

ISSUES REGARDING THE DEVELOPMENT OF RECREATIONAL FISHERIES WITHIN A MARINE PROTECTED AREA: CASE OF THE NHA TRANG BAY MPA IN VIETNAM

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ABSTRACT

This project reviews the current status of recreational fisheries within the Nha Trang Bay Marine Protected Area (MPA) in Vietnam to identify the possible benefits and challenges of developing this economic sector in accordance with the mission and regulations of an MPA. The project synthesizes social-economic motivations and consequences of recreational fisheries on local communities in the MPA in order to identify impact factors for appropriate solutions for the sustainable development of the industry.

The findings show that recreational fisheries does not affect other economic activities in the MPA mostly because activities occurs in seperate areas. Furthermore, the tourism experienced benefits more than other sectors in the MPA. Recreational fisheries have the potential to create desirable alternatives for the current occupations of the local residents, because occupations such as arts and crafts, and aquaculture, which are created by the MPA's programmes with the goal of improving local livelihoods, so far do not seem to positively impact local incomes. Therefore, in the longterm, recreational fisheries could provide greater benefits to the fisheries and tourism industries while improving the local community's livelihood. Additionally, the findings categorized recreational fishermen into three distinct groups (i.e. the MPA residents, the local office-based professionals, and tourists) and describes their particular fishing behaviours in order to help fisheries, tourism, and MPA managers to make appropriate and sustainable development plans of recreational fisheries sector targeted to each group.

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1 INTRODUCTION

1.1 Research topic

Recreational fisheries are a part of both the fisheries industry and the tourism industry that Vietnam has been developing for ten years. In particular, Nha Trang City, Vietnam has been very popular in tourism and has a growing fisheries industry. As such, well-planned development of either or both of these sectors could bring benefits to the local and national economy.

However, there is a challenge to develop recreational fisheries within an MPA. The underlying tension is that the purpose of an MPA is to protect marine resources, while the purpose of recreational fisheries is to consume/use marine resources. A further aspect of this challenge is to decide how much and what level of development of recreational fisheries should occur within the MPA so that the recreational fishing activities will not negatively affect the local community or environment. Sustainability studies are critical in any such development. This project, therefore, focuses on finding the best solutions to manage the recreational fisheries in the Nha Trang Bay MPA, in order to maximize the social benefits of this activity in a way that can accommodate the regulations of the MPA's operation.

1.2 Research objectives

This project provides an overview of recreational fisheries in the Nha Trang Bay MPA, and describes the social impacts, the main concepts, and conditions for the sustainable development of recreational fisheries within the MPA. The research is mainly targeted to policy makers, fisheries and tourism officers, and those who want to understand more about recreational fisheries in the Nha Trang Bay MPA.

2 PROJECT BACKGROUND

The report focuses on the Nha Trang Bay MPA in Vietnam. In order to study the feasibility of developing recreational fisheries in the MPA, a two-step procedure was applied. The first step was to construct a comprehensive view of the MPA, including its natural characteristics as well as the socio-economic activities that are already taking place. The second step, based on the first, was to map out the challenges and possible benefits of developing recreational fisheries within the MPA. In this step, a theoretical framework from economic theory such as cost-benefit analysis should have been applied to evaluate and identify the challenges and possible benefits. However, this project is limited by a lack of data, both with regards to the biology and socio-economic issues. Data on the costs and benefits related to different options is not available. Therefore, it was impossible to develop a robust cost-benefit analysis at this stage.

Still, sufficient secondary data exists to develop a comprehensive view of the MPA, including its natural characteristics and the socio-economic activities that are already taking place, such as tourism, fishing and other uses. Data regarding the population, number of households and the importance of fisheries for people in the MPA was also collected. Furthermore some indicative data on the number of visitors to the MPA as well as information on the demographics of

international tourists, such as income levels, occupation, gender and their motivation for travel was collected. This information, combined with the information gathered from other studies, allows us to outline the main issues and challenges in further developing recreational fisheries in the MPA.

The data for this research was collected from various sources found via internet, including literature, existing research, and unpublished studies carried out by the MPA itself. In addition, information related to the management regulations and numbers of people participating in recreational fishing activities in the MPA was obtained from two tourist agencies and from the MPA managers following individual requests for data.

3 LOCATION AND CHARACTERISTICS OF THE NHA TRANG MPA

Vietnam has a coastline of about 3,444 kilometers (Central Intelligence Agency, n.d.) along which the fishery sector has a great potential (Nguyen D. M., 2011). Ha Noi is the capital, located in the north of the country, and Ho Chi Minh City, located in the south, is the largest city of the country. Nha Trang is a coastal city of Khanh Hoa Province located in south central Vietnam, which is about 450 km from Ho Chi Minh City, and 1,500 km from Ha Noi.

Nha Trang City is located on the south central coast. The population of the Nha Trang City reached over 390,000 people in 2013 (VKSKH, 2013). The Nha Trang Bay has a total area of 420 km², accommodating more than 600 fish species and 350 types of coral reefs, including red coral, which is very rare (Ministry of Natural Resources and Environment, 2005). In 2005, Nha Trang Bay was recognized as one of 29 most beautiful bays in the world (Ministry of Natural Resources and Environment, 2005).

Nha Trang has a variety of economic activities, including the manufacturing, fisheries processing and export, aquaculture, agriculture, and tourism. It also has a shipping port, airport, and train station (Hayners & Ha, 2004). Furthermore, Nha Trang is one of the most important locations for tourism in Vietnam, attracting a large number of international and domestic tourists every year. There were approximately 220,000 visitors coming to Nha Trang in January, 2014 including 73,000 international tourists and 147,000 domestic tourists (Khanh Hoa Culture, Sport and Tourism Authority, 2014).

Established in 2011, the Nha Trang Bay MPA was the first MPA in Vietnam. A map of the area can be seen in Figure 1 below. It was formally known as Hon Mun MPA and is supported by the Hon Mun MPA Pilot Project. The project was funded by the Global Environmental Facility through the World Bank, Danish International Development Agency (DANIDA), the International Union for Conservation of Nature (IUCN), and the Vietnamese government. The project was implemented and managed by the Ministry of Fisheries, Khanh Hoa Province and the IUCN (Khu Bảo Tồn Biển Nha Trang, n.d.). The goals of the Nha Trang Bay MPA are to protect marine biodiversity, help the local community improve their livelihoods and living standards, and build the models of co-management successfully in the MPA.

The Nha Trang Bay MPA is located in the south of the city. It includes nine islands named Hon Tre, Hon Mieu, Hon Tam, Hon Mot, Hon Mun, Hon Cau, Hon Vung, Hon Rom, and Hon Noc. Based on The Temporary Regulations in the Decision No. 26/2002 publicized on March 11, 2001

by the People's Committee of Khanh Hoa Province, the MPA comprises three main zones: the core zone, buffer zone and transition zone, as illustrated in Figure 1. The total area of the MPA is approximately 160 km² including 38 km² of land and 122 km² of sea water (Vo, Nguyen, Pham, Hoang, & DeVantier, 2005). The population on the islands were about 5,300 people whose livelihood basically depends on fishing activities (Pham, Tran, & Cesar, 2005).

The distance between the islands and the mainland ranges from several kilometers to about 15 kilometers in the case of the furthest islands. The MPA has a resident population of about 5,300 people who rely on its waters for commercial and subsistence fishing. Currently the area is also the focus of rapidly developing aquaculture, shipping, and tourism (Pham, Tran, & Cesar, 2005).

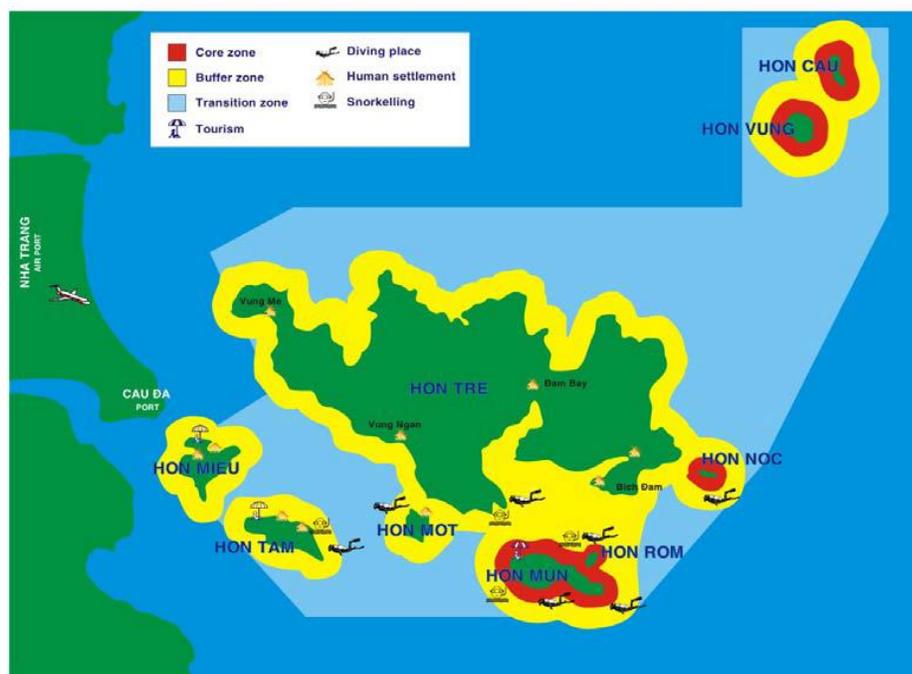


Figure 1. Map of the Nha Trang Bay MPA (Khu Bảo Tồn Biển Nha Trang, n.d.)

According to the IUCN, a marine protected area is defined as “a clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values” (IUCN, 2012). This definition posits that the purpose of an MPA is to protect and maintain the natural resources and associated cultural resources, and that an MPA is managed through laws or effective means.

Similarly, the purposes of the Nha Trang Bay MPA are to maintain biodiversity, protect coral reefs, improve fisheries, control pollution, manage tourism, and create new jobs for local people hired to manage the MPA (Khu Bảo Tồn Biển Nha Trang, n.d.). Due to the two main roles of the Nha Trang Bay MPA, including the improvement of local livelihoods and conservation of the outstanding biodiversity, protecting and sustaining the area's fisheries is a crucial function of this MPA (IUCN Vietnam Program, 2003).

3.1 Biodiversity in the Nha Trang MPA

The Nha Trang Bay MPA is a valuable environmental and tourism resource (Pham, Tran, & Cesar, 2005). It is considered Vietnam's highest priority for marine conservation and coastal tourism due to its rich biodiversity and coral reefs of high economic value (Khu Bảo Tồn Biển Nha Trang, n.d.).

Many important habitats and ecosystems can be found in the MPA, including coral reefs, mangrove, and sea grass. Specifically, there were more than 350 types of coral reefs which accounted for 40% of the world's coral species (Chi, 2013), 230 fish species, 122 crustacean species, 112 mollusc species, 69 seaweed species, and other environmental attributes (Vo, Nguyen, Pham, Hoang, & DeVantier, 2005). The rich biodiversity contained by the MPA has helped support the local fishing industry. Furthermore, this biological richness is also an attractive element to tourist attraction. The Nha Trang Bay MPA was found to contain valuable economic resource due to their recreational value, with the annual recreational value of the islands valued at approximately US\$ 17.9 million (Pham & Tran, 2001). The MPA is thus a significant source of economic benefit to the country.

3.2 Tourism and livelihood activities in the Nha Trang MPA

There are approximately 920 households in the Nha Trang Bay MPA, generally characterized by low educational levels because there are only kindergartens and primary schools available in the islands. Of these households, 36% of the households take part in aquaculture activities (Nguyen L. T., 2009). Apart from fishing, other activities in the MPA include aquaculture, tourism, and residential activities associated with shipping, military, and bird's nest management operations (Nguyen L. T., 2009). There were more than 100 tourist boats at the Cau Da passenger port daily to serve all recreational activities in the Nha Trang Sea, mainly for tourists visiting the MPA (Nguyen L. T., 2009).

The quality of ecosystems in the MPA is found to be an attractive element for recreational activities (Pham & Tran, 2001). The two important elements have played an especially vital role in attracting huge numbers of tourists to the city: the recognition of Nha Trang Bay as one of the most beautiful bays in the world, and the establishment of the MPA.

There is a variety of recreational activities available in the MPA, such as glass bottom boats and party boats; fast power activities (e.g. jet-ski and parascending); non-motorized activities (e.g. sailing, windsurfing, kite surfing, and kayaking); swimming; fishing; and relaxing on the beach. Diving and snorkeling have been the main activities operating in the MPA and have brought the majority of tourists to the area. Most recreational activities available in the MPA are more preferred by international tourists than they are by domestic tourists. Most of the domestic tourists like to participate in activities such as swimming and relaxing on the beach, while international tourists prefer the other available activities. This difference can be explained by the habits, motivation, and income differences between foreign tourists and domestic tourists. Specifically the foreign tourists have higher motivation of traveling and higher incomes than those of the domestic tourists (Pham & Tran, 2001). Moreover, there are also other economic activities in the area such as restaurants (land based and floating), hotels, and resorts.

The Nha Trang Bay MPA has been the main location for the six diving schools operating in the city, due to its ecological diversification among coral reefs (Hayners & Ha, 2004). This activity has attracted about 18,000 “dive days” and 52,000 “snorkel days” per year (Pham, Tran, & Cesar, 2005). According to the Temporary Regulations of the Hon Mun MPA (currently known as the Nha Trang Bay MPA) management, all boat types when crossing or coming to the Hon Mun Island have to follow the strict rules of marine resource reservation. This stipulates that scuba diving and snorkelling tours can only operate at the level of 10 m depth; and all fishing technologies are strictly banned near this island.

4 THE FISHING ACTIVITIES IN THE NHA TRANG BAY MPA

Fishing is the primary income-generating activity in the Nha Trang Bay MPA, where about 79% of household include fishermen (Pham, Tran, & Cesar, 2005). Therefore, the main income of the residents in the MPA is derived from fishing activities. Specifically, fishing provides 74.49% of income of the residents in the MPA while income sources from other sectors are minimal, as seen in Figure 2.

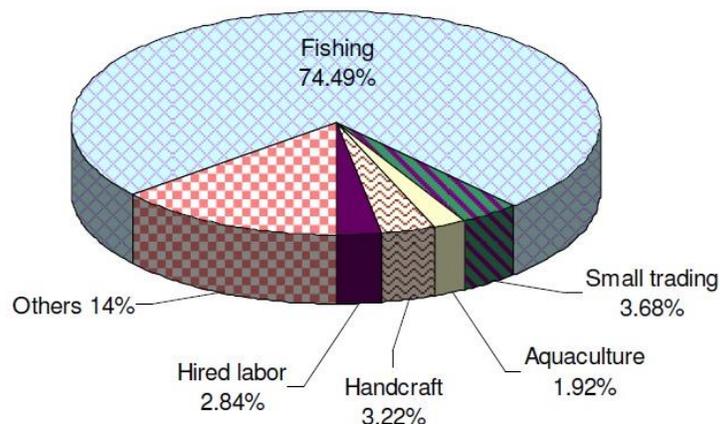


Figure 2: Distribution of household income in the Nha Trang Bay MPA (Nguyen L. T., 2009)

4.1 Commercial fishing

The main fishing activities in the MPA are small scale with most fishing vessels having an engine power lower than 50 horse power (Ho, et al., 2005). In 2002, there were approximately 380 motorized fishing boats with the average length of 9 m; engine capacity ranges from 15 - 45 CV; and the cost of about 2,630 USD (55,400,000 VND) per boat (Nguyen & Adrien, 2002). In the years around 2003, the village-based aquaculture of reef lobster and grouper began to develop, and eventually lobster cultivation to become a vital part of the local economic (Pham, Tran, & Cesar, 2005).

4.2 Recreational fishing

Recreational fishing basically refers to fishing for pleasure. Recreational fisheries have been defined as all fishing activities (i.e. an activity intended to catch fish or other aquatic organism) not conducted for commercial fishing purposes (i.e. catching and selling fish in other to support a

livelihood, at least in part) (Pawson, Glenn, & Padda, 2008). It refers to and includes the fishery resources, fishermen (including local residents and tourists) and businesses providing needed goods and services. Therefore, it differs from commercial fishing or artisanal fishing.

Sport fishing and hobby fishing are other terms used to refer recreational fishing, which is often done with a hook and line (Flåten, 2011). The size of fish, the size of the catch per day of fishing, the fishing process itself, the available fish species, and the natural scenery at the fishing spot are among the characteristics that recreational fishermen consider when contemplating whether or not to go fishing (Flåten, 2011).

Recreational fishing has existed since the establishment of the MPA; however, there is no official record on this activity in terms of catch species or number of participants, etc. This makes it difficult to answer the questions regarding possible impacts of recreational fisheries on the local economy in the MPA.

Recreational fisheries are one way of utilising an MPA (Quach & Flåten, 2010). There are many types of protected areas with different protection degrees, in which some activities are allowed or restricted. When considering the development and maintenance of recreational fisheries in an MPA, questions are regarding the levels of protection and in which areas recreational fishing can be developed, and what the appropriate level of development is for each area.

The MPA established for recreational fisheries under an ocean zoning plan may help to distribute the fish stock for recreational fishers (Quach & Flåten, 2010). One condition to develop recreational fisheries, therefore, might depend on the fish stock.

The existence of recreational fisheries within an MPA might create some conflicts with other sectors, especially the conflicts between commercial fishing and recreational fishing or between fisheries and tourism development.

5 THE RELATIONSHIP BETWEEN MPA DEVELOPMENT AND TOURISM

There could be positive and negative relationships between MPA development and tourist attractions. The potential positive relationship is that the development of the MPA could hold promise for better marine recreational activities to attract tourists. The operation of an MPA, with the aim to sustain the marine resources by applying appropriate regulations on activities related to the resource's life and development, can help to protect and develop the biodiversity and productivity within the MPA, which can help to recruit more fish and other species for recreational fishing as well as other marine recreational activities, such as diving and snorkeling, in the areas.

Moreover, tourist attraction to the MPA could help firstly to increase the fund to run the MPA if the revenue from the entrance fees is directed to help to pay for the management of the MPA. Secondly, it could help to enhance the awareness of resource conservation for the MPA. For instance, through tourism people interact more closely with nature and environment, which can help to increase and spread awareness of environmental problems (UNEP, n.d.).

However, there might be negative relationships between MPA development and tourist attraction as well. MPA regulations limit of the number of fishermen, fishing boats, the catch, dive sites etc., to avoid overfishing and resource depletion. Such limitations could reduce the opportunities of attracting tourists who have the motivation of participating in recreational activities at the MPA. By contrast, if tourist attraction develops without proper management, there could be over-consumption of marine resources, which could contribute to the loss of marine biodiversity. Therefore, there might be some conflicts between tourism development and nature conservation in the area. The challenge is to achieve a balance between sustaining and consuming the marine resources to solve the possible conflicts.

6 SUSTAINABLE DEVELOPMENT OF TOURISM

Sustainable tourism is defined as “tourism that respects both local people and the traveler, cultural heritage and the environment” (Fien, Calder, & White, 2010) or “tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities” (UNWTO, n.d.). Sustainability includes the environment, economics, and culture, and so the principles of sustainable tourism development must concern those three dimensions.

First, the environmental dimension refers to maintaining and protecting natural resources and biodiversity. Second, the cultural dimension involves respecting the local communities’ society and culture, and helping to facilitate mutual understanding of cultural heritage and traditional values. Lastly, the economic dimension refers to guaranteeing the longterm operations of the local economy, which can bring social benefits such as stable employment, opportunities to raise income, and reduction of poverty.

Sustainable development of tourism requires the participation of all relevant stakeholders (UNWTO, n.d.). Furthermore, it also involves the satisfaction of tourists because consumer satisfaction could lead to their repurchasing and recommending the destination and products to others.

Sustainable development must be considered for the longterm viability of the MPA. Specifically, the consumption of marine resources must comply with the principles and practices of sustainable consumption. The United Nations Environment Programme states that “sustainable consumption includes building consumer demand for products that have been made using cleaner production techniques, and for services - including tourism services - that are provided in a way that minimizes environmental impacts” (UNEP, n.d.). This implies tourism services offered must be considered in a way that does not negatively affect natural resource. Therefore, sustainable tourism development must be based on the foundation of preventing negative environmental impact.

Similarly, the general aim of fisheries management is to maintain, and if possible to increase, the total sum of the benefits that fisheries provide to fishing communities and society at large, including conservation of biodiversity. To manage fisheries sustainably, it is thus paramount to understand the nature and diversity of benefits generated by inland fishing to anglers, communities and society at large as a basis for decision making and to defend the sector against other social priorities (EIFAC, 2010).

If managed well, recreational fishing can bring economic benefits through employment and revenue from businesses. Furthermore, it can bring people together who have a common interest in protecting the environment in which they fish, and who, through their clubs and associations, are in a good position to participate in environmental issues and contribute to improving the local community and economy.

7 SOCIAL AND ECONOMIC ACTIVITIES IN THE NHA TRANG BAY MPA

7.1 Social programmes aimed at local communities

Since the Nha Trang Bay MPA was established in 2001, various social programmes have been carried out in the MPA aimed at supporting the local residents while minimizing negative impacts on environment. Examples include a programme regarding marine and brackish aquaculture (i.e. coral reef and molluscos aquaculture, etc.) and a programme aimed at fostering arts and crafts activities (Nguyen H. V., 2012). However, according to the local residents, these programmes were not successful. First, the aquaculture programme failed due to problems related to disease. Second, the arts and crafts programme lacked an established market for the products (Nguyen H. V., 2012).

Moreover, the residents revealed that these programmes did not seem to work efficiently because the income generated was too low to support their daily needs (Nguyen L. T., 2009). Some residents stated a belief that only the tourism industry gained benefits from the MPA. The perception of residents towards tourism in the MPA was quite positive (Nguyen L. T., 2009). According to their beliefs, tourism could bring higher incomes than fishing. This perspective is based on their comparisons of their incomes with that of the residents of islands in the MPA where tourism has been working successfully. Tourism in Hon Mun Island was their typical example: it has attracted huge numbers of tourists coming to the island to participate in recreational activities (e.g. scuba diving, snorkeling, and watching coral through glass bottom boats) based on the biodiversity of coral reefs. These activities, according to MPA residents, have brought elevated income to the residents of islands where recreational activities occur, while the income of residents generated from aquaculture and arts and crafts remained low. They, therefore perceived that tourism would be more helpful in improving their livelihood than other sectors.

7.2 Tourism in the Nha Trang Bay MPA

The Nha Trang Bay MPA offers various tourist possibilities. The main advantage of the MPA management scenario is tourism benefits. Reefs in the Nha Trang Bay MPA offer many diverse benefits to fishers, local communities, tourists, tourism industry operators, local authorities, and civil society (Pham, Tran, & Cesar, 2005).

The tourism sector in the Nha Trang Bay MPA has developed dramatically since the MPA was established in 2001 and is now the mainstay of the tourism industry of the Nha Trang City (Pham, Tran, & Cesar, 2005). The numbers of visitors to the Nha Trang Bay MPA in 2012 were about 94,200 and increased to 106,553 in 2013 with the numbers of visitors reached approximately of 4,000 to 12,000 people every month. Data on visitors to the Nha Trang Bay MPA is illustrated in Figures 3 and 4 below.

One successful tourism development programme supported by the MPA Authority in the Hon Mun and Hon Mot islands utilized glass bottom basket boats, hygiene and cookery courses. Moreover, to improve people's possibilities of working in the tourism sector, English lessons for the residents were established in order to help them become less dependent on fishing (Nguyen L. T., 2009).

The people living in the fishing areas have historically depended mainly on commercial fishing activity to generate income, but commercial fishing has been banned in the MPA since its establishment in 2001, while recreational fishing is not. Therefore, the people whose livelihood depends on commercial fishing have to fish outside of the MPA. In other words, if recreational fishing is developed in this area, it could help the local community improve their livelihood by participating in tourism service activities such as organizing fishing boats for rent with guides. Since they are already fishermen who know the best places in the areas to catch fish, they could work as guides in the service of recreational fishing activity.

According to a study on tourist motivation and activities carried out in the Nha Trang City in 2010, the results of a survey of 500 international tourists visiting the city, indicate that the average age of the respondents was quite young, with 59.6% of the respondents between 20 to 30 years old and 24.9% between 30 to 40 years old (Phan, 2010). The respondents had an average income of 54.494 US dollars per year. In addition, the proportion of male tourists (54.4%) was higher than that of female (45.6%).

Furthermore, the same study also showed that social and intellectual motives were found to be the strongest motivations of tourists visiting Nha Trang, compared with other motivations of mastery/competence and stimulus avoidance (Phan, 2010).

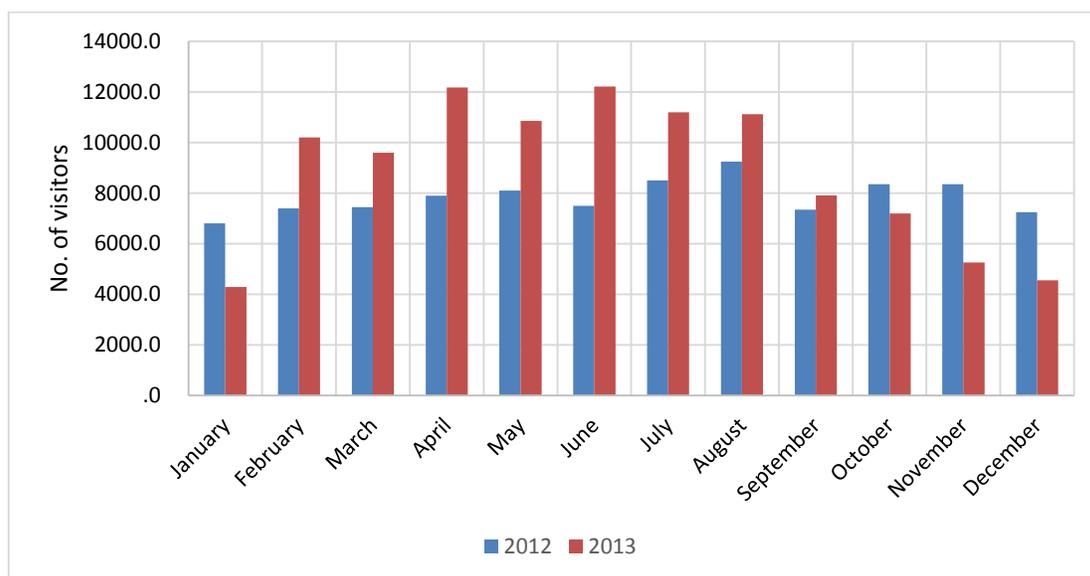


Figure 3: The number of visitors to the Nha Trang Bay MPA in months (MPA manager, personal communication, February, 2014)

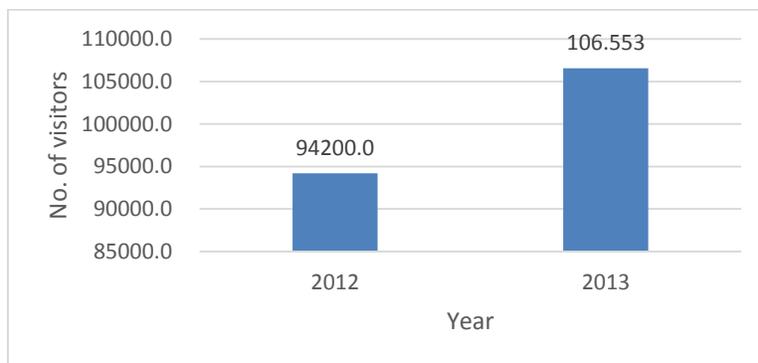


Figure 4: The number of visitors to the Nha Trang Bay MPA in 2012 and 2013 (MPA manager, personal communication, February, 2014)

In 2000, there were about 400,000 visitors to the Nha Trang City and 70% of them took boat trips to the islands to enjoy the recreational activities available (Pham & Tran, 2001). There are six diving schools based in Nha Trang, all located in the core zones of the MPA (Hayners & Ha, 2004). This activity attracted more than 18,000 ‘dive days’ and approximately 52,000 ‘snorkel days’ per year (Pham, Tran, & Cesar, 2005). The number of snorkel days was nearly 52,000 per year (Pham, Tran, & Cesar, 2005). The welfare gain of visitors and value added for the economy from the reef-related recreation industry constitute the recreational benefits of the MPA’s coral reefs for society (Pham, Tran, & Cesar, 2005). Specifically, the total recreational benefits of coral reefs in the MPA was estimated at about 65,430 US dollars in 2005 (Pham, Tran, & Cesar, 2005).

One of the biggest challenges facing the Nha Trang Bay MPA was sustainable financing (Pham, Tran, & Cesar, 2005). Hence, a “conservation fee” was established for coral reef users. The large tourism benefit implies grounds for this conservation fee (Pham, Tran, & Cesar, 2005).

The government has decided to have a budget of about 24 million USD to be invested in developing the marine protected areas for the years from 2011 to 2020 (Government Portal, 2010). 30% of the budget, roughly 8 million USD, will be invested in studying, expanding the current MPAs, and establishing new MPAs in the period of 2016-2020. Furthermore, the goal of the Decision is to build an MPA system with the dual aim of protecting ecosystems and aquatic species which have economic and biological values in order to develop marine economics, and improving the livelihood of the local fisheries communities. The Nha Trang Bay MPA is included in this project. Therefore, the project could bring opportunity for developing recreational fisheries in the Nha Trang Bay MPA.

8 RECREATIONAL FISHING ACTIVITY IN THE NHA TRANG BAY MPA

The national regulations and legislations regarding fisheries play a vital role in regulating commercial and recreational fishing in the Nha Trang Bay MPA. The national legislation can affect regulations on recreational fishing via legislation on commercial fishing, such as regulations on closed areas, fishing gear, engine capacity, and catch size. However, there is currently no specific legislation issued particularly for recreational fishing. The regulations on recreational fishing in the Nha Trang Bay MPA basically depend on the national ones issued for commercial fishing. There

is no regulation on whether selling catch from the MPA is illegal or not. The MPA management is responsible for controlling this and all other activities within the MPA.

8.1 Fishing methods

There is a restriction on the fishing methods used, which defines the use of certain fishing techniques. The current fishing methods allowed are only boat fishing with rod and handline. The fishing activities must occur at the level of less than 30 m deep according to the regulations.

Bottom fishing with a rod is by far the most common method used in recreational fishing in the Nha Trang Bay MPA. One of the reasons why this fishing technique is used commonly is because it is simple to use and does not require much fishing expertise. The fishing boat used is easy to manage and there are no special techniques involved like there are for some other methods such as the spinning method. The second most common fishing method is handline.

Many previous studies have only looked at whether a fishing technique was used or not, but did not define the most commonly used in percentage terms. Thus, the extent of fishing techniques from a boat may be underestimated. Generally, fishing method in terms of recreational fishing has been small-scale, scattered and unprofessional.

8.2 Fishing effort

Fishing effort refers to the number of hooks, number of rods, length of nets and longlines, mesh size, etc. In the Nha Trang Bay MPA, the allowed engine power is less than 40 CV. Capacity is basically measured in terms of vessels tonnage and engine power; and effort is the product of capacity and actual fishing activity, which expressed by fishing hours at sea.

Most of the fishing vessels used for recreational fishing in the MPA are small-scale vessels. The boats come from the tourists companies which organize recreational fishing for tourists. These vessels have a length of 10-15 m and the average engine power of about 40 CV. In terms of the fishing vessels which belong to the MPA residents, there were two main trends of changing among the fishing vessels in the MPA after its establishment: the number of vessels longer than 10 m decreased, while the vessels' engine capacity has increased, as illustrated Figure 5 (Ho, et al., 2005). This choice of the MPA's residents can cause a problem of fishing pressure in the MPA.

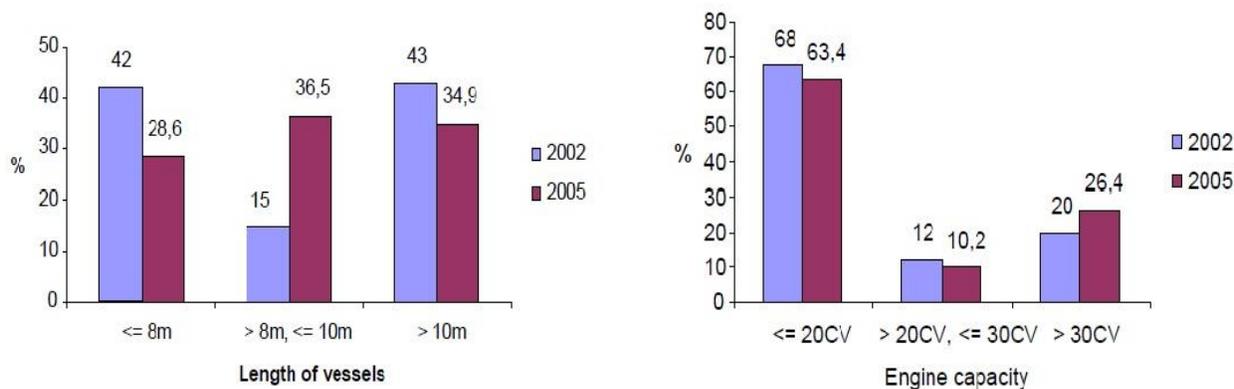


Figure 5: The distribution of vessels operating within the Nha Trang Bay MPA by length and engine capacity (Ho, et al., 2005)

Fishing effort in terms of recreational fishing may be expressed by the numbers of hours or days of fishing per year, the number of hooks or lines per fishermen and per day's fishing, or simply by the total number of fishermen. The findings of this project focus on the fishing hours per fisherman per day and the numbers of fishermen per year due to the lack of data.

Regarding tourists' fishing activity, there seems to be two patterns of the number of hours per day which fishermen spent on recreational fishing, irrespective of the types of fishing methods used. The number of hours vary from three to seven hours per day for recreational fishing, basically depending on fishermen's demand. The ones who went fishing with company (e.g. family, friends or colleagues) usually spent five to seven hours on this activity while those who went fishing on their own but accompanied by other recreational fishermen who purchased this activity (ie, tourists) spent about three to four hours per day on this activity. The boats taking tourists to the MPA for recreational fishing usually depart from the port at 8:00 o'clock in the morning or 6:30 to 7 o'clock in the evening.

However, while average number of fishing hours per fisherman is low it does not mean the fishing effort is low as well, because in certain areas, if the number of fishermen is high, the fishing effort might also be high.

Elements such as the number of hours or days spent on fishing, the number of hooks used per fisherman and per day fishing, or the number of fishermen, etc. are considered to express fishing effort in the case of recreational fishing. However, there has been no record on the number of hours per fisherman spent on recreational fishing per year, nor quantity of fishing gear per fisherman.

8.2.1 The preferable seasons

The information regarding preferable seasons of the year and time of the day for fishing can help to estimate the seasonality of the fishing effort. Nha Trang has only two seasons in a year, which are rainy and sunny seasons. The sunny season (which usually lasts from March to September) is the preferable season for fishing in the MPA when the weather is nice and cool and there is no rain and little wind, which makes it easier for boats to access to the fishing areas. This is also the

highest tourism season of the city. Furthermore, the most favorable time of the day is in the morning because it is less windy and there are more fish than at other times of the day. The fishing trip usually leaves the port around 8:00 am and it takes 10 to 15 minutes to get to the fishing sites, depending on the locations of each island in the MPA.

8.2.2 Catchability and species

The average catch size ranges from 0.5 to 1.5 kg per fisherman, 5 to 15 kg per boat. The most commonly caught species are grouper, tuna, and squid. Moreover, reef fish, horsehead fish, bonnet fish, battered fish, and red mullet fish have been also frequently caught depending on the water depth and area.

In general, the recreational fishing in the Nha Trang Bay MPA does not affect other economic activities within the MPA much. The main reason is because this activity operates in the allowed areas which are separated from the areas which other activities operate.

8.2.3 Number of fishermen

Since there is no record on the number of recreational fishermen who are the residents, the results of this project only focus on recreational fishermen who are not the residents but are tourists. According to one of the MPA managers, there are 30 to 70 people participating in recreational fishing in the MPA every month. Therefore, the number of fishermen who come from tourism can be estimated at about 360 to 840 people per year.

8.2.4 Fishing location and no-take zones

All types of fishing are strictly banned in the core zone of the MPA, including the four islands named Hon Mun, Hon Rom, Hon Cau, and Hon Vung. The allowed areas for recreational fishing are the other five islands including Hon Mot, Hon Mieu, Hon Tre, Hon Tam, and Hon Noc.

The fishing locations preferred are the two islands in the MPA which are Hon Tre and Hon Tam. The distance from the port to the fishing sites are about 5 - 7 kilometers. One reason why they are preferred to the other islands in the MPA is probably due to their locations close to the tourism areas. The other reason is that it is easier to access to these fishing areas compared to the other ones, where there is a lot of wind and less fish stock.

There are no specific regulations on protected species, closed season, fees, catch limits, type of fishing, and fishing licences (boat, shore and underwater fishing). Although there has been no license required to participate in recreational fishing in the MPA, there is a permission required for any boat departing from the port. This type of permission is applied for all boats departing from the port, and is directly issued before departure time by the port management located at the port. However, the local people who live in the MPA do not need to get this permission because there is not port management agency located in the islands of the MPA.

8.3 Monitoring of the Nha Trang Bay MPA

There is a security group including 14 people working in three shifts per day and covering the entire area of 122 km² of sea water and 38 km² of land in the MPA (Duc, 2010). This indicates that the security is quite “thin” to work in such a large area. Moreover, the security board does not have the rights to inspect and/or punish the trespassers. When catching regulatory infractions, they can only make a report to The Khanh Hoa People’s Committee, Inspector of Agriculture and Rural Development Department, and the Khanh Hoa Sub-Department of Resource Protection, then coordinate with the Border Guards, Environment Police and the above organizations to address problems. The management system is still very complicated and it takes a long time to solve problems. Since they do not have enough power to punish the trespassers immediately at the time of infraction, it should be appropriate solution to give them more power to punish the trespassers according to specific regulations related to the infractions.

8.4 Social profile of recreational fishermen

The findings generally delineate the profiles of the three patterns of recreational fishermen: pattern one, the residents; pattern two, the local office-based professionals; and pattern three, the tourists. Pattern one, the MPA’s residents, is by far the largest proportion of the participants in recreational fishing in the MPA because they fish for daily food. The pattern two, the group of office-based professionals who live in Nha Trang, is the second large proportion of recreational fishermen, and the one made up from tourists accounts for the smallest proportion.

The three patterns of recreational fishermen are important dimensions in adequately planning tourism and fisheries development. Although the pattern of the MPA’s residents is by far the largest proportion of the recreational fishermen in the MPA, it might not create benefits for the MPA in terms of finance. Specifically, most of these fishermen do not need to rent a vessel to go fishing because they already have this equipment; thus, there might be no economic benefits created due to non-monetary element generated. This finding indicates an available condition to develop the recreational fishing service in the MPA: the local residents have had important elements to participate in organizing recreational fishing service (e.g. their fishing vessels could be used for rent out; and their fishing experiences could help them work as guides). Furthermore, pattern two, the group of office-based professionals; and pattern three, the tourists, could bring financial benefit to the local community through their expenditure on recreational fishing service. The proportion of the participants come from the office-based professionals group is higher than that of the tourists group, it would thus be a very good potential group for the tourism industry of Nha Trang. This group of recreational fishermen can be considered as the target market for the local tourism industry to focus on in both the present and the future. Consequently, there should be some marketing policies towards this pattern to increase recreational fishermen’s satisfaction in order to increase their intention of repurchasing this activity at the MPA and recommending it to others.

Most of people participating in recreational fishing in the Nha Trang Bay MPA are male, with the average age of around 40. The recreational fishermen who are local usually participate in fishing with company. The ones who go fishing with family usually prefer to rent a private boat to participating in recreational fishing.

9 DISCUSSION

9.1 Future plans for recreational fishing development

The Khanh Hoa Province has a plan to organize fishing competitions in every sea festival carried out in Nha Trang. The Sea Festival is one of the biggest events of Nha Trang City every year, which the most attract tourists. Moreover, Sea Festival events are always organized in summer which is also the fishing season. The city has organized the Sea Festival every year since 2002. This plan might create a good chance to advertise the recreational fishing activity more widely and also attract more people to join this activity.

9.2 The possibilities

This project has attempted to investigate and provide an overview of recreational fisheries within the Nha Trang Bay MPA, Vietnam, with a focus on identifying the elements to develop it in a sustainable way, which can accommodate the underlying needs of the MPA's regulations of marine resources protection. Due to the lack of data on the local community, the project focuses on investigating the recreational fishermen who are not residents of the MPA. Based on this approach, the results indicate that the majority of recreational fishermen were at the average age of 40 years old and mostly are office-based professionals living in the Nha Trang City, the others are tourists. Furthermore, the results show that the existense of recreational fishing in the MPA does not create any conflict with other uses within the MPA due to the fact that this activity is set in a separate zone. Therefore, it does not affect the business of other activities in the MPA in terms of physical interaction.

Although there is no data on the fish stock in the MPA, the richness in biodiversity of coral reefs in the MPA can be considered a sign of a large fish stock size in the MPA because areas with diversification and large amount of coral reefs are good environments for fish growth.

In addition, developing recreational fishing in the Nha Trang Bay MPA might help to reach one of the MPA's goals which is to improve the local communities' livelihood in a sustainable way. The residents in the MPA depend mainly on fishing activity but it cannot help them raise their income because commercial fishing has been banned in the MPA, and therefore they go fishing only to support their daily food. By contrast, recreational fishing is allowed in five islands in the MPA.

Furthermore, regardless of the actual income differentials between MPA residents engaged in tourism and recreational activities versus those engaged in commercial fisheries, aquaculture, arts and crafts, and the residents' perception that participating in tourism activities leads to higher incomes could be leveraged as a motivating factor to recruit more residents to participate in tourism activities in the MPA. This can be considered a promising potential in motivating them to change their livelihood into activities related to tourism, such as organizing recreational fishing service. Moreover, since they are already professional fishermen who have fishing boats and know the best areas in the MPA to catch fish, they could generate income by renting out their boats and serving as expert fishing guides. Therefore, recreational fisheries within the MPA, if managed well, could help to reach one of the MPA's goals that to improve the residents' livelihood; and concurrently, could help to attract more tourists to the MPA.

In addition, the findings indicate that tourism has been the major activity in the MPA; and the fact that 70% of tourists visiting Nha Trang City took the trips to the MPA to enjoy the recreational activities can be considered a good opportunity to attract tourists to participate in recreational fishing in the MPA.

Furthermore, tourists' motivation of visiting Nha Trang was generally to satisfy their social and intellectual motives which can be understood as enjoying a good time with others and building friendships (social motive), and discovering new places and increasing knowledge (intellectual motive). For this finding, we can assume that since recreational fishing in the MPA has not been well-known, a programme of advertising it might attract these types of tourists to purchase the recreational fishing service in the MPA. Additionally, the finding of tourists' satisfaction and intention of recommending Nha Trang to others can be considered a possibility among this group of tourists. If they purchased the recreational fishing service in the MPA, and were satisfied of this service, they might have two behaviors afterwards which are, firstly, to recommend this activity to others, and secondly, revisit the MPA to purchase this activity again in the future.

9.3 The main challenges

9.3.1 Conflicts with local fishermen

Fishing is a major activity of the residents in the Nha Trang Bay MPA (79% of household in the MPA are fishermen). Therefore, there could be a conflict between recreational fishing and commercial fishing when the recreational fishing is developed without a good monitoring system. However, if recreational fishing is developed in a way that has the local community involved in this business as discussed above, this conflict could be solve through intentional and thoughtful promotion of the alternative livelihood (i.e. the local fishermen would join in organizing recreational fishing service to make money instead of fishing for daily food).

9.3.2 Monitoring and management

The management system was found to be the main weakness contributing to the inefficient operations of all activities in MPA in general and recreational fisheries in particular. Stronger regulations from the Ministry of Agriculture and Rural Development on monitoring the MPA are recommended, such that they include the specific rights and responsibilities of all stakeholders and all stakeholders are strictly assigned the mutual responsibilities.

In order to develop recreational fisheries in a sustainable way, the level of development must proceed in such a way that marine fish stocks are controlled and not overexploited. Fisheries authorities, therefore, need to develop a framework for managing the fisheries industry in terms of recreation. Specifically, there should be regulations on items related to fishing effort. For instance, a framework should ensure recreational fishing is well supervised; that the regulations issued (e.g. size limited) are clearly understood and are posted to visitors; that the gear will not be discarded over board; and that all landings are recorded, etc. Additionally, there should be an action to raise awareness among recreational fishermen of the environmental consequences of their actions.

Moreover, there should be a usage fee for recreational fishing inside the MPA. This recommendation was applied to other recreational activities in the MPA such as scuba diving. After

the fee applied since 2004, the revenue from this fee has contributed partially to the management as well as to the improvement of the local community (Pham & Tran, 2001).

9.3.3 *Education*

Educational activities should be organized to raise the local people's awareness of environmental reserves and the importance of developing the recreational fisheries in a sustainable way to protect natural resources and improve their livelihood concurrently.

9.4 Limitations and suggested future research

There appears to be some limitations generated through this project, which should be considered in future research. For instance, a cost-benefit analysis should be applied to identify the potential benefits and challenges of developing recreational fisheries in the MPA. The necessary elements for a cost-benefit analysis is to collect data on monetary values concerning environmental cost and benefits of the recreational fisheries to evaluate these together with other benefits and cost. Furthermore, there should be sampling within the MPA by each of the three different sectors. This would make it easier to see which areas within the MPA are most frequented by fishermen, which would be very useful for policy makers to tailor specific policies for each area.

Moreover, there should be research to investigate the influences of satisfaction on recreational fishermen's intention in order to understand the role of satisfaction in explaining the repurchase the intention; and fishermen's motivation for participating in recreational fishing in the MPA. These type of studies would be helpful to give a deeper understanding of consumer behaviour in a tourism context of the Nha Trang Bay MPA. The findings from such studies might give more effective policies for the fishermen patterns. Furthermore, an investigation of factors influencing recreational fishermen's dissatisfaction towards recreational fishing within the Nha Trang Bay MPA should be carried out to seek and provide efficient solutions for such problems so that the development of the local tourism industry can be carried out more efficiently.

ACKNOWLEDGEMENTS

I would like to express my great appreciation to all the people who have given me full support, helpful advice, and assistance that contributed to the timely completion of this project.

First and foremost, I would like to express my deep gratitude and appreciation to my supervisor, Doctor Gunnar Haraldsson for his enthusiastic guidance and valuation support during the project writing period.

I would additionally like to thank all the Professors, Lecturers, and Coordinators of the United Nations University - The Fisheries Training Programme, including Doctor Tumi Tomásson, Mister Thor Ásgeirsson, Ms Sigríður Ingvarsdóttir, Ms Mary Frances Davidson, Mister Jóhann Sigurjónsson, Mister Arnljótur Bjarki Bergsson, Professor Gunnar Knapp, Professor Olafur Astthorsson, Associate Professor Sigurjón Arason, Doctor Daði Már Kristófersson, Doctor Eddie Allison, Doctor Grimur Valdimarsson, Doctor Gudmundur Thordarsson, Doctor Ogmundur Knútsson, Doctor Ragnar Arnason, Doctor Sigmar Steigrimsson, Doctor Steingrímur Jónsson, Doctor of Philosophy Student Sjöfn Vilhjeldsdóttir, Mister Bjarni Eiríksson, Mister Eyjólfur Reynisson, Mister Franklín Georgsson, Mister Gudmundar Oskarsson, Mister Haraldur Arnar Einarsson, Mister Helgi Gestsson, Mister Jonas Jonnasson, Mister Margeir Gissurarson, Mister Valdimar Ingi Gunnarsson, and other UNU-FTP staff, who have contributed to the completion of this training programme.

I am grateful to the Icelandic Government and the United Nations University that granted me, as well as other fellows, the scholarship to participate in this six-month training course.

I would also like to express my special gratitude and thanks to Professor Ola Flåten for inspiring me to do research on this project topic.

I would like to thank Doctor of Philosophy Student Nguyễn Ngọc Duy and Doctor of Philosophy Student Phan Thanh Lâm, who have given me helpful and constructive recommendations on this project.

I also would like to extend my thanks to my friends and colleagues, who have provided their assistance to me while writing this project, including Doctor Quách Thị Khánh Ngọc, Doctor of Philosophy Student Lê Chí Công, Ms Nguyễn Thị Trang Nhung, Ms Vũ Thị Hoa, and all others classmates in the United Nations University - The Fisheries Training Programme 2013 who have provided camaraderie and support.

I would particularly like to thank my parents and sister for their constant support and encouragement throughout my study.

I would additionally like to express my sincere appreciation to my best friend, Mallory Powell, who has supported and encouraged me, and who have helped me to edit my English in this project. I cannot thank you enough for your generous support.

Especially, my special thanks to an important person to me, Nad Kram, who has always seen my challenges and helped me to face them successfully; inspired me to pursue my dreams. Your encouragement and inspiration have helped me overcome all the difficulties during this study.

Lastly, I would like to express my profound gratitude once again to all of you, who have supported me in any respect during the completion of this study.

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