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Sentiong Riverbank Conservation Model as a Residential Settlement Learning Resource for Elementary Schools in Central Jakarta

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Abstract

Objective: This study aims to examine the environmental conditions and causes of degradation along the Sentiong River and develop a riverbank conservation model as a contextual learning resource for elementary schools in Central Jakarta. **Novelty**: This study introduces the Sentiong Riverbank Conservation Model, integrating ecological restoration, waste management, community participation, and environmental education into a locally grounded learning resource that connects environmental conservation with students' everyday surroundings. **Methods**: A descriptive qualitative approach was employed, involving purposively selected informants. Data were collected through interviews, observations, documentation, and field notes, and analyzed through data condensation, data display, and conclusion drawing. **Results**: River degradation was associated with uncontrolled settlement expansion, inadequate sanitation, domestic waste disposal, and limited community participation. These findings informed the development of a conservation model encompassing ecological protection, sustainable waste management, community engagement, and environmental education, providing contextual learning opportunities related to river ecosystems and sustainable settlements. **Conclusion**: The Sentiong Riverbank Conservation Model offers an integrated approach to river conservation while providing a contextual learning resource to strengthen elementary students' environmental awareness and understanding of sustainable settlement practices.

Keywords: Riverbank Conservation, Community Behavior, Sentiong River.

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INTRODUCTION

Humans living in a mutually supportive environment need to interact with the environment itself and with humans who inhabit the environment we live in (Sustainable Human Settlements in the 21st Century, 2026). This can be in the form of the physical and social environment, in the form of the environment as a whole experience or those made by humans, and the cultural environment, which results in a sense of will in human beings (Sustainable Human Settlements in the 21st Century, 2026). In a way, general settlement human habitation can be grouped into two groups, namely settlements in rural areas (rural settlements) and settlements in urban areas (urban settlements) (van Vliet et al., 2020). As for the number, an increasing population means more people need land for living develop or other activities, including land for housing. Example: land. This is the land that is used for forests, cities, facilities, sports, parking, economic activities, recreation, markets, etc. Problems: this is what is related to activities, industrialization, and development (Amir, 2020). Settlements can be defined as housing or a group of houses with all elements and related activities therein (Dovey et al., 2020). Home can be interpreted as a place to take shelter from something dangerous, rest, and gather together relatives (Dekel, 2020).

The increasing demand for land has resulted in skyrocketing land prices in urban areas (Koroso et al., 2021). This is the problem currently being faced by the population living in urban areas. Rapid urbanization, not balanced with the availability land settlement this, is what causes bring up settlement seedy/unreliable in the end, bringing up social problems (Koroso et al., 2021; Isiani et al., 2021). Population a city that every day the more increased and buildings the more narrow, condition the real way as means of transportation are increasing day the more switch function as a place economy (trading), the actual gutters its intended use as place drainage the more Lots trash and finally traffic jam and cause flood. Sanitation facilities, including a place for bathing, washing, and so on, toilets (MCK), are inadequate, and especially clean water will be affecting public health (Corburn et al., 2020). The decline in the function of the physical environment has an impact on the formation of the environment as slum areas (Isiani et al., 2021).

In reality, the current population of Jakarta is experiencing an improvement; the amount is due to the very high urbanization that causes the use of land for housing, which of course must be increasingly wide, while the reality is zero. So cause resident newcomers this is what makes the use of the Sentiong River Bank a temporary residence (Koroso et al., 2021). Sentiong River Bank, as a place, should be free from human activity and, according to its intended purpose, is a track safety watercourse; finally, in a way, slowly utilized by resident newcomers as a place of residence. Cannot denied switch function The Sentiong Riverbanks are being converted to other areas for inappropriate purposes. This is what has caused the riverbank environment to become damaged due to human activity (Wahyuni et al., 2021). This environmental damage is a threat to human life. The Sentiong River, which should be a source of water for life, has instead become a threat to humans. Human needs are becoming more difficult to meet. The river, which should be used as a water source, has become a disaster for human life (Vollmer et al., 2021). One of the things that emerges from the Sentiong Riverbank is water pollution caused by garbage and household waste dumped into the river. This is what causes bad smell, changed water. The color turns black (Izzati & Hasibuan, 2025).

Environmental damage caused by activities and human activities can impact humans too (Vollmer et al., 2021).

A number of the people who live on the banks of the Sentiong River have bad behavior towards the environment in which he lives. Behavior that does not support the sustainability of the banks of the Sentiong River includes, among others, throwing away garbage or waste House stairs to this river. This misconduct can have direct consequences for the environment, especially the river itself. The situation in Jakarta is interesting to study, as Jakarta, despite being the city center and no longer the capital, has quite serious problems, one of which is polluted rivers.

Jakarta, although no longer the nation's capital, continues to develop and improve into a more advanced city, especially in the Jakarta area, especially Central Jakarta. Central Jakarta consists of 8 districts and 44 urban villages. One of the interesting districts to study is Johar Baru. Johar Baru District consists of 4 urban villages, namely: Johar Baru, Tanah Tinggi, Kampung Rawa, and Galur. Johar Baru District has an area of 2.37 km². The population/community of Johar Baru District has increased every year. According to the Central Statistics Agency (BPS), the population census data for Johar Baru District, which is carried out every 10 years, Johar Baru District experienced an increase of 0.64% in 2010-2020, which is quite high when compared to other districts. More complete data can be seen in the table 1 below

Table 1.
Total population according to Ward Based on the results of the Population Census 1990, 2000, 2010 and 2020

Ward	Resident			Growth Resident (%)	
	1990	2000	2010	2000-2010	2010-2020
New Johar	**39 197**	**34 353**	**38 003**	**-1.35**	**1.01**
Swamp Village	22 846	21 088	21 203	-0.82	0.06
Highlands	41 073	36 710	40 078	-1.15	0.82
Line	19 750	16 952	16 977	-1.57	0.18
Total number	122 866	109 103	116 261	-1.22	0.64

Source: Population Census 1990, 2000, 2010 and 2020

Johar Baru District is a district through which the Sentiong River flows. The Johar Baru area is densely populated due to its location in the city center. The Sentiong Riverbanks were not originally intended for residential use. They were intended to control the flow of water in the river and provide a water source for both sides of the river. However, the reality on the ground has not lived up to the plan. The land along the Sentiong Riverbanks in Jakarta has been built with semi-permanent houses and is no longer suitable for its intended purpose. Many non-permanent and semi-permanent houses are located along the riverbanks. Piles of garbage are visible on either side of the riverbanks, and some household waste is dumped directly into the river, creating an unpleasant odor in the surrounding area.

METHODS

This study used a descriptive method with a qualitative approach. Data were obtained from residents and important community leaders living along the Sentiong Riverbank through interviews. According to Creswell (2012), as quoted by Sugiyono (2014:347), qualitative research is the process of exploring and understanding the meaning of individual and group behavior, describing social and humanitarian issues. Data obtained in the field can then be analyzed, and after the results are explained descriptively, a picture is obtained that matches the reality that occurs in the Johar Baru District, Central Jakarta. Hermanto (2017:73) states that "informants are people who have information about the community being studied. They are among individuals or groups of community leaders, religious leaders, and/or youth leaders who are trusted in their community. Moleong (2014:132) defines an informant as a person who is involved in research; an informant is also a person who is used to provide information about situations and conditions related to the research.

RESULTS AND DISCUSSION

1. Behavior

Humans exhibit a variety of behaviors throughout their lives, one of which depends on the environment in which they live. According to Robert Y. Kwick (1974), as cited by Notoatmodjo (2013:61), behavior is the actions and/or deeds of an organism that can be directly observed and learned. This suggests that behavior can emerge if something is needed to trigger a stimulus; thus, a particular stimulus will produce different behaviors. Notoatmodjo (20 13:55), defines behavior as a human action that has a broad meaning, including: reciting the Koran, writing, smiling, moving, working, burping, and so on. It can be concluded that human behavior is all human activities, whether they can be observed directly or indirectly.

Behavior is formed through a long-term process and human activity with the environment. Notoatmodjo (2013:62) defines the factors that can influence the formation of behavior as divided into two, namely: internal factors and external factors. Internal factors include: intelligence, emotions, knowledge, perception, motivation, and others, as well as managing external stimuli. External factors include the surrounding environment, both physical and non-physical, such as climate, economics, social, cultural, and others.

Human behavior is largely learned from the environment. According to Walgito (2013), several factors contribute to the formation of a person's behavior, including:

a. Habits: behavior is formed due to habits that are often carried out in daily life, for example: waking up in the morning, then taking a shower, eating breakfast, and going to the office.
b. Understanding (insight) of the formation of behavior is obtained from the results of understanding the concept, for example, turning must use the send, walking must be on the left.

This type of behavior is formed from observing others' behavior, which is then followed and emulated. Therefore, it can be concluded that human behavior occurs through

a process based on awareness, knowledge, attitudes, and environmental encouragement, becoming a habit practiced in everyday life.

2. Settlement

According to Purwodarminto (1966); in Arleni (2019:25), the meaning of the words settlement and settlement lies in the difference in affixes and the meanings they produce. As written by Ndang Hidayat and Hanapi Natasasmita (2016) in Arleni (2019:25), these two types of affixes have the function of forming nouns, namely between Settlement and Housing. The affix per-an, it turns out that the most appropriate for the word settlement is a place to live or a place to live, while the affix pe-an in the word Settlement has the meaning of how to do or the thing to do.

Yunus (20 17) in Arleni (2019) defines settlements as residences or residential buildings. Law Number 4 of 1992 concerning Housing and Settlements explains that settlements are a part of the living environment outside protected areas, both urban and rural areas that have a function as a residential environment, residence or place for activities. Settlements include housing units and facilities that function as a residential environment, residence, or activity equipped with environmental infrastructure and facilities, thus producing social and cultural.

It can be concluded that settlements are human dwellings that can be used as residences, both individually and in groups, along with activities within them that support life and other facilities that are used as human service facilities for a certain period of time.

3. Riverbank Structure

According to Bianpoen (2017) in Salmah (2010: 19), a riverbank is a strip of land located on the right or left of a river, between the river and the embankment. There is no fixed width for a riverbank, as it is determined by each local government. Riverbanks typically function to control water flow, water quality, flooding, erosion, and sedimentation, as well as providing habitat for plants and animals. According to Atmanto (2017) in Salmah (2020:19) said that riverbanks are, "...the riverbank area that is inundated by water during floods (Flood plain)/floodbank, while the river boundary is the floodbank area plus the width of the cliff landslide (sliding) that may occur, plus the width of the ecological bank and the required safety width in relation to the location of the river.

Understanding Riverbanks and Land Use, Salmah (2020: 20) defines Riverbanks as, “ surface limit land wet (wetland) on the side edge of the river that is flooded during floods (floodplain). Its function as land conservation is to prevent damage to river areas (river bodies) due to erosion/landslide natural causes caused by human behavior or nature. The width of the riverbank cannot be confirmed Because related to the structural land use conditions changed in a way experience.

Based on the definition above, Salmah sketched to differentiate the location of riverbanks and river boundaries in the river flow as follows Figure 1:

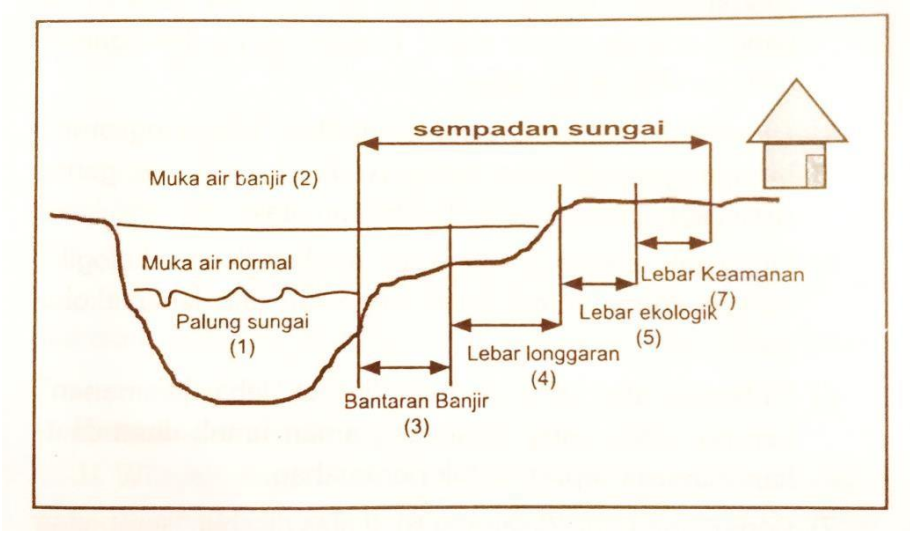


Figure 1. Sketch of Riverbanks and River Boundaries (Salmah, 2020)

The image above shows that there are several levels of conditions in the area flow rivers, namely :

a. The bottom one is curved, called a " trough" river, or also called “ river body,” which functions as a place to accommodate and channel river water under normal conditions.
b. On the trough river is written " flood water level," which shows that the water discharge exceeds normal, or when it occurs, flood waters are rising in height, and when the water is back to normal will seen mud used the so -called flood flood plain.
c. Adjacent to the top right of the trough river called " Bantaran" river or “ bank” flood is land wet (wetland) which is in its ecological condition, serves for conservation. The width of the riverbank is highly dependent on the structure of land use that changes naturally.
d. On the top of the flood bank, it is called " landslide width " in the form of a cliff-width space (sliding) to anticipate if erosion occurs from the upper part.
e. At the top width landslide called " Ecological Width " in the form of an area between the landslide width and the ecological.
f. At the top of Eid ecological called " Eid" Security ” in the form of an area that is seen safe to use by humans for housing.
g. Combination points 2 to 6 are called “ border river " in the form of a land combination start riverbank, wide landslide, wide ecological, up to the width of security. Based on the changing land use structure in a natural way, then wide border rivers are also relative.
h. In proper condition, riverbanks are not permitted for settlements residents, however the reality riverbank river and even upstream rivers are also used for settlements resident .

For more details can differentiated in picture as following Figure 2:

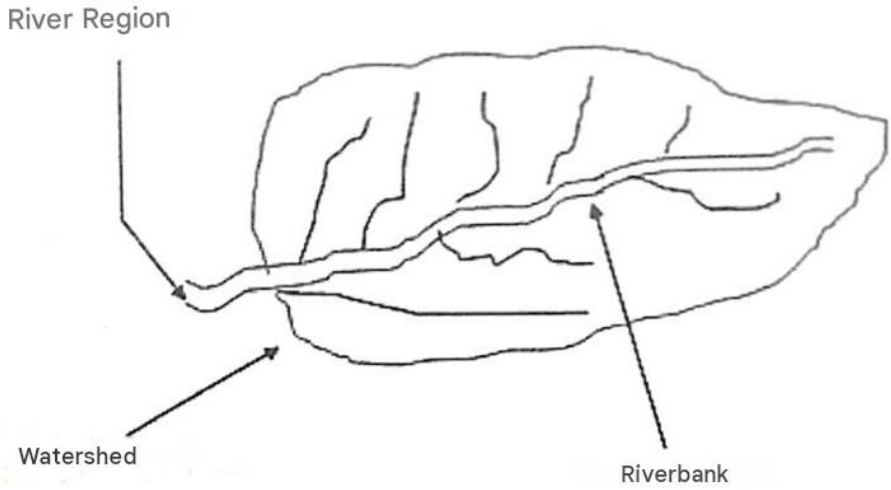


Figure 2: River Basins, River Basins and Riverbanks (Salmah, 2020)

Information Figure 2:

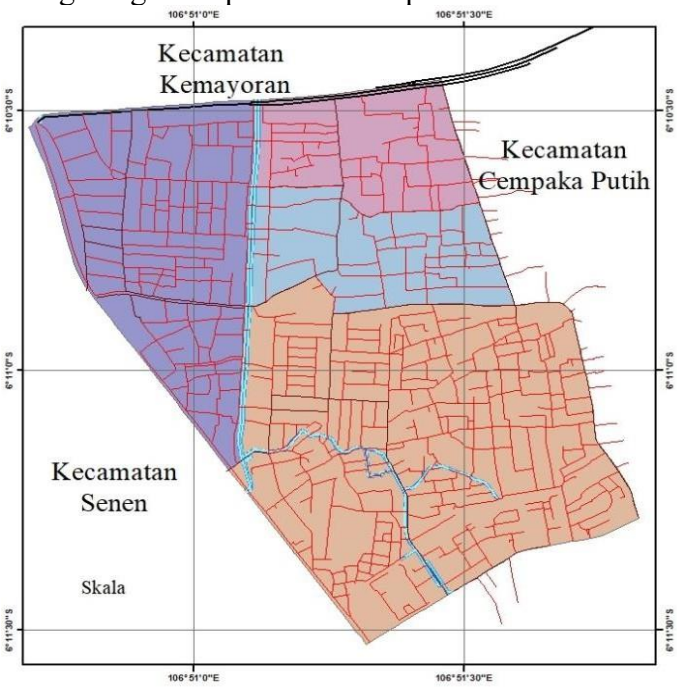
a. According to Salmah (2020:23), a river area is a body of water that receives water runoff from artificial hydrology in the area of its flow. The river is a chain in recycling hydrology, namely flowing water bodies through channel nature. Thus, geomorphology and geology, if you look at streams and watersheds, cannot be separated.
b. Basin Area (DAS) is an area/ region that is limited by boundaries (topography, back hills) that receive and collect rainwater as well as sediment, after that flows it through children river and out to the main river to the sea. Linsley (1980) refers to DAS as "A river of drainage basin in the entire area is drained by a stream or system of connecting streams such that all stream flows originating in the area are discharged through a single outlet". Mujiani (2014) in Salmah (2020: 24) defines a watershed as an area that collects, stores, and flows rainwater into rivers, both in the form of surface flow, subsurface flow, or flow basis. The area is separated by a topographic separator. In addition, according to Law No. 7 of 2004, a watershed is a land area that includes rivers and channels of the river, which functions to accommodate, store, and channel water to sea in a way experience.
c. Riverbanks form a single territorial unit within the River Basin. According to Salmah (2020:24), a river, from its source (spring) to its outlet into the sea, is an inseparable organic entity.

4. Function of Riverbanks

Tarsoen (2015:11-13) in Salmah (2020:32), riverbanks as conservation areas aim to maintain, prevent, and protect river bodies from landslides and erosion, as well as water catchment areas when water discharge exceeds normal levels. Good riverbanks can provide benefits as oxygen producers, absorb air pollution, absorb pollutants (from heavy metals, dust, and sulfur), reduce noise, and provide wind and sun protection. Likewise, Silas (20 13:7) in Salmah (2020:32-33) said that natural riverbanks support the creation of ecosystem balance, bind water, fill groundwater supplies, slow down the flow of water and

the spread of water into the ground, and act as a filter for groundwater waste and river water before it reaches the Aquifer.

According to Sugiyanta (2013:58-59) regarding the function of rivers, it is stated that: Rivers function to collect precipitation or rainfall in certain areas and flow it towards the sea. Meanwhile, the benefits of rivers include shipping, fisheries, power generation, tourism, and helping with irrigation. In addition, certain rivers provide benefits for daily human needs such as bathing, washing, and defecating/toileting. The land that was deposited by the river is a fertile area and is suitable for growing crops and becoming a place for residents to live. The wrong use of rivers is that rivers are used as dumping grounds for garbage and waste such as plastic waste or household and industrial waste. Rivers can be good if they are used properly, but on the other hand, they can be a disaster if rivers are used as garbage dumps and to dump waste from households and industries.



Administrative Map Of Johar Baru District, Central Jakarta

Figure 3. Sentiong River Research Area, Johar Baru, Central Jakarta

5. Environmental conditions of the Sentiong River in Johar Baru District

The Sentiong River was originally built as an irrigation channel to convey water from Bogor to the sea through Jakarta during the Dutch East Indies colonial period. The river flows along the Bogor–Jakarta corridor through Cimanggis, Depok, and Cilangkap before discharging into the Kali Besar River in Tanjung Priok, North Jakarta. Besides functioning as an irrigation canal, the river also served as an important transportation route for agricultural commodities from Bogor to Batavia using medium-sized and small vessels. Historically known as the East New River (Oosterslokkan), it was one of the artificial waterways constructed together with the Katulampa Water Gate during the eighteenth century. Historically, urban rivers function not only as hydraulic infrastructure but also as ecological and socio-economic systems that support transportation, agriculture, and community livelihoods. Apriliani and Dewi (2020) explained that river corridors in Indonesian cities have historically played multiple roles, integrating environmental,

economic, and social functions, while Cole et al. (2020) emphasized that maintaining riparian zones is essential for preserving ecosystem services and river sustainability.

In the 1970s, the Sentiong River had clear water, dense vegetation along both riverbanks, and abundant fish populations. Local communities utilized the river for irrigating rice fields, bathing, washing clothes, and even obtaining clean water for daily needs. However, the environmental conditions of the Sentiong River in Johar Baru District have changed dramatically. The river is now heavily polluted, emits unpleasant odors, and its water has turned black because of domestic waste and other pollutants. Residential settlements occupy almost the entire riparian zone, leaving virtually no ecological buffer between houses and the river embankment. According to Cole et al. (2020), the loss of riparian vegetation and increasing human activities along riverbanks significantly reduce river ecosystem services, including water purification, biodiversity conservation, flood mitigation, and riverbank stabilization. Consequently, the ecological resilience of the river continues to decline while environmental risks increase.

The eastern side of the river, bordering Johar Baru, Kampung Rawa, and Galur sub-districts, is densely occupied by permanent and semi-permanent residential buildings. In contrast, the western side still has a relatively small buffer because an alternative road separates some settlements from the riverbank. Several vacant areas remain and have been planted with trees by local residents to provide shade and reduce urban heat. Nevertheless, much of the remaining open space has gradually been converted into public toilets, neighborhood offices (RT/RW), integrated health service posts (posyandu), parking areas, and informal commercial activities. Apriliani and Dewi (2020) argued that the conversion of riparian zones into residential and public facilities commonly occurs in rapidly growing urban areas where land availability is limited. Such land-use changes reduce the ecological function of riverbanks and complicate future river restoration programs. Meanwhile, Cole et al. (2020) highlighted that riparian buffer zones should remain protected because they function as natural filters that reduce pollutant loads entering rivers.

The current condition of the Sentiong River is therefore far more concerning than it was several decades ago. Once characterized by clean water and dense vegetation, the river has gradually transformed into a densely populated settlement because of uncontrolled urban development, population growth, and continuing urbanization. Public awareness regarding the importance of conserving riparian vegetation has also declined. Vacant land along the riverbanks is increasingly used for housing, commercial activities, gathering spaces, and other private purposes rather than environmental conservation. Cole et al. (2020) stated that riparian vegetation performs important ecological functions, including stabilizing riverbanks, filtering sediments and pollutants, regulating microclimates, and maintaining aquatic biodiversity. Therefore, the continuous reduction of riparian vegetation weakens the ecological integrity of urban river ecosystems and increases environmental vulnerability.

Most residents living along the banks of the Sentiong River are indigenous families who have occupied the area for generations. Many continue to live on inherited land despite limited household incomes and inadequate environmental conditions. Furthermore, the strategic location of the area, with easy access to markets, employment opportunities, public transportation, and other urban facilities, discourages residents from relocating.

Compared with many other parts of Jakarta, housing along the Sentiong River remains relatively affordable, making it attractive to low-income households. Apriliani and Dewi (2020) reported that socio-economic factors, accessibility, and employment opportunities are among the primary reasons residents continue to occupy riverbank settlements despite their environmental vulnerability. Therefore, riverbank conservation should not focus solely on ecological restoration but also integrate affordable housing, community participation, and sustainable urban planning to achieve long-term environmental sustainability

6. Damage and Pollution of the Sentiong River

The Sentiong River ecosystem has experienced severe environmental degradation, as indicated by the declining water quality and the disappearance of aquatic organisms that were once suitable for human consumption. Fish that previously served as an important source of food for local communities are now no longer considered safe to consume because the river water has become heavily polluted. The water is extremely turbid, dark brown to black in color, emits a strong unpleasant odor, and has gradually transformed into an open drainage channel receiving domestic solid waste and household wastewater. Similar conditions have been reported in many urban rivers in Indonesia, where untreated domestic wastewater is one of the largest contributors to river pollution. Lestari et al. (2021) explained that domestic wastewater accounts for the majority of pollution loads entering Indonesian rivers, significantly deteriorating water quality and threatening both ecosystem health and public health.

One of the efforts undertaken by the Provincial Government of Jakarta to reduce pollution along the Sentiong River is the deployment of river cleaning personnel through the Environmental Agency, commonly known as the Orange Troops (Pasukan Oranye) and the Blue Troops (Pasukan Biru). These officers routinely remove floating waste, sediments, and other pollutants from the river and its banks. Their activities have gradually reduced the accumulation of solid waste and improved the visual condition of the river. Nevertheless, regular cleaning alone cannot completely restore river water quality because pollution sources continue to originate from surrounding settlements that discharge domestic wastewater directly into the river. Sutanto and Bawole (2021) emphasized that improving urban river quality requires not only routine cleaning but also proper domestic wastewater treatment systems to reduce pollutant loads before they reach water bodies.

Recognizing the increasing environmental degradation, the Jakarta Provincial Government has also implemented a river normalization program along several urban rivers, including the Sentiong River. The primary objective of river normalization is to restore the river's hydraulic capacity, improve drainage performance, reduce flood risks, and separate domestic sewage from the natural river flow. By preventing household wastewater from entering the river directly, the program is expected to improve water quality and restore the ecological functions of the river ecosystem. According to Ayu et al. (2021), river normalization contributes to increasing river capacity and reducing flood hazards in densely populated urban areas. However, physical normalization alone is insufficient if it is not integrated with effective

wastewater management, environmental law enforcement, and community participation in preventing waste disposal into rivers.

From an environmental perspective, pollution in the Sentiong River is not merely a problem of water quality but also reflects unsustainable urban environmental management. Continuous disposal of household waste, inadequate sanitation infrastructure, and the absence of proper wastewater treatment systems accelerate the degradation of river ecosystems. Over time, these conditions reduce dissolved oxygen concentrations, increase organic pollution loads, threaten aquatic biodiversity, and diminish the river's ecological services. Therefore, sustainable restoration of the Sentiong River requires an integrated approach involving pollution prevention, domestic wastewater treatment, riverbank conservation, environmental education, and active participation of local communities. Such integrated river management is considered more effective in achieving long-term ecological sustainability than relying solely on periodic river-cleaning activities (Lestari et al., 2021; Sutanto & Bawole, 2021).

7. Analysis of Community Behavior in Protecting the Sentiong River

In essence, people behave differently because their behavior is shaped by the social, cultural, and physical environments in which they live. Repeated interactions with the surrounding environment gradually form habits that become difficult to change over time. This phenomenon is also evident among communities living along the Sentiong River. Environmental behavior is influenced not only by individual knowledge but also by social norms, environmental awareness, the availability of supporting facilities, and the surrounding community culture. Ananda et al. (2024) found that pro-environmental behavior among riverbank communities is strongly associated with environmental awareness and collective responsibility toward maintaining river ecosystems.

So far, residents living along the Sentiong River generally understand the negative impacts of disposing of waste into the river. They realize that waste accumulation causes the river to become increasingly polluted, reduces water quality, produces unpleasant odors, and contributes to flooding during the rainy season. However, environmental knowledge does not always translate into environmentally responsible behavior. Dewi et al. (2025) demonstrated that although many residents understand the consequences of river pollution, actual waste-disposal practices are often influenced more strongly by habits, convenience, and perceived behavioral control than by knowledge alone.

In general, household waste generated by communities living along the Sentiong River should be disposed of through the waste management system provided by the Jakarta Provincial Government. Waste is collected in garbage carts before being transported by garbage trucks, while in areas inaccessible to vehicles, sanitation workers collect waste directly from residents using sacks or plastic containers. These services indicate that the government has provided relatively adequate waste collection facilities to reduce direct disposal into the river. Nevertheless, despite these facilities, some residents continue to dispose of household waste into the river because they perceive it as the easiest and fastest disposal method. According to Izzati and Hasibuan (2024), the availability of waste

management infrastructure alone is insufficient to change community behavior if it is not accompanied by strong environmental awareness, continuous education, and community participation. Communities living along riverbanks often continue disposing of waste into rivers because such practices have become habitual and are reinforced by the perception that river-cleaning workers will eventually remove the waste.

Field observations also revealed that some residents rely heavily on sanitation workers, assuming that maintaining river cleanliness is solely the responsibility of the government. This perception weakens individual responsibility for environmental conservation despite local regulations prohibiting waste disposal into rivers. Similar findings were reported by Ananda et al. (2024), who concluded that environmental awareness does not necessarily lead to pro-environmental behavior unless it is supported by community participation, social norms, and effective environmental governance.

It can therefore be concluded that the greatest challenge faced by the government in protecting the Sentiong River is not merely the provision of waste management facilities but also changing long-established community behavior. People who have become accustomed to disposing of waste into rivers tend to maintain these practices even when alternative disposal systems are available. Sustainable river conservation therefore requires an integrated approach that combines adequate waste management infrastructure, strict law enforcement, continuous environmental education, and active community participation. As emphasized by Dewi et al. (2025), behavioral change is more likely to occur when environmental knowledge is supported by social encouragement, institutional support, and consistent environmental policies that foster long-term pro-environmental habits.

CONCLUSION

This study concludes that the Sentiong Riverbanks in Johar Baru District have undergone significant land-use transformation from ecological buffer zones into densely populated residential settlements. Uncontrolled settlement expansion, inadequate sanitation and drainage infrastructure, domestic waste disposal, and reduced riparian vegetation have contributed to river pollution, ecological degradation, and increased flood risk. These conditions demonstrate the importance of integrating river conservation with sustainable residential settlement management.

The study also identifies community behaviour as a critical factor influencing river conservation. Although residents are generally aware of the environmental consequences of improper waste disposal, environmentally responsible practices remain inconsistent. This highlights the need for continuous environmental education, stronger community participation, and collaborative efforts among local communities and government institutions.

Based on these findings, the Sentiong Riverbank Conservation Model integrates ecological restoration, riparian protection, sustainable waste management, environmental education, community participation, and collaborative governance. Beyond its environmental management function, the model provides a contextual learning resource for elementary schools in Central Jakarta. The surrounding residential environment and river ecosystem offer opportunities for students to explore environmental degradation, waste management,

ecosystem conservation, and sustainable settlement practices through real-life local contexts. Therefore, the model connects environmental conservation with elementary education by positioning the Sentiong Riverbank as a meaningful source of contextual learning. Its application is expected to support environmental awareness, strengthen students' understanding of ecological responsibility, and encourage sustainable behaviour from an early age.

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