

# Merti Kali: River Conservation Based on Local Wisdom

Dony D Hadiputro<sup>1,\*</sup>, Yuli Handayani<sup>2</sup>, Joesron Ali Syahbana<sup>3</sup>

<sup>1, 2, 3</sup> Diponegoro University

\*Corresponding author. Email: [dony.dwihp@gmail.com](mailto:dony.dwihp@gmail.com)

## ABSTRACT

Merti Kali is an activity to clean and maintain rivers in the Yogyakarta Special Region that aims to preserve the watershed. This research aims to examine how much Merti Kali's activities affect the river pollution index and public health. A descriptive qualitative design was utilized, and the data were obtained from interviews with the Yogyakarta Province Environment and Forestry Service and other secondary sources. The results of the analysis demonstrated that while the activities of Merti Kali did not affect the river pollution index, they, however, transformed the health level of the river community. As the locations of Merti Kali activities increased in 2016, there has been a decrease in the number of dengue cases. There is still a need for the role of the Regional Government to raise awareness among business actors who dispose of their waste into rivers.

**Keywords:** *Merti Kali, Environment, Local Wisdom, Yogyakarta*

## 1. INTRODUCTION

The social efforts to reestablish and keep up with biodiversity is significant and should be predictable in the long haul. Improvement in financial conditions and human government assistance is indistinguishable from the administration of existing normal assets and the other way around, the terrible effect that will be felt by people because of helpless administration of regular assets. Water is a bountiful normal asset on this planet and is the primary segment for all animals [1].

Soil and water preservation is a work to ensure, reestablish, improve, and keep up with the capacity of land ashore by the abilities and distribution of the land to help practical turn of events and feasible living. The execution of soil and water protection should be founded on participatory standards, combination, balance, equity, advantage, neighborhood insight, and supports [2].

Neighborhood astuteness is something imperative that should be considered to help ecological assurance and the executive exercises [3]. Neighborhood intelligence can be perceived as a human exertion by utilizing perception to act and act towards something, item, or occasion that happens in a specific space [4]. Nearby shrewdness (neighborhood virtuoso) is a reality that has generally been set up in a space; it is a mix of the heavenly upsides of God's statement and the different qualities that exist [5]. The Law on Environmental Protection and Management states that ecological administration and upkeep exercises should be incorporated with nearby intelligence that focuses on the conservation of normal assets, government assistance, populace, and the natural states of the space

in its arranging, usage, control, upkeep, oversight, and law authorization exercises [6].

The increase in population has triggered environmental and health problems. The problem that occurs in many regions in Indonesia, including Yogyakarta, is the problem of waste. This environmental problem is serious and must be resolved immediately. As is known, since the last few years the condition of the Winongo River has seriously degraded its environmental quality. This is marked by the narrowing of the river body due to pressure from settlements, poor water quality due to contamination from household waste, both liquid and solid, and the loss of most of the aquatic flora and fauna that characterize river ecosystems [7].

Solid waste should be placed in trash cans, while liquid waste is disposed of in special containers, such as septic tanks or wastewater treatment plants (IPAL). Household solid and liquid waste should not be disposed of in rivers or other surface water bodies [8]. Solid waste that is stuck around the river causes puddles of water, both from river water and rainwater, which can be used as a place for Aedes mosquitoes as a vector for Dengue Hemorrhagic Fever (DHF) [9].

Merti Kali comes from the word 'petri' which in Javanese means memetri (to maintain) and kali (river), so that when the two words are put together they mean to maintain, protect, and preserve the river. The purpose of the Merti Kali activity is to raise awareness and concern for the community in maintaining and preserving the river [10].

## 2. METHOD

This research uses the descriptive qualitative method [11]. The data used are primary and secondary. Primary data are in the form of interviews with the Water and Air Pollution Control Section at the Environmental and Forestry Service of the Yogyakarta Special Region Province (DLHK Yogyakarta Province), while secondary data are the number of cases of dengue fever collected from the publication of Yogyakarta Health Profile, in addition to insights from previous research articles. The data collection method was done by interview and data analysis.

## 3. FINDINGS AND DISCUSSION

The Merti Kali activity started in 2015. In 2019, with total of 10 rivers in conservation, the activity made use of APBD and APBN funds by involving community leaders and local communities. Implementation was carried out 2 to 3 days in each river. This activity proved to reduce pollution and Dengue Hemorrhagic Fever Cases. Many other factors also affected the level of pollution, including industrial waste. Other factors affected Dengue Hemorrhagic Fever Cases, including a healthy lifestyle in the community. This is something that is not discussed in this article and is one of the causes of the increase in pollution and Dengue Hemorrhagic Fever Cases in 2019, in addition to the limited budget allocated by the government.

### 3.1 History of Merti Kali

The Merti Kali activity is an implementation of Law Number 32 of 2009 concerning Environmental Protection and Management in Article 13 which states that control of environmental pollution and/or damage is carried out in the framework of preserving environmental functions. In addition, the Government Regulation Number 82 of 2001 concerning Water Quality Management and Water Pollution Control, at:

1. Article 13 paragraph 2 states that the Central Government can assign the Provincial Government concerned to monitor the quality of water at water sources;
2. Article 18 paragraph 2 states that the Provincial Government shall control water pollution in water sources that cross regencies/municipalities.

The activity of Merti Kali began in 2015 by a regional work unit in the environmental sector, namely

the Environment Agency for the Special Region of Yogyakarta, which is currently named DLHK Yogyakarta Province. In 2015 this activity was carried out in 3 rivers namely Code River, Gajah Wong River, and Winongo River. In 2016 there were 2 more rivers, namely the Yellow River and the Bedog River. In 2019, there were 5 more rivers or a total of 10 rivers, namely the Code River, the Gajah Wong River, the Winongo River, the Yellow River, the Bedog River, the Konteng River, the Tambak Bayan River, the Oyo River, the Belik River, and the Bulus River.

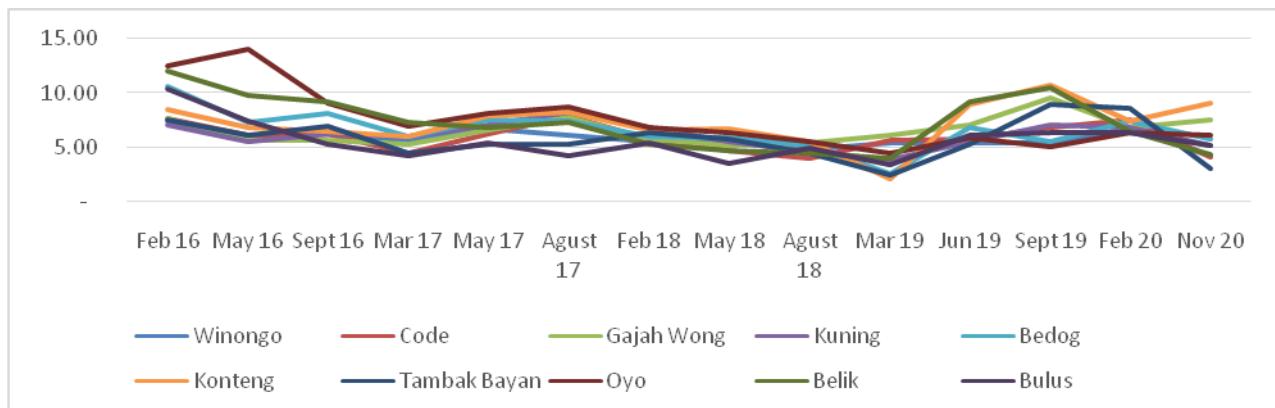
From 2015 to 2017, Merti Kali activities used special Yogyakarta funds obtained from the State Revenue and Expenditure Budget (APBN). Because of other priorities, in 2018 and 2019, this activity was funded by the Regional Budget (APBD) for the Special Region of Yogyakarta. However, in 2020, Merti Kali activities were not carried out, because the existing budget was transferred to accelerated handling of the Covid-19 pandemic.

The parties involved in this activity include DLHK Yogyakarta Province, community groups, and communities around the river. Environmental activist community groups included the Yogyakarta River Community Association (AKSY), Code Pemerti, Winongo Asri Communication Forum (FKWA), Forsidas Gajahwong, Kali Kuning Conservation Forum, Green Umbrella Forum, Sleman River Community Forum (FKSS), and other groups.

This activity was carried out once a year before the rainy season. Each time, it was carried out in 2 to 3 days at each point. This activity was carried out from upstream to downstream of the river. One of the duties of DLHK Yogyakarta Province was to coordinate schedules and community groups at each point. Merti Kali activities included:

1. Cleaning up rivers and watersheds, especially inorganic waste that cannot be decomposed;
2. Testing and mapping the water quality in each river;
3. Recording/listing the source of pollutants for each river.

Apart from cleaning the river, this activity aimed to raise awareness of the community in terms of the importance of watershed ecology.



**Figure 1. Rivers Pollution Index Test Results from 2016-2020** Resource: DLHK Yogyakarta Province

### 3.2 Merti Kali's Implementation and Impact

#### 3.2.1 Merti Kali Reduces River Water Pollution Index

DLHK Yogyakarta Province provided socialization to raise awareness of the community living around the river that the health of the community around the river starts from a clean river. Merti Kali activities, started from 2015 to 2017, used privileged funds of Yogyakarta originating from the APBN, while in 2018 and 2019 used APBD budget allocations. In 2020 Merti Kali

activities were not carried out because the budget allocation was used to accelerate the handling of the Covid-19 pandemic.

In Figure 1, it can be seen that the Pollution Index has decreased every year, with comparisons in the same month. However, in 2019 there was an increase in the pollution index; there were 4 rivers that experienced a fairly high increase in the pollution index based on the test results in June and September 2019, namely the Konteng, Belik, Gajah Wong, and Bedog rivers.

**Table 1. Pollution Index 2019 - 2020**

No	River's Name	Pollution Index 2019			Pollution Index 2020	
		March	June	September	February	November
1	Konteng	2,07	9,00	10,76	7,47	9,09
2	Tambak Bayan	2,40	5,26	8,89	8,51	3,00
3	Oyo	4,39	5,82	4,93	6,26	6,07
4	Belik	4,00	9,20	10,44	6,45	4,35
5	Bulus	3,35	6,04	6,25	6,30	5,13

Source : DLHK Yogyakarta Province, 2019, 2020

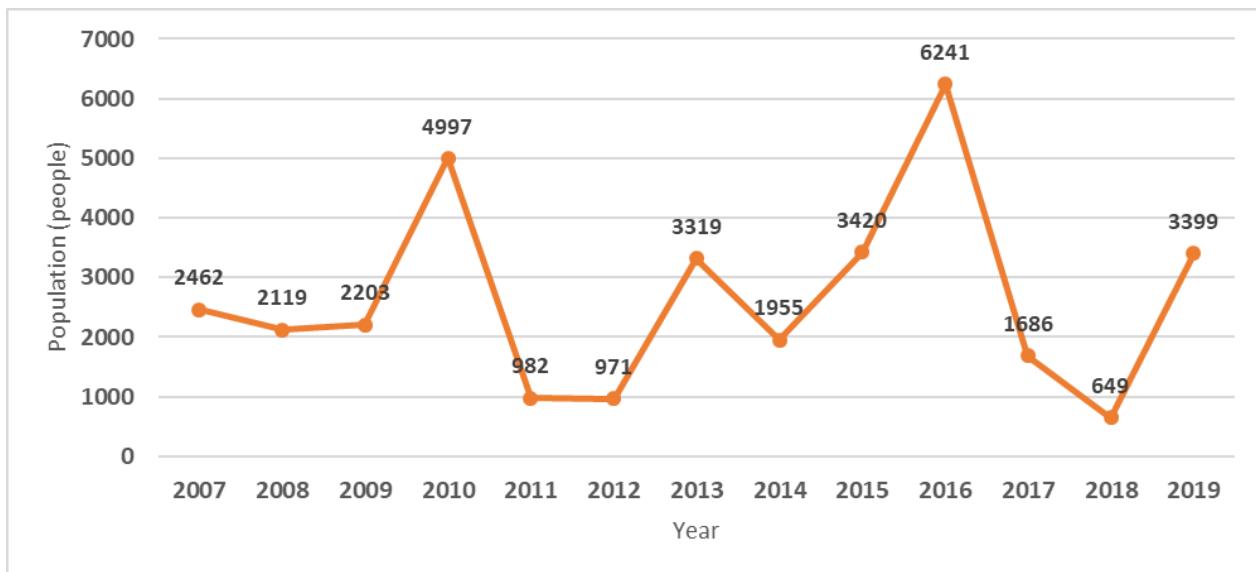
As previously explained, the Konteng River, Tambak Bayan, Oyo, Belik, and Bulus just entered the Merti Kali activities in 2019. In table 1, it can be seen that the Yogyakarta Province DLHK conducted water quality testing 3 times in 2019 and 2 times in 2020, using the method of calculating the pollution index, by the Decree of the State Minister of the Environment Number 115 of 2003 concerning Guidelines for Determining Water Quality Status. The 2019 and 2020 quality tests were carried out in different months.

The 4 rivers in table 1, namely the Konteng River, Tambak Bayan, Belik, and Bulus river pollution index figures have decreased at the end of 2020 when compared to the end of 2019. This shows that the activities of Merti Kali were quite influential on the 4 rivers.

#### 3.2.2 Merti Kali Reduces the Number of Dengue Hemorrhagic Fever Cases

Merti Kali cultural activities are a manifestation of clean and healthy living habits (PHBS). PHBS is a form of implementing a healthy paradigm in the culture of individuals, families, and communities. It contained a set of behaviors that are practiced, based on awareness as a result of learning which allowed a person or family to help themselves in the health sector and play an active role in realizing public health, including the proper household management of solid and liquid waste [8]. Furthermore, the application of PHBS was an effort to prevent Dengue Hemorrhagic Fever (DHF).

DHF is an infectious disease caused by the dengue virus which is transmitted by infected *Aedes aegypti* and *Aealbopictus* mosquitoes [12]. The cases of DBD in Yogyakarta had fluctuated annually, as seen in Figure 2 [13, 14, 15, 16, 17, 18]



**Figure 2. Number of DHF Cases in Yogyakarta Special Region 2007-2019**

In 2016, one year since the Merti Kali activities were first implemented, it appears that there has been a fairly high increase in the number of dengue cases. In the first year, it is assumed that the implementation of Merti Kali was not optimal because it had only been implemented in three rivers. As expected, the number of dengue cases will continue to decline in the following years, namely 2017 and 2018, as the number of Merti Kali locations extended to five rivers. However, in 2019 the number of dengue cases increased again. In 2019, there were 10 rivers participated in the Merti Kali activity. With this increase, it is expected that the number of dengue cases would decrease.

If Figure 1 and Figure 2 are juxtaposed, the fluctuation in the graph of the number of DHF cases from 2016 to 2019 has a pattern similar to the fluctuation in the graph of the results of the river water pollution index test. When the pollution index is high, the number of DHF cases has increased. Conversely, when the pollution index is low, the number of DHF cases has decreased. However, this relationship cannot be used as a standard for events at different times and/or locations. More in-depth research is still needed to determine this relationship.

#### 4. CONCLUSIONS AND SUGGESTIONS

The Merti Kali is an activity that fosters a communal concern for maintaining the river, to control the river pollution in the Special Region of Yogyakarta, identify the sources of pollution, and provide the solutions. Pollution in rivers were not only caused by household waste, but also by industries around the watershed, such as workshops, health services, hotels, restaurants, batik, textiles, and other industries. So, when viewed from the pollution index in the river, it seems that Merti Kali's activities have not had a significant impact in terms of decreasing the river water pollution index.

However, the increasing number of rivers participating in the Merti Kali led to a decreasing number of dengue cases in the Special Region of Yogyakarta. There were similarities in the fluctuation pattern of the river water pollution index and the fluctuation pattern of the number of DHF cases. Nonetheless, a more in-depth research is needed to determine the relationship between the two variables.

After the Covid-19 pandemic, the Merti Kali activities could be improved by optimizing existing resources, and involving the community not only to clean and maintain watersheds but also monitor the behavior of the industries and report those that do not comply with statutory regulations concerning waste disposal to DLHK Yogyakarta Province.

#### REFERENCES

- [1] Antariksa. (2009). Kearifan Lokal dalam Arsitektur Perkotaan dan Lingkungan Binaan. Seminar Nasional "Kearifan Lokal (Local Wisdom) Dalam Perencanaan Dan Perancangan Lingkungan Binaan."
- [2] Badan Pusat Statistik. (2015). *Statistik Indonesia 2015*.
- [3] Badan Pusat Statistik. (2017a). *Jumlah Kasus Penyakit 2007-2013*.
- [4] Badan Pusat Statistik. (2017b). *Statistik Indonesia 2017*.
- [5] Dinas Kesehatan Daerah Istimewa Yogyakarta. (2018). *Profil Kesehatan D.I Yogyakarta Tahun 2017*.
- [6] Dinas Kesehatan Daerah Istimewa Yogyakarta. (2019). *Profil Kesehatan D.I Yogyakarta Tahun 2018*.

- [7] Dinas Kesehatan Daerah Istimewa Yogyakarta. (2020). *Profil Kesehatan D.I Yogyakarta tahun 2019.*
- [8] DLHK Provinsi Yogyakarta. (2019). *Analisis Data Kualitas Air Sungai Tahun 2019.*
- [9] DLHK Provinsi Yogyakarta. (2020). *Analisis Data Kualitas Air Sungai Tahun 2020.*
- [10] Eni Yuniarti. (2019). *Mertikali : Menggali Budaya, Menjaga Semesta.* <http://dlhk.jogjaprov.go.id/mertikali>
- [11] Ernawi, I. S. (2010). Harmonisasi Kearifan Lokal Dalam Regulasi Penataan Ruang. *Seminar Nasional "Urban Culture, Urban Future : Harmonisasi Penataan Ruang Dan Budaya Untuk Mengoptimalkan Potensi Kota."*
- [12] Gani, H. A. (2013). Perilaku Hidup Bersih dan Sehat (PHBS) pada Masyarakat Using di Kabupaten Banyuwangi. *Jurnal IKESMA*, 9(2), 147–158.
- [13] Lambert, V. A., & Lambert, C. E. (2012). Qualitative descriptive research: An acceptable design. *Pacific Rim International Journal of Nursing Research*, 16(4), 255–256.
- [14] Maridi. (2015). Mengangkat Budaya dan Kearifan Lokal dalam Sistem Konservasi Tanah dan Air Using Culture and Local Wisdom in Soil and Water Conservation. *Seminar Nasional XII Pendidikan Biologi UNS.*
- [15] Pramudito, S., & Banon, Y. (2017). *MEMETRI KALI WINONGO.*
- [16] Qomariah, A., Setiawan, H., Purnaweni, H., & Ali Syahbana, J. (2020). Grebeg Susuk Wangan: A river conservation based on local wisdom in Gondang Village, Kendal Regency. *E3S Web of Conferences.* <https://doi.org/10.1051/e3sconf/202020206014>
- [17] Sekretariat Negara. (2009). *Undang-Undang Negara Republik Indonesia Nomor 32 tahun 2009 tentang Pengelolaan dan Perlindungan Lingkungan Hidup.*
- [18] Sekretariat Negara. (2014). *UU Nomor 37 Tahun 2014 tentang Konservasi Tanah dan Air.* <https://peraturan.bpk.go.id/Home/Details/38775/uu-no-37-tahun-2014>
- [19] Syamsul, M. (2018). Hubungan Faktor Lingkungan dengan Kejadian Demam Berdarah Dengue di kabupaten Maros Sulawesi Selatan. *UNM Environmental Journals*, 1(3), 82–85.
- [20] Woolsey, L. K. (1986). The critical incident technique: An innovative qualitative method of research. *Canadian Journal of Counselling and Psychotherapy*, 20(4).