



Local Wisdom Based Water Resources Conservation for Environmental Sustainability

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Abstract

The purpose of this research is about to find out how the society's local wisdom of Lempur, Gunung Raya sub-district conserve water resources. Data and information were taken from interview and observation of river condition by observing its pH and transparency. This research adopts descriptive qualitative approach. The informants of this research were the leaders of custom Lekok Lima Puluh Tumbi Lempur and Village government of Lempur. The data were collected by taking the sample of river water quality, interview, and documentation. The data were analyzed by using interactive model concept proposed by Miles and Huberman (reduction, display, and verification). In general, the results of this research showed that local wisdom such as the customary law have not been implemented well yet. Based on the test of pollution parameter, it was found that the condition of waters did not achieve the level of danger yet because the level of pH is 7. It is expected that the society keep local wisdom in conserving water resources to make those water resources conserved well.

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1. Introduction

Water is an absolute natural resource which is needed by living things and their habitat environment. Besides, water is a living substance where no living thing can live without the presence of water (Suripin, 2002; Hidayati, 2016). The water used by human comes of various water sources, such as rain water, surface water and ground (Sudarmadji, 2016). Freshwater habitat occupies a relatively small area on the surface of the earth compared to marine and terrestrial habitats but this habitat has a much greater importance for humans because freshwater habitat is a practical and inexpensive source of water for various purposes, both domestic, domestic, and industrial. In addition freshwater ecosystems offer an adequate and cheapest disposal system (Odum, 1993).

One important part of ecology related to water resources is river. River is a natural phenomenon that is formed naturally. The river has many functions such as reservoirs, storage for the availability of irrigation water, and sources of drinking water for the community. The river is a form of aquatic ecosystem that has an important role in the hydrological cycle and

serves as a catchment area for the surrounding area, watershed, or drainage basin (Sudaryono, 2002).

Local wisdom can be defined as local knowledge, local intelligence (local genius), and local policy (local wisdom). Local wisdom can be understood also as an idea or local ideas that are wise, wise, have good values in the local community. Law of the Republic of Indonesia number 32 year 2009 concerning environmental protection and management is interpreted to be noble values which are in the life order of the community. This value is used to protect and manage the environment to be sustainable. Local wisdom takes the form of values, etiquette and morals, and norms to guide community attitudes and behavior to protect water resources (Siswadi et al., 2011). One example of local wisdom is the customary rules made by a region's customary institutions to protect the customary forest ecosystems and water resources.

Based on the results of the author's interview with the leaders of the 50 Tumbi Lekok Traditional Institution some time ago in Lempur, Gunung Raya District, Kerinci District, the headwaters of the river are strictly forbidden to be disturbed, let alone to be exploited and polluted. Therefore, the local customary institution has decided to make a prohibition to exploit the area around the headwaters and also the customary forest. This rule was made to protect the upstream, middle and downstream water and customary forests. Likewise, what applies in the Rano Village community of Balaesang Tanjung District in Donggala Regency, local wisdom regarding tree felling must be in accordance with Adat Topomaradia provisions (Ariyanto et al., 2014).

Water and local wisdom are very valuable assets so they must remain sustainable. This is based on decreasing water availability and increasing water demand and water quality which is also getting lower. In the Gunung Kidul area of Yogyakarta, for example, local people's wisdom in managing Ngloro lake water resources. Local people consume lake water for various purposes (Sulastriyono, 2009).

Decrease in river water quality cannot be separated from the role of the community in maintaining environmental conditions around the river. What if the community does not protect the environment around the river, the water quality will decrease. Low public awareness and knowledge about how to protect the environment around waters has been a factor in the decline in water quality. This is because rivers that function as bathing, washing as well as serving as a lavatory, household waste disposal and industrial waste disposal cause

environmental sanitation to decrease as happened in the Kupang River in the city of Pekalongan. The decline in the quality of the Kupang River water is caused by industrial waste, agricultural waste and domestic waste. The development of industries and settlements along the Kupang river flow has affected river water quality. The decline in quality occurs from upstream to downstream of the Kupang River (Pohan, 2016).

Therefore, one way to find out whether the water that is in the upstream, middle and downstream of the river is in good and clean condition is by conducting a water quality test. Some methods in conducting this water quality test are by testing pollutant parameters that have exceeded the quality standard by using physical, chemical and biological parameters (Effendi, 2003). Based on the description above, it is necessary to conduct an assessment of the local wisdom of the community to manage water resources and monitor water quality in the local area. The purpose of this study is to determine the local wisdom of the community in preserving water resources and their implementation and to determine the quality of local river water.

2. Method

This research was conducted in the Lempur area of Gunung Raya Sub-District, Kerinci District. The sampling technique is done by using purposive sampling method. The research informants consisted of the Lekok Lima Puluh Tumbi Lempur Customary Figures who had the authority to enforce customary rules on local wisdom in the Lempur area and the Village Government of the Lempur area. This research belongs to the type of descriptive qualitative research. Data collection techniques carried out as it follows: 1) sampling of river water quality in the upstream, middle and downstream; 2) observation; 3) interview; and 4) documentation. Data analysis technique refers to the interactive model concept proposed by Miles and Huberman (1994), namely the classification of data analysis in three steps (reduction, display, and verification).

3. Results and Discussion

3.1 Overview of Research Setting

Gunung Raya Sub-District is an area with a plain topography with a geographical location of 890 m above sea level. In the north it is bordered by Keliling Danau Sub-District, in the east it is bordered by Batang Merangin Sub-District, in the south it is bordered by Merangin

District, in the west it is bordered by Bengkulu Province. Gunung Raya sub-district has an area of 74,385 ha or 19.53% of the area of Kerinci District of 380,850 ha with an altitude between 950-1,200 m above sea level with a tropical climate with an average temperature of 21,12⁰C.

Gunung Raya Sub-district has 18 villages and Lempur Village is the sub-district capital. Nearly 78% of the mountain highway is a rice field and Cassiavera plantation area and the rest is a residential area and has beautiful tourist attractions such as Lake Lingkat, Lake Kaco, Lake Duo and Geothermal. This pristine lake is located on the edge of the forest of Kerinci Seblat National Park, which is adjacent to Lempur Mudik Village with an area of ± 12 ha at an altitude of 1,100 m above sea level (Source: BPS 2014).

3.2 The Result of Water Quality Test

Test results on water quality using physical and chemical parameters such as the level of clarity and pH of water show that water is still relatively clear because the bottom is still clearly visible. The brightness of waters signifies the process of assimilation in water and helps to find out which layers of water are turbid and not turbid.

Table 1. Brightness and pH of river water in Lempur

Section	Brightness	Degree of acid (pH)
Upstream	65	7.4
Middle of the river	87	7.4
Downstream of the river	150	7.5

If the brightness value of a water is low during normal weather, it indicates that there are particles suspended in these waters (Hamuna et al., 2018). The average pH of water is also not much different from the normal pH of water which is 7. The value of the degree of acidity (pH) of water consumed as drinking water must not be acidic or basic. Pure water has a pH of 7 (Sasongko et al., 2014). This is also evidence that the condition of the waters in the Lempur area is not yet at an alarming level. Therefore, policies to maintain the preservation of these water resources so that they can continue to be utilized by the nation's successors.

3.3 Overview of the Community in the Lempur Area

Society can be interpreted as a community that inhabits an area. Society is a form of network of relationships between individuals who are the main subjects of social science studies. The community plays a role in protecting the environment sustainably, especially water resources. Tribal people are referred to as people with traditional way of life in rural

areas, which are far from modern technology and are known as indigenous communities or customary law communities, indigenous people or traditional communities (Dasmaan in Suhartini, 2009). Likewise in managing the environment, traditional communities will apply customary law.

Communities in the Lempur area of Gunung raya sub-district are traditional communities that still adhere to traditional rules and laws. The majority of the people work as farmers and others work as civil servants and entrepreneurs. Talking about the level of education of the people in Lempur, especially for formal education at school, the majority of the population attends education through high school and only a small proportion are graduates of tertiary education. Some people also do not take formal education, they only learn the Koran and study religion in the surau-surau.

The existence of water has a multipurpose role, as a source of drinking water for consumption, irrigating agricultural land and also place for bathing, washing as well as serving as a lavatory by the community. Regarding water quality, public toilets activities carried out by the community in rivers can cause river water quality to decrease. Chemical waste from detergents and soap can cause the frequency of biota that lives in rivers to decrease. In the Lempur area, people are still doing bathing, washing as well as serving as a lavatory activities on the river. This is illustrated by the author's direct observation on the banks of the Batang Lempur river (Figure 1).



Figure 1. River as a place for bathing, washing as well as serving as a lavatory (Source: Private Collection)

The majority of the community throws trash in the river bank. Some reasons for people in the Lempur area to dispose of garbage around the river, is the unavailability of trash bins in their homes and also around settlements so that people prefer to dispose of garbage on the

banks of the river (Figure 2). The community also dumps household waste into rivers because there is no sewage management system or waste collection in their homes.



Figure 2. Pile of Garbage around the River Bank (Source: Private Collection)

3.4 Water Condition

Water is the substance that forms the basis of life on earth. Organisms are composed of components with water as the dominant constituent. There are three physical forms of water that are made up of liquid, gas and solid. This is because this abundance of water is the basis of life on earth. Ecologist Lawrence Henderson highlights the importance of water for life. While acknowledging living organisms to adapt to their environment through natural selection, Henderson stressed that the environment must be suitable for habitation in order for life to take place (Campbell et al., 2012).

Our ancestors actually have inherited a variety of local wisdom that is used as a guide for attitudes and behavior in interacting with nature and the environment. Empirically local wisdom has succeeded in preventing damage to environmental functions, both land / land, forests, and water. Local wisdom is the root and basis and is a form of community behavior in managing and protecting the environment wisely (Sufia et al., 2016). As is the case for hereditary habits inherited in the form of customary rules in the Lempur area so that water resources are maintained. In fact, the implementation of the rules to protect the waters has not been implemented well. This can be caused by the community's lack of understanding of the existing rules. Law Number 7 of 2004 concerning Water Resources regulates the provisions concerning Conservation of Water Resources, Utilization of Water Resources Utilization and Water Damage Control.

Increasing the population, resulting in increased waste disposal into rivers. This happens because of low public awareness who deliberately throw garbage into the sea or deliberately compact the trash using land and sand, especially around the river flow. As a result of these conditions, the river conditions in the Lempur area cannot yet be stated as good but the observations of pH water shown that 7.4-7.5 and brightness can be seen that the water conditions are still not at a hazard level. The water source in Lempur has not been properly maintained yet. The impact of community habits that make the condition of water sources is not maintained. Likewise, people who still dispose of waste around water areas. Have a measure of the pH of the water, and also by observing the level of water brightness. According to the Head of Desa Baru Lempur (2016), community activities cause the condition of water sources to be not well maintained. The presence of waste have negative effect on water quality, so that monitoring of water quality must be carried out sustainably by using various pollution parameters (Kapelewska et al., 2019). The water that contaminated like toxic metals, coliforms as well as other organic and inorganic pollutants can cause a risk to human health conditions and can even cause death (Hasan et al., 2019; Noreen et al., 2019).

Drinking water is water that is consumed by humans. The Ministry of Health of the Republic of Indonesia (2002) states that drinking water requirements include, tasteless, odorless, colorless, does not contain harmful microbes, and does not contain heavy metals. Drinking water can be processed or not in accordance with the stated drinking water requirements so that the water can be consumed (Minister of Health Decree Number 907 of 2002). The people in Lempur do not use river water as drinking water but they only use it for bathing, washing as well as serving as a lavatory activities. For drinking water, most people consume water from water corporation as drinking water.

3.5 Local Wisdom

Local wisdom is the intelligence and management strategies of the universe in maintaining ecological balance, termed local genius in the form of knowledge or ideas, customary norms, cultural values, activities, and equipment as a result of the abstraction of managing the environment (Wahono, 2005). Local genius is a term that was first introduced by Quaritch Wales. Anthropologists discuss at length the notion of local genius (Ayatrohaedi, 1986). Local wisdom is a form of Indonesian cultural heritage. Local wisdom or traditional knowledges as an epistemological system which includes a close relationship between knowledge, residence and spiritual (Davis, 2006; Remington, 2018).

Aside from being a character of a community, local wisdom becomes an effort in environmental management, including water. Water resources are important for people and ecosystems. Humans are very dependent on water resources for many purposes such as energy, recreation, industry and most importantly for agriculture (Lomsadze et al., 2017). Water resources greatly affect the productivity of irrigation water for agriculture (Hadizadeh, et al., 2018). From observational and interview data, in Lempur area according to traditional rules that apply for generations strictly forbid the community to exploit the area around the waters, especially in the Ulu Ayei (upstream / river). If the headwaters of the river have been damaged or polluted, the water quality along the river will also decrease.

The community understands local wisdom as an effort to preserve the environment, especially water resources. From the writer's observation, few people understand that. Most of the Depati (one of the local traditional titles) and older people who know about customary rules to preserve the environment, especially water resources. The local wisdom of the people, especially for the management of water resources in Lempur, has been passed down from generation to generation since their ancestors. Until now, local wisdom is still there and maintained. In general, the majority of young people are less interested in knowing and learning the traditional rules that have been passed down for generations. They tend to be apathetic about this, so the elders and traditional leaders are a bit pessimistic and afraid when these rules will disappear in the future. Ferry (2017) argues that local wisdom is very important to be passed on to each generation. In Keluru Village, Keliling Danau sub-district, Kerinci District, for example, the existence of local wisdom plays an important role in protecting the Temedak Traditional Forest of Keluru Village.

From the findings it is known that customary rules have been made but have not been properly applied, due to lack of socialization about the rules. If there are people who break the rules, they will be given strict sanctions. For example, a community who spread potassium poison to catch fish in a river in a proven event. The traditional leader gave him a fine in the form of a buffalo. That is proof that the Lempur community still upholds the applicable customary law which is a manifestation of the local wisdom of the community. The same thing was done by the Osing indigenous people in Banyuwangi, East Java. In order to keep the water flowing constant, they protect the trees and plants around spring (Belik), both *belik lanang* and *belik wadon*. The Osing indigenous people inherit local wisdom in the form of values, ethics and norms as guidelines for attitudes to respect nature (Sumarmi, 2015). Local

wisdom is justified by many scientific studies, because scientific research can provide answers to important problems faced by the community. This can be effective in order to trigger a sustainable growth system where the economy is aligned with ecology (Kakoty, 2018).

The local wisdom also influences the overall sustainability of natural ecosystems. Humans can conserve ecosystem by reducing or eliminating waste and pollutants to protect water resources from generation to generation (Patten, 2016; Kevany et al., 2013). Therefore, local wisdom has an important role in solving problems, especially water resources management so that it is natural for the community to continue to preserve it.

4. Conclusion

Based on this research, we can draw a conclusion about the local wisdom of Lempur people in managing water resources which are: (1) local wisdom for the management of water resources in Lempur already exists and has been passed down from generation to generation in the form of adat rules, but has not been implemented properly; (2) Communities that violate customary rules in exploiting nature, especially water resources, will be subject to sanctions in accordance with the types of violations; (3) River water quality in the clay region of Gunung Raya Sub-District of Kerinci District has not reached an alarming level as evidenced by the level of brightness and pH value of water 7.

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