Volume 20 / No.1, Juni 2025

ISSN Print 1907 - 8536
ISSN Online 2988-120x

Submit : 01/07/2024 | Submitted 26/06/2025 | Published June,2025

STRENGTHENING COMMUNITY ROLE FOR THE SUSTAINABILITY OF THE RIVER ECOLOGY

STUDY AT THE PADEPOKAN CILIWUNG CONDET (PCC), JAKARTA

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Abstract : *The destruction of the Ciliwung River (Sungai Ciliwung) was once the basis for a publication which stated that the river is the most polluted river in the world. Not only disrupting the main functions of the river, activities that cause disruption to the river ecology also have a negative impact on the city through which it passes; Jakarta. This study aims to explore the role and benefits of the Padepokan Ciliwung Condet (PCC) in an effort to revitalize the functions of the river. The research was conducted for a year (2020) using the participatory research method. This study uses a qualitative approach and is described descriptively. Padepokan Ciliwung Condet has succeeded in making efforts to prevent river pollution in the Condet area, as well as being a means of social education about river ecology and environmental improvement in the area. This research shows that the PCC applies the basic principles of environmental science by building a community that cares for the environment that effectively transforms the people awareness around the hermitage to participate in maintaining the river environment in the area.*

Kata Kunci: *River Destruction, River Sustainability, River Ecology, Environmentally Concerned Community*

INTRODUCTION

A report was published several years ago regarding the results of a study stating that the Ciliwung is the dirtiest river in the world. The research results issued by Dutch and Indonesian researchers who are members of the van Ammerik Team are reported to have observed macroplastics in five locations along the Ciliwung River [1].

Observations of macroplastics carried out in May 2018 yielded data that as many as 20,000 items made of plastic flow into the Java Sea via the Ciliwung River every hour. Other rivers in the world are still inferior to the record obtained from observing the garbage flowing in the Ciliwung River, namely; The Chao Phraya River in Thailand flows

ISSN Print 1907 - 8536
ISSN Online 2988-120x

5,000 goods per hour, the Seine River in France as many as 700 goods per hour, and the Rhine River in the Netherlands with 80 goods per hour [2].

The report also stated that the total weight of waste in all rivers in Jakarta reached 2,100 kg when the research was conducted. Most of them are garbage flowing in the Ciliwung River. Although the relevant department has provided an explanation regarding the status of the river, the most important thing to record is the fact that the river is dirty and has lost its functions in an environmental science review.

It is not only the loss of river functions that is a loss in this case, but a number of negative consequences for urban residents in Jakarta are also a major concern. Overflowing river water during high rainfall is an annual problem that until now has not been completely resolved. Not a few material losses caused by flooding in Jakarta are still threatening residents.

Efforts to deal with flooding due to disruption of the main function of rivers in Jakarta have caused disagreements among scientist, practitioners and bureaucrats in this area. The emerging concept is river normalization and naturalization. Normalization is only focused on the functioning of rivers to flow water unhindered to the sea in large volumes. The focus is only on the piles of garbage and the shallowness of the riverbed. The solution offered is dredging the riverbed and making concrete on the banks of the river.

The solution is seen as a problem because of its relation to natural existenceit is the river community that is disturbed. Many aspects have become the bad result of the normalization plan whose form is concreting. *Wahana Lingkungan Hidup Indonesia (Walhi)*, The Indonesian Forum for the Environment, responded to the river normalization program by stating that there was a threat of silting of the river, serious disruption to flora and fauna, and large-scale changes in the ecological function of the river [3].

This idea was then improved by proposing the concept of river naturalization. However, the naturalization of this river has not been realised. The drafting of the concept and design of the river naturalization program plan has not yet been submitted to the public.

The study of the revitalization of river functions is interesting from a socio-ecological approach. The river is a community in which there is life. The various biota whose populations exist and live in river habitats must be understood fundamentally. All of them interact with their abiotic environment naturally and reproduce according to their respective bio-ecological conditions. The river describes an ecological system life that continues day by day.

Very different from ditches, although they function to drain large amounts of water and can also go to the sea like rivers, ditches do not represent a living ecological system. That's why the idea known as river normalization seems to ignore natural principles regarding the formation of life that should take place in the river itself. The normalization of the river seems to want to change the function of the river to become a mere giant ditch.

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ISSN Online 2988-120x

In addition, the existence of communities around the river is the most important factor that needs attention in this context. In fact, it is the existence of the community that becomes an interesting object of study because according to the principles of environmental science, harmony must be formed in an interaction between the various components of nature. This harmony will guarantee the continuity of life in a sustainable manner and humans and their behavior as an important component of the environment are the main determinants.

Another principle of environmental science is sustainability. The principle of sustainability can be an important factor influencing the presence of social elements in the study of river conservation and its functions in the future. The participation of the community around the river should be able to support the principle of sustainability, namely the use of the river community without reducing its functions in the future.

Therefore, the participation of the people who live around the banks of the river is very important for the sustainability of the river ecosystem. A group called Padepokan Ciliwung Condet (PCC) is one of the groups participating in efforts to maintain the function of the river and prevent residents from disasters arising from damage to the Ciliwung River. Since its establishment, there have been no studies trying to explore the role of the community managed by the PCC.

This study aims to explore the role and benefits of the Padepokan Ciliwung Condet (PCC) in an effort to revitalize the function of the river. The research was conducted for a year (2020) using the participatory research method. This study uses a qualitative approach and is presented descriptively with research questions, as follows:

1. What is the role of Padepokan Ciliwung Condet (PCC) in efforts to strengthen community participation for the sustainability of river communities?
2. What is the level of sustainability of the river community with Ciliwung Condet Padepokan activities?

METHOD

As stated above, this research is a qualitative research using participatory research methods. Researchers are directly involved in the ongoing process of community development to carry out repairs, maintenance and preservation of the river. Data and information were collected by means of field observations using observation guides, unstructured interviews (by not preparing closed-ended questions), as well as secondary information from other parties, such as the local sub-district government and activists from non-governmental organizations engaged in nature conservation. The collected data or information is processed by reducing it first. Data reduction is done by removing information that is not related to the process of drawing conclusions. Next is the display or display of data that has been selected for later analysis according to the research objectives. The last is to verify and draw conclusions.

RESULT AND DISCUSSION

Data on the Ciliwung River shows that it flows along 120 km and the total catchment is

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387 km2. The headwaters of this river are on Gunung Gede Pangrango in Cianjur Regency, West Java. Water from the upstream flows successively through Bogor Regency, Bogor City, Depok City, and the Daerah Khusus Ibukota (DKI) Jakarta, whose estuary is in the Luar Batang area, the fish market area near the Pelabuhan Sunda Kelapa, one of the oldest harbour in West Java [4].

So far, various communities have emerged working to restore the function of the Ciliwung River, including the Komunitas Peduli Ciliwung (KPC) in Bogor, Padepokan Ciliwung Condet (PCC) in East Jakarta, Komunitas Ciliwung Condet (KCC), Wahana Komunikasi Sungai Ciliwung Condet (WKSCC), and Masyarakat Peduli Ciliwung (Mat Peci) in the Pancoran Area, South Jakarta. Broadly speaking, the people who are still in direct contact with the banks of the Ciliwung River besides those living in Bogor Regency and Bogor City, as well as Depok City and the mountainous areas of Gunung Gede Pangrango in the interior of Cianjur Regency through which rivers pass, in DKI Jakarta there are still Condet and Pancoran which has a green community.

PADEPOKAN CILIWUNG CONDET (PCC)

Padepokan Ciliwung Condet (PCC) is one of the many river caring communities along the Ciliwung watershed. PCC is located in the Balekambang Village area and conducts community assessment and development activities around the river on a flat area of approximately 2000 square meters.

PCC was established on August 8 2020 based on approval from the Ministry of Law and Human Rights of the Republic of Indonesia. However, this community has actually been working to build community participation in restoring river functions, preventing floods, repairing riverbanks, and public education for river maintenance and preservation, since several years before obtaining institutional approval from the government.

This caring community was developed by several activists who have taken care of the Ciliwung River, especially because of the large erosion of the riverbanks by the swift flow from the upper reaches of the river. The approach taken by PCC is community strengthening with the aim of increasing the number of parties who care about the river community in the Ciliwung watershed. In addition, PCC's participation has contributed to the increase in the number of community groups that have participated in restoring river functions in the Ciliwung watershed.

PCC's activities consist of various programs aimed at strengthening environmental vision and ecological sustainability in the Ciliwung, Condet area, which includes the Balekambang area and its surroundings. Activities in the PCC program include river bank revegetation, development of performing arts and traditional dance, tutoring services and *Pedagang Kaki Lima (PKL)*, batik production and Condet chips, rescue, and gymnastics.

River revegetation is an important part of efforts to naturalize and revitalize river functions. The growth of various river vegetation on the banks that have been damaged by floods in the last thirty-five years. PCC is reconstructing the banks which have been

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damaged by erosion due to the swift flow of the river during heavy rains. Erosion, which until now is estimated to have reached 5-10 meters from the main body of the river, is being restored by binding the silt material that has drifted through the work area around Balekambang.

PCC activists invite residents around Balekambang to participate in making bamboo "nets" that can be used to tie up the mud. Since the river revegetation program was carried out, an area of approximately 2,500 square meters on the east side of the river in the Balekambang and Munggang areas has been covered again and can be planted with river vegetation. The types of trees planted in the PCC work area include bamboo, banana, kapok, gempol, and elo.
In addition to holding back the rapid flow of river vegetation, it turns out that it can slowly restore river ecosystems with the appearance of various low vegetation and river animals. The food-eating chain within the river community is slowly forming. In the last five years, PCC has succeeded in encouraging the formation of an ecological system that is crawling forward and has the potential to be duplicated as a new effort to restore the river community.

In addition to the ecological aspects of the river, PCC is very diligent in efforts to establish a social system that can serve the environmental improvement process in the area. PCC constructs a system of work for the community around the river in various activities that work to serve the purposes of restoring river functions.

The most important functions of rivers include habitat for various living things that form a strong ecosystem, water sources for human needs, potential energy sources, transportation facilities, certain food sources, recreation and entertainment facilities, research facilities, flood control, and nature conservation. PCC has started a simple conservation process by pushing back ecosystem functions as described above.

In its strategic planning, PCC actually prioritizes community strengthening. This is the most priority strategic choice for the next ten years. PCC believes that strengthening river communities will greatly affect the process of improving existing river functions, in addition to its bio-ecological aspects. At the same time, PCC believes the flood control process can actually be carried out by improving the community in its bio-ecological aspects.

Planting natural vegetation after strengthening the foundation on the banks of the river where typical river bank plants grow is a much better choice than "planting" concrete, walls or rocks. The restoration of the bio-ecological aspect of the Ciliwung River is proven to work by first reviving the activities and roles of the communities around the river.

PCC strengthens the education and training aspects of members of the social community around the river in just about 3 years. In 2021 a social community has been formed that can network with various parties supporting the process of restoring the function of the Ciliwung river.

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SITUATION OF THE CILIWUNG RIVER

The situation of the Ciliwung River in general can be explained by two types of descriptions, namely the description of the morphology and the functions of the river ecosystem. The morphological description of the Ciliwung river from its abiotic elements is generally a clay-mud soil found at the bottom. The clay-mud soil has long been covered by heaps of fine and light clay which are easily carried by fast currents. The heap comes from upstream because it is carried away by the flow of water, especially when it rains.

In addition, other abiotic elements are large river stones that blend with the river bed in certain areas. The river stone is deeply and firmly embedded in the riverbed. It is not uncommon to find the size of the rock as wide as the body of the river so that it looks like a stone courtyard that cannot be moved. In addition, in other parts there are puddles of water that persist even though it's not raining.

The biotic elements of the Ciliwung River are bacteria, fungi, moss, algae, water spikes, deer, water spinach, water hyacinth, bamboo, bananas, kapok, gempol, elo, aquatic insects, snails, worms, frogs, snakes, birds, fish, and so on. Based on the research results of Sri Wiedarti et.al. (2014) the total number of plants in the Ciliwung watershed is 33 species from 22 families consisting of 23 species of which are erosion-preventing plants [5]. That is, actually the Ciliwung River has the potential to prevent flooding from overflowing rainwater with approximately 70 percent of vegetation preventing erosion. Daisy Wowor (2010) describes that in the Ciliwung watershed there are 9 species of crustaceans, 4 species of crabs, 23 species of fish, 5 species of amphibians, and 20 species of reptiles [6]. Meanwhile Asmar Rusmendro, et.al. (2009) explained that in the Ciliwung watershed there are 48 species of birds, of which 28 species are found in the Condet area.

Arief Pambudi, et.al. (2017) noted that there are 53 genera of phytoplankton in the Ciliwung watershed. Meanwhile, zooplankton according to Ratna Sari Hasibuan (2017) consists of 2 groups that live in the Ciliwung watershed to date. The following table shows the biodiversity found in the Ciliwung River Basin (DAS).

Table 1. Biodiversity of the Ciliwung watershed

Num	**Biota**	**Amount**	**Description**
1.	Erosion prevention plants	23 species	
2.	Plants are not erosion prevention	10 species	
3.	Crustaceae	9 species	
4.	Crabs	4 species	
5.	Fish	23 species	
6.	Ampibia	5 species	
7.	Reptilia	20 species	
8.	Burung	48 species	23 of them are in the Condet area
9.	Fitoplankton	53 genus	
10.	Zooplankton	2 groups	

ISSN Print 1907 - 8536
ISSN Online 2988-120x

Source: Processed from several sources.

Raeka Widi Anggeraeni, et.al., (2020) that the acidity level or pH of Ciliwung river water has reached 6.8-7.4, which means that it is still possible to process it into household consumption water, but the turbidity level is included in the moderate turbidity category, namely with a refractive index of 1.46. This means that the quality of the water, seen from the pH, reaches a threshold that is not recommended, even though the turbidity is still in the moderate category, it requires more careful treatment to be consumed. Unlike Ahmad Sudarno (2022) who reported that the level of turbidity in the Ciliwung River has exceeded the threshold. Currently, the turbidity level in the Ciliwung watershed reaches 5,000-6,000 Nephelometric Turbidity Units (NTU), far from the 100 NTU tolerance [7].

Ratna Sari Hasibuan (2017) explains that the water quality of the Ciliwung River is seen from the levels of Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) that the Ciliwung river water has exceeded the recommended threshold according to Government Regulation No. 82 of 2001, namely 12. The results of his research show that the Ciliwung river water is included in Class 4 because the BOD value of the water exceeds 12 mg/liter, which is 13.6418 mg/liter, while in terms of COD reaching 98 mg/liter it also reaches 50- 100 mg/liter (Class 4) [8].

The following is a table regarding the water quality conditions of the Ciliwung River in terms of pH, turbidity, BOD, and COD. The data shows that based on the parameters of pH, Turbidity, BOD, and COD, the Ciliwung River really needs good handling so that it can support life in it.

Table 2. Water Quality Parameters; pH, Turbidity, BOD, and COD of the Ciliwung River (2017)

Num	**Parameter Kualitas Air**	**Nilai**	**Ambang/Kisaran**
1.	pH	6,8-7,4	1-14
2.	Turbidity	5.000-6.000 NTU	100 NTU
3.	BOD	12 mg/liter	13,6418 mg/liter
4.	COD	98 mg/liter	50-100 mg/liter

Source: Processed from several sources.

As discussed earlier, the level of pollution due to plastic waste in the Ciliwung River is worrying. Nursita Sari [2] reported that the Ciliwung River at the time the research was conducted was in a very worrying state. The sustainability of the Ciliwung river will be threatened if these factors are not controlled or restored. The sustainability of the river is highly dependent on the involvement of its social aspects. The social community plays an important role in ensuring that there is concern for residents who live and can receive the direct or indirect effects of river damage.

The Ciliwung River morphologically has shown a very circular relationship of biotic and abiotic elements. This is indicated by the low support of biotic elements such as water and soil quality in river habitats in the Ciliwung watershed for the existence and survival of hundreds of species of biota in the area. Thus, the functions of the river ecosystem

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have decreased and the surrounding community is very vulnerable to natural disasters and loss of biological resources in the future.

CONTRIBUTION PADEPOKAN CONDET CILIWUNG (PCC)

The presence of PCC has become part of the ecological dynamics of the Ciliwung River. Even though its work is still limited to the Condet area and will never be optimal if it is not supported by other Ciliwung caring communities, especially people who have direct contact with the river environment from upstream to downstream, PCC can absorb and provide inspiration.

PCC's contribution can be seen in the development of the five important functions of the Ciliwung River, namely; *First,* the Ecological Function. The ecological function of the Ciliwung River has been revived with various programs to restore the banks and riverbeds, revegetation, and reduction of external materials that can pollute the river. The river bank and bed restoration program has succeeded in reinforcing the erosion-affected cliffs of approximately 2,500 square meters. Revegetation has also been and is being carried out which until now has succeeded in growing 5 types of flood prevention vegetation. The waste reduction program is also carried out periodically, namely once every week by lifting piles of garbage that drifts from the upstream of the river. Furthermore, the treatment and management of waste is carried out according to its characteristics. The Ciliwung River is slowly becoming a habitat that can accommodate various types of biota.

Second, the Economic Function. The economic function of the Ciliwung River in the next 10 years will increase because some of its economical biota allow it to reproduce naturally after its habitat has gradually recovered. In addition, economic activities including tourism and research in the Ciliwung watershed area have slowly found a foundation for their development.

Third, Social Function. The Ciliwung River continues to be a good facility for the meeting of various social groups in a number of educational, training and productive activities as well as entertainment programs. The waste reduction program is also carried out periodically, namely once every week by lifting piles of garbage that drifts from the upstream of the river. Furthermore, the treatment and management of waste is carried out according to its characteristics. The Ciliwung River is slowly becoming a habitat that can accommodate various types of biota. The following is a table regarding the functionalization of the Ciliwung River by PCC in the 2020-2023 period.

Table. 3. Functionalization of the Ciliwung River by PCC (2020-2023)

No.	Function	Activities	Result
1.	Ecology	1. Dredging silt at the bottom of the river 2. Cliffs by binding and compacting mud on the banks. 3. Revegetation	Overcome the effects of siltation, strengthen river banks as a place for river vegetation to grow, the growth of vegetation types, and the life of various types of

ISSN Print 1907 - 8536
ISSN Online 2988-120x

			biota in the river.
2.	Economy	1. Utilization of certain plants to become handicraft materials. 2. Utilization of land for food crops. 3. Fostering craft centers for micro and small scale creative industries.	Communities are starting to develop handicraft products and food ingredients that can support creative economic activities, develop small-scale agriculture, and process organic fertilizers for commercial purposes.
3.	Social	1. Developing institutions for skills training for residents, building solidity and solidarity among residents for disaster prevention, strengthening the family economy, and other skills.	Residents have group awareness with good governance, community and informal ties and high social solidarity. Residents have the ability to solve environmental problems appropriately.
4.	Culture	Regularly hold art activities, such as painting, dancing, drama, and so on.	Residents have artistic products of high value by utilizing natural materials.

Source: Processed from several sources.

The table shows the role of the social community to ensure the ongoing process of restoring river functions. The great benefit of social participation as carried out by the PCC is that the river repair and restoration movement unites with the will of the public and not just in order to carry out an instruction that is distant from the public.

CONCLUTIONS

Based on the description above, it is concluded that even though the Ciliwung River has been declared the most polluted river in the world, even its functions as an ecosystem have been on the verge of total and irreversible damage, but the presence of Padepokan Ciliwung Condet (PCC) can provide new hope for sustainability. the ecosystem in the future. Community participation driven by PCC in order to ensure the sustainability of the Ciliwung river ecosystem can be summarized as follows:

1. Padepokan Ciliwung Condet (PCC) has worked on the process of restoring river morphology with physical improvements such as strengthening river banks and cliffs so that they can become places for the growth of various river vegetation.
2. Padepokan Ciliwung Condet (PCC) succeeded in strengthening community participation in good institutions so that it can be expected to maintain the

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ISSN Online 2988-120x

sustainability of the Ciliwung river ecosystem in the future.

3. The Ciliwung Condet Padepokan has succeeded in making efforts to prevent river pollution in the Condet area, as well as being a means of social education about river communities and environmental improvement in the area.
4. The Ciliwung Condet Padepokan applies basic principles of environmental science by building a community concerned with the environment that effectively transforms the awareness of the people around the hermitage to participate in maintaining the river environment in the area.

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