

The Form of Local Wisdom of Society in Maintaining the Sustainability of Forest Ecosystems in Lake Toba Region

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Abstract: The management of forest resources is heavily influenced by local wisdom owned by local society to prevent various adverse impacts on the forest and the water quality present in the lake. This research was conducted to determine the extent to which form and role of local wisdom possessed by society maintaining forest ecosystem area and water quality at local area. The research was conducted in Tuktuk Siadong Village and Tomok Parsaoran Village, Simanindo District. The method used was survey by using questionnaire as well as direct observation. Data were processed by qualitative descriptive method. The results show that local wisdom owned by society has reduced the impact of forest degradation and lakes management, although forest destruction continues throughout the year. Forms of local wisdom that can support forest management are in the form of belief, in the form of the implementation of traditional ceremonies. Ethics and rules of cutting have local beliefs. Techniques and technologies used, among others, do not use explosives, do not cut trees with a machete / ax randomly and close the floating net cages at the edge of Lake Toba, and do not dispose of waste in the lake. The results of the research provide input for the government to continue to provide assistance and counselling for the society for local wisdom owned continues to grow.

1 INTRODUCTION

Local wisdom is a form of environmental wisdom that places natural wealth for the community in a sustainable manner in social life in a place or region. (Lisdiyono, 2017). All forms of local wisdom are lived, practiced, taught and passed down from generation to generation as well as shaping patterns of human behavior towards fellow human beings. Local wisdom has an important role in maintaining and building social integrity, preventing social integrity and becoming social glue in society (Chao, 2012). Local wisdom becomes important and useful only when local societies who inherit the knowledge system accept and claim it as part of their lives. Each part of the life of the local society is wisely directed based on their knowledge system, which is useful not only in daily activities and interactions with others, but also in unexpected situations such as sudden disasters.

The value of local wisdom in the area around Lake Toba has begun to wear off; for example, the values of local wisdom of the Batak ethnic culture in

making the function of Lake Toba as the source of living water began to decline. Previously Lake Toba is known as the king of all lakes so that the society respects and maintains the quality of the water while now it is rarely done or may even have been lost and the cause is unclear. In 1996, fishery business in the waters of Lake Toba began to develop in the form of Floating Net Cages (KJA). Currently its development reaches an area of \pm 440 ha. Although the area under water only reached 0.4% of the width and allowed 1% of Lake Toba's waters, the behaviour of the society and the business community disposes of domestic waste and wastewater. (Environment Agency of North Sumatra Province, 2015).

Lake Toba region itself, when viewed by naked eye, has become a degraded area, especially the occurrence of deforestation in some places in the lake Toba including on the island of Samosir. The water quality of Lake Toba is influenced by various factors such as domestic waste or settlement, agriculture, fishery, industry, sailing and tourism, both from land (land based) and from lake activities. The main problem faced by the Lake Toba ecosystem is mainly the decline in quality as a result

of the various waste discharged into the lake causing pollution. In contrast, Lake Toba is also used as a place to dispose of various types of waste generated from agricultural activities around the Lake Toba area, nutritional waste from the remaining fish feed that is not consumed by fish that are cultivated domestic waste from settlements and hotels, and waste from industry and tourism water. Reforestation in the mountainous/hilly areas of Lake Toba serves as a water reservoir, water system, water impregnation and environmental balance and natural surroundings. Based on the results of field surveys, it is known that the society has no way to maintain the local wisdom of the area around Lake Toba so as to maintain the preservation of Lake Toba area. Therefore, research related to local wisdom around Lake Toba area needs to be done.

2 METHODOLOGY

2.1 Time and Location

This activity was held in April-May 2017 in both of Tomok Parsaroan and Tuktuk Siadong Villages located in Simanindo District, Samosir Regency, and North Sumatra Province.

2.2 Tools and Material

The tools in this research were cameras for documenting, and computers or laptops for compiling and processing data and stationery. The materials used in the research were in the form of questionnaires to collect primary data and secondary data as well as the results of previous research and literature study sources as research supporting data.

2.3 Population and Sample

The population of the subjects interviewed from Tuktuk Siadong and Tomok Parsaoran villages were 50 respondents respectively so that the total respondents were 100 people.

2.4 Data Collection

Data collection was done through interview and field observation. The research data taken was primary data and secondary data. Primary data collection was done by:

(i) Participatory observation which is data collection method used to collect research data through observation and sensing. The participatory

observation method is well suited to find out to what extent the local wisdom of the society can sustain the development of Lake Toba resource management in the society (Soehartono, I. 2005).

(ii). Deep Interview

Deep Interview or oral questionnaire is a dialogue conducted by the researcher towards the research informant. The draft question aims to ask questions that will be structured and minimize unnecessary questions in the research.

(iii). Questionnaire

The questionnaire is a structured question that is filled in by the respondent or filled by the interviewer who reads the question and then records the answer given (Sugiyono. 2007). Secondary data collection is obtained through reading sources such as books, magazines, newspapers, documents and research reports relating to research topics deemed relevant and valid to the issues researched.

2.5 Data Analysis

Descriptive analysis is used to know and analyze the data collected from the results of questionnaires, deep interviews, observations and literature studies that have been done. The local wisdom to be seen in this research is the beliefs related to the type of beliefs and the abstinence exercised by the society; ethics and rules relating to the way that the society has; techniques and technologies related to public knowledge; and practices/traditions of forest/land management related to society knowledge in utilizing medicinal plants.

3 RESULTS AND DISCUSSION

3.1 General Condition of Research Sites

Tuktuk Siadong Village is one of the parts of Simanindo District, Samosir Regency. Tuktuk Siadong village is located at an altitude of 904-2157 m above sea level. The average temperature ranges between 18° - 24° C and the land area of Tuktuk Siadong Village is 340 Ha with the lake area of 410 Ha while Tomok Parsaoran Village is located on the east side of Samosir Island just like Tuktuk Siadong Village.

Tomok Parsaoran Village is a traditional village known as the gateway and the introduction of Samosir Island. Similar to Tuktuk Village, Tomok Parsaoran Village is also included in Simanindo District, Samosir Regency which has the altitude of 810-2.157 m above sea level and its temperature

ranges between 18° - 24° C and the area of Tomok Parsaoran Village is 300 Ha. Tuktuk Siadong village, Simanindo district, lies in geographical position between 2°30 'and 2°45' LU and 98°45' and 98°55 'BT, with altitude above sea level is 931 m. The land area is 198.20, with a percentage of the total area of Samosir Regency at 13.72%. Tomok Parsaoran Village located in Simanindo District has geographical location at 20 32- 20 45'LU and 98° 50'BT so that Tomok Parsaoran is the gate located beside the east of Samosir Island (Regional Regulation of Toba Samosir Regency, 2001)

3.2 Population Composition

The people living in Tomok Parsaoran Village has an area of approximately 8 KM² of the population living in this village is 1,399 people from 292 HH with details of 682 men and 717 women with a population density of 174 persons/Km². The population living in the village of Tuktuk Siadong has an area of about 9.3 Km². There are 1941 people living in this village from 367 HH with details of 960 men and 1001 women with a population density of 265 people/Km².

3.3 Form of Local Wisdom

3.3.1 Belief and/or Abstinence

Tradition and belief are the traditions and beliefs of Batak Toba. It can be seen from the behavior and attitude of Tuktuk Siadong and Tomok Parsaoran Village villagers by speaking Batak Toba in everyday life and customs applied. Religions adopted by the people are Protestant, Catholic, and Islam. The tradition that is still run by Tuktuk Siadong and Tomok Parsaoran villages up to now is

in the form of certain traditional ceremonies that are still performed at certain times or periods with certain purposes such as ceremonies of death, marriage and thanksgiving of crops and religious ceremonies. Several custom and religious ceremonies are also held in Tuktuk Siadong Village and Tomok Parsaoran Village by looking at Table 1.

From Table 1 it can be seen that there are 4 traditional ceremonies that are still carried out by the people in TuktukSiadong Village and TomokParsaoran Village namely Manulangi ceremony, Mambosuri Boru, Marhajabuan and Hamatean. Manulangi ceremony is especially done to the parents when they step on the age of the elderly or enter a critical period in a disease. The purpose of the ceremony is to strengthen family relationships between families.

The ceremony of mambosuriboru is a traditional ceremony that is still held until now. The ceremony is believed to keep a woman who is pregnant from all things that are not good and the child who was conceived will be born safely. Marhajabuan is a traditional ceremony involving all villagers and close relatives. Society involvement is a mirror which states that the nature of society cannot be separated from one another. The high level of society dependence with each other is still a good picture because the attitude of mutual cooperation or togetherness still exists even though it is not as tight as in the days of the ancestors. Marhajabuan is a traditional ceremony held to celebrate marriage between women and men as well as paying customary debt. Hamatean is the most often performed traditional ceremony because this ceremony is a ceremony for death. Batak custom ceremony is tailored to the family whether made with a drum or in a simple way.

Table 1. Table of Traditional Ceremonies

No	Traditional Ceremony	Society Involvement	Time	Purpose
1	Manulangi	All family	Elderly	A ceremony that the society acknowledges with their children and grandchildren feed their favorite food in the hope that they will always be healthy
2	MambosuriBoru	Close Family	When a woman is 7 months pregnant	So that children born later can be healthy.
3	Mangharoan	All family	2 weeks after the birth of the baby	A traditional ceremony to welcome the baby
4	Marhajabuan	All society and family	When someone is going to start a new household	A ceremony that is expected for both bride and groom to be happy
5	Hamatean	All society and family	When someone dies	A traditional ceremony made if someone <i>issaurmatua, sarimatua.</i>

3.3.2 Society Dependency on Forests

The distance between Tuktuk Siadong and Tomok Parsaoran villages with forests is about 1-3 Km making the people live around the forest have a dependence on forests. Forests as natural resources become a place of dependence to fulfill basic needs and survive for generations for people live within or adjacent to the forest. Several studies show that forest products contribute significantly to rural household income, including poverty alleviation. (Angelsen, 2014). Several studies (Central Bureau of Statistics of Samosir Regency, 2010), (Aung, 2014), (Chao, 2012) highlight the significant contributions of forest products to the income of rural households, including the alleviation of poverty. This has made Tuktuk Siadong and Tomok Parsaoran villagers become very dependent on local agricultural produce, trade etc. Due to the very high dependence of the society on agricultural land, the society must also pay attention to the sustainability aspects of forests to continue to obtain non-timber and timber forest products such as frankincense, teak, honey and other local timber.

Utilization of forest products is by a board or *broti* to build a house or cottage. At present Indonesia must be able to see its forest potential through a different perspective which implies that the forest does not only provide wood. Intangible benefits in the form of forest environmental services provide such as, protection of agricultural land and live stock from their effects weather or carbon sequestration, watershed control, social and cultural benefits obtained from production these goods and services (Latifa, 2011). Other forest products utilized by the society are humus, medicinal plants, firewood, wild pigs, bamboo, and rattan. The most common types of forest products are humus and bamboo. Bamboo taken is used to make crafts such as baskets and souvenirs.

3.3.3 Ethics and Rules

The level of dependence of the people around the forest is very high on life both in economic and ecological terms. This will obviously encourage villagers to keep the forest down until it declines. Villages have customary restrictions on forests that allow society to safeguard their forests. Societies are well aware that logging activities not only damage the environment, but also affect their acquisition of forest products and Lake Tabatha hereditary hunting activity is still done in the forest area, but the society still pays attention to the applicable environmental

ethics. Ethics that apply is not to hunt all types of animals that exist in the forest but the main animal being hunted is the animal that becomes the main pest for agriculture like wild boar and monkey.

Villagers realize that catching fish around Danu Toba area by poisoning or using bombs is not the right way. Societies are aware that it will damage the environment and will be detrimental to their lives over a long period of time. Local knowledge owned by Tuktuk Siadong and Tomok Parsaoran villages indirectly has a positive impact on the existence of forests and their environment. Many places around the world where people are very dependent on ecosystem services for their livelihoods and welfare are areas of biodiversity in the tropics, where the livelihood strategies of the poor include several activities (Johannesen. 2006).

Sardjono argues that studying local wisdom can give us insight into how indigenous peoples living in adjacent forest areas treat available forest resources and be able to act in accordance with their local knowledge so that forest sustainability can continue to be utilized until future generations (Sardjono, 2004)

The migrant society in Lake Toba area pays more attention to the surrounding area, either from the water quality, the local forest ecology or the environment. Migrant societies are more aware of the cleanliness, ecological conditions and social and economic functions of the local area than the indigenous peoples. It is the migrants who invite and give examples for indigenous peoples to pay attention to the condition and function of Lake Toba Area from water quality and its forest function.

3.3.4 Techniques and Technology

Most societies have livelihoods as Farmers, Traders and Guides, both indigenous and immigrant societies. The techniques undertaken by indigenous people for the sustainability of the area around Lake Toba are still relatively low and not satisfactory because the local society does not really understand the importance of the sustainability of Lake Toba, in contrast to the immigrant societies in Tuktuk Siadong Village and Tomok Parsaoran Village.

Immigrants and the government shut down all floating net cages in the waters of Lake Toba although this has left some local people lost their jobs and livelihoods but it is indispensable to make Lake Toba one of the largest tourism destinations. Indigenous people maintain the area of Lake Toba as reported to the Environment Agency in the event of contamination such as the existence of black leech

waste makes the area smell unpleasant, the reduction of fish catch and the number of people who throw garbage carelessly. (Sundawati and Lanudin. 2009)

3.4 Practices and Traditions for Maintaining Lake Toba Area

Native societies more often do not maintain the water quality of Lake Toba. It is seen with the amount of garbage that is in the edge of Lake Toba whether it is organic waste or non-organic waste, while the immigrant society knows a lot about the positive impacts and negative impacts of Lake Toba. Some of the migrant society respondents have knowledge that Lake Toba water is very good for Hydrilla as aquatic vegetation species that can keep Lake Toba area, water catchment area for area conservation, for water needs and as an international tourism destination.

3.5 Impact of Implementing Local Knowledge

Local knowledge of the society has an impact on the economic, social, and environmental aspects. Viewed from the economic aspect, the livelihoods in Tuktuk Siadong and Tomok Parsaoran villages are trading, but the livelihood is mostly as a farmer with 291 people and Private Employment is the second largest work (287 people). Farmers in this area usually grows rice, corn, vegetables and beans in their fields. The plant is grown in a medium number and usually only in own consumption and the rest is sold to neighbors or traditional markets.

Local knowledge owned by the society also has a positive impact on the social aspects of society. Local knowledge of the society encourages awareness of the sustainability of the forest and Lake Toba area related to the sustainable use of natural resources. In the current era of modernization with the entry of various knowledge and western technologies such as television, satellite dish and even cellular phone makes the outer information flow cannot be prevented.

The introduction of various external information resulted in changes in the lifestyles of the society seen from some homes that are no longer characterized by traditional houses with bamboo walls and roofed fibers, but the influence of the modernization of houses have begun to use concrete walls and roofed tile. There is a belief that they call "Mulajadi Na Bolon". Mulajadi Na bolon or also called the village guard is the ancestral spirit in the form of a stone that is respected by the people of

Tuktuk Siadong Village and Tomok Parsaoran Village.

Local knowledge of the society about medicinal plants also affects the social life of the society. Based on the results of interviews conducted, people who are smart to make traditional medicine are still needed in the village. Because medicinal plants that have very efficacious properties, the potential to be passed on to future generations is greater. Local knowledge of the society regarding the use of forest resources, in addition to having a positive impact on forests, also has a negative impact. Positive impact is society encouragement to keep the forest sustainability. However, due to the lack of awareness of some of the indigenous people on the importance of forest functions and the high economic demands make some people clear forest land into agricultural land. This certainly has an adverse impact on the balance of the environment so it is very important to do counseling.

4 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

Forms of local wisdom still exist in Tuktuk Siadong Village and Tomok Parsaoran Village in maintaining forest area and Lake Toba. This is evident from the beliefs that are undertaken every year, the existence of ethics and rules that are still in the form of a restriction on logging from protected forests, the existence of techniques and technologies such as prohibition not to dispose of waste arbitrarily, and practices and traditions to maintain the area of Lake Toba. The application of local knowledge applied by indigenous societies and migrants influences social aspects, economic aspects and interrelated environmental aspects.

The community has the role of local wisdom in safeguarding forest ecosystems is the diversity of patterns of adaptation to the environment that exists in Indonesian society bequeathed from generation to generation to guide the use of natural resources. Public awareness to conserve the environment can effectively grow through local knowledge and cultural approaches.

The level of awareness of migrant societies in the economic, social and cultural aspects is more concerned with the environment and the natural environment than the indigenous people.

4.2 Suggestions

This study suggests that training activities and extension programs such as tree-based intercropping as agroforestry with multipurpose tree species because the community prefers. Local wisdom plays an important role in forest management so that local wisdom owned by the people of Tuktuk Siadong Village and Tomok Parsaoran Village so it is very necessary to be maintained and developed but it also requires assistance from the government

The government should build customary institutions that are tasked to regulate and control forest and limit excessive society interaction to forests

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REFERENCES

- Angelsen, A., P. Jagger, R. Babigumira. 2014 "Environmental income and rural livelihoods: a global-comparative analysis," *World Development*, vol. 64, no. 1, pp. S12–S28.
- Aung, P.S; Y. O. Adam, J. Pretzsch, and R. Peters, 2015. "Distribution of forest income among rural households: A case study from Natma Taung national park, Myanmar," *Forests, Trees and Livelihoods*, vol. 24, no. 3, pp. 190–201.
- Chao,S. 2012.Forest peoples: Numbers across the world, Peoples Program
- Central Bureau of Statistics of Samosir Regency. 2010. Samosir in Figures 2010. Samosir District (ID): Central Bureau of Statistics of Samosir Regency
- Environment Agency of North Sumatra Province, 2015.
- Johannesen A. B. 2006. Designing integrated conservation and development projects (ICDPs): Illegal hunting, wildlife conservation, and the welfare of the local people. *Environ. Dev. Econ.* 11, 247–26710.1017/S1355770X05002792
- Latifah, S., Muhdi, Agus, P., and Etika, T. 2018. Estimation of above ground tree biomass *Toona sureni* and *Coffea arabica* in agroforestry system of Simalungun, North Sumatra, Indonesia', *Journal BIODIVERSITAS*. 19 (2) [Online]. Available at: <http://biodiversitas.mipa.uns.ac.id/D/D1902/D190239> (Accessed, 23 Mei 2018)
- Lisdiyono, E. .2017. Exploring The Strength Of Local Wisdom In Efforts To Ensure The Environmental Sustainability. *International Journal of Civil Engineering and Technology (IJCIET)*. Volume 8, Issue 11, pp. 340–347
- Regional Regulation of Toba Samosir Regency. 2001. about Toba Samosir Regional Development Program Year 2001-2005.
- Sardonic, MA. 2004. Sociological Mosaic of Forestry: Local Communities, Politics, and resource sustainability. Press Debut. Yogyakarta.
- Sianturi, T. 2004. Degradation of Lake Toba. *Journal of Agriculture. Field*
- Soehartono, I. 2005. Social Research Methods. PT RemajaRosdakarya.Bandung.
- Sugiyono. 2007. Educational Research Methodology. Bandung. Alfa beta
- Sundawati dan Lanudin. 2009. Stakeholder analysis on ecosystem restoration of Lake Toba Catchment Area.JMHT, 115(3):102-108 and Resource Sustainability.PressDebut. Yogyakarta