

ENVIRONMENTAL ENGINEERING FOR SOCIAL ADAPTATION OF TOURISM DEVELOPMENT ON TIDUNG ISLAND, THOUSAND ISLANDS DKI JAKARTA

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Abstract. The research objective was to develop environmental aspects for social adaptation to tourism development on Tidung Island, Thousand Islands, DKI Jakarta. To support research objectives, the survey method in this research involved stakeholders. The results of this study explain that an environmental engineering for social adaptation of tourism development on Tidung Island need for seven of the eight variables found to be statistically significant, they are: a) Environmental sensitivity level, b) Perceived knowledge of environmental action strategies, c) Perceived skills in using environmental action strategies, d) Classification of the role of psychological sex, e) Individual focus control, f) Locus of control group, and g) Attitudes towards pollution. While the significant variables are confidence in technology.

1. Introduction

Tourism is one of the economic machines for regions that have attractive and exotic natural conditions, provided they are practiced wisely and sustainably, respecting local heritage and culture. As the subject of tourism, human beings are the actors and recipients in the development of tourism and one of the main elements in the ecological system of tourism destinations(1). At other times, sustainability implies a rational relationship between man and nature; alterations that affect the natural environment impose limits that must be evaluated before they create disturbances in that environment(2).

In the past decade, it has been proven that pressure on ecosystems is caused not only by dramatic ecosystem changes, but also by changes in the social system. And the tendency now, found a growing pressure on marine ecosystems from human activities, globally, regionally and nationally(3). All countries, according to the Rio Convention(4), are obliged to understand and preserve their biodiversity. And efforts to realize the solution to the above problems include through a process of social adaptation where this process will parallel the patch pattern which represents a direct response to various habitat conditions and cycles of disruption and recovery(5).

At the same time, the institutional system might have just collected information related to ecosystems that had never been implemented before. Or conversely, efforts to improve ecosystem management to increase the level of community welfare require new institutional or institutional arrangements. While social conditions make the process of adaptation to change, another paradigm emerges in the form of tourism development. Policy arrangements and changes relating to rights and access to resources that occur today are in conditions of rapid social change compared to before. On this basis, social adaptation is needed through innovative processes(6). Defined as “the process of inventing, securing support for, and implementing novel solutions to social needs and problem”(7), social innovation is the outcome of a social change and is usually administered by a social agent. Unlike technological innovations whose impact is more on a certain company or an industry, social innovations always aim at collective changes in society(8). When knowledge and resources are exchanged and shared between the agent and social institutions, the need for a social change inspires and is realized through innovations.

The concept of social innovation was being confused with technical innovation until sociologist William Ogburn first noted the distinction between them. He described the introduction of ‘League of Nations’, different religious rituals and other social processes as a social innovation and tried to clear the confusion(9). Moreover, during the last two decades, the term “social innovation” was discussed in different fields of studies like social

entrepreneurship, social movements and social economy(10). It is only in the recent past that study and discussion of social innovation was popularized after more scholars started to realize the broader sources of social innovations and their impacts.

Howaldt and Schwarz identified a wide variety of sources for social innovations including web-based social networking, new business and logistic models, social movements (gender mainstreaming) and so on(8). One of the central questions to ask when studying a social innovation is “what factor(s) motivate such an innovation?” The answer has been perceived differently by different researchers. Some focused more on the social changes or the need for change as the key motivating factor of a social innovation(8)(11), while others described social innovation as an effective, efficient and sustainable solution for a social problem(7). However, regardless of whether the change is viewed as the solution or the trigger, based on the nature and iteration of the innovation process, it is clear that a social problem is present in the event of social innovations. When the goal has been set as a collective well-being, the first thing that comes to attention is a social problem and then a way to solve it. The driving factors for social innovations differ from the ones for technological innovations. As discussed earlier, social change is the main objective for a social innovation; therefore it acts as one of the main driving factors. This unique nature has given social innovations an immaterialist face(8). In technological innovations that deal with products and services, performance is evaluated mainly on the creation of economic value(12). Profit and commercialization success drive the technological innovations. In terms of social innovations, value creation and social welfare play important roles in the driving force, and success comes out as social practices and norms rather than in any materialistic form.

In addition, in technological innovations, “modularity” is considered as the heart of diverse advancement(13), whereas “social behavior and structure” is the core driving factor in social innovations(14). Moreover, when it comes to social development, new research findings show that social innovation is closely related to technological innovation(14), thus triggering further development of the social adaptation process. Social adaptation(15) is the process of adaptation of the individual (group) to the social environment, involving interaction and gradual agreement the expectations of both parties. The aim of social adaptation is providing stability, tradition, consistency, social experience, and its changes, on the basis of innovative enrichment. Social adaptation involves the acquisition of individual subjectivity for self implementation of social actions and functions with optimal psycho-physiological costs.

The adaptation criterion means that teenagers have high resistance to stress, adequate perception of criticism, good health and mood, cheerfulness, healthy ambition, mobility, high operability, selfconfidence, steady and positive selfassessment, understanding and division of I-images. The communicative-organizing criterion includes skills to listen and understand interlocutors, sincerity, capacity to build long-term partnership and confidential contacts in real life, ability to argue one’s point of view, non-conflict, empathetic, real estimation and distributing of one’s forces(16). In the context of this research, the processes and results of social adaptation are analyzed along with the conditions that seek the development of tourism on Tidung Island.

The theory of social-ecosystem adaptability focuses on that the adaptation of “human” elements in the system adjust themselves through a series of behavioural measures to deal the system risks when facing disturbance factors, so as to achieve the goal of sustainable development of the whole system. Smit defines adaptation strategies for short-and long-term climate change and extreme weather events to enhance the viability of social-economic activities and reduce vulnerability(17). Therefore, according to the behaviour mode of adaptation subjects, human adaptation can be divided into two types: ecological system adaptation and human adaptation. Feenstra et al. pointed out that the former focuses on the protection and maintenance of natural ecosystem functions, and human adaptation emphasizes the planned behaviour of human society based on the cognition of what has happened, what is happening and what may happen, as well as the awareness of the possible consequences of taking actions(18).

From the perspective of the objects of adaptation, Xu Guangcai et al.(19) classified human adaptation strategies into ecosystem adaptation and human adaptation. One is to intervene and regulate natural ecosystem artificially, so as to maintain the stability of ecosystem structure and function. On the other hand, people mitigate the impact of human activities on the environment by adjusting the structure of social production sector and technological progress(19). According to this classification, the adaptation types of tourism social-ecosystem can be divided into two types: tourism ecosystem adaptation and tourism subject adaptation. The adaptation of tourism ecosystem refers to the intervention and adjustment of the natural ecosystem on which the tourism subject depends under the disturbance of tourism, so as to maintain the stability of the ecosystem structure and function of the tourism destination. The adaptation of tourism subject refers to the adaptation of tourism subject to deal with the impact of tourism development on the environment of tourist destinations through the adjustment of production structure, capital introduction, technical services and employment participation. This paper aims to develop environmental aspects for social adaptation to tourism development on Tidung Island, Thousand Islands, DKI Jakarta.

2. Method

The survey method in this research involved stakeholders on Tidung Island; they are government officials in the sub-district, community leaders / religious leaders, environmental activists, and parties involved in tourism businesses. Data analysis in this study uses social-ecological systems (SES) models, therefore they coevolve through interactions between actors, institutions, and resources constrained and shaped by a given social-ecological setting(20).

SES models have therefore often been developed from the perspective of a single discipline, such as resource economics, applied ecology, or fisheries science(21). Based on the respective disciplinary frameworks and theories such approaches tend to oversimplify either the ecological or the social domain, and often fall short in exploring and explaining the social-ecological feedbacks that drive the development of the coupled SES(21). More recently, emerging interdisciplinary approaches such as resilience theory, ecological economics, and complex adaptive system theory have contributed to an integrative study of SES, but these have often been criticized for their “ad hoc” approach to representing relevant variables and processes, particularly with respect to modeling changes in human behavior(22).

3. Results and Discussion

Changes (social and environmental) and the causes felt by the community as a result of tourism on Tidung Island are as follows.

Table 1. Social and Environment Changes on Tidung Island

| No. | Perceived Change | Choosing the First Answer | % | Rank |
|-----|---|---------------------------|-------|------|
| 1 | Population increases | 28 | 87.50 | 1 |
| 2 | Development of settlements | 26 | 81.25 | 2 |
| 3 | Environmental and coastal degradation | 25 | 78.13 | 3 |
| 4 | Sedimentation - coastal erosion | 24 | 75.00 | 4 |
| 5 | Change in shape / coastal land | 23 | 71.88 | 5 |
| 6 | Reduced land vegetation including mangroves | 20 | 62.50 | 6 |
| 7 | Reduced seaweed and sea grass beds | 19 | 59.38 | 7 |
| 8 | Reduced fish catch | 16 | 50.00 | 8 |
| 9 | The flow of fishermen's shipping shifted | 11 | 34.38 | 9 |
| 10 | Tourists increase | 7 | 21.88 | 10 |
| 11 | Decreased protected animal population | 5 | 15.63 | 11 |

The form of change that is felt by the community is the growing population, which causes residential areas to continue to grow, resulting in damage and pollution of the environment around the coast, and changes in the coast. The answer occupies the percentage sequence and the first to fourth highest ranking. The causes of changes that are felt by the community are due to increasing population, pollution, and lack of education and environmental awareness. Is the answer with the highest ranking to one to three? And according to respondents, some things that can produce negative changes are rapid population growth (number of children) (46%), but the increase in migrants seems to have no effect (69%). Some other factors as parameters of environmental variables include: the increase in tourists / travelers has no effect (91%) on the environment. Besides that, the lack of septic tanks and waste treatment by respondents was declared influential (40%) on the quality of the land environment. In addition to the minimal condition of wastewater treatment facilities, the lack of waste management by respondents was also stated to be very influential (94%) on environmental quality.

Respondents also complained about the lack of regulations to maintain and preserve the quality of clean water. This problem according to respondents will affect (66%) the condition of the quality of the island's environment, especially if there are still applicable laws / regulations that are also not applied will have an effect (66%) on the worsening environmental conditions. Tourist activities in this case have no effect (91%) on the environment around the island.

3.1. The Social Adaptation for Tourism Development; base on SES models

a. Resources and society; resources in the form of coral reefs play an important role, apart from being their fishing ground, but also as a resource that affects the availability of other catches.

b. Communities and infrastructure providers

The relationship is more of a lack of participation and lack of information because the community is only a user of public infrastructure built by the local government.

c. Infrastructure provider with infrastructure

- The existing infrastructure is less monitored for the repair and rebuilding process
- Infrastructure that has been built has not been evenly distributed, such as clean water facilities

- d. Resources with infrastructure; the impact of infrastructure development, such as docks and environmental roads on resources, is effective so that the economy lives.
- e. Infrastructure with interactions between communities and resources; the relationship between infrastructure and the interaction between society and resources is interrelated. This means that infrastructure (such as docks) influences interactions between communities and resources
- f. Communities with infrastructure; resource user's only use existing infrastructure without directly carrying out maintenance, monitoring and sanctions given if there is a violation. This is due to the view that the duty to carry out maintenance, monitoring and sanctions is the duty of infrastructure makers. The community tends to provide its own infrastructure with regard to the household, for example building a well or water source in his home. Meanwhile, greater infrastructure is considered the responsibility of the local government.
- g. External influences on infrastructure; external influences such as bad weather, and the increasing (intensity and volume of arrivals) tourists.
- h. External influences on infrastructure providers; disasters that occur allow damage to the infrastructure that has been built. This damage is usually handled by infrastructure providers, for example the local government to repair or rebuild in order to move the economy of the community.

Through good understanding of the important factors of managing and developing tourism areas, it will usually be able to shape the behavior of the community and tourists to take part and maintain the environment. Specifically, Archibald P. Sia, Harold R. Hungerford and Audrey N. Tomera(23), outlined eight relative contributions in predicting responsible environmental behavior.

The development management plan should use a two-pronged approach, top down approach and bottom up approach. This can be seen in the issue of integration to relevant stakeholders, where responsible behavior refers to the action of individuals or groups directed to find the best solution of environmental problems(24). This can be mediated through extracting and developing local wisdom. The values of local wisdom of tourism objects are very important to understand because they are needed for effective product development, planning, marketing, management and interpretation of future tourism development. The questions(24): Is this an understanding helps ensure that tourism development in the future? Is commensurate with respect for existing values? Is this characterized by a combination of individual and community interests and concern for others and ecosystems?

Based on the above questions, an analysis of the list of tourist needs and desires consists of the intention to travel, prior knowledge of tourist destinations that have been visited, and the desire to act more likely to lead to actual actions of individuals in tourist sites to be addressed(25).

4. Conclusion

The results of this study explain that an environmental engineering for social adaptation of tourism development on Tidung Island need for seven of the eight variables found to be statistically significant, they are: a) Environmental sensitivity level, b) Perceived knowledge of environmental action strategies, c) Perceived skills in using environmental action strategies, d) Classification of the role of psychological sex, e) Individual focus control, f) Locus of control group, and g) Attitudes towards pollution. While the significant variables are confidence in technology.

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