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PERCEPTION AND AMELIORATION OF TOURISM IMPACT ON COASTAL ENVIRONMENT IN VIETNAM

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ABSTRACT

Tourism is considered as one of the world's fastest growing industries and is a major economic sector in tropical developing countries. In Vietnam, coastal tourism is also a significant portion of the national economy, due to its diverse coastal environment with a variety of ecosystems and a tremendous potential for developing coastal tourism. In recent years, coastal tourism has strongly developed with the number of tourists and revenue continuously increased every year. Unplanned tourism development causes negative impacts on coastal environment and ecosystems, and further increase with exploitation unless amelioration measures are adopted. This study aims at evaluating the impact of coastal tourism and propose mitigation strategies to minimize negative impacts for sustainable tourism development. Coastal tourism has caused loss of marine biological diversity, coral reefs cover change, and environmental pollution. Field surveys research methods are used to assess the tourists and local residents' perception on sustainable tourism development and their awareness on the negative environmental impact of tourism activities. This information may aid policy makers, tourism developers in formulating best solutions to manage and to protect biodiversity, natural resources and to control environmental pollution.

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INTRODUCTION

Coastal areas have been identified as having a fragile ecosystem and are vulnerable to outside influences, heightened by human activities (Medina-Munoz and Garcia-Falcon, 1998; UNEP, 2000) mostly tourism (UNEP and WTO, 2005). Coastal areas are one of the most sensitive environment around the world and have lots of resources which are valuable for nature. As increasing numbers of world population is gravitated toward the coasts, they have faced up to numerous problems including population growth, recreation, tourism, urbanization, accommodation development, infrastructural pressure, sewers. The relationship between coastal ecosystems and tourism is highlighted through sun, sea and sand tourism which is mass oriented and its impacts are challenging in terms of sustainability issue. Tourism industry plays a unique role regarding the changes and management of coastal areas and its resources (Burton, 1995).

Improving tourism and increasing tourism income has been one of the most important policies of every country. The Vietnam government has carried out policies to boost tourism and attract more tourists. As a new destination with natural resources and many foreign investment hotels and resorts, in recent years, coastal tourism in Vietnam has strongly developed. The number of visitors and revenue has been continuously increasing. Coastal tourism attracts about 80 percent of tourists to Vietnam and accounts for over 70 percent of revenue from tourism for the whole country. Khanh Hoa is a coastal province of the South Central Vietnam (Figure 1). It has attracted a great number of local and foreign tourists visiting the province and it provides significant revenue for the economic development of the province. This destination has attracted tourists because of the abundance of coastline, their marine life and activities associated with these features. However, the exploitation of natural resources and tourism development in the province has many inadequacies, leading to negative impacts on environment. Tourism is one of the major disruptor of the marine ecosystem (Zhong *et al.*, 2011; Buckley, 2012). Tourism development can cause great pressure on an area and lead to negative impacts such as soil erosion, land degradation, environmental pollution, discharges into the sea, biodiversity loss, which will increase with

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exploitation unless preventive solutions are adopted. Without sustainable strategies, the natural resource share will be unevenly distributed and growing inequality will represent a big challenge (Tuan *et al.*, 2010; Pham, 2016). A need for research into the impacts of tourism development is urgently required on natural environment for sustainable tourism development. The objectives of this study are to: (1) evaluate the impacts of tourism development along coastal areas; (2) assess the perceptions of local residents and tourists about sustainable coastal tourism development; and (3) propose solutions to minimize negative impacts, improve the quality of the environment and sustainable tourism development.

MATERIALS AND METHODS

The Study Area

Khanh Hoa Province is located along the coastline of South Central Vietnam. The province is adjacent to Phu Yen Province to the north, Dak Lak and Lam Dong Provinces to the west, and Ninh Thuan Province to the south (Figure 1).

Geography and climate

Khanh Hoa is a coastal province lying at 108°40'33" to 109°27'55" E and 11°42'50" to 12°52'15" N with a total area of 5,217 km² (Khanh Hoa Statistics Office, 2015). It has a total coastline length of 385 km spreading from Dai Lanh to the end of Cam Rang Bay, featuring numerous creek mouths, lagoons, river mouths and more than 200 of islands and islets offshore, of which Truong Sa Spratly Island gathers over one hundred islands around. The province also administers large territorial waters. The coastline is indented by several bays, most notably the four bays: Van Phong Bay, Nha Phu Bay, Nha Trang Bay and Cam Ranh Bay, of which Cam Ranh Bay with its area of around 200 km², surrounded by a mountain range, is regarded as one of the three best natural seaports in the world, Cam Ranh Bay is strategically important and has been used as a naval base by several major powers throughout history. The province is mostly mountainous. The highest peak is Vong Phu Mountain (2,051 m) at the border to Dak Lak Province. Forests cover more than half of the province's area. Khanh Hoa Province is characterized by a tropical monsoon climate with



Figure 1. Location map of Khanh Hoa Province study area

an average annual temperature of 26.7 °C. There are two distinct seasons. The rainy season lasts four months from September to December, with the other months being the dry season, except in Nha Trang City where the rainy season lasts for just two months. It is hot dry summer and mild winter, which makes it appealing to tourist from colder areas and providing very favorable conditions to develop a long-lasting tourism season.

Demographics

Khanh Hoa population in 2015 was 1,205,300 with a density of 231 people per km² and a growth rate of 0.7 % per year. The province had an urban population of 522,489 or 44.5 % of the total in 2011, making it the most urbanized province of the South Central Coast. Average population growth per year between 2000 and 2007 was 1.26 %. The population rate in the period of 2013 to 2014 was 0.37 %.

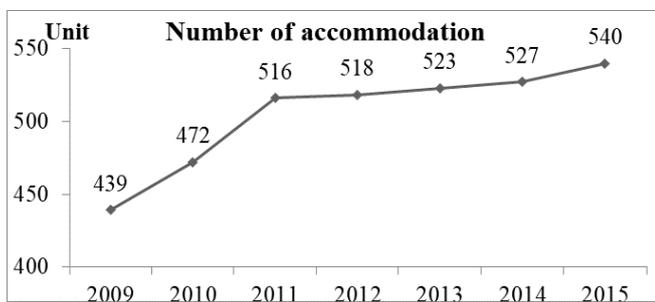


Figure 2. Number of accommodation during the period 2009 to 2015 (Khanh Hoa Statistical Office, 2015)

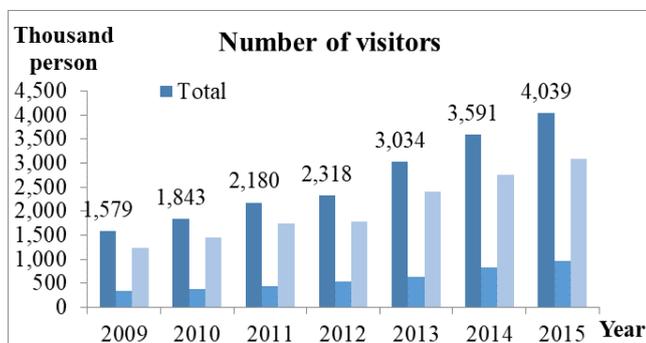


Figure 3. Number of visitor arrivals during the period 2009 to 2015 (Khanh Hoa Statistical Office, 2015)

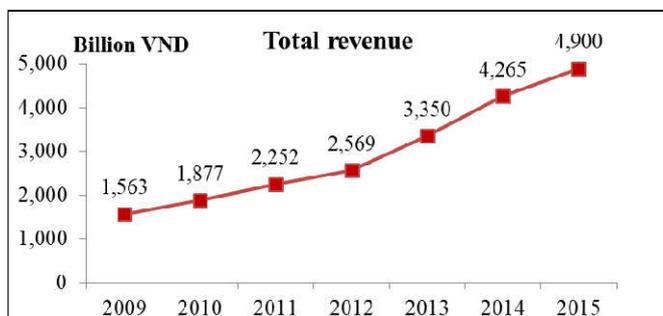


Figure 4. Total revenue of tourism industry during the period 2009 to 2015 (Khanh Hoa Statistical Office, 2015)

Economy

With the gross domestic products (GDP) of 43,847 billion VND (1 VND = 0.00004 USD) in 2015, Khanh Hoa is the

economically most developed province of central Vietnam (Khanh Hoa Statistical Office, 2015). The major human activities in the province are categorized into three sectors comprising of trade-tourism, industry-construction and agriculture-forestry-fishing. Trade and tourism is the largest economic sector followed by industry-construction contributing 47.3 % and 41.42 % to the GDP respectively. Agriculture-forestry-fishing account for 11.28 % (Khanh Hoa Statistical Office, 2015). It has a relatively small agricultural sector, but strong trade and tourism. The province is endowed with beautiful natural landscapes and beaches, which attracts a large number of tourists. Khanh Hoa has had a significant trade and tourism surplus in recent years, with exports of 11,447 billion VND and imports of 5,060 billion VND in 2007.

Tourism industry

Khanh Hoa has been recognized as one of the most beautiful coastal province in Vietnam with the largest number of destinations as well as tourist arrivals. Its coastline is a major attraction for tourists with an increase up to over 4 million by 2015. Khanh Hoa is endowed with wonderful natural sites and sandy beaches, making the province a tourism attraction. Tourist may enjoy the majestic natural sites in Khanh Hoa such as Cam Ranh Bay (one of the three harbors that have the best natural condition in the world), Van Phong Bay (with a beautiful nature, temperate climate, ideal beaches with mostly yellow sand, surrounded by hill, tropical forest and diverse coral reefs), Nha Trang Bay (an internationally famous sea resort, which has been recognized as the 29th most beautiful bay in the world), and many other sand beaches. The city of Nha Trang has long been renowned for being a sea resort with plenty of historical vestiges and wonderful sceneries: Cham Po Nagar Towers, Long Son Pagoda, Ba Vu Mausoleum, Bao Dai Palace, Hon Chong, Hon Yen, Tri Nguyen Fish Pond, Bai Tru, Suoi Tien, Dai Lanh Beach, and many islets offshore. Tourism is declared as a leading sector towards economic development of Khanh Hoa Province. The growth of tourism industry gradually increases over the year. This is evident in the increase in the number of tourist agencies, hotels accommodation, restaurants, resort and the increase in tourism contribution to GDP and employment. The number of accommodation establishments continuously increased from 439 (10,200 bed capacity) in 2009 to 540 (14,440 bed capacity) in 2015, thus increasing the pressure on land use especially along the coast (Figure 2). The number of tourist arrivals to Khanh Hoa is about 4,030,000 person (of which number of foreigner is 950,450 person) compare with 1,579,000 in 2009 (Figure 3). With the global call for sustainable development, attempts are being made to develop several tourism activities to enhance the continued growth of the tourism of Khanh Hoa. Net tourism income grew from 1,563 billion VND to 4,900 billion VND in the period 2009 to 2015 (Figure 4).

Transportation

Khanh Hoa Province has various forms of convenient available transportation. Because the province lies along Vietnam's main north-south transport corridors. Regular connections between Ha Noi and Ho Chi Minh City as well as some local trains all stop at Nha Trang Railway Station. National Road 1A and the North-South Railway run through the province, linking it with the other provinces in the North and South. The National Road 26 links Khanh Hoa to some provinces in the Central

Highland. As a coastal province featuring several natural deep water bays, Khanh Hoa has what is needed to develop its deep-water seaports. Cam Ranh and Nha Trang ports connect Khanh Hoa with many regions in Vietnam as well as with abroad. Cam Ranh International Airport is located in the south of the province and is one of Vietnam's busiest airports. Nha Trang Airport is 5 km from the center of the city. Vietnam Airlines offers daily connections with Ho Chi Minh City and Ha Noi, and four connections a week with Da Nang.



Figure 5. Section of Nha Trang Beach dug up to make way for new hotel (Photo by Nguyen Chung)



Figure 6. Constructions along Nha Trang Beach (Photo by Hien Luong)

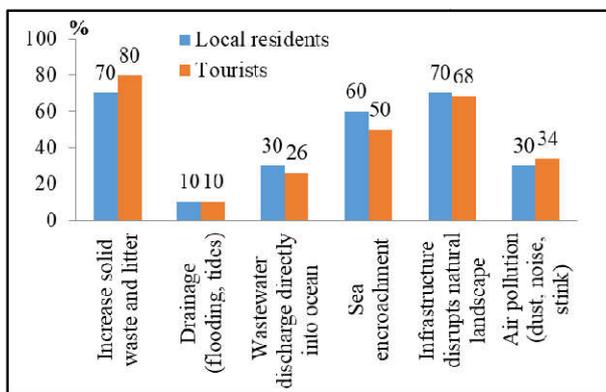


Figure 7. Critical environmental problems in Nha Trang Bay

Data sources

The data for this study were collected from both secondary and primary sources. The secondary data were sourced both

electronically, from government and individual databases while the primary data were collected from the field surveys and observations.

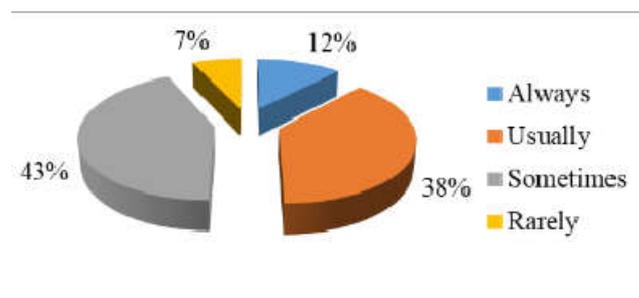


Figure 8. Frequency of environmental information search

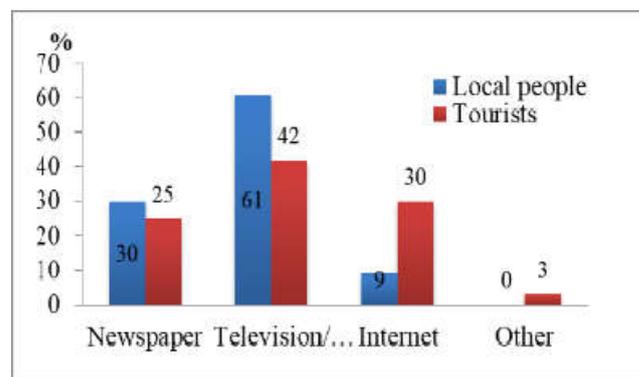


Figure 9. Means for environmental information search

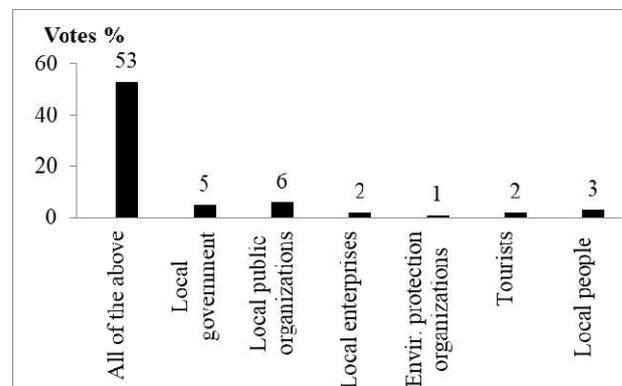


Figure 10. Responsibility for environmental protection and sustainable tourism development

Table 1. Purposes to visit Nha Trang Bay (Unit: Votes)

Purposes	Leisure travel	Nature sightseeing	Relaxation (diving/ fishing)	Festival	Other
< 26	1	9	12	1	0
26-35	5	22	8	4	0
36-50	0	6	2	2	0
> = 50	2	0	0	0	1
Total	8	32	27	7	1

Secondary data

The secondary data were collected from various sources found via internet, including literature, existing research and social-economic development. The numerical data were extracted from the electronic database of Statistics Office of Khanh Hoa Province, Vietnam as well as other state website. Historical, geographic, physical data and other necessary information for this study were also obtained from archives, state documents, publications and syndicate sources. Furthermore, some

indicative data on the number of tourists to Nha Trang Bay as well as information on the demographics, tourism activities, the natural characteristics was collected. This information combined with the information gathered from other studies. The environmental quality monitoring data were hand-collecting from the annual reports of Khanh Hoa Department of Natural Resources and Environment.

already scarce. The rapid development of tourism in Nha Trang Bay, Khanh Hoa Province may lead to loss of biodiversity. Even though some of the tourism activities may help protect biodiversity, it is also obvious that tourism can impact biodiversity more negatively. Tourism development has led to consequences such as: landscape fragmentation, vegetation degeneration, loss of biodiversity and coastal

Table 2. Awareness and concern levels (in %) regarding environmental issues

Items	Level of agreement		
	Low	Moder-ate	High
Tourism activities (camping, fishing, diving, swimming) has negative impacts on environment	13	68	19
Dusty, noise, and smoke released by vehicles, recreational activities effects the health and environment	18	20	62
Disposal of solid waste and litter from hotels/resorts/chalet services/restaurant and tourists effects the environment	8	14	78
Improperly treated wastewater from tourism premises effects the environment	9	26	65
Tourism activities cause erosion to the rock and beaches	57	30	13
Poor air quality effects tourism activities	20	55	25
Natural landscapes in this area have changed compared to before	24	59	17
Tourism activities effects the habitat of the wildlife	22	53	25
Biodiversity of living things are affected by tourism activities (fishing, hunting)	12	68	20

Table 3. Perception of participants (in %) on impact of tourism infrastructure development

Items	Level of agreement		
	Low	Moder-ate	High
Accommodation development and other tourism structural development should be controlled and monitored by authorities for sustainable development	15	43	58
Tourism development effects the environment and landscape	16	49	35
Improper material used for buildings will cause negative impacts on the environment.	45	38	17
Poor maintenance of public and tourist facilities will affect the tourism industry	11	32	57
Tourism infrastructure development has disturbed the natural environment.	16	48	36

Table 4. Priority to develop tourism or protect environment

Opinion	Local people	Tourists
Environmental protection (%)	40	24
Tourism development (%)	0	2
Simultaneously implementation (%)	60	74
Total	100	100

Primary data

In other to obtain new and first-hand data, questionnaire was prepared and individuals were engaged directly and face to face with the use of questionnaire as an instrument. The questionnaire was designed based on literature and cases study to collect information regarding the level of awareness and concern of local residents and tourists on the impact of coastal tourism activities on environment in Nha Trang Bay, and the perception of them about sustainable tourism development. This field survey was done within a week. Most of the interviews were conducted in Vietnamese, some translation from Vietnamese to English and then to English. The questionnaire was used to collect data from 50 tourists and 40 local residents. Field observations are carried out to identify activities that are taking place and their status within the Nha Trang Bay. It also allows the accurate determination of the information gained by other means.

RESULTS AND DISCUSSION

The impact of coastal tourism

Loss of biological diversity

Tourism development can put pressure on natural resources when it increases consumption in areas where resources are

erosion, which in turn impede on the goal of economic growth (Hayners and Ha, 2004; Pham, 2016). The tourism industry has had a negative impact on both marine biodiversity and the natural environment. Marine biodiversity suffers threats from a range of direct human activities, increase in global temperature and unpredictable changes of weather. Tropical coral reefs are the most biologically rich and productive ecosystems on Earth, providing vital services and playing a crucial role in nature and human life. However, they face a wide and intensifying number of global and local threats including global warming, ocean acidification, coastal development, pollution, overfishing, tourism development, coral mining and shipping (Kleypas and Eakin, 2007; Wilkinson, 2008; Burke *et al.*, 2011). The biodiversity in the islands of Nha Trang Bay has been evaluated. Regarding species abundance of coral, Hon Mun Island has the highest species in number with 197 species, Hon Mieu has 70 species (Tuan *et al.*, 2005). Other islands are characterized by low coral cover and species. Increased tourism caused the reduction in the hard coral cover in the main areas attracting tourists. The decline in coral cover in the bay resulted in increased sedimentation from several development projects (Nguyen *et al.*, 2013). There are (1) dredging and seaward expansion of the Nha Trang Port (Figure 5); (2) road construction parallel to the shoreline (Figure 6), which extended up to 60 km to the north and to the south from the central Nha Trang City with land clearing and flattening

activities. Coral reefs were destroyed by turbid water, reduced salinity, strong wave, storms, and pollution as well as other destructive activities such as sediment excavation and the use of dynamite and explosion in fishing. The biodiversity in Nha Trang Bay has faced many risks due to infrastructure construction, fishing practices, tourism activities, climate change, environmental pollution, and marine aquaculture.

Environmental pollution

Waste and sewage pollution are considered severe environmental threats from tourist visits to the Nha Trang Bay. On average, it is estimated that each visitor to the Nha Trang Bay generates 0.7 kg of solid waste and 96 liters of sewage per day (Khanh Hoa Department of Natural Resources and Environment, 2013). In other words, in 2014, tourists produced approximately 5,700 tons of waste and 780 million liters of sewage, which is equivalent to 16 tons and 2 million liters per day, respectively. Unfortunately, much of this sewage is dumped into the sea without proper treatment and removal of toxic substances. This causes nutrient enrichment, which favors certain species (algae in particular) at the expense of corals. Litter from tourists is a problem in Hon Mun and Hon Mieu Island. Discarded plastic, polymer bags and drinking bottles are left on the islands and pollute the sea, as there is no formal mechanism for handling garbage on the islands. Tour boats, cruise ships cause significant petroleum hydrocarbon pollution, especially when oil and fuel spills occur (Loya and Rinkevich 1980; UNEP 2015). These boats are also responsible for a considerable amount of sewage and waste. A large percentage of the sewage generated by the tour boats is discharged into the sea without adequate treatment. This has led to eutrophication and substantial negative effects on the ecosystem. Although bins and toilets have been requested on board all tour boats since 2013, these requirements have not been fully implemented. As has been observed, solid waste is still dumped into the sea in the harbor by irresponsible vessel owners. The construction of hotels, resorts, recreation and other tourist facilities often lead to increased sewage pollution. It is estimated that approximately 100 ha of the Nha Trang Bay has already been cleared to make way for tourism projects.

Perceptions of tourists and local residents about tourism development and its impact on environment

Questionnaire was designed to collect information regarding perceptions of local residents and tourists about sustainable tourism and the impact of tourism development on natural environment. The specific objectives of this questionnaire are the level of awareness, concern of tourists, local residents on the impacts of tourism activities and infrastructural development on environment in Nha Trang Bay, as well as understanding their perceptions of the sustainable tourism development, in order to increase their understanding and contribution towards the preservation of natural environment and to raise awareness about environmental protection.

More specifically, the research questions are organized according to the following major categories:

- How are the local residents and tourists concerned about environmental issues in general?
- How are they aware of the sustainable tourism development and its importance?

- How are they aware of the impact of tourism infrastructural development on environment?

Demographic profile of respondents

Age group and Gender

There were a total of 90 survey participants, 50 tourists and 40 local residents, representing 56 % (female) and 44 % (male) respectively of the overall survey sample. The difference in the number of participants among categories of interest has been caused by the accessibility of respondents. Tourists were more easily accessible than local residents. Surveys were undertaken at Nha Trang Beach in Khanh Hoa Province. The age of the tourists who are interviewed was mostly young people under 26 years old and from 26 to 35 years old. The minimum age of the entire survey sample is 18 years old and the maximum is 70 years old. The largest proportion of respondents is the 26 to 35 years old. It is also the age group having a good health and financial success to participate in travel activities.

Level of education

When asked which the highest level of education they had attained, over 60 % of the total number of participants stated that they had a university degree, followed by a percentage of respondents in high school. The majority of tourists (75 %) have attained a university degree, while from the local residents less than 40 % participants have high school or university levels. Overall, tourists are more highly educated when compared to local residents, the majority of whom have attained high school degree or lower levels of education.

Employment

Data regarding respondent's occupation were separated in four major categories: employed, unemployed, retired and student/pupil. Overall, the majority of respondents fall within employed (65 %). A large percentage of local residents are retired (44 %), 38 % are employed, 19 % are unemployed, and 0 % are students. The majority of tourists are employed (80 %), 5 % are unemployed, 1 % retired, and 14 % are students.

The purposes of tourists visiting Nha Trang Bay

The aim of visits by the tourists was different but most of them came for sightseeing in Nha Trang Bay. Others are for relaxation in diving, fishing, swimming, leisure travel, and to participate in a beach festival. But mostly are to combine multiple purposes, which is shown in Table 1.

Perception of tourists and local residents on tourism activities and its impact on environment

One of the functions of the Management Board of the Nha Trang Bay is to raise environmental awareness of the local people, tourists, individuals and involved communities. The awareness of environmental protection depends on their occupation, age, educational background and living environment (Table 2). Overall, Table 2 shows that the majority of respondents on the environmental issues are at moderate and high levels of concern by tourists and local residents. Meanwhile, items on disposal of solid waste and litter, improperly treated wastewater, dusty, noise, and smoke released by recreational activities and vehicles have a high level of concern. The majority of respondent (78 %) thought litter on the beaches is the most concerned environmental

issues, followed by wastewater and air pollution with 65 % and 62 % respectively. The total percentage of respondents with moderate and high level of awareness is 78 %. This can explain that a large number of tourists and local residents agree that tourism development has a significant impact on the natural environment in Nha Trang Bay.

Perception of tourists and local residents on tourism infrastructure development and environmental impact

The total percentage of respondents with moderate and high levels of awareness is 71 %. This can clarify that the large number of tourists and local residents agree that tourism infrastructure development has a significant impact on the environment (Table 3). Overall, Table 3 shows that items on control and monitoring of authorities on accommodation development with maintenance and conservation of public and tourist facilities have a high level of agreement.

Main environmental issues of concern

Figure 7 indicates the results of the question on the main environmental issues of concern of tourists and local residents in Nha Trang Bay. Increase in solid waste and littering was the most frequently voted environmental issue at 80 % and 70 % by tourists and local residents respectively, followed by infrastructure disrupting the natural landscape.

Frequency of environmental information search

Figure 8 shows that the frequency of environmental information search by people is 50 % of the total. However, the fact that tourists and local residents find out about environmental information is still not really a majority, and has not really become a habit of the community. There is a necessity to raise awareness of environmental issues, so that the community takes practical action to protect the environment.

Means for collecting environmental information

Tourists and local residents retrieve and collect environmental information by traditional media such as television, radio, book, newspaper. These are the most popular and effective means. In modern times, the tourists and local people usually do not just use a media to search but by many different media simultaneously. This is shown in Figure 9. Modern means such as the internet are mostly favored by young people. However, not everyone has the opportunity to use these approaches (especially for older people). From these considerations, diffusion policies should choose the most effective means of disseminating environmental information to the communities.

Priority to develop tourism or protect environment

Data in Table 4 indicates that the majority of tourists and local people expect that it is advisable to combine both environmental protection and tourism development implementation simultaneously.

Responsibility for environmental protection and sustainable tourism development

Tourists and local people insist that environmental protection and sustainable tourism development is the responsibility of the whole community, it does not belong to an individual, organization or government (Figure 10).

To achieve a sustainable quality and productivity of the coastal tourism, it is necessary for a combined effort between public, private sectors and government. It is important that, alongside professionals in environmental protection and government agency personnel, both tourists and local residents have to be well aware of the importance of environmental protection and biodiversity conservation parallel with tourism development.

Awareness of sustainable tourism development

The answers to the question of how much knowledge do you have regarding the concept "sustainable tourism", a big number of tourists 69 % of them knew the concept. The reason was because they had university qualifications and 39 % of local residents knew the concept of sustainable tourism. About the last question which was the most important question: Sustainable tourism was defined as "Fulfilling present tourist needs and host regions, protecting and increasing possibility for the future", is this concept achievable where most of the tourists (67 %) answered "Yes" while local residents is 37 %. On the whole, the results of the field survey show that local residents have a lower level of awareness and concern of environmental protection and sustainable tourism within Nha Trang Bay. Their limited knowledge of the importance of sustainable tourism development negatively influences perceptions. A big number of tourists are aware of the consequences in the environment, and in every manner should try to minimize the use and drain of the natural resources and degrading the environment. This field survey has a significant contribution to the field of conservation by generating useful information not only for policy makers but also for individuals involved in the management of Nha Trang Bay. A better understanding of human attitudes, perceptions and their successful and timely incorporation into future environmental protection policies, will contribute to generating positive conservation outcomes. Furthermore, newly developed conservation and protected area management strategies will favor the sustainable management of protected areas by effectively conserving natural resources and contributing to improve human livelihoods.

Propose solutions to minimize impact and sustainable tourism development

Solutions to minimize negative impacts of tourism on environment

Tourism has been identified as an important instrument to help the communities that can promote economic growth in coastal areas (Kruger, 2005), particularly in Nha Trang Bay, Vietnam (Hayners and Ha, 2004; Pham, 2016). If tourism is an attraction developed without proper management, there could be negative impacts on the natural environment, which could contribute to the pollution of the coastal water environment, the loss of marine biodiversity. Therefore, there might be some conflicts between tourism development and nature conservation in the area. In order to protect the tourism resources and environment in Nha Trang Bay, it is necessary to have some solutions to minimize negative impacts from tourism to the environment, to limit the pressures from tourism activities on the natural environment.

For coastal water environment

For wastewater and garbage, most coastal tourism businesses do not have or have operated on an infrequent basis therefore the composition of waste water exceeds the permitted level.

Vietnamese environmental standards. Now the problem is the necessity of treating wastewater up to standards before discharging into the environment for business establishments in these areas. Therefore, the immediate solution is to review and inventory all coastal business establishments at sea resorts to classify facilities which existed, absented, existed but not operated yet for export the treatment measures which are mandatory for businesses that do not have a wastewater treatment facility. For businesses with hazardous chemicals that need to relocate out of the coastal area and have standardized treatment technologies.

For groundwater environment

It is necessary to survey and evaluate the reserve of groundwater resources in the coastal zone and to work out the overall planning of groundwater sources as well as plans for exploitation and use for tourism purposes. To minimize the exploitation of shallow groundwater sources and improperly exploited and unsupported technical standards, thus causing the pollution of water sources. Waste and wastewater treatment solutions for coastal service businesses and communities need to be planned.

For biological diversity

Frequent supervision and inspection of business establishments associated with waste and wastewater and to relocate or stop business activities of establishments without wastewater treatment and without organizing the collection of wastes in coastal or island areas. Regular inspection and control to timely prevent the exploitation and use of destructive fishing method on the ecological environment. Resorts, restaurants and hotels are not allowed to process food from wildlife and to encourage diverse dishes from the marine fish or farmed fish species. Propagate and mobilize fishermen, tourists, visitors to live in a friendly marine environment. People who live close to the sea should advocate and adopt appropriate policies so that residents have friendly protective solutions in the tourist sites. Strict sanctions for sabotage acts or pollution of the marine and coastal environment should be strengthened by organization of patrol teams to control environmental sanitation in fishing ports, passenger ships, and by local community (village, commune) hiring to create more local job opportunities. Coral reefs protection plan should include instructing the divers to observe the coral, to avoid landscape disruption, to regulate number of dive crews from 5 to 10 persons per dive. In the month there should be about 7 to 10 days rest for coral ecosystems. The master plan should provide anchorage yard control for fishermen and owners, a monitoring scheme for the fishery products around the reef, control of solid waste and waste discharge and water flow into coral reef areas. There should be a careful maintenance and restoration plan for coral reefs in the event of a problem. Water-borne erosion around coral reef ecosystems should be strictly prohibited to sustain coral reefs as well as fish habitats.

Solutions to sustainable tourism development

On planning: Solutions need to be developed in the right direction, to avoid exploitation of the potential and to preserve sustainable tourist resources. To do so, there should be a master plan for tourism development and general orientations, objectives and solutions. Besides, each cluster of tourist sites should have a detailed plan defining the functional areas and

investment projects in order of preference in accordance with demand.

On organization management

This is the important solutions contributing to ensure the success in environmental protection and sustainable development of Khanh Hoa tourism. These solutions include: to formulate rules and regulations on the rationality between tourism exploitation, business, and the protection of natural resources and environment with the propagation and education of people and tourists; to define roles and responsibilities for all levels of the sector as well as the general public in terms of social awareness of tourism and tourism development.

On policy mechanism

In order to preserve the natural resources and the environment for sustainable tourism development, it is necessary to study and promulgate a number of basic policies: policies for the development of key economic sectors in a rational manner as well as the selection and determination the suitable economic structure in each territory; besides the solutions on the exploitation and rational use of resources, there should be the solution to protecting the environment on the basis of sustainable development by region and territory.

On environmental impacts

Tourism programs and projects at sites, zones and clusters should be considered in a reasonable manner, especially the immediate and long-term environmental impact assessment are required by the law on environmental protection. There is a general coordination in propaganda, advertising, management, control and treatment of environmental sanitation among branches, levels and business establishments. There is coordination, cooperation and exchange of experience between domestic and foreign organizations on monitoring, analysis, management and handling of impacts.

On linking with local communities

The sharing of benefits with local communities, encouraging community participation in tourism activities, and jointly resolving conflicts that arise during development is essential to being able to ensure the preservation of resources and potentials for the long-term development of tourism at all tourist spots and clusters by synchronous measures between exploitation and conservation and the fostering of natural resources. Linking with the community can be done in a variety of forms such as job creation, cognitive education, benefits sharing, and so on.

On environmental training and education

A comprehensive and long-term solution, environmental education and training not only provide environmental knowledge to managers and business travelers, but also to local visitors and communities, creating a sense of security, environment and resource protection for tourism development.

On application of scientific and technical progress

The application of scientific and technical advances in the management and use of resources as well as the processing of

information from tourism activities and services to make timely and appropriate decisions in each stage with each development activity are essential. The tourism industry needs to coordinate with functional agencies to utilize technical means and equipment and environmental monitoring regularly at tourist sites to make appropriate adjustments to ensure proper operation of environmental sustainability.

CONCLUSION

Tourism industry diversifies the economy of the region, thereby improving infrastructure and economy well-being for local communities. Coastal tourism, however, may cause loss of marine biological diversity, coral reefs cover change, and environmental pollution. The results of the field survey show that local residents have lower level of awareness and concern of environmental protection and sustainable tourism within Nha Trang Bay. Their limited knowledge of the importance of the sustainable tourism development negatively influences perceptions. A big number of tourists are aware of the consequences in environment, and in every manner should try to minimize the use and drain of the natural resources and degrading the environment. As tourism becomes more extensive and further development, the local residents have to become more involved in various tourism activities. Local people can now choose to work for tourism companies or create self-employment in small and medium-sized income-generating activities. In order to enhance the involvement of local people with income generating tourism activities, hospitality training should be provided to villagers who are interested in working for the tourism industry. Such courses not only create potential employment for local people, but also enable them to think of Nha Trang Bay as their property. Other protected areas have failed to produce conservation and development benefits from ecotourism because they have not included the local people in all aspects of the planning, operation, and management of ecotourism activities.

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