

## OVERVIEW OF SUSTAINABLE URBAN LAKES/ “SITU” MANAGEMENT IN BOGOR

Andi Setyo Pambudi<sup>1</sup>

<sup>1</sup>*Fungsional Perencana Ahli Madya, Direktorat Pemantauan, Evaluasi dan Pengendalian  
Pembangunan Daerah, Badan Perencanaan Pembangunan Nasional (Bappenas)*

Correspondent email: [andi.pambudi@bappenas.go.id](mailto:andi.pambudi@bappenas.go.id)

**Abstract:** The increasingly advanced development in the city of Bogor has an impact on the carrying capacity of the environment. One that is rarely in the spotlight is about the decreasing number of lakes in Bogor. In urban areas such as Bogor City, local people refer to the lakes as situ or setu. The existence of these “Situ” affects the water system, both in this city and in the surrounding areas. Although “Situ” play a vital role in maintaining the balance of urban water systems, they have not received sufficient attention in the planning documents for the City of Bogor, both annual and medium-term documents. The rapid development of the city affects the quantity and quality of urban lake water in the city of Bogor. These “Situ continue to experience physical and ecological degradation which increases the threat to the health of the population of the city of Bogor. This situation shows that the site has not been managed and functioning properly. Human and natural disturbances such as encroachment, garbage disposal, and untreated waste have polluted “Situ” water and reduced its volume capacity. Most of the lakes in the city of Bogor experience disturbances in damaged environmental conditions. This paper seeks to examine the condition of the “Situ” in Bogor City and its problems based on literature studies from previous researchers. The results of the research will provide recommendations based on scientific theories and existing regulations, both national regional regulations and regional regulations in Bogor City.

**Keywords:** “Situ”; Environment Problems; Management; Policy

Pambudi, A. S. (2021). Overview Of Sustainable Urban Lakes/ “Situ” Management In Bogor. *Indonesian Journal of Applied Research (IJAR)*, 2(2), 79-91. <https://doi.org/10.30997/ijar.v2i2.108>

### 1. INTRODUCTION

The balance of water regulation can be affected by damage to the watershed, especially due to mismanagement in the upstream part of the watershed, such as the addition of cultivated and residential areas (Bellfield *et al.*, 2015; Kindu *et al.*, 2017; Euler *et al.*, 2018). Many studies have been carried out regarding the impact of human activities on the upstream of a watershed on environmental factors (Li *et al.*, 2018; Martopo, 1993). In developing countries such as Indonesia and other Southeast Asian countries, watershed management still faces the problem of lack of integration between sectors, between agencies, and between regions so that water regulation

becomes disrupted (Atapattu & Kodituwakku, 2009). Community participation, both upstream and downstream of the watershed is also considered not optimal therefore environmental sustainability in the watershed area is increasingly alarming (Asdak, 2010).

The development of the upstream area of a watershed requires good planning, especially regarding water resources (Pambudi, 2019; Arsyad, 2006). In upstream areas such as Bogor City, the development of the lake is very influential on the ecology of the community and the balance of the water balance will affect the middle and upstream areas of the watershed. The city of Bogor, which is located in the administrative area of West Java Province and regionally has a very close relationship with the capital city of Jakarta, is currently developing into a city that relies on the service, tourism, trade and settlement sectors (GoI, 2017). In the Bogor City Spatial Plan, the Government's policies in the tourism sector are in line with the function of the City of Bogor as a tourist city, one of which is by placing natural tourism activities as the basis for developing local attractions and potentials, in the form of natural tourist attractions in protected areas such as parks, cities, urban forests, botanical gardens and the situ/lakes area.

The city of Bogor is known as the "City of Rain" because it has higher annual rainfall than other regions in Indonesia, with the average total rainfall of 3876 mm/ year and rainy days of 252 days/ year (GoI, 2014). Despite having abundant water resources, population growth and socio-economic development in Bogor City have led to an increase in water demand, especially for the household sector (Ramdhan *et al.*, 2018). On the other hand, the availability of clean water tends to decrease due to lack of water resources, climate change, pollution of water bodies, over-exploitation of ground water and low efficiency of water use.

Another thing that was found in Bogor City was that the condition of the drainage channel with non-optimal maintenance caused inundation in several regions. The environmental awareness factor is one of the causes of the drainage channel which is the drainage line for the outlet (Waryono, 2001; Chow, 1988). One of the outlets in Bogor City is urban lake/"situ". The lakes in the city area are slightly different from the natural lakes in general. Urban lakes or "Situ" tend to be smaller and shallower, functioning to balance urban water systems but often lack substantial vegetation cover (Nabi, 2017). The city landscape with all its spatial rules exerts a strong influence on the lake which means that everything like urban runoff, waste streams etc. ends up in the lake (Schueler & Simpson, 2001). Urban lakes play an important role not only in maintaining the balance of hydrology (groundwater and surface water) but ecology as well in urban ecosystem. The lakes must be managed for flood control, water supply, recreation, fishing or some other direct human use. Environmental behavior and sustainable lake/situ management is one of the things that needs to be addressed.

The city of Bogor is expected to become a water-sensitive city in the future (Ramdhan *et al.*, 2018). The concept of a water-sensitive city refers to 3 main pillars, namely; cities as water absorbers, cities as environmental and municipal service providers as a place for governments and people who care about water. Water is an important input for the survival of a city. The existence of urban water is in line with the problems of population growth, competition for land, globalization and climate change which are common concerns in relation to efforts to maintain viability (Maheshwari *et al.*, 2016). One of the water resources that needs to be managed is lakes, both natural and artificial. Urban lakes in Bogor city called as "situ or setu" have been functioned for flood control, water supply, water retention as ground water recharge, irrigation, recreation, fishing and fishery as well (GoI, 2007).

The "Situ" in Bogor has lost its ability to control floods, provide water, and for other direct use by its inhabitants. Lack of concern for the vital role of "Situ" in protecting urban water

and ecosystems not only by the community, but also by the government. Bogor City has 7 “Situ” scattered throughout the region, all of which are part of the Ciliwung Watershed. The question that arises later, what will happen after knowing the general problems of “Situ” in the city of Bogor?

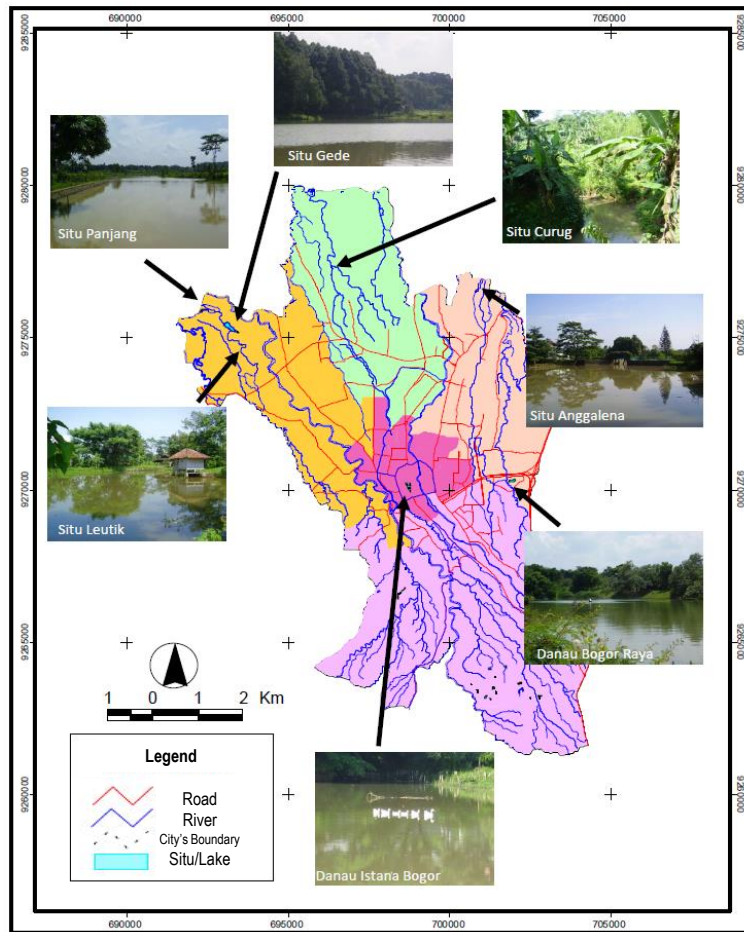


Figure 1 Situ's Map Location in Bogor City – Indonesia  
Source: Rahman, 2010

## 2. METHOD

This paper seeks to examine the condition of “Situ” in the city of Bogor and its problems based on literature studies from previous researchers. The technique used in collecting data on the physical quality and problems of the lake (situ) field is direct interviews using a purposive sampling technique, namely taking samples that are not random and selected based on considerations of direct linkages with the lake, such as government agency officials, community leaders and lake managers (Arikunto, 2006; Cochran, 1977). Conditions and problems also consider the literature review of various reports and scientific studies about lakes (situ) in Bogor City that already exist for further analysis. The results of the study will provide

recommendations based on scientific theories and existing regulations, both nationally and local regulations in the city of Bogor.

### 3. RESULTS AND DISCUSSION

Water problems are the problem of ecological balance related to environmental carrying capacity (Common & Stagl, 2005; Miller & Spoolman, 2015). Ecology is always related to ecosystems with their constituent components such as abiotic and biotic factors by defining the environment as an area within the boundaries of economic activities that affect the development of life in it. (Bellfield *et al.*, 2016; Asdak, 2010; Common & Stagl 2005). The problems in lakes observed in Bogor City are generally related to natural conditions and human factors. The natural contour conditions of the lake tend to be steep, such as causing less support for the development of riparian vegetation. In addition to serving as a supplier of detritus as natural fish food, these peripheral plants can also function as a shelter and spawn (Mawardi, 2010; Lukman, 2008). Likewise, the anointing carried out by the Public Works Department, in some places allows for changes in the condition of the outskirts. The sheet pile installation policy also has the potential to eliminate edge vegetation and also eliminate receding areas. The condition that becomes the main problem, as stated earlier, is siltation which results in the narrowing of the lake/situ waters (Mazaya *et al.*, 2016).

The shores of some lakes/situ are dike areas and become highways, so that the condition of the banks tends to be steep. The unspoiled area is only in the main inlet, namely on the south side, but the condition has experienced silting, weed invasion and some of them have become rice fields. This condition has been identified since the early 90s (Sulatri *et al.*, 2009). Based on literature review and direct observations in the field and discussions with the surrounding community, it is known that the 7 city lakes/situ in Bogor City are facing complex problems. These problems are different. In general, the city lakes in Bogor are problematic, except in areas that have been integrated with botanical garden (danau Istana Bogor) areas which is relatively still in good condition compared to others. The attention of the city government is also not optimally manifested in the Bogor city planning document. The solution to the problem of in situ is not responded to by a specific policy but is still considered a general problem of ordinary water resources.

Table 1 Mapping Problem of Lakes/Situ in The City of Bogor

Name of Situ/Lakes	Location/Situation	Problems
Situ Panjang	Situ Panjang is located in Situ Gede village with an area of + 4.5 ha, but 70% siltation has occurred. The intact condition is + 1.8 Ha (22%). This lake is partly filled with water weeds, the water source	The results of the measurement of water quality in situ Panjang show that there are several parameters that exceed the quality standard, such as the content of BOD, DO, COD, Suspended Residue and total coliform. In addition to the problem of quality standards that have exceeded normal conditions, the physical condition of Situ Panjang is also experiencing increasingly shallow concern

Name of Situ/Lakes	Location/Situation	Problems
	of Situ Panjang comes from springs and is supplemented by the Cibanten River with a flow rate of 75 liters/second.	from year to year.
Situ Gede	The situ is located in Situ Gede Village, West Bogor District, Bogor City is approximately 7 km from the city center to the west. Situ Gede with an area of 6.2 Ha is part of the Cisadane watershed and is located between Situ Panjang and Situ Leutik with water sources coming from springs and irrigation canals of Cibantn and Cibenda.	The area of the rain catchment area is 1550 ha in the form of forests, agricultural land and settlements The condition of shrinking the area of Lake (Situ) Gede is in a low condition, because in the last 10 years there has not been a decrease in area which has a negative impact, even though there are efforts from residents to use the land in the area to be converted into houses. Situ Gede belongs to class II which can be used for water recreation, freshwater aquaculture, animal husbandry, water for planting and for other uses that require the same water quality as these uses.
Situ Curug	The situ is located in Curug Village, West Bogor District, Bogor City, is approximately 7 km from Bogor City to the north. Situ Curug is part of the Angke watershed with a rain catchment area of 500 ha. Around Situ Curug is a residential area, on the east side of the Situ is a residential area managed by the Developer (Developer) Bumi Usaha Griya.	The shrinkage of the area of the Situ Curug is in a high condition, because the destruction of the weir causes the 2 hectares of lake which is part of the Angke watershed and becomes the upstream of the Angke River to turn into fields and fish ponds that are cultivated by the surrounding community. The condition of the border and the boundary of the lake is in the condition of the non-existent border and the boundary is not clear, there is only a former embankment with a width of 1 meter which is surrounded by residential areas. In assessing the condition of the inlet water structure, there is no functioning water structure, because the outlet and sluice gates no longer exist. In the criteria of vegetation covering the lake, it is in a condition above 50%, it can be seen that the condition of vegetation that covers the entire ex situ with vegetation in the form of trees. Regarding the assessment of water quality conditions, Situ Curug is in class IV
Situ Leutik	The situ is located in	The depth of Situ Leutik during the rainy

Name of Situ/ Lakes	Location/ Situation	Problems
	<p>Situ Gede Village, West Bogor District, Bogor City is approximately 6 km from Bogor City to the west. Situ Leutik with an area of 0.2 ha is part of the Cisadane watershed and is located upstream between Situ Panjang and Situ Gede with a rain catchment area of 1450 ha.</p>	<p>season is shallow, because the average depth of the lake is below 2 meters. Meanwhile, during the dry season, the decrease in the water level of Situ Leutik is in a low condition, because the decrease in water level occurs below 0.5 meters. In the assessment of the condition of the in situ border and boundary, the condition is in the condition of no border and no in situ boundary, because there is no clear boundary that there is an in situ border, there is only an in situ embankment with a width of 1 meter. The condition of the vegetation is below 25%, which can be seen from the vegetation that covers the body of the lake, only about 5% of the total area of the lake is covered by vegetation. While in the assessment of water quality conditions, Situ Leutik is in class III which can be used for freshwater aquaculture, animal husbandry, water for planting.</p>
Situ Anggalena	<p>The situ is located in Ciparigi Village, North Bogor District, Bogor city is approximately 6 km from the city center to the north. Situ Anggalena is part of the Ciliwung watershed with a rain catchment area of 1600 ha with the main source of water being the Situ from the Ciparigi channel and the Ciburial spring.</p>	<p>Around Situ Anggalena is the residential area of Villa Bogor Indah which was built by a housing developer. Situ Anggalena often experiences drought which is marked by the formation of a ditch/river channel in the middle of the lake (situ). In the assessment of the condition of the inlet water building in a condition that exists but does not function due to the presence of an outlet building. d On the assessment of the condition of the inlet water building in a condition that exists but does not function due to the presence of an outlet building and a floodgate that is not functioning properly. a floodgate that doesn't work properly</p>
Danau Bogor Raya	<p>Lake Bogor Raya is located in Tanah Baru Village and Cimahpar Village, North Bogor District, Bogor City is located approximately 3 km from the city center to the east. Lake Bogor Raya is part of the Ciliwung watershed</p>	<p>The condition of the lake border and boundary condition is categorized as having a clear lake boundary, because there is a fairly good lake border with a width of more than 3 meters and overgrown with trees and accompanied by a jogging track. In Lake Bogor Raya the condition of the inlet water building is in a condition but not functioning, due to the presence of outlet buildings and water gates that are not functioning properly. In the criteria</p>

Name of Situ/Lakes	Location/Situation	Problems
	with a rain catchment area of 400 ha with water sources from the Citangkil spring as well as from the Parung Banteng secondary irrigation canal as well as a water source and the headwaters of the Ciluar river.	of vegetation covering the water body, it is in conditions above 50% because it is seen that almost 50% of the vegetation covers the lake area due to the occurrence of very high sedimentation or siltation in the lake water body. Lake Bogor Raya is in class II which can be used for water recreation, freshwater aquaculture, animal husbandry, water for planting and for other uses that require the same water quality as these uses.
Danau Istana Bogor/Danau Kebun Raya – Botanical Garden Lake	The lake, which is located within the Bogor Botanical Gardens Complex, has an area of 1.5 hectares and is located in the center of Bogor in Paledang Village, Central Bogor District. This lake is part of the Ciliwung watershed where the water source comes from the Cibalok irrigation canal. The lake, which is under the management of the Bogor Botanical Gardens, is in much better condition compared to other lakes in the city of Bogor.	In the assessment of the condition of the border, the lake has a very wide and good border and a clear boundary with a width of more than 3 meters and is overgrown with trees and accompanied by a jogging track and park benches. In the assessment of the condition of the water structure, it is categorized as existing and functioning well, because there are outlet buildings and sluice gates that function properly. On the criteria of vegetation covering the lake water body, the condition is below 25% with visible vegetation conditions that cover almost 5% of the lake area. While the assessment of water quality conditions, Botanical Gardens Lake is classified as class I which can be used for drinking water raw water, water recreation areas, freshwater aquaculture, animal husbandry, water for planting and for other uses that require the same water quality as these uses.

*Source: Analysis Results, 2021*

Of the 7 (seven) lakes in Bogor City, most of them are in poor condition and are in poor condition due to garbage, silting due to sedimentation and due to the unclear boundary between the lake and community land, which has led to efforts to encroach on the lake area (situ) and use the lake without permission by the community. In addition, the lack of tourism supporting facilities such as accommodation, restaurants and other facilities as well as tourism promotion makes the potential of the lake less visible. The poor condition of the lake (situ) makes the potential of the lake (situ) as a tourist attraction unable to be utilized properly, so that the interest of tourists to visit is very little. To restore the function of a water resource as it should be, conservation efforts are needed to maintain the existence, sustainability of the condition, nature

and function of water sources that are always available in adequate quantity and quality. In addition, it is also to meet the needs of living things both at present and in future generations in order to maintain the continuity of the carrying capacity, capacity and function of the lake (situ). This conservation activity is carried out through the protection and preservation of water sources and the area around the lake (situ), water preservation, water quality management and water pollution control.

Based on the analysis that has been carried out, the quality of the lake in the city of Bogor is divided into three, namely the lake with good quality in Situ Gede and Botanical Gardens Lake, the lake with disturbed quality in Lake Bogor Raya, Panjang Situ, Anggalena and Situ Leutik, and the lake with good quality. damaged in Situ Curug. Meanwhile, the class of potential lake as a tourist attraction is divided into two, namely the lake that has the potential as a tourist attraction at Lake Botanical Gardens and Situ Gede and the lake that has less potential to become a tourist attraction at Situ Anggalena, Lake Bogor Raya, Situ Leutik, Situ Panjang and Situ Curug.

In order to identify what recommendations will be given in the management of lakes in the city of Bogor, it is necessary to study regulations related to lakes in Indonesia in general and in the city of Bogor in particular. Some of regulations are: a) UUD Tahun 1945 Article 5 Paragraph (2) and Article 33 Paragraph (3) ; b) UU No. 11 Tahun 1974 about Water Resources; 3) UU No.23 Tahun 2014 about Local Government; d) PP No. 22 Tahun 1982 about Water Settings; 4) Peraturan Menteri Negara Lingkungan Hidup Nomor 28 Tahun 2009 about the Capacity of Lake and / or Reservoir Water Pollution. More specifically, Indonesia has Presidential Decree Number 32 of 1990 about Management of Protected Areas, Article 1 : *“the existence of the situ area or reservoir (waduk) and the surrounding area has important benefits to maintain the sustainability of river functions, managed as an effort to prevent environmental damage with the aim of improving the protection function of land, water, climate, plants and animals and ecosystems”*. Furthermore, Indonesia also has Presidential Regulation No. 54 of 2008 about Spatial Planning Area of Jabodetabekpuncur, which mention situ is defined as a container of raw water, which is formed naturally or artificially whose water comes from soil or surface water as a hydrological cycle, which is one form protected area.

In the context of situ conditions, several researchers have addressed the problems faced by the 7 “Situ”. in Bogor city. Situ Panjang faces extensive shrinkage problems from 2.5 ha (data in 1993) to 1.8 ha (data in 2005) and increasingly tended to shrink every year. The boundary of situ is not clear and is used for farming by the surrounding community (Rahman, 2010). Situ Gede area is in a low condition, because in the last 10 years there has not been sufficient depreciation. The boundary of situ is clear, with the existence of situ borders that are quite wide more than 3 meters with a clear boundary and can be used as a jogging track area (Mazaya, 2016). Meanwhile, Situ Leutik has problems about depth condition which averaged under 2 meters and categorized as very shallow because of sedimentation (Rahman, 2010). Situ Curug is facing a critical level of degradation that affects physically and ecologically the quantity and quality of its water (Handayani, 2018). The other situ in Bogor city is Situ Anggalena. The shrinking condition of the Situ Anggalena area is in a low condition. This situ often experiences drought which is marked by the formation of a ditch / river channel in the middle of the situ (Rahman, 2010). Danau Bogor Raya has problem about very high sedimentation in water bodies (Handayani, 2018). The best situation of situ in Bogor city is Danau Kebun Raya. The condition of the situ looks awake and maintained (Rahman, 2010).

Situ conditions in the city of Bogor are currently experiencing extensive shrinkage which



is quite high (average 29%) and shallow depth averages and the threat of sedimentation and land grabbing on the body (Handayani, 2018; Mazaya, 2016; Rahman 2010). In addition, the problem of urban lakes that is often seen is the condition of the narrow embankments and boundaries, the number of water structures that do not function as a result of lack of attention and maintenance. From several urban lakes in Bogor City, there are 2 (two) locations that have good physical quality, namely Situ Gede and Kebun Kebun Lake. On the other hand, there are 4 (four) urban lakes that fall into the almost critical category, namely Situ Panjang, Situ Leutik, Situ Anggalena and Lake Bogor Raya. In Bogor City, there is 1 (one) location of urban lakes in the damaged category, namely Situ Curug. Situ conditions in Bogor at this time are not very supportive for the development of the situ as a tourism center because almost all of the central locations are degraded by silting, widespread shrinkage and illegal use by the community has resulted in decreased tourist interest in visiting.

Current policies related to sustainable situ/lake management in Bogor City are realized in 2 major policies in the form of presidential regulations (Peraturan Presiden) and Bogor’s regional regulations (Peraturan Daerah). Presidential Regulation No. 54 of 2008 about Spatial Planning Area of Jabodetabekpuncur mention that in its policy, the Bogor, Puncak and Cianjur areas are directed as protected areas so that the implication is the provision of water catchment areas in the form of reservoirs, situ-sites, artificial lakes, and green open space to accommodate the overflow of surface water that cannot be directly absorbed into the ground. The situ-sites area is part of a protected area, in its management, must be directed towards the use of water and soil conservation activities (GoI, 2008).

Bogor’s regional regulations or Peraturan Daerah number 6 Year 2014 about Mid-Term Development Plan (RPJMD) Kota Bogor (2015 -2019) mandating 2 things related to lake/situ management (GoI, 2014). There are: 1) Improving the quality of the environment carrying capacity of the city through the number of situ / ponds / lakes that are protected with a target of 7 situ until the end of 2019; and 2) Realizing a more environmentally friendly city by emphasizing changes in people's awareness and behavior through formal education and continuous coaching. Policies related to urban lakes/”Situ” in Bogor City are very limited. This shows that the alignment of budget and planning on environmental issues has not been maximized. In the existing planning documents, there are only 2 small things about urban lakes being a policy. The policy is also not tangible and measurable to improve the conditions of urban lakes as they should function.

The political will of the Bogor City government which is supported by the role of the community and the business world is the key to the ideal management of water resources in the future in Bogor City. Controlling and regulating human activities to be pro-environment through policy instruments is far more urgent than just building infrastructure and answering the root of the main problem. In order to optimize the results of Bogor City's water resources management planning strategy, the city government needs to coordinate well with the provincial government and the central government to get more financial support.

Table 1. Short-Term Development Planning Matrix for Sustainable “Situ” Management in the Bogor City.

Problem	Impact	Solution	Target			
			2021	2022	2023	2024
Flood	Damage to public facilities,	Drainage repair, periodic	“Situ”/Urban Lakes priority 1	“Situ”/Urban Lakes priority 2	“Situ”/Urban Lakes priority 3	“Situ”/Urban Lakes priority 4

Problem	Impact	Solution	Target			
			2021	2022	2023	2024
	economic losses	maintenance				
Clean water that is not evenly distributed	Economic losses, health problems	Expansion of piping networks, cross subsidies for new pipelines	“Situ”/Urban Lakes priority 1	“Situ”/Urban Lakes priority 2	“Situ”/Urban Lakes priority 3	“Situ”/Urban Lakes priority 4
Wasteful behavior of water, not caring and not environmentally friendly	Health problems, clogging of waterways	Environmental education, regulation, water saving campaign	“Situ”/Urban Lakes priority 1	“Situ”/Urban Lakes priority 2	“Situ”/Urban Lakes priority 3	“Situ”/Urban Lakes priority 4
Water pollution	Health problems	Construction of communal Waste Water Treatment Plant (IPAL), law enforcement	“Situ”/Urban Lakes priority 1	“Situ”/Urban Lakes priority 2	“Situ”/Urban Lakes priority 3	“Situ”/Urban Lakes priority 4
Degradation of watersheds	Extreme discharge fluctuations, erosion, sedimentation to “Situ”/Urban Lakes	Spatial planning control, forest and land rehabilitation ( <i>one man one tree</i> ), construction of water and soil conservation buildings	“Situ”/Urban Lakes priority 1	“Situ”/Urban Lakes priority 2	“Situ”/Urban Lakes priority 3	“Situ”/Urban Lakes priority 4
Over-exploitation of “situ”	“Situ”/Urban Lakes drops, water crisis	Construction of infiltration and biopore wells, reservoir and situ construction (optimization of surface water)	“Situ”/Urban Lakes priority 1	“Situ”/Urban Lakes priority 2	“Situ”/Urban Lakes priority 3	“Situ”/Urban Lakes priority 4

Source: Analysis Result, 2021

In the context of medium-term planning, it is recommended that a program that is possible be realized in more than 4 years. The recommended mid-term program is the development of high-tech rainwater storage projects that are useful for meeting the water needs of residents during the dry season. In addition, this program needs to be supplemented by education to the community to gradually reduce the use of ground water. Meanwhile, the recommended long-term program in Bogor City is the development and improvement of access to information on water resources and control of population growth so as not to further suppress the carrying capacity of the environment.

## 5. CONCLUSION

The results of the analysis regarding the sustainable lake/situ management in the city of Bogor are inseparable from the problems of education, spatial planning and infrastructure. It can be interpreted that the synergy of economic, social and environmental aspects in the concept of sustainable development requires the cooperation of many parties. Some recommendations that can be given by the author are:

- a) The Government of Bogor City must be able to produce guidelines / regulations for site managers and stakeholders to achieve situ management within a sustainable and integrated ecological framework. The involvement of stakeholders across fields of science in the preparation of guidelines / regulations is something that cannot be ignored so that these regulations can be ensured that they can be implemented at the field level.
- b) The Government of Bogor City must be consistent in monitoring and law enforcement involving government agencies in promoting continuous improvement of urban lake water management by integrating the 6 pillars of policies, institutions, technology, participation, information and funding.
- c) Involving key stakeholders, including local community to strengthen the framework of integrated situ sustainable management
- d) Enhancing investment with the private sector for the technology and maintenance construction of situ in order to meet the needs of situ's water conservation, tourism and situ's basin protection.
- e) Campaign environment awareness to people surrounding the situ area
- f) The Government of Bogor City needs to identify and determine the status of urban lakes in Bogor City as the basis for selecting priority locations for sustainable urban lake restoration policies. The most critical / damaged "situ" can be categorized as priority 1, critical "situ" as priority 2 and semi-critical "situ" as priority 3. The definition of the most critical, critical and almost critical "situ" should be determined based on environmental, economic and social aspects in a balanced manner.

In dealing with the problems of water resources of "situ" in the city of Bogor which are in line with the development of the population and the increase in economic activities of the community, it is necessary to manage, maintain, utilize and protect its sustainability by giving a role to the community at every stage of water resource management (GoI, 2014; Ohno, 2010). For this reason, the strategy that should be chosen is based on an integrated and measurable problem-based planning approach of "situ" in the city of Bogor. Targets are given to priority areas taking into account the urgency, funding and effectiveness of implementation.

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