

Sustainable ecotourism development in the Muslim community after the impact of the tsunami disaster in 2004: a case study in Bang Rong Village, Phuket Province, Thailand

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Abstract

This paper deals with sustainable ecotourism development of Muslim communities after the tsunami disaster in Bang Rong Village Phuket Province, Thailand. The objective of this study is to compare the impact of ecotourism which occurred before and after the tsunami disaster by considering 3 criteria: social, economic and the environment. This study also identified potentials of some ecotourism attraction for sustainable ecotourism development. The baseline for sustainable ecotourism indicators that is beneficial in suggesting potential ecotourism attractions were established based on a sustainable development model. There were 66 comprehensive indicators based on physical and ecological characteristics, ecosystem management in tourism attraction, value and importance of tourism attraction, education, spirituality and religious traditions management, participation in conservation, community economic, and policy compliance used in the model. The population sampling groups are government agencies and local authorities based on an in-depth interview of 18 candidates with 6 key persons of tourism business stakeholders, and 361 questionnaires distributed among local people and tourists. The results of this ecotourism attraction potentials assessment, and the impact of ecotourism on the Muslim community, can suggest a specific approach to seven dimensions or theme models for sustainable ecotourism development.

Keywords: sustainable tourism development, ecotourism, impact of tsunami disaster, Thai Muslim community.

1 Introduction

Global change caused by the influence of human activity, has caused severe problems to the environment. In recent years, more frequent global natural disasters have occurred; one of them was the huge tsunami waves and earthquake on December 26, 2004 in the Andaman coast of southern Thailand. The tsunami caused damage to the utilization of six prefectures' coastal resources. It strongly hit many coastal villages in Thailand including Bang Rong Muslim that is located in Paklok sub-district, Thalang district, Phuket province, Thailand. Since the disaster occurred, local people have tried their best to recover from the big catastrophe. They established a post tsunami sustainable recovery program as a whole and one factor of the planning development program is the establishment of sustainable ecotourism development. It is important for community development particularly in providing job opportunities and income based on tourism that was based on the preservation of local ecosystem and community cultural heritage.

2 Research objective and methodology

2.1 Objective

With two main objectives, the first is to compare the ecotourism situations before and after the tsunami disaster for comparative study by considering 3 criteria: social-cultural, economic and the environment. The second is to assess the ecotourism attraction potentials for sustainable development which establishing baseline sustainability indicators for the potential of ecotourism attractions based on sustainable development models.

2.2 Study area

This study was conducted at Bang Rong Muslim community which was suggested as one of the villages that were affected by natural disaster, in a case where populations that were affected by tsunami disaster were 92 cases and 28 households with 1.75 meters height of tsunami [1]. The village is located in Moo 3 Paklok sub-district, Thalang, Phuket, (8°03'N, 98°25'E) on the northeast coast of Phuket Island, Thailand, with history of more than 200 years. The population of this village is 2,312 people with 920 households. The community of this village is mostly Muslim who is committed in preserving their cultural heritage and is self-sustenance community that established community-based ecotourism in Paklok sub-district.

2.3 Literature review

Ecotourism is a concept which appears close to nature-based tourism, bio-tourism or green tourism. The International Ecotourism Society [2], had defined ecotourism as "Responsible travel to natural areas that conservation the environment and sustains the well-being of local people" including sustainability



concept that contribution is beneficial to local communities that concern is important role for community-based natural resource management [3]. Ecotourism also allowed natural heritage to be preserved, since intangible cultural heritage of humanity, spiritual and religious traditions [4]. Besides, Thailand is successful tourism country that involved many tourism business organizations that focus on sustaining tourism. Sustainable tourism development can be achieved through balancing tourism resources from environmental, economic and social- culture aspects which if utilize wisely can maintain the natural and cultural uniqueness allowing minimal impact that indirectly helped for long-term nature resources usage [5].

However, ecotourism also brings positive and negative impact on economic, environmental, and social-cultural aspects. Inadequate ecotourism management and plan can caused negative impact on community and decreasing eco-tourists and stakeholders' environmental awareness causing severe environmental degradation that indirectly leads to natural habitat destruction. Since this paper propose sustainable ecotourism development for post-tsunami disaster, we look at how natural disaster affected the local tourism industry based on other industries crisis such as fisheries, agricultures, natural resources, and ecotourism attractions that impact could have directly factorized ecotourism industry. The impact from economy, social-culture and environment is highly related issues. This research focus on the impact on community and ecotourism's potential attraction as an effective tool for sustainable ecotourism planning, potential important information for tourism recovery policy making for community-based management [6]. With Bang Rong Muslim community based-ecotourism establishment before the tsunami, poverty issue can be recovered through existing financial. The term of community-based ecotourism refer to involvement of local residents, conservationist, tourist and also organizations, individuals and institutions, participation in development, operation, decision- making ecotourism planning and management [7]. Stakeholder's participation which benefit-sharing from ecotourism activities should contribute to the fund, encouraging ecotourism development such as improving awareness and protecting natural and cultural resources of ecotourism attraction [8]. There are numerous ecotourism attraction such as mangrove forest tail, rainforest, Gibbon Rehabilitation, mangrove monkey and marine tourism, Muslim's spiritual and religious traditional activities is attractive for both religious and non- religious tourist. Spirituality and religious traditional beliefs can be integrated into tourism for sustainable ecotourism development while the theme of spirituality and religious traditional plays a role in ecotourism attraction and new product development, it's the of beliefs that cultivate inner awareness and enhancing cultural exchange and promote mutual understanding. The important role of spirituality and religious values can play in conservation biology and ecosystem management, and including cultural landscapes [9]. Example sacred natural sites (SNSs) also indigenous communities; rural traditional cultures and lifestyles, such as, sacred mountains, rivers, forests, mangrove, beach or coastal, islands and animal species are the world's oldest natural environment conservation [10]. Recommendations section is also provided in this paper to advice specific approach based on seven dimensions which are



economic, environment, social, cultural, spirituality and religious traditions, marketing and policy planning for sustainable ecotourism development. Sustainable tourism development in rural area under concept of ecotourism can to help generate revenue and poverty alleviation, increasing employment opportunities for local people with job related to tourism such as restaurants, tour guides, transportation, accommodation, and souvenir shops etc. Government agencies, tourism business stakeholder, and local people should be involved in opinion of planning in ecotourism development by defining economic, tourism marketing, social, culture and environment of policy, and operating as planned.

2.4 Methodology and analyses

This research employed a mixed of both qualitative and quantitative methodologies as warranted. Focusing on five groups in population sampling.

2.4.1 Qualitative data

Data collection was based on in-depth interviews using key-information of three groups: household leader, entrepreneurs of accommodation, travel companies or agencies by purposive sampling. Interview was based on discussion of the problems and threats faced by tourism management, and important factors affecting model of sustainable ecotourism development.

2.4.2 Quantitative data

Data collection from interviews of 155 residents' on their perception on ecotourism impact which occurred before and after the tsunami disaster by considering the positive and negative based on 3 criteria: economic, social-culture, and environment. Rated score of each indicators were given five difference scales. With total 361 questionnaires taken from 150 domestic tourists, 56 international tourists and 155 local people's, their opinion on potential assessment ecotourism attraction were collected using, convenience sampling. The questionnaire used likert scale with five answers option: lowest, low, moderate, high and highest based on 66 indicators. MS Excel 2013 was used for the analysis (Statistics relationships to percentage, mean, standard deviation) by descriptive statistic.

2.4.3 Application of criteria and indicators for assessment of the ecotourism attraction potential

UNWTO has developed sustainable tourism indicators (STI) for all tourism destinations [11]. In this workshop, the specific selection criteria and indicators was made by focus group participants and previous literature consideration. Indicators for assessment of ecotourism potential process that each of indicators link to physical and ecology characteristics, ecosystem management in ecotourism attraction, value and importance of tourism attraction, education, spirituality and religious traditions, management, participation in conservation, community economic, and policy compliance which cover all dimension of sustainable ecotourism development. Respondents were asked to select score from five- point Likert scale. The important of each indicator was found out using equation were calculated, using formula for RII also determine the mean score as below [12]:

$$\text{Relative importance index (RII)} = \frac{\sum w}{A \times N} \times 100, (0 \leq \text{RII} \leq 1) \quad (1)$$

where:

w – weight give to each criteria by the respondents and range from 1 to 5.

A – highest weight (i.e. 5 in this case) and

N – total number of respondents.

According to the importance levels of RII are determined with score as follows:

1 = $0.0 < \text{RII} < 0.2$ Low (L)

2 = $0.2 < \text{RII} < 0.4$ Medium-Low (M-L)

3 = $0.4 < \text{RII} < 0.6$ Medium (M)

4 = $0.6 < \text{RII} < 0.8$ High- Medium (H-M)

5 = $0.8 < \text{RII} < 1.0$ Highest (H)

One-way analysis of variance (ANOVA) was used to test the significant difference between the groups based on mean [13].

2.5 Hypotheses

2.5.1 The impact of ecotourism

H1: The opinions of the local people differ in the impact of ecotourism occurred before and after tsunami disaster

2.5.2 Assessment of attraction potentials for sustainable development after tsunami disaster

H2: The opinions of local people, domestic tourist and international tourist differ with respect to the ecotourism attraction potentials for sustainable development

3 Results and discussion

Residents were asked about 3 criteria and 38 indicators. The negative impact on natural environment and ecology ($p=0.062$) before the tsunami disaster is higher than after the tsunami disaster (Table 2). High negative impact was found on fauna (RII=0.80), flora (RII= 0.78), natural areas and mangrove encroachment (RII=0.73) due to human activities have strongly affected mangrove area, especially charcoal business for export products and tourism infrastructure construction supports such as hotel, resort, and coastal ecosystems (RII= 0.63) were destroyed (Table 1). In addition, soil degradation due to shrimp farming (RII=0.68) is a \big problem in the Muslim community, while the negative impact on economic and society and culture were not significantly different before and after tsunami disaster. After the tsunami disaster, the positive impacts on natural environment and ecology ($p=0.0002$) was higher compared to before the tsunami disaster, but not for positive impact on economic and society and culture, since significant difference was not shown before and after tsunami. However, most local people opine that social and economic impact before the tsunami disaster was more negative rather than positive since impacts were just average on the community. After the tsunami disaster the positive impacts and negative impact on natural environment and ecology, economic, and society and culture were different ($p<0.05$), positive impact on environmental and ecology were higher than negative impact which were just moderate. The research revealed that over 10 years after

Table 1: Impacts assessments of ecotourism on the Muslim community before and after the tsunami disaster.

| | Criteria | Impact of indicators | Before tsunami disaster | | | After tsunami disaster | | |
|---------------------|---------------------------------|---------------------------------|-------------------------|------|------|------------------------|------|------|
| | | | Mean | RII | Rank | Mean | RII | Rank |
| Negative Impact | Natural environment and ecology | NN1 | 2.59 | 0.63 | 7 | 2.25 | 0.71 | 3 |
| | | NN2 | 2.57 | 0.55 | 8 | 1.95 | 0.68 | 4 |
| | | NN3 | 2.10 | 0.80 | 1 | 2.55 | 0.64 | 5 |
| | | NN4 | 2.16 | 0.78 | 2 | 1.45 | 0.58 | 6 |
| | | NN5 | 2.19 | 0.73 | 5 | 2.07 | 0.77 | 1 |
| | | NN6 | 1.68 | 0.74 | 4 | 1.16 | 0.37 | 7 |
| | | NN7 | 1.69 | 0.76 | 3 | 1.14 | 0.34 | 8 |
| | | NN8 | 2.46 | 0.68 | 6 | 1.97 | 0.75 | 2 |
| | Economic | NE1 | 2.48 | 0.65 | 5 | 2.21 | 0.81 | 1 |
| | | NE2 | 2.45 | 0.66 | 4 | 2.48 | 0.57 | 5 |
| | | NE3 | 1.89 | 0.79 | 1 | 2.36 | 0.61 | 3 |
| | | NE4 | 1.86 | 0.77 | 2 | 2.36 | 0.59 | 4 |
| | | NE5 | 1.66 | 0.69 | 3 | 1.68 | 0.80 | 2 |
| | Society and culture | NS1 | 2.35 | 0.79 | 2 | 1.91 | 0.65 | 5 |
| | | NS2 | 2.05 | 0.84 | 1 | 2.35 | 0.76 | 2 |
| | | NS3 | 2.16 | 0.70 | 7 | 2.25 | 0.76 | 2 |
| | | NS4 | 2.15 | 0.76 | 3 | 2.26 | 0.61 | 7 |
| | | NS5 | 2.41 | 0.71 | 5 | 2.00 | 0.85 | 1 |
| | | NS6 | 1.89 | 0.74 | 4 | 2.01 | 0.75 | 4 |
| | | NS7 | 1.75 | 0.71 | 5 | 2.26 | 0.64 | 6 |
| | Positive Impact | Natural environment and ecology | PN1 | 1.42 | 0.57 | 2 | 1.93 | 0.70 |
| PN2 | | | 1.38 | 0.55 | 3 | 2.22 | 0.69 | 2 |
| PN3 | | | 1.52 | 0.63 | 1 | 2.42 | 0.56 | 4 |
| PN4 | | | 1.23 | 0.42 | 4 | 2.28 | 0.66 | 3 |
| Economic | | PE1 | 1.14 | 0.34 | 8 | 1.55 | 0.58 | 6 |
| | | PE2 | 1.63 | 0.55 | 4 | 1.61 | 0.55 | 8 |
| | | PE3 | 1.34 | 0.47 | 6 | 2.18 | 0.66 | 3 |
| | | PE4 | 1.38 | 0.49 | 5 | 1.43 | 0.56 | 7 |
| | | PE5 | 2.06 | 0.80 | 3 | 1.35 | 0.63 | 4 |
| | | PE6 | 2.13 | 0.82 | 2 | 1.48 | 0.71 | 2 |
| | | PE7 | 2.29 | 0.84 | 1 | 2.05 | 0.81 | 1 |
| | | PE8 | 1.32 | 0.47 | 6 | 1.58 | 0.63 | 4 |
| Society and culture | | PS1 | 1.94 | 0.69 | 2 | 1.71 | 0.64 | 2 |
| | | PS2 | 1.24 | 0.43 | 6 | 2.05 | 0.71 | 1 |
| | | PS3 | 1.34 | 0.48 | 3 | 2.19 | 0.63 | 3 |
| | | PS4 | 1.35 | 0.48 | 3 | 1.44 | 0.57 | 5 |
| | | PS5 | 1.34 | 0.48 | 3 | 1.55 | 0.63 | 3 |
| | | PS6 | 2.14 | 0.78 | 1 | 1.19 | 0.40 | 6 |

the tsunami disaster, environmental management of the Muslim community has been improved, particularly in restoration and conservation of mangrove and coastal ecosystems for human well-being support as well as security from future tsunami protection. Furthermore, negative impact on economic, and society-culture before and after tsunami disaster were higher than positive impact (Tables 3 and 4). After the tsunami disaster residents perceived significant increase of negative impact like land speculation or increased cost of land, leakage of money to outside business owners, increased indebtedness, low-income from tourism and

imbalance between revenues and costs, the relative importance index of value are at the highest level. Also, negative impact from social-cultural aspect such as poverty and unemployment (RII=0.85) due to foreign workers employment and outnumbered illegal workers in Phuket province besides social conflict and collision (RII= 0.76). Water shortage (RII=0.76) were high-medium impact on community suggesting impact indicators as the information baseline for future environmental planning. Negative social-culture and economic impact within the Muslim community that is higher than positive impact highlights well-being improvement issue as more important issue before solving poverty and other social.

Table 2: Comparative meaning of negative and positive impacts assessments of ecotourism before and after tsunami disaster.

| Criteria | Negative impact | | | | Positive impact | | | |
|---------------------------------|-----------------|-------------|---------------|---------------|-----------------|-------------|---------------|----------------|
| | Before | After | t | P-value | Before | After | t | P-value |
| Natural environment and ecology | 2.18 | 1.82 | 1.6357 | 0.0620* | 1.39 | 2.21 | 6.9121 | 0.0002* |
| Economic | 2.07 | 2.22 | 0.6862 | 0.2559 | 1.66 | 1.65 | 0.0399 | 0.4843 |
| Society and Culture | 2.11 | 2.15 | 0.7162 | 0.2443 | 1.56 | 1.69 | 0.5941 | 0.2828 |
| Total | 2.12 | 2.06 | 0.4446 | 0.3398 | 1.54 | 1.85 | 1.5919 | 0.0933* |

Remark: * significant difference between groups at $p < 0.05$.

Table 3: Comparative meaning of negative and positive impacts assessments of ecotourism before the tsunami disaster.

| Criteria | Negative impact | | Positive impact | | t | P-Value t- Prob (One-tail) | Significant difference |
|---------------------------------|-----------------|------|-----------------|------|--------|----------------------------|------------------------|
| | Mean | SD | Mean | SD | | | |
| Natural environment and ecology | 2.18 | 0.71 | 1.39 | 0.54 | 5.6584 | 0.0001 | Sig. difference |
| Economic | 2.07 | 0.71 | 1.66 | 0.60 | 1.7857 | 0.0522* | Non-sig. difference |
| Society and culture | 2.11 | 0.75 | 1.56 | 0.56 | 2.9698 | 0.0104 | Sig. difference |

Table 4: Comparative meaning of negative impacts and positive assessments of ecotourism after the tsunami disaster.

| Criteria | Negative impact | | Positive impact | | t | P-Value t- Prob (One-tail) | Significant difference |
|---------------------------------|-----------------|------|-----------------|------|--------|----------------------------|------------------------|
| | Mean | SD | Mean | SD | | | |
| Natural environment and ecology | 1.82 | 0.61 | 2.21 | 0.65 | 1.8886 | 0.0441 | Sig. difference |
| Economic | 2.22 | 0.68 | 1.65 | 0.64 | 3.2007 | 0.0062 | Sig. difference |
| Society and culture | 2.15 | 0.72 | 1.69 | 0.60 | 2.756 | 0.0141 | Sig. difference |

Table 5: Analyses comparison of importance rating mean by local people, domestic tourist and international tourist of potential assessment ecotourism attraction in Bang Rong Muslim community.

| Criteria | Local people | Domestic tourist | International tourist | Sum-mean | F | P-value |
|--|--------------|------------------|-----------------------|----------|--------|---------|
| | Mean | Mean | Mean | | | |
| Physical and ecology characteristics | 3.18 | 3.25 | 3.62 | 3.35 | 1.460 | 0.263 |
| Ecosystem management in tourism attraction | 3.48 | 3.71 | 3.45 | 3.55 | 1.075 | 0.362 |
| Value and important of tourism attraction | 3.34 | 3.75 | 4.10 | 3.73 | 9.491 | 0.001 |
| Education | 2.92 | 3.82 | 3.77 | 3.50 | 23.863 | 0.000 |
| Management | 3.15 | 3.32 | 3.59 | 3.35 | 2.205 | 0.139 |
| Participation in conservation | 3.41 | 3.54 | 3.36 | 3.44 | 0.676 | 0.528* |
| Community Economic | 2.16 | 2.84 | 2.91 | 3.26 | 6.122 | 0.008 |
| Policy compliance | 2.84 | 3.11 | 3.05 | 3.00 | 0.406 | 0.671 |
| Spirituality and religious traditions | 3.23 | 3.84 | 3.72 | 3.60 | 3.570 | 0.042 |

According to the comparison of mean score among 3 groups of respondents to identify individual opinions level in difference potential indicators of ecotourism attraction for sustainable ecotourism development, 66 indicators, out of 58 indicators had shown significant different. However, ecotourism's perceived potential of 3 groups were high scores of culture and traditions dimension refer to value and importance of tourism attraction (M=3.73) and Community base spirituality and religious tradition tourism management(M=3.76), social dimension refer to education (M=3.50), spiritual and religious traditions (M=3.60), ecosystem management in tourism attraction (M=3.55) and participation conservation (M=3.44) after tsunami disaster indicate high potential indicators for attraction. This suggest that Muslim community have several prominent natural resources, values and importance, easy accessibility to tourist attractions, beautiful landscape as well as good ecosystem management practices such as community participation in protection, maintenance and restoration natural resources; knowledge of local people in tourism hospitality operations management and protecting cultural heritage values. Muslim village's strict Islamic spirituality and religious traditions and regulations of management (M=3.30) such as high respect for protection of sacred natural site, including animals and wildlife, restrictions of bar and night clubs, sex tourisms, drugs tourism, and alcoholic drinks may contribute to unique attractions of this village. Low and moderate scores showed in three dimensions economic, marketing and policy that were measured using various indicators such as resident participation in tour operator and tourism activities management, accommodations service management, revenue management from admission fee, price of transportations, commercial livestock activity, promote ecotourism marketing or ecotourism marketing management, suggest for future improvement. In order to promote

sustainable ecotourism development, safety management practices and compliance of biological diversity and ecosystem conservation policy should be strictly instilled towards local people and tourists.

4 Conclusion

Overall, this study highlights the perception of local people towards the negative and positive impact of ecotourism before tsunami as important baseline information for ecotourism planning and management after tsunami disaster in Muslim community. Inefficiency of previous management is important reflects that is useful for future planning and management [14], such as considering the problem of nature resources which were destroyed by villagers and investors in the part, environmental degradation and poverty. Decision makers have recognized the need to establish policy to resolve the community problem and environmental awareness to provide information that may help to reduce disaster risk, poverty apart from achieving sustainable development goal [15]. The most important dimensions influencing the sustainable ecotourism development concept are policies and economic, marketing, social and natural environment within the community.

4.1 Recommendations

4.1.1 Recommendations community level

4.1.1.1 Government agencies According to the highest negative impact on economic and social occurred before tsunami disaster continuously until the present; high cost of living, indebtedness, tourism on low-income and insufficient livelihood was perceived as problem. Positive economic benefits that was perceived were just a few such as equal village income distribution from tourism, employment opportunities, tourism and coastal fishing income, safety management for local people and tourist, conservation of biological diversity and ecosystem and regular landscape improvements. The government should consider reducing the negative effects and also sets additional requirements to maximize positive impacts of ecotourism on poor people.

4.1.1.2 Entrepreneurs Support initiatives to encourage entrepreneurship to participating in the decision and policy -making in reducing social problems. Due to the lack of cooperation between local government and the private sector tourism, there is no consistent vision or marketing strategy for the local tourism sector. New tourism product and innovations is essential for the long term sustainability of ecotourism attractions besides promoting Muslim spirituality and religious traditional tourism such as ritual practice, pilgrimage (Hajj) to Mecca, development of halal restaurant, Muslim museum and festival to attracts religious tourist (pilgrims) and ASEAN countries is proposed in the future with financial support and advertising to be included.

4.1.1.3 Local community or residents According to the highest negative impact on economic and social. And considered 9 critical to assess ecotourism



potential attraction, the most effectively is community economic and policy compliance, such as low income from accommodations service, tour operator and tourism activities management, local culture and heritage, transportation and other service, commercial livestock activity, selling local products and handicraft. In terms of practical policy, should support community involvement in promote ecotourism marketing include marketing mix need to use all of the 8 Ps so as enhance the income of residents and reduce poverty and protecting environment.

4.1.1.4 Tourist In the case of the impact of ecotourism due to tourist behaviors is the important issue, apparently direct negative impact on animal life, wildlife and marine animal habitat changes. For example, the destructions of monkey, fishes and marine species habitat had increased. Tour operator should be provide sufficient the information in conservation and protect environment to tourist and an interpretative service based on environmental education. Also support and purchase of products within community.

4.1.2 Recommendations for sustainability development: sustainable ecotourism development in Bang Rong Muslim community

Recovery process for Bang Rong Muslim community after tsunami disaster are constructed to reflect the sustainable management and development issue being addressed and particular policy, economic, marketing, social, culture, spirituality and religious traditions and includes environment.

4.1.2.1 Policy Important several policies for recovery community after tsunami disaster. Especially, public policy in promoting holistic ecotourism it can play the major role in poverty alleviation in rural community. The most importantly policies must address all of dimensions: economic, marketing, social, culture, spirituality and religious traditions and includes environment, there are relevant to the sustainable ecotourism development.

4.1.2.2 Marketing Continuous promotion of ecotourism marketing especially development standard of local products and crafts through co-ordinate with entrepreneurs should be instilled Management of the existing and new product should be encouraged for continual growth in tourism business by increasing the homestay service, promotion of Muslim spirituality and religious tradition tourism such as halal tourism, halal accommodations, halal restaurants and others. Marketing planning activities was suggested to follow 3Es concept: Economic, Ecology, and Equity [16].

4.1.2.3 Economic Financial support and insurance for investments promotion is required to support small and medium enterprises (SMEs) for local development. Increasing tourists and student travellers that utilized overnight accommodation, restaurants and shopping revenues will provide economic development but with nature conservation awareness during development.

4.1.2.4 Environment For environment and conservation, these policies should include the National Environmental Policy Act (NEPA) to protect the environment besides establishment of Council on Environmental Quality (CEQ), National



Forest Policy (NFP) to maintain forest resources and their interaction with other land uses, National Land Policy (NLP) to addressing environmental problems that affecting land such as soil degradation due to shrimp farming and pollution in ecotourism attractions. National Wildlife Policy (NWP) also should be included for management wildlife resource management that also includes marine ecosystem, that at risk of extinction such as fisheries, dugongs, crabs, sea-grasses and others.

4.1.2.5 Social Social development policies must address spiritual and ethical dimension for human being. Adjusting social-environmental negative impact such as conflict, criminal, drugs, terrorist and incidents is important in creating positive image of safety and security in Muslim community.

4.1.2.6 Culture Due to various unique and distinctive culture of Muslim community such as archaeology, arts, heritage, mosque (masjid), inherited Islamic tradition, festival, halal food, it is therefore suggested for tourists important attraction. Local government and residents need to coordinate in cultural event management for Muslim festivals, besides exhibitions to bring more tourists from outside community.

4.1.2.7 Spirituality and religious traditions Spirituality and religious traditions development policies must address creating community ecology and environmental with spiritual awareness and practice of human being. Spirituality and religious leave more positive impact on economic, social, cultural and environmental through due to the promotion of the four pillars of sustainability community development. Muslims believe that teachings of Islam for relevance to the environment and sustain human life, it appears in many Qur'anic verses such as "All this is God's creation and Muslims should therefore seek to protect and preserve their environment" [17]. According to spirituality and religious traditions were highest potential. For ecotourism management role; religious leaders and stakeholders provide opportunities for youth and children to engage faith practices continuously, besides supporting spiritual value and religious traditions activities, while adopting Islamic beliefs and teachings in daily life.

4.1.3 Recommendation for research

Although the paper focuses on one village as a basis for quantitative and qualitative social research methods, the context of a disciplinary specialization; potential assessment ecotourism attraction can be applied to other villages, future research should be developed to assess the impact of ecotourism by considering other important indicators.



Appendix

Table A1: Definition of impact indicators assessed before and after the tsunami disaster.

| | Negative impact | Positive impact |
|---------------------------------|---|---|
| Criteria | Impact of indicators | Impact of indicators |
| Natural environment and ecology | NN1= Coastal ecosystems were destroyed NN2= Mangroves were destroyed NN3= Fauna were destroyed NN4= Flora were destroyed NN5= Natural areas and mangrove encroachment NN6= Wastewater problem NN7= Garbage NN8= Soil degradation due to shrimp farming | PN1= Wildlife conservation PN2= Mangrove restoration PN3= Fauna restoration (rare aquatic plant) PN4= Flora restoration (rare aquatic) |
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| Economic | NE1= Land speculation and increased cost of land NE2= High cost of live or increased cost of products and service NE3= Increased indebtedness NE4= Low-income from tourism and imbalance between revenues and costs. NE5= Leakage of money to outside business owners | PE1= Increases sufficient economy promote project PE2= Increases village fund and welfare PE3= Increases community co-operatives groups PE4= Provides employment opportunities and income PE5= Increases income from tourism activities PE6= Increases income from coastal fishing PE7= Increases income from agriculture PE8= Increases income distribution or flow of money in village |
| Society and culture | NS1= Residential environment and habitat NS2= Social conflict and collision NS3= Water shortage NS4= Affected Muslim festivals, traditional lifestyle NS5= Poverty and unemployed NS6= Illegal workers NS7= Crime, drugs, accidents, infectious diseases | PS1= Increases tourism facilities (hotel, homestay, restaurant, etc.) PS2= Tourism improves quality of education and tourism human resource development PS3= Increases quality of local health and social welfare PS4= Increases employment opportunities PS5= Livelihoods: well-being, safety PS6= Increases quality of infrastructure and facilities |

Table A2: Potential indicators used in ecotourism attraction in Bang Rong Muslim Community assessment.

| Criteria | Indicators | Mean |
|--|--|------|
| Physical and ecology characteristics | PE1= Convenient access to tourism attraction | 3.79 |
| | PE2= Quality of roads (slope, dangerous curve, road surface) | 3.04 |
| | PE3= Landscape (minimal number of building around nature public area, height of building, etc.) | 3.72 |
| | PE4= Geomorphological formations and soils | 3.29 |
| | PE5= Flora biodiversity | 3.14 |
| | PE6= Faunal biodiversity | 3.12 |
| Ecosystem management in tourism attraction | EM1= Quality of maintaining environment (protection, maintenance, restoration) | 3.68 |
| | EM2= Voice quality management | 3.52 |
| | EM3= Solid waste management | 3.40 |
| | EM4= Wastewater management | 3.81 |
| | EM5= Water availability and conservation | 3.84 |
| | EM6= Energy management (per capita consumption of energy from all sources, applying energy saving policy, renewable resources) | 3.35 |
| | EM7= Air pollution management | 3.24 |
| Value and importance of tourism attraction | VT1= Complete ecosystem/biological diversity | 3.83 |
| | VT2= Beautiful landscape | 3.67 |
| | VT3= Agricultural way of life | 3.64 |
| | VT4= Uniqueness and distinctive culture | 4.19 |
| | VT5= Various tourism activities | 3.37 |
| | VT6= Value and importance of archaeological, artistic and heritage | 3.61 |
| | VT7= Inherited Islamic tradition | 3.83 |
| | VT8= Fair price | 3.69 |
| Education | ED1= Knowledge of local people in environment conservation | 3.81 |
| | ED2= Knowledge of local people in ecotourism management | 3.50 |
| | ED3= Environmental compliance (environment lows, regulations, standards) | 3.26 |
| | ED4= Knowledge of local people in tourism hospitality operations management | 3.59 |
| | ED5= Environmental conscious | 3.37 |
| Management | MN1= Ecotourism marketing management | 2.69 |
| | MN2= Community base spirituality and religious tradition tourism management | 3.76 |
| | MN3= Protecting cultural heritage values (interpretation, renovation, restorations) | 3.53 |
| | MN4= Safety management (possible occurrence of nature hazard, crime, accidents statistics and damage, immigration measure) | 3.25 |
| | MN5= Strictly Islamic spirituality and religious tradition of regulations | 3.30 |
| | MN6= Control land use in tourist attraction, adequate housing | 3.44 |
| | MN7= Networking ecotourism in other village | 3.51 |
| Participation in conservation | PC1= Local people participation in land conservation | 3.24 |
| | PC2= Participation in environment rehabilitation | 3.27 |
| | PC3= Participation in culture conservation | 3.64 |
| | PC4= Participation in environment protection | 3.48 |
| | PC5= Tourist participation in ecotourism attraction protection | 3.54 |

Table A2: Continued.

| Criteria | Indicators | Mean |
|---------------------------------------|--|------|
| Community economic | CE1= Tour operator and tourism activities management | 2.21 |
| | CE2= Accommodations service (number of hotel, guesthouse and homestays. etc.) | 2.15 |
| | CE3= Restaurant and local product (number, price) | 2.97 |
| | CE4= Transportation and other service (number, price) | 2.50 |
| | CE5= Local culture and heritage (number, revenue management from admission fee) | 2.40 |
| | CE6= Commercial fishery activity | 3.30 |
| | CE7= Commercial agriculture activity | 3.02 |
| | CE8= Commercial livestock activity | 2.52 |
| Policy compliance | PC1= Restoration flora and fauna project | 3.21 |
| | PC2= Management of ecosystem, ecological health and process | 3.51 |
| | PC3= Promote education and public awareness | 3.23 |
| | PC4= Rehabilitation and conservation of local cultural and historical values | 3.40 |
| | PC5= Land use management | 3.81 |
| | PC6= Regularly landscape improvements | 2.89 |
| | PC7= Conservation of biological diversity and ecosystem | 2.42 |
| | PC8= Safety management for local people and tourist | 2.61 |
| | PC9= Promotes ecotourism marketing | 1.76 |
| | PC10= Promotes investment that support local development(SME) | 3.16 |
| Spirituality and religious traditions | SP1= Often adopts the your own religious teachings to daily life | 3.92 |
| | SP2= Have opportunities to participate in practices of your own religious | 3.31 |
| | SP3= Participation in your own evangelism and their faith to children | 3.54 |
| | PS4= Increases employment opportunities | 3.58 |
| | SP5= Often to foster care, and conscience protection on your own religious and other (donations, making merits and volunteer, etc.) | 3.18 |
| | SP6= Respects the religion and traditional culture of the Muslim community | 3.63 |
| | SP7= Obtaining equality and justice (tourism service, investment and operation) | 3.03 |
| | SP8= Participates in the preservation and promotion of local traditional culture (not join child sex tourism, not join drug tourism) | 4.29 |
| | SP9= Compliance with all of low and land use regulations and zone management | 3.73 |
| | SP10= Involved in the care, attention to protecting and rehabilitation the nature resource | 3.76 |

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