

## ***The Influence of Socio-Economic, Cultural, and Environmental Ethical Factors on the Development of the Capacity of Managing Lake Toba Ecosystem***

**R. Hamdani Harahap**

*Department of Anthropology  
Faculty of Social and Political Sciences  
University of Sumatera Utara, Medan  
rhamdani@yahoo.com*

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**Abstract**—Lake Toba is one of natural and environmental resources in Samosir Regency; it is the largest lake in Indonesia and famous for its tourism objects. Today, its environmental protection is being threatened by unsustainable development. The objective of this research was to analyze the influence of socio-economic, cultural, and environmental ethical factors on the sustainable development of the capacity of managing Lake Toba ecosystem by identifying the local people's traditional wisdom and its relation to the environmental management in Samosir Regency, to analyze the local people's socio-economic and socio-cultural aspects and its relation to the conservation of Lake Toba ecosystem, to analyze the capacity of managing Lake Toba ecosystem. The research used explanatory survey approach; it was conducted in Samosir Regency. The result of the research showed that the capacity of the local people and the Government in managing Lake Toba ecosystem was in moderate category. The variable of education had positive and significant influence on the capacity of environmental management. The variable of income had negative and insignificant influence on the capacity of environmental management. The variable of environmental ethics had positive but insignificant influence on the capacity of environmental management. The variable of social relationship had negative and insignificant influence on the capacity of environmental management.

**Keywords:** *Capacity Building, Socio-Economic, Socio-Cultural, Ecological Wisdom*

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### **INTRODUCTION**

#### **A. Background of the Problems**

Lake Toba is one of the natural and environmental resources in Samosir Regency; it is the largest lakes in Indonesia and famous for its tourism object (Manurung, 2016). The aesthetic beauty of its panorama and all its potential SDA (natural resources), especially the conservation of its function, is now being threatened by the development which ignores environmental protection (Badan Lingkungan Hidup Sumatera Utara, 2011)

The development of environmental institution discusses the development of the institution in environment, the capacity of development in the context of institutional development, strategies (including purpose, participation development, the principles of development, methodology, and consultation), the technique of cooperation in environment, various kinds of consultation, human resources

management, the function and role of pilot projects, and several examples of institutional development in environmental management. The damages in natural and environmental resources are caused by individual and organizational behavior through their decision and action which are determined by institutional matters. In this analysis, they include organization, the rights on natural resources, legal provisions, market structure, knowledge and information, and the political process in the Government.

Substantially, institution can be players of the game and rule of the game that organize the performance of an organization and the cooperation among its members in order to achieve their intended mutual goal (Ostrom, 1985; Ostrom, 1986; Dorward, et. al., 1998; Nabli and Nugent, 1996; Haris J. Hunter J and Lewis, CM. (ed.), 1995).

## B. Formulation of the Problems

Based on the problems in managing natural and environmental resources of Lake Toba, Samosir Regency, the formulations of the problems were as follows:

1. How was the capacity of managing Lake Toba ecosystem, viewed from social, cultural, and economic aspects?
2. Was there any relationship between the socio-economic and socio-cultural condition of the people in the vicinity of Lake Toba and the capacity of managing Lake Toba ecosystem?

## C. The Objective of the Research

The objective of the research was to organize the concept of developing the capacity of managing Lake Toba ecosystem by

1. analyzing the local people's socio-economic and socio-cultural aspects concerning the use and the conservation of ecological functions/ecosystem of Lake Toba.
2. analyzing the relationship between the capacity of managing Lake Toba ecosystem and the pattern of using Lake Toba ecosystem and the local people's socio-economic and socio-cultural aspects.

In other words, the objective of this research was to formulate the strategy of developing the capacity of managing Lake Toba ecosystem which was able to maintain environmental quality and to improve the coastal people's socio-economic and socio-cultural aspects.

## LITERARY REVIEW

### A. The Capacity of Managing Lake Toba Ecosystem

Brown in Karwono (2008) defines *capacity building* as a process which can improve the capacity of an individual, an organization, or a system in order to achieve an expected goal.

Natural resources are a resource which is established by natural power such as soil, water, and waters, biotic potential, air and space,

minerals, natural matters, geothermal and natural gas, wind, and low tide/marine current (Soerjani, et.al., 2008). Either market or the government has mono-political view on natural resources by putting forward merely the economic aspect, while the other groups of people look on natural resources holistically which includes social, cultural, and spiritual/religious aspects (Kartodiharjo, Hariadi, and Hira Jhamtani, 2006). Fauzi (2010) points out that good management of natural resources will eventually increase human prosperity; on the other hand, bad management of natural resources will have bad effect. Therefore, the fundamental problem which is related to the management of natural resources is how to manage them to get the largest benefit for human beings without sacrificing the natural resources themselves.

Hufshmidt (1992) points out that specific management capacity is needed to avoid environmental damage caused by individuals, groups of people, and developing institutions in society that do not consider fully any aspects which become the burden for environment. Social capital is closely related to the institutions of environmental management. Thorburn (2004) points out that social capital is social resources which enable a society to achieve their way of living. In other words, social capital is the capacity to work together due to mutual understanding among the community members (Woolcock in Depdagri, 2004).

The most important element in the social capital is trust which becomes an adhesive for the sustainability in cooperation with groups of people. By having trust, people can work together effectively (Fukuyama, 2002). According to Pretty and Ward (2001), mutual understanding behavior is something which smoothes and is very important for cooperation which, according to Fukuyama, is believed as something which can smoothes social life. What Fukuyama wants to confirm is that we cannot separate economic life from cultural life. Fukuyana (2002) points outs that today the factor of social capital has the similar importance with physical capital; it means that people who have high level of social confidence will be able to create flexible business organizations that are able to compete in the global economy.

Fukuyama (2002), who has studied social capital and trust in a complex economic society, states that trust is beneficial for the creation of high-ranking economic structure. It can be liable to reduce costs if all employees who work in a certain company have mutual understanding and work according to a series of ethical norms. An anthropological research finding on forestry resources management by local people in Asian and Latin American countries proves that indigenous people have cultural capacity, knowledgeable and technological system, religion, tradition, and social capital such as ethics and environmental wisdom, and legal norms and institutions to manage natural resources wisely and sustainably (Dove, 1985, 1988; Zerner, 1990; Taylor, 1993; Lynch and Talbot, 1995; Poffenberger, 1990; Ganjanapan, 2000; Laungaramsari, 2001).

## RESEARCH METHOD

In accordance with the objective of the research which identified and analyzed the influence of some determined variables, the type of the research was explanatory research method which explained the influence of research variables and examined the hypothesis that had been formulated.

### A. Research Location

The research was conducted in Samosir Regency. It was selected based on the consideration that all subdistricts of Samosir Regency were located in the vicinity of Lake Toba. Besides that, there were the conservation and exploitation of natural and environmental resources of Lake Toba. This research activity was conducted in Simanindo Subdistrict, Pangururan Subdistrict, Palipi Subdistrict, Nainggolan Subdistrict, Onan Runggu Subdistrict, Ronggur Ni Huta Subdistrict, Harian Subdistrict, Sitio-tio Subdistrict, and Sianjur Mula-mula Subdistrict.

The data were analyzed qualitatively and quantitatively.

## RESULT AND DISCUSSION

### A. Socio-cultural Based Lake Toba Ecosystem Management

The Batakese community always emphasizes on the importance of education. This was indicated from the majority of the respondents' level of education which was in good category. Besides that, their income was also in moderate category.

Their socio-cultural condition was measured by four indicators: first, social relationship among the people in the community (in the research location). Working together in mutual cooperation was frequently done which indicated that their social relationship in working together was still good. Secondly, indicator of participation in the togetherness was still maintained. Indicator of the level of criminality and indicator of communication were in good category. All in all, the socio-cultural condition in the local people (in the research location) which had been measured was in good category.

### B. Local People's Capacity in Managing Lake Toba Ecosystem

All in all, the local people's capacity in managing Lake Toba ecosystem was indicated by five indicators. They were legal provisions which were related to the role of the local people in managing Lake Toba ecosystem, their participation in the form of fund in managing Lake Toba ecosystem, their organization in managing Lake Toba ecosystem, the procedure made by the local people in conserving Lake Toba ecosystem, and the capacity of LSM (Non-Government Organizations) in conserving Lake Toba ecosystem; they were all in good category. The fifth indicator, the capacity of the Government in managing Lake Toba ecosystem, was in moderate category. Some human ecological researchers indicate that there is close relationship between managing natural resources and the existence of institutions in the groups of people. In the context of the management of Lake Toba ecosystem, it has been long identified that Lake Toba ecosystem has been damaged and polluted which is allegedly caused by the change in the institution of the Batak Toba community.

This is in accordance with what has been pointed out by Gisli Pálsson (1991, 1996: 16), using communalism approaching a human ecological studying the context of fishermen in Iceland with their marine waters, that there was the similarity or the unity in the relationship between the fishermen and their marine waters; in this case, they are balance relationship and inter-subjective relationship between human and environment. Communalism paradigm also describes the characteristics of the economic system of the fishermen that is subsistent with simple technology which has environmental wisdom. According to Pálsson, communalism paradigm is established for reconstructing the complexity of the life of fishermen that has run since the very beginning of the history of the continual cultural development by the existence of exploitative paternalism culture which relies on science and technology.

### ***C. Interconnection of Socio-economic and Socio-cultural Condition of the Local People Surrounding Lake Toba with the Capacity of Managing Lake Toba Ecosystem***

The capacity of managing Lake Toba ecosystem is influenced by some variables. In this research, the variables which were included in the model were environmental ethics, the level of education, income, and social relationship (conflict) which were all called independent variables, while the capacity of managing Lake Toba ecosystem was called dependent variable.

The regression model equation in this research was

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$$

From the result of the calculation, it could be formulated the regression model equation as follows:

$$Y = 26,476 + 0,804X_1 - 0,077X_2 + 0,072X_3 - 0,017X_4 + e$$

1. The variable of the level of education ( $X_1$ ) had positive and significant influence on the capacity of managing ecosystem ( $Y$ ). It could be seen from the significance value ( $0.001$ )  $> 0.05$  and the value of  $t_{\text{count}}$  ( $3.292$ )  $> t_{\text{table}}$  ( $2.77645$ ) which indicated that if the variable of education ( $X_1$ ) was

increased, the capacity of managing environment ( $Y$ ) would increase. It meant that the higher the level of education of the people and of all stakeholders in the area of Lake Toba, Samosir Regency was, the higher the capacity of managing ecosystem in that area. This result showed that the variable of education had an important role in increasing the capacity of managing Lake Toba ecosystem.

2. The variable of income ( $X_2$ ) had negative and insignificant influence on the capacity of managing ecosystem ( $Y$ ). It could be seen from the significance value ( $0.731$ )  $> 0.05$  and the value of  $t_{\text{count}}$  ( $-0.344$ )  $< t_{\text{table}}$  ( $2.77645$ ) which indicated that if income ( $X_2$ ) increased, the capacity of managing ecosystem ( $Y$ ) would not increase. The result of t-test showed that the variable of income had negative and insignificant influence on the management of Lake Toba ecosystem which indicated that the amount of income of the respondents and the stakeholders did not have any influence on the capacity of managing Lake Toba ecosystem.
3. The variable of social relationship (conflict) ( $X_3$ ) had positive but insignificant influence on the capacity of managing ecosystem ( $Y$ ). It could be seen from the significant value ( $0.434$ )  $> 0.05$  and the value of  $t_{\text{count}}$  ( $0.783$ )  $< t_{\text{table}}$  ( $2.77645$ ) which indicated that if social relationship (conflict) ( $X_3$ ) increased, the capacity of managing ecosystem ( $Y$ ) would not increase. The result of t-test showed that conflict had positive but insignificant influence on the capacity of managing the ecosystem. It indicated that the extent of conflict existed among the people and the stakeholders in Samosir Regency did not have any influence on the capacity of managing ecosystem.
4. The variable of environmental ethics ( $X_4$ ) had negative and insignificant influence on the capacity of managing ecosystem ( $Y$ ). It could be seen from the significance value ( $0.896$ )  $> 0.05$  and the value of  $t_{\text{count}}$  ( $-0.131$ )  $< t_{\text{table}}$  ( $2.77645$ ) which indicated that if environmental ethics ( $X_4$ ) increased, the capacity of managing



ecosystem (Y) would not increase. The result of t-test showed that environmental ethics had negative and insignificant influence on the capacity of managing ecosystem. This result indicated that the extent of environmental ethics of the respondents in the vicinity of Lake Toba ecosystem did not have any influence on the capacity of managing Lake Toba ecosystem.

#### ***D. Strategy in Increasing the Capacity of Managing Lake Toba Ecosystem, based on Integrated Management Strategy***

By considering internal and external environmental factors, a strategy was determined as follows:

- Performing people empowerment in carrying out the conservation of forest, land, and water to create environmental-based tourism.
- Maintaining and developing Batakese art and culture as a tourism package in receiving tourists.
- Organizing fishery zone in Lake Toba and the other lake waters to become the area of tourism development by always maintaining its environmental conservation function.
- Increasing the production of high-ranking commodity of Samosir Regency which is known as the production of high land high-ranking commodity.
- Structuring communal (village adat) land and the use of protected forest according to the regional regulations.
- Increasing the participation of all stakeholders in implementing development according to the guidance of RT (Local Neighborhood Association) and RW (Residents Association) of Samosir Regency.
- Utilizing Lake Toba water as the source of energy and as the need for un-distilled water.
- Collaborating with all Subdistrict Administrations surrounding Lake Toba, the Provincial Administration, investors, and Batakese emigrants.

#### **CONCLUSION**

1. The position and the role of the Batakese traditional wisdom in Samosir Regency in managing natural and environmental resources gradually disappear from the community.
2. Environmental ethics is seen from its indicators that the earth which has limited source of supply, environmental damages, and degradation in human health should be reconsidered. We should understand and cooperate with nature, and we should not think that we are more superior than nature. Recycling and using natural resources should be done in order to prevent from the use up of resources which is regarded as good category.
3. People have had bad perception on the condition of environmental damage and pollution in the area of Lake Toba ecosystem. They think that the utility of natural resources in the research location is by damaging environment. It seems that the use of the lake ecosystem is by damaging rather than by using it for forest and agricultural resources.
4. The capacity of the local people and the government in managing Lake Toba ecosystem can be categorized as moderate.
5. The variable of the level of education has positive and significant influence on the capacity of managing ecosystem.
6. The variable of income has negative and insignificant influence on the capacity of managing ecosystem.
7. The variable of environmental ethics has positive but insignificant influence on the capacity of managing ecosystem (Y).
8. The variable of social conflict ( $X_4$ ) has negative and insignificant influence on the capacity of managing ecosystem (Y).

#### **RECOMMENDATION**

1. To increase the capacity of the people and the government in Samosir Regency in managing the area of Lake Toba by providing training related to sustainable development and tourism service.

2. To empower people in conserving forest, land, and water by getting support from the Provincial Administration, foreign countries, and stakeholders.
3. To structure fishery zone in Lake Toba waters by always maintaining its environmental conserving function.
4. To increase collaboration among all Subdistrict Administrations in conserving Lake Toba area.
5. To increase SDM (human resources) by improving educational system which is the principal capital in managing Lake Toba ecosystem.

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