

DEVELOPING AND VALIDATING AN INSTRUMENT FOR THE ASSESSMENT OF TOURISM CARRYING CAPACITY IN PULAU PERHENTIAN MARINE PARK

Nadia Mohd Nasir¹

PhD candidate of Institute of Halal Research And Training (INHART), IIUM
(Email: nadianasiro@gmail.com)

Mansor Ibrahim²

Professor, Department Of Urban And Regional Planning,
Kulliyyah Of Architecture And Environmental Design (KAED), IIUM

Accepted date: 09-02-2019

Published date: 30-06-2019

To cite this document: Nasir, N. M. & Ibrahim, M. (2019). Developing and Validating An Instruments for The Assessment of Tourism Carrying Capacity in Pulau Perhentian Marine Park. *Journal of Tourism, Hospitality and Environment Management*, 4(15), 10-18
DOI: 10.35631/JTHEM.415002

Abstract: *Carrying capacity is one of the concepts in tourism management and planning. Though it shows a remarkable solution in controlling the impacts of tourism towards the environment, it involves a very complex process and vagueness in indicating attributes and criteria to govern this framework. This study is carried out to evaluate the relevant indicators for the tourism carrying capacity in Pulau Perhentian marine park. In this paper, a conceptual model based on a study from the current literature was proposed. Data collected from the questionnaire was analyzed to validate and test the reliability of the instruments. The findings of this paper will be used for developing the model in the future.*

Keywords: *Carrying Capacity, Sustainable Tourism, Highly Sensitive Area Tourism, Marine Park, Significant Indicators*

Introduction

Malaysia is rich with marine biodiversity assets such as beautiful coral reefs and marine fishes. Marine tourism started to flourish in Malaysia early 1980s. Since then, many tourist accommodations and infrastructures were built on the island. When Malaysia first promoted its 'Visit Malaysia Year', tourists arrival increased tremendously throughout the country. Total arrivals of tourists were 423 229 in 2000 and increased up to 822 498 tourists in 2015 (JTLM, 2018). The high number of tourist arrivals at MPA (marine park area) indicate that marine tourism in Malaysia is growing remarkably. A total of 9 million local and international tourists have visited peninsular Malaysia MPAs in the last 15 years (JTLM, 2018).

Marine park is defined as "the water body within two nautical miles from the island's lowest tide mark. Once gazette, the area become a 'no-take zone'. No fishing or extraction of any form of resources is allowed" (DMPM & GEF, 2014).

Overdevelopment of the tourist accommodations and facilities on the MPAs are causing severe degradation of the Peninsular Malaysia marine ecological assets. Uncontrolled developments of chalets, resorts, jetties, shops, airports, roads and harbors are causing degradation of coral reefs, marine flora and fauna, freshwaters pollutions and solid waste generation. Improper operations of tourist providers on the MPAs are causing cumulative negative impacts on the marine ecological assets. Degradation and destruction of marine ecological assets forced the Malaysia government to take initiatives to improve the situation.

The first action taken was to establish Marine Parks under the Department of Fisheries. The first MPA was established in 1983 where fishing was prohibited in all waters within 8km of the marine parks. The second action taken was formulating various acts to protect Malaysia marine biodiversity. Some examples are the Environmental Quality Order Act (1987), the National Parks Act (1980), and the Fisheries Act (1985).

The third action taken was by signing the convention on biological diversity (CBD) in June 1992. Since then, marine biodiversity has been part of Malaysia's policies, strategies and action plans. Some examples of policies and plans are the five years Malaysia plans, The National Policy on Biological Diversity (1998), National Policy On The Environment (2002), National Wetlands Policy (2004), And National Physical Plan (2005) (Kaur, 2012).

Another action taken by the Malaysian government was integrating the concept of sustainability in the development and management of the marine tourism industry in Malaysia. Apart from this, the government also formulated various guidelines and best practices to be implemented at the multiple sectors and levels of agencies.

However, due to redundancy of rules and regulations, authority and lack of execution, this research aims to find the most significant factor in implementing carrying capacity. The reason is to ensure that the most critical factor is given priority to be 'treated' first. Carrying capacity are known as the growth limits an area can accommodate without violating the environmental capacity goals (Mexa & Coccossis, 2004). Tourism carrying capacity indicators can be identified based on the tangible and intangible impacts at tourism sites.

Identification of Key Factor and Subfactor of Tourism Carrying Capacity

Tourism impacts are identified notably on the economic, socio-cultural, environmental dimensions, tourism facilities management and tourist perceptions. Identification of these key factors and subfactor are made through literature review content analysis which led to a list of 32 subfactors generated. The subfactors were groups into 6 key factors; biophysical environment, social-cultural, economic development, tourism facilities management, planning control law and tourist perception. Table 1 shows the 6 key factors with its subfactors which was adapted from the references.

Table 1: Key Factor and Sub Factors

Key Factor / Sub Factors	Definition	References
Biophysical Environment		
Water consumption	Freshwater used for tourism-related activities in the tourism area.	Aris & Praveena, 2013 Isa Et Al, 2014 Praveena Et Al, 2010 Praveena Et Al, 2011

Cleanliness	The condition of land and water at the tourism area.	Portman, M. E., Pasternak, G., Yotam, Y., Nusbaum, R., & Behar, D. (2019)
Wastewater management	Wastewater disposal management and treatment process.	Kaczor, G., Bergel, T., Bugajski, P., & Pijanowski, J. (2015)
Waste management	Daily solid and liquid waste production and management.	Mason, 2011c Li, Yang, Liu & Zheng, 2014
Vegetation loss	Lesser vegetation on land due to development of infrastructure that threatened the species habitat.	Zhong Et Al, 2011
Marine life threatened species	Marine disturbance and increased number of threatened species.	Mellin, C., Aaron MacNeil, M., Cheal, A. J., Emslie, M. J., & Julian Caley, M. (2016)
Weather	Climate. relative humidity, average temperature, rainfall intensity, and sunshine hours	Becken, 2010 Davies, H. N., Beckley, L. E., Kobryn, H. T., Lombard, A. T., Radford, B., & Heyward, A. (2016). Hopkins, C. R., Bailey, D. M., & Potts, T. (2016). Jarvis, D. (2015)
Social Cultural		
Population density.	Population growth rate at tourism area which will bring implications to the daily waste produced by residents and land exploration.	Pieraccini, M., Coppa, S., & De Lucia, G. A. (2017).
Employment growth rate.	Local employment rate in tourism activities	Eshliki & Kaboudi, 2012
Behavior Awareness.	tourists and residents moral conduct towards preserving the environment	Zamani-Farahani & Musa, 2012
Conflict of culture.	Are resident's local tradition guarantee untouchable with the influx of tourist	Ariza, E., Pons, F., & Breton, F. (2016)
Criminality & Safety	The frequency of accidents and criminal statistics within the boundaries	Brodie & Waterhouse, 2012
Residents satisfaction level	Number of residents' complaints	Gladstone, Et Al 2012
Economic Development		
GDP Growth rate	Gross domestic product (GDP) or the country's overall economic output per capita	Begam 2018
Tourism receipts	The average rate of tourism or expenditure of inbound/outbound visitors for higher economic value	Jeyacheya, J. R., Lee, D., & Hampton, M. (2017).

Tourism investments	Investments available in the tourism sector and seed grant received from the government or other sectors	Azizan & Marzuki, 2011
Community profits	How much are residents benefiting from tourism expenditure on tourism development	Sugiantoro, A., Ohdate, M., Sullivan, S., & Zedilla, W. E. (2017) Choi, Y. E., Jin, J. Y., Chang, Y. S., Jang, B., & Chon, J. (2018)
Tourism Facilities Management		
Tourist arrival flow	How tourist arrivals management during peak/non-peak season	Todd & Katie, 2013
Tourism facilities	The capacity of facilities and amenities in the tourism area. Is it enough?	Silva & Ghilardilopes, 2012
Condition	The condition of the facilities and amenities in the tourism area.	Begam 2018
Tourist products availability	The diversity and uniqueness of a tourism area can offer to the tourist	Wolf, Et Al 2013
Tourist satisfaction level	Number of tourist complaints on overall aspects such as safety, infrastructures, scenic quality and hospitality	Moore, S. A., Rodger, K., & Taplin, R. (2015)
Travel time	Average time travel to reach the destination	Ramirez 2016
Perception to crowding	Average no of tourists at one time, time waiting or queuing for tourism activities	Brooks & Fairfull, 2016 Siti Nabihah & Md Saad, 2015
Planning and Control Law		
Land use condition	Does the land use of an area give pressure on marine life	Liu, Wu, Jhan 2011 Yates, Et Al, 2013
Policy and regulations	A standard policy, dos and don'ts, rules and regulations implemented by marine park management at tourism area	Connor, Et Al 2010 Dredge, Ford & Whitford, 2011 Brokaj 2014
Political stability	Will tourism disturb political stability in the tourism area	Saad, Et Al 2014 Abdul Khalid et al, 2013
Tourist Perception		
Satisfaction	Tourist satisfaction with the way the marine park is managed currently	Abecasis, Et Al, 2013
Damages	The perception that uncontrolled number of tourists will bring damages to tourism sites in the future	Ismail & Turner, 2008
Impact	The perception that activities on the land (nearby marine park) will have an impact on the marine park	Nejati, Et Al, 2014
Threat	The perception that the east coast marine park being under threat	Noh, A. F. M., Shuib, A., Tai, S. Y., & Noh, K. M. (2018).

		Ng, S. I., Chia, K. W., Ho, J. A., & Ramachandran, S. (2017).
Cleanliness	Cleanliness of the tourism sites	Ramdas & Mohamed, 2014
Sufficiency	Does the policies that Department of Marine Park Malaysia (DMPM) sets is enough?	Sharpley, 2014
Implementation	Does the implementation that Department of Marine Park Malaysia (DMPM) sets is satisfying?	Baysan, 2011

A conceptual model based on the identified factors from the literature is formed as illustrated in figure 1. All the sustainable measures listed is the key factor in determining the most significant indicator of tourism carrying capacity in the MPA.

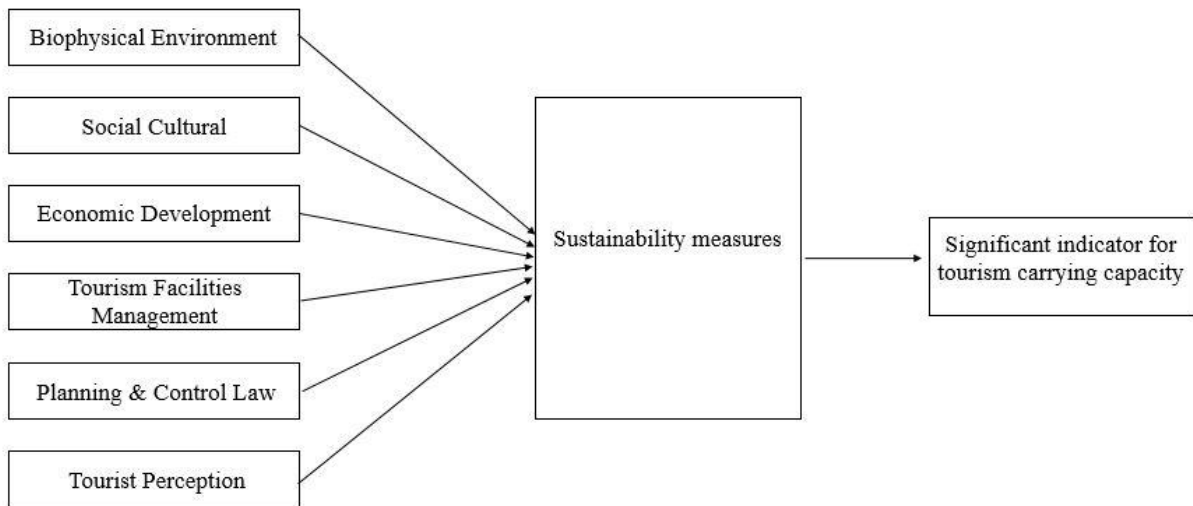


Figure 1: Conceptual Model

Research Methodology

A questionnaire was constructed and consists of two sections; demographics and evaluation on the importance of each factor in maintaining the sustainability of a tourism site. The questionnaire consists of six constructs; biophysical environment, social-cultural, economic development, tourism facilities management, planning and control law, and tourist perception. All items were measured using a five-point Likert scale anchored at 1 (very least important) and 5 (very important).

A pilot study was conducted to test the reliability of instruments used in the study. Ramona et al (2017) mentioned the need to go through this reliability tests are to ensure that during prioritizing the indicators in the pairwise comparison later could enhance the accuracy of the most significant tourism carrying capacity indicator.

Data Analysis and Result

A total of 22 sets collected data were analyzed using Cronbach’s alpha to test on the reliability. The accepted value for the reliability should exceed 0.70. In this study, the overall Cronbach’s

alpha is 0.943; which means, most items appeared to be worthy of retention, resulting in a decrease in the alpha if deleted. While for each key factor, all show an excellent strength of reliability where the alpha coefficient was more than 0.7 except for social culture (table 2). The resulting values ranged from 0.676 to 0.855.

From the analysis, it shows that the subfactors for social culture aspect need to be examined further if it is to be retained in the list. While for the other subfactors, it displays reliability and has internal consistency. In the future, this model will be used to collect large scale data and wider coverage of respondents for further analysis and model development.

Table 2. Cronbach's Alpha Value for Each Item

Item	No of Item	Cronbach's Alpha Value	Mean	Std Deviation
Biophysical environment (BE)	7	0.837	31.36	3.672
Social-cultural (SC)	6	0.676	23.91	3.100
Economic development (EC)	4	0.814	17.09	2.448
Tourism facilities management (TM)	7	0.855	31.64	3.526
Planning Control Law (PC)	3	0.772	10.59	2.823
Tourist perception (TP)	5	0.796	21.73	2.798

Conclusion

In this study, a conceptual model was proposed to evaluate the sustainability measure available and significant indicator of tourism carrying capacity. An instrument was developed to measure the effect of six factors on the available sustainability measure.

The developed instrument was validated using simple statistics and internal consistency reliability. The result indicates there is a high correlation between the items in the questionnaire except for the social cultural factors. Therefore, the developed instrument should be further applied for data collection in a larger sample size to construct the tourism carrying capacity.

Acknowledgment

This research was supported by the ministry of higher education Malaysia under FRGS 17 022-058

References

- Abecasis r. c., Schmidt L., Longnecker N., & Clifton J. (2013). Implications of community and stakeholders' perceptions of the marine environment and its conservation for MPA management in a small Azorean island.
- Aris A. Z., & Praveena, S. M. (2013). Conceptualizing seawater intrusion process in small tropical island via geochemical modeling. *Coastal hazards* (vol 6, pp. 269-284) USA: Springer
- Ariza, E., Pons, F., & Breton, F. (2016). Is "socio-ecological culture" really being taken into account to manage conflicts in the coastal zone? Inputs from Spanish Mediterranean beaches. *Ocean & coastal management*, 134, 183-193.
- Becken, (2010) *Tourism and Environment*. (S. Becken Ed) (Economics). UK: Edward Elgar Publishing Limited.
- Begam. Z., (2018). Green operations practices for MSIC operators at the peninsular Malaysia marine park islands. *IIUM*

- Brodie, J. & Waterhouse, J. (2012). A critical review of environmental management of the 'not so great' barrier reef. *Estuarine, Coastal and Shelf Science*, 104-105, 1-22
- Brokaj, R. (2014). Local government 's role in the sustainable tourism development of a destination. *European Scientific Journal*, 10(31), 103-117
- Brooks, K., & Fairfull, S. (2016). Managing the new coastal zone: Restructuring governance for inclusive development. *Ocean & Coastal Management*, 1-11
- Choi, Y. E., Jin, J. Y., Chang, Y. S., Jang, B., & Chon, J. (2018). Role of Official Development Assistance in Enhancing Resilient Coastal Community in Small Island Developing States. *Journal of Coastal Research*, 85(sp1), 1466-1470.
- Connor, M. C., Cooper, J. A., Mckenna, J. & Jackson, D. W. (2010). Shoreline management in a policy vacuum: a local authority perspective. *Ocean & coastal management*, 53, 769-778
- Davies, H. N., Beckley, L. E., Kobryn, H. T., Lombard, A. T., Radford, B., & Heyward, A. (2016). Integrating climate change resilience features into the incremental refinement of an existing marine park. *PloS one*, 11(8), e0161094.
- Dredge, D., Ford, E. J. & Whiteford, M. (2011). Managing local tourism: Building sustainable tourism management practices across local government divides. *Tourism and Hospitality Research*, 11(2), 106-116
- (DMPM., & GEF, (2014). Pulau Redang Marine Park Management Plans.
- Eshliki, S. A. & Kaboudi, M. (2012). Community perception of tourism impacts and their participation in tourism planning: A case study of Ramsar, Iran. *Procedus- Social and Behavioural Sciences*, 36, 333-341
- Gladstone, W., Curley, B., & Shokri, M. R. (2012). Environmental impacts of tourism in the Gulf and the Red Sea. *Marine Pollution Bulletin*, 72 (2), 375-388
- Hopkins, C. R., Bailey, D. M., & Potts, T. (2016). Perceptions of practitioners: Managing marine protected areas for climate change resilience. *Ocean & coastal management*, 128, 18-28.
- Isa, N. M., Aris, A.Z., Wan Sulaiman, W N. A., Lim, A. P., Looi, L. J., (2014). Comparison of monsoon variations over groundwater hydrochemistry changes in a small tropical island and its repercussion on quality. *Hydrology and Earth System Sciences Discussions*, 11(6), 56405-6440
- Ismail, F., & Turner, L. (2008). Host and tourist perception on small island tourism: a case study of Perhentian Island and Redang Island Malaysia. *International Conference on Applied Economics, AiLCOAE*, 401-410
- Ismail, F., & Turner, L. (2008). Tourism Impact Perceptions on Small Islands: A Comparative Study In Malaysia Where The Bloody Hell Are We? In *CAUTHE 2008 Conference* (pp 1-20)
- Jarvis, D. (2015). Could climate change redistribute global tourism activity by impacting trip satisfaction? *CAUTHE 2015: Rising Tides and Sea Changes: Adaptation and Innovation in Tourism and Hospitality*, 178.
- Jeyacheya, J. R., Lee, D., & Hampton, M. (2017). The political economy of international dive tourism. Published in *Tourism Geographies* (10.1080/14616688.2017. 1357141).
- JTLM (2011). *Pelan Strategik Jabatan Taman Laut Malaysia*
- Kaur, C. R., (2012). Protecting Malaysia's marine biodiversity for future generation: Issues, challenges and the way forward. *Sea Views*, (9), 1-5.
- Kaczor, G., Bergel, T., Bugajski, P., & Pijanowski, J. (2015). Aspects of Sewage Disposal from Tourist Facilities in National Parks and Other Protected Areas. *Polish Journal of Environmental Studies*, 24(1).

- Khalid S. N, Saad N. H. & Mahadi. R., (2013). Barriers to integrating tourism in the development planning: The perspective of the Malaysia local authorities. *International Conference on Tourism Development: Building The Future Of Tourism* (pp 1-8)
- Li, G., Yang, X., Liu, Q., & Zheng, F. (2014). Destination island effects: A theoretical framework for the environmental impact assessment of human tourism activities. *Tourism Management Perspectives*, 10, 10-18
- Liu, W. H., Wu, C. C., Jhan, H. T., & Ho., C. H. (2011). The role of local government in marine spatial planning and management in Taiwan. *Marine Policy*, 35(2).
- Marzuki, A. (2011). Resident attitude towards impacts from tourism development in Langkawi Islands, Malaysia. *World Applied Science Journal*, 12 (Special Issue of Tourism & Hospitality), 25-34
- Mason, P. (2011b). Environmental impact of tourism. *Tourism Impacts Planning and Management* (2nd edition., pp 69-84). Routledge
- Mason, P. (2011c). Social change and growth of tourism. *Tourism Impacts Planning and Management*. Routledge
- Mellin, C., Aaron MacNeil, M., Cheal, A. J., Emslie, M. J., & Julian Caley, M. (2016). Marine protected areas increase resilience among coral reef communities. *Ecology letters*, 19(6), 629-637.
- Mexa, A. & Coccossis, H. (2004). Tourism carrying capacity assessment, *Ashgate*
- Moore, S. A., Rodger, K., & Taplin, R. (2015). Moving beyond visitor satisfaction to loyalty in nature-based tourism: A review and research agenda. *Current Issues in Tourism*, 18(7), 667-683.
- Nejati, M., Mohamed, B., & Omar, S. I. (2014). Locals perceptions towards the impacts of tourism and the importance of local engagement: A comparative study of two islands in Malaysia. *Tourism*, 62 (2), 135-146
- Ng, S. I., Chia, K. W., Ho, J. A., & Ramachandran, S. (2017). Seeking tourism sustainability—A case study of Tioman Island, Malaysia. *Tourism Management*, 58, 101-107.
- Noh, A. F. M., Shuib, A., Tai, S. Y., & Noh, K. M. (2018). Indicators of governance of marine ecotourism resources: Perception of communities in Pulau Perhentian, Terengganu. *International Journal of Business and Society*, 19(S1), 17-25.
- Pieraccini, M., Coppa, S., & De Lucia, G. A. (2017). Beyond marine paper parks? Regulation theory to assess and address environmental non-compliance. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 27(1), 177-196.
- Portman, M. E., Pasternak, G., Yotam, Y., Nusbaum, R., & Behar, D. (2019). Beachgoer participation in prevention of marine litter: Using design for behavior change. *Marine Pollution Bulletin*, 144, 1-10.
- Pratt, S. (2011). Economic linkages and impacts across the talc. *Annals of Tourism Research*, 38(2), 630-650
- Praveena, S. M., Abdullah, M. H., & Ariz, A. Z., (2010). Groundwater challenges in small islands. A review and examples from Malaysia. *Sciences and Technology Vision*, 6(10), 17-23
- Praveena, S. M., Abdullah, M. H., Bidin, K., & Ariz, A. Z., (2011). Understanding of groundwater salinity using statistical modeling in a small tropical island, East Malaysia. *Environmentalist*, 31(3), 279-287
- Ramdas, M., & Mohamed, B., (2014). Impacts of tourism on environmental attributes, environmental literacy and willingness to pay: a conceptual and theoretical review. *Procedia- Social and Behavioral Sciences*. 144, 378-391
- Ramirez, L. F., (2016). Marine protected areas in Columbia: Advance in conservation and barriers for effective governance. *Ocean and Coastal Management*, 125, 49-62.

- Ramona Ramli, Asmidar Abu Bakar, Roslan Ismail, & Norshakirah Aziz. (2017). The trust effect towards online seller in social commerce in Zulikha, J. & N. H. Zakaria (Eds.), *Proceedings of the 6th International Conference of Computing & Informatics* (pp 317-322). Sintok: School of Computing.
- Saad, N. H., Abdul Khalid, S. N., & Zainol Abidin, N. (2014). Tourism development and planning at a local authority level: A case in Manjung, Perak. *SHS Web of Conferences*, 12, 1-8
- Seetanah, B., (2011). Assessing the dynamic economic impact of tourism for island economies. *Annals of Tourism Research*, 38(1), 291-308
- Sharpley, R., (2014). Host Perceptions of Tourism: A Review of The Research. *Tourism Management*. 42, 37-49.
- Silva, J. N., & Ghilardilopes, N. P., (2012). Indicators of the impacts of tourism on hard bottom Benthic communities of Ilhado Vardoso State Park (Cananea) and Sonho Beach (Itanhaem), Two southern coastal areas of Sao Paulo State (Brazil). *Ocean and Coastal Management*, 58, 1-8
- Siti Nabiha, A. K., & Md Saad, N. H., (2015). Tourism planning and stakeholder's engagement: The case of Penang Island, *Problems and Perspectives In Management*, 13(2), 269-276
- Sugiantoro, A., Ohdate, M., Sullivan, S., & Zedilla, W. E. (2017). An Evaluation of Public Policy Implementation on Marine Tourism in Banyuwangi.
- Todd, E. M., & Katie, J. F., (2013). Sediment disturbance associated with trampling by human alters species assemblages on a rocky intertidal seashore. *Marine Ecology*, 472, 129-140
- Walz A., Calonder, G. P., Hagedorn, F., Lardelli, C., Lundstrom, C., & Stockli, V, (2008). Regional CO2 budget, countermeasures and reduction aim for the Alpine tourist region of Davos, Switzerland. *Energy Policy*, 36(2), 811-820
- Williams, R., Wright, A. J., Ashe, E., Blight, L. K., Brintjes, R., Canessa, R., Wale, m. a. (2015). Impacts of anthropogenic noise on marine life: publication patterns, new discoveries and future directions in research and management. *Ocean & Coastal Management*, 115, 17-24
- Wolf, I. D., Hagenloh, G., & Croft, D. B., (2013). Vegetation moderates impacts of tourism usage on birds' communities along roads and hiking trails. *Journal of Environmental Management*, 129, 224-234.
- Yates, K. L., Payo Payo, A., & Schoeman, D. S., (2013). International, regional and national commitments meet local implementations: A case study of marine conservation in Northern Ireland. *Marine Policy*, 38, 140-150
- Zamani-Farahani, H., & Musa, G. (2012). The relationship between Islamic religiosity and residents' perceptions of socio-cultural impacts of tourism in Iran: Case studies of Sare'in And Masooleh. *Tourism Management*, 33, 802-814.
- Zhang, J., Zhang, H., & Liu, F. (2011). Review of studies on the environmental impacts of tourism waste. 2011 2nd International Conference on Artificial Intelligence, Management Science and Electronic Commerce (AIMSEC), 6369-6372
- Zhong, L., Deng, J., Song, Z., & Ding, P., (2011). Research on environmental impacts of tourism in China: progress and prospect. *Journal of Environmental Management*, 92, 2972-2983.