving south-southwest with a speed of 15 knots and still heading to Airport I Gusti Ngurah Rai, Bali (Gamar, 2017). Airport closure lasts for 3 days. Ngurah Rai Airport is open again on Wednesday, November 29, 2017.

The results of interviews with 25 respondents (hotel managers and tourism stakeholders) in Bali related to the impact of the Gunung Agung eruption on tourism indicate that the closure of Ngurah Rai Airport for several days had a significant economic impact. Most respondents reported experiencing drastic management after the closure of Ngurah Rai airport due to the eruption of Mount Agung. This is as stated by several respondents in the quote below:

After the eruption of Mount Agung, the occupancy rate of rooms in our hotel immediately dropped, the employee working hours were reduced by 10% for 3 months. After the Mount Agung eruption in mid-2017, occupancy dropped to 10%. Whereas in 2016, the average occupancy of the hotel was at 60% in our hotel[1].

Gunung Agung eruption has a significant impact on the tourism industry. Many companies accept cancelation from guests, both long stay and short stay[3].

Economic impact is felt in our company. Business has declined because guest occupancy has begun to decline due to the closure of the airport which has resulted in fewer guests staying at our hotel and there are guests who have booked to cancel in those months[6].

The impact of the Mount Agung eruption greatly affected tourists. Our hotel occupancy has decreased to 80%. Our hotel development project was cancelled. In fact, we experienced a very significant income decline, to the extent that we could not pay our home installments[8].

The on-the-job training activities for students which usually start in December have to be postponed until hotel occupancy recover. We were worry, what if the hotel occupancy is not recover, what will happen to our students'on the job training program[10].

The results of content analysis on 30 articles related to the impact of Mount Agung eruption on tourism indicate that the closure of Ngurah Rai Airport for several days had a significant economic impact. 100% of articles stated that Bali tourism experienced a significant decline in income. There have been a number of perceived impacts since the closure of Ngurah Rai Airport, including:

1) Since the closure, the situation at Ngurah Rai Airport was filled with passengers, both at the domestic and international terminals. The closure resulted in a big crowd in the airport waiting room. In fact, some passengers sit or lie on the floor due to lack of seats. Many foreign tourists choose to stay at Ngurah Rai Airport because they want to go back home. It is estimated that as many as 89,000 tourists who cancelled their flight were caused by the cancellation of 445 flight routes. There were a lot of cancellations on coming to Bali and there were an estimated 44,000 foreign tourists with an average expenditure of Rp 1.3 million per person per day. Whereas from the cancellation of domestic tourists as many as 44,000 people with the potential to spend around IDR 520,000 per day (Lavinda, 2017)

2) Room occupancy rate in Bali is drastic. The occupancy rate of the hotel also dropped to only about 10 percent of the total room capacity. The economic value of the loss is estimated at Rp 11.5 billion from

the cancellation of 11,013 rooms in 44 hotels and villas (Lavinda, 2017).

The manager of Ayodya Resort Bali in Kuta said that the occupancy rate of hotels and surrounding hotels is only around 20%. (www.voaindonesia.com, 2017).
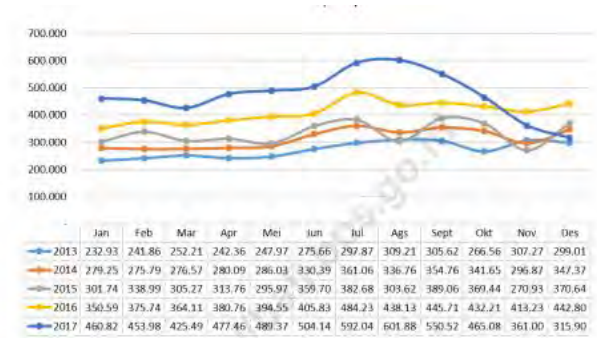
3) Hotel room occupancy decline significantly and its influence hotel management ability to pay employee salaries resulting in a cut in employee working hours. As Cok Ace told Bali PHRI Office on Tuesday (5/12/2017) to that in December 2017, around 20% of 5000 hotels in Bali cut their worker working hours to reduce salary cost (Bali Tribunnews, 2017).

4) With an average loss of Rp. 250 billion per day due to a decrease in the number of tourists to Bali, the Coordinating Minister for Maritime Affairs Luhut Binsar Pandjaitan said the total losses due to the eruption of Mount Agung, Bali for 40 days reached Rp. 19 trillion.

5) Karangasem Regency as an area affected by the eruption of Mount Agung experienced a significant decline in income due to a decrease in the number of tourists. Foreign tourists cancel their visit due to travel restrictions or travel warnings from their home countries. PAD Karangasem Regency in 2016 is Rp. 235 Billion and in 2017 it is estimated that only Rp. 50 billion (Desi, 2017)

The interviews results and above content analysis are reinforced by official statistical data published by the Bali Central Bureau of Statistics (BPS Bali). Chart 1 shows the number of foreign tourist arrivals to Bali Province per month from 2013 to 2017.

Figure 1. Number of International Tourists to Bali Province per Month in 2013-2017 (000)

	Jan	Feb	Mar	Apr	Mei	Jun	Jul	Ags	Sept	Okt	Nov	Des
2013	232.93	241.86	252.21	242.36	247.97	275.66	297.87	309.21	305.62	266.56	307.27	299.01
2014	279.25	275.79	276.57	280.09	286.03	330.39	361.06	336.76	354.76	341.65	296.87	347.37
2015	301.74	338.99	305.27	313.76	295.97	359.70	382.68	303.62	389.06	369.44	270.93	370.64
2016	350.59	375.74	364.11	380.76	394.55	405.83	484.23	438.13	445.71	432.21	413.23	442.80
2017	460.82	453.98	425.49	477.46	489.37	504.14	592.04	601.88	550.52	465.08	361.00	315.90

Source: BPS, 2017

From the data presented in Figure 1 can be seen that there was a significant decline of tourist visits from November to December 2017 which can be directly linked to the closure of Ngurah Rai Airport due to the eruption of Mount Agung. In November 2017 a decrease of -12.6% or as many as 52225 tourists. While in December 2017 there was a decrease of -28.6% or as many as 126891 tourists. If the average expenditure of foreign tourists per day is 1 million rupiahs, then Bali's lost 126 billion per day. Total income loss in December 2017 reached Rp. 3.78 Trillion. This amount does not include a decrease in hotel occupancy rates and income from purchasing airline tickets to come to Bali. In 2017, the number of star-rated hotels in Bali was 551 units and non-star hotels were 4323 units (BPS Bali, 2017).

Chart 2. Room Occupancy in Bali Province per Month in 2017.
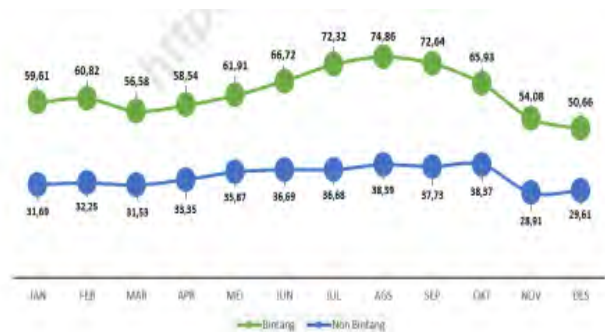
Source: BPS, 2017

The graph illustrates room occupancy in December 2016 was 50.66% and in December 2017 was only 29.61%. So there was -21% decrease in room occupancy in Bali (BPS Bali, 2017). The average foreign guest stay in 2017 in star and non-star hotels is 3 days while the average domestic guest staying in Bali is 2 days (BPS Bali 2017). The total rooms available in Bali on star hotels are 94222 rooms and non stars as much as 80477. So the total rooms available are 174 699 rooms. If the average room price in Bali is Rp. 1 million rupiah. Then the total loss due to room occupancy decline is estimated around Rp. 1,1 T.

This figure affects the economy in Bali because almost 80% of the people in Bali are economically dependent on the Tourism sector. The hotel reduces working hours and money for hotel staff. So that the purchasing power of hotel workers against other products also declined. Other tourism stakeholders such as tour and travel managers, dive center managers, souvenir traders also feel the direct impact of the decline in the number of tourists to Bali in December 2017. If it lasts long, the economic crisis can occur in Bali.

Thanks to the promotion of the Government that Bali is safe, this situation can be immediately controlled. In February 2018 the situation gradually improved and in June 2018, the room occupancy was above 70%. Table 2 shows the average room occupancy for star-rated hotels in 2018.

Table 2. Hotel room occupancy in 2018

Source: BPS Provinsi Bali, 2018.

The Mount Agung eruption gave a direct picture to the community and the Government regarding the important role of the tourism sector in Bali. The ability to overcome disasters and continue to provide the best service when an emergency situation can be an investment of positive image for Bali tourism. This disaster also reminded of the importance of developing strategies to deal with natural disasters.

V. Conclusion

The eruption of Mount Agung and the closure of Ngurah Rai Airport in 2017 have had a significant economic impact on Bali tourism. Room occupancy decreased and the number of foreign tourists who came to Bali decline drastically in December 2017. December 2017 recorded a decrease of -28.6% or as many as 126891 tourists. If the average expenditure of foreign tourists per day is 1 million rupiahs, then Bali's loss is 126 billion per day. The amount of loss for tourist decline in December 2017 reached Rp. 3.78 Trillion. This amount does not include a decrease in hotel occupancy rates and income from purchasing airline tickets to come to Bali. While the total loss due to reduced occupancy rate of rooms is estimated at around Rp. 1.1 Trillion for December 2017. The number of losses that significantly affect the economy of the Balinese people is 80% dependent on the tourism sector. This event also reminded the importance of developing strategies to overcome natural disasters, especially for the Tourism sector.

References

[1] Badan Nasional Penanggulangan Bencana. 2018. Kejadian Bencana 10 tahun terakhir. [online] available from http://bnpb.cloud/dibi/laporan4 [accessed 1 September 2018].

[2] Bali Tribunnews (2017) Dampak Erupsi Gunung Agung yang tengah dirasakan secara nyata oleh masyarakat Bali. [online] available from http://bali.tribunnews.com/2017/12/06/5-dampak-erupsi-gunung-agung-yang-tengah-dirasakan-secara-nyata-oleh-masyarakat-bali [accessed 10 September 2018].

[3] BPS Provinsi Bali (2018). [online] available from https://bali.bps.go.id/dynamictable/2017/05/30/171/banyaknya-kamar-yang-tersedia-pada-hotel-non-bintang-dan-akomodasi-lainnya-menurut-kelompok-kamar-di-bali-2011-2015.html [accessed 10 September 2018].

[4] Becken, S. & Hay, J. (2012). *Tourism and climate change mitigation and adaptation*. London: Routledge.

[5] Becken, S. (2013). A review of tourism and climate change as an evolving knowledge domain. *Tourism Management Perspectives, 6(0), 53-62*. doi: 10.1016/j.tmp.2012.11.006

[6] Berger, A., Fischer, D., Lema, R., Schmitz, H., & Urban, F. (2013). China–Europe relations in the mitigation of climate change: A conceptual framework. *Journal of Current Chinese Affairs, 42(1), 71-98.*

[7] BPS & DCT. (2009). *Bali Tourism Satellite Account 2007*. Jakarta, Indonesia: Statistics Indonesia (BPS) and Department of Culture and Tourism (DCT).

[8] Cinner, J. E., McClanahan, T. R., Graham, N. A. J., Daw, T. M., Maina, J., Stead, S. M., et al. (2012). Vulnerability of coastal communities to key impacts of climate change on coral reef fisheries. *Global Environmental Change, 22(1), 12*. doi: 10.1016/j.gloenvcha.2011.09.018

[9] de Freitas, C. R. (2009). A review of "Tourism and climate change: risks and opportunities". *Journal of Sustainable Tourism, 17*(5), 640-642. doi: 10.1080/09669580902775000

[10] Desi, Aditia Ningrum (2017) [online] available from https://www.merdeka.com/uang/dampak-erupsi-gunung-agung-disebut-lebih-merugikan-dari-bom-bali.html [accessed 10 September 2018].

[11] Dwyer, L., Gill, A., & Seetaram, N. (2012). *Handbook of research methods in tourism: Quantitative and qualitative approaches*. North hampton: Edward Elgar Pub.

[12] Engle, N. L., & Lemos, M. C. (2010). Unpacking governance: Building adaptive capacity to climate change of river basins in Brazil. *Global Environmental Change, 20*(1), 4-13. doi: 10.1016/j.gloenvcha.2009.07.001

[13] Ercan Sirakaya-Turk, M. U., Hammitt, W., & Vaske, J. J. (2011). *Research methods for leisure, recreation and tourism*. Wallingford, Oxfordshire; Cambridge: CABI.

[14] Glesne, C. (2011). *Becoming qualitative researchers: an introduction*. Boston, Mass: Pearson. Guest, G., Namey, E. E., & Mitchell, M. L. (2013). *Collecting qualitative data: a field manual for applied research*. Thousand Oaks: SAGE Publications.

[15] Jennings, G. (2010). *Tourism research*. Milton, Qld: John Wiley & Sons.

[16] Lindseth, G. (2004). The cities for climate protection campaign (CCC) and the framing of local climate policy. *Local Environment, 9*(4). 325-336.

[17] Lavinda (2017) Pendapatan Bali terancam susut Rp.2,47T akibat Gunung Agung. [online] available

from https://www.cnnindonesia.com/ekonomi/20171122160323-92-257388/pendapatan-bali-terancam-susut-rp247-t-akibat-gunung-agung [accessed 1 September 2018].

[18] Mason, P. (2012). *Tourism impacts, planning and management*. Hoboken: Taylor and Francis.

[19] McCarthy, J. J., Canziani, O. F., Leary, N. A., Dokken, D. J., & White, K. S. (2001). *Climate change 2001:* Impacts, adaptation, and vulnerability: Contribution of Working Group II to the third assessment *report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press.

[20] Neuman, W. L. (2011). *Social research methods: Qualitative and quantitative approaches*. Boston: Allyn & Bacon.

[21] Ockwell, D., Whitmarsh, L., & O'Neill, S. (2009). Reorienting climate change communication for effective mitigation: Forcing people to be green or fostering grass-roots engagement? *Science Communication, 30*(3), 305-327.

[22] Petheram, L., Zander, K. K., Campbell, B. M., High, C., & Stacey, N. (2010). 'Strange changes': Indigenous perspectives of climate change and adaptation in NE Arnhem Land (Australia). *Global Environmental Change, 20*(4), 681-692.

[23] Rahmawati, Putu Indah. (2017) *Linking Corporate Social Responsibility, Tourim and Climate Change to Build Tourism Community Adaptive Capacity to Climate Change in Bali*. PhD thesis. Victoria University, Australia.

[24] Sakya, A. E., (2009). Climate observation: Risks and challenges – Indonesian case. *Parallel Session of the World Climate Conference-3*. Geneva, 1 September 2009.

[25] Saavedra, C., & Budd, W. W. (2009). Climate change and environmental planning: Working to build community resilience and adaptive capacity in Washington State, USA. *Habitat International, 33*(3), 246-252.

[26] Scott, D., Simpson, M. C., & Sim, R. (2012). The vulnerability of Caribbean coastal tourism to scenarios of climate change related sea level rise. *Journal of Sustainable Tourism, 20*(6), 883-898. doi: 10.1080/09669582.2012.699063

[27] Smit, B., & Pilifosova, O. (2003). From adaptation to adaptive capacity and vulnerability reduction. In Smith, J. B., Klein, R. J. T., & Huq, S. (Eds.), *Climate change, adaptive capacity and development* (pp. 9-28). London: World Scientific Publishing.

[28] Stocker, T. F. *et al.* (2013) 'Climate Change 2013. The Physical Science Basis. Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change - Abstract for decision-makers'. Available at: https://inis.iaea.org/search/search.aspx?orig_q=RN:45042273 (Accessed: 3 October 2018).

[29] United Nations Development Programme (UNDP), Bureau for Crisis Prevention and Recovery (BCPR). (2013). *Climate risk management for agriculture sector in Indonesia*. New York, NY: UNDP BCPR

[30] Veal, A. J., & Ticehurst, G. W. (2005). *Business research methods: A managerial approach*. Sydney: Pearson/Addison Wesley.

[31] Wilkinson, C. R. (1996). Global change and coral reefs: Impacts on reefs, economies and human cultures. *Global Change Biology, 2(6), 547-558*.

[32] Voaindonesia.com (2017) [online] available from https://www.voaindonesia.com/a/kerugian-pariwisata-bali-bisa-ancam-peroleh-devisa-indonesia-/4163172.html [accessed 10 September 2018].