Community Participation in Preservation Efforts of the Lakes in Depok City

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Abstract. Depok is a city that has the most lakes in West Java. Those lakes have several functions as flood controller, recreation area and fishpond. Every year, lakes in Depok City are getting constricted and minimized, it would cause the lakes to be slowly disappeared. It could happen because of human where they should have taken the role in preserve lakes, so that community participation is very important to do. The research objective was to analyze the level of community participation in the form of thought, wealth, energy, skill, and social in lake preservation in Depok City. This research uses the descriptive method with the quantity of area samples are in 3 subdistricts and human samples are 100. Data tabulation uses coefficient correlation and contribution experimental. The result of analysis shows the level of community participation in thought, property, and skill has a low relation towards lakes preservation. While community participation in power and social has a medium relation towards lakes preservation. Government’s effort to increase the community role in lake preservation in Depok City such as urging people to join the community, join some planting community petition and empowering them to make a small quay and be responsible of water games’ treatment in the recreation area.

Keywords: Community Participation, Preservation, Lakes

1. Introduction
Lake ecosystems in Indonesia are mostly in critical condition. This is caused by human factors and the weak coordination between sectors or regions in the utilization of the lake resulting in a decline in the function of the lake in terms of both quantity and quality. Besides that, it is exacerbated by global warming and climate change. Lake waters are one of the forms of freshwater ecosystems on the surface of the earth. In general, lakes are inland public waters which have important functions for development and human life [1].

In the past the people of West Java called the small size lake with the name Situ, but currently the use of the name has been standardized into a National language. According to the Indonesian Dictionary of Large Languages [2] Daring, mentions that Situ has the meaning of a lake or pond. Lake/Situ relatively small size causes its existence is threatened by the high rate of sedimentation, especially in shallow lakes, the impact will be very visible and worrying because lake status gradually change to a plot of land even though the condition and function of the ecosystem before is Lake. Changes in lake status will cause the loss of value ecosystem that is truly a characteristic of the lake.
In West Java, especially Depok City besides being a Government Center that is directly bordering to Jakarta Capital Special Region it is also a buffer zone of the nation's capital that is directed to residential cities, education cities, trade and service centers, tourism cities and as water catchment cities. According to the Depok City Spatial Planning Regional Regulation document 2012-2032 [3] concerning Water Resources Infrastructure Network System article 28 paragraph 3 letter C, there are 28 lakes in Depok City.

But the conditions actual are only 21 lakes whose existence is still maintained. Several lakes in Depok City had disappeared when the transfer of government from Bogor Regency split into Depok City, the lake was not maintained until the water dried up and then used by people to be slums or farming. All names of lakes that have disappeared are still listed in the Depok City Spatial Planning Regional Regulation because they are assets owned by Depok City so that even though their existences are gone but the naming will not be deleted.

In general, the conditions of the existing lakes in Depok are still a concern. The large number of residents who come from other region and do not have a place to live so that they build buildings in the lake border area which should be a land to absorb water. As a result of the accumulation of residents on the side of the lake causing the accumulation of household waste which is the main source of lake pollution then siltation and mineral enrichment (eutrofikasi) occur so that water weeds thrive. Many irresponsible people also use the lake water and lake environment without paying attention to environmental sustainability. All the problems that threaten the lake are actually caused by humans themselves. They do not realize that changing environmental patterns will also affect their life patterns. Because a lot of the environmental conditions of the lake are damaged, in the sense of many environments that are not balanced in the situation so there is less benefit for human life even though the lake has many benefits.

Because of the importance of the lake's function as a buffer of life, the lake must be protected and preserved, enhanced functions and benefits, and controlled damage to the environment. Related to this, the management plan is aimed at conservation and protection efforts, so that its utilization can be sustainable without changing the function of the lake. In its application, the preservation of the lake requires the role of all parties both community till the local and central government.

Suharto [4] strongly emphasizes the importance of community involvement because he thinks the community must participate in their own empowerment because the purpose, methods and results must be formulated by themselves. The level of public awareness is the key to empowerment, because knowledge can mobilize action for change in empowerment also involves access to resources and the ability to use these resources effectively.

Community and local governments should learn from the mistakes of lakes that have been lost so that lakes that have not been damaged should be maintained, monitored, and protected so that the lakes are not damaged and lost because they are valuable assets for Depok City.

Research on community participation aims to analyze the level of participation in the form of thoughts, property, power, skills, and social so that it can be seen the level of community participation in the preservation efforts lakes in Depok City.

2. Methods

Based on character of the problem in this study using descriptive method is a method that aims to find a picture in a group of people, an object, a circumstances or condition. The purpose of this descriptive study is to make a systematic description or description of the disclosure of facts and circumstances that occur in the study area regarding opinions, responses, ideas, or thought owned by the community in an effort to preserve the lakes in Depok City. In this study consisted of five independent variables (X) and one dependent variable (Y). To more clearly see the relation scheme of variables X to Y in Figure 1.

Sampling using purposive sampling, it is sample determination techniques with certain considerations. Subdistrict samples were chosen which had the largest total lake area in a subdistrict or a total lake area of more than 19 Ha (> 19 Ha).
Figure 1. Schematic Relationship Variable X to Y

Given the function of the lake according to Alikodra [5] which is as a source of water for life, water management and groundwater suppliers, flood control, microclimate regulators, preventing sea water intrusion, sludge settling and pollutant binding, habitat of various types of flora/fauna, places recreation/tourism, and aquaculture. So if the lake is damaged like polluted or flooding overflows then the first to be affected is the community around the lake or the community closest to the lake. If there are more and more lakes or the total area of the lake is getting bigger in a subdistrict, it will have more impact on the community in the subdistrict.

3. Result and Discussion

Based finding at research location that almost all lakes in Depok City are currently in critical condition. Some lakes have the most unsafe conditions including Lake Gadog, Lake Rawa Kalong and Lake Bahar. Not safe in the sense that it is currently in a condition that is quite severe due to environmental pollution by factory waste and household waste. If left unchecked, the lakes will disappear in a fast period if the handling is not done immediately. Other lakes such as Lake Pedongkelan, Lake Tipar, Lake Jemblung, Lake Rawa Gede, Lake Cilodong, Lake Sidomukti, Lake Pengasian, and Lake Bojongsari, these lakes can disappear at any time in a relatively long period of time considering in terms of their size which is still quite large and on average has inlet and outlet channels so that water can still enter and exit properly. To more clearly see the distribution of lake samples can be seen in Figure 2 and the condition of the lake sample can be seen in Table 1.

The results showed that from 11 lakes sample locations, 8 lakes had a medium level of community participation in the preservation of lakes, 2 other lakes namely Lake Tipar and Lake Gadog had a low level of community participation in the preservation of lakes and only 1 lake, Lake Cilodong had a participation rate high community towards lake preservation. Can see Table 2 for more details.

Table 1. Condition of Lake Samples

| Num. | Lakes Name | Depth | Water Sources | Environment | Utilization | Road Access |
|------|------------|-------|---------------|-------------|-------------|-------------|
| 1.   | Lake       | ± 1m  | Closed Lake   | Dirty lake  | Rainfed     | On the roadside, |
|      | Gadog      | Water | No trees      |             |             | footpath    |

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|      | Gadog      | Water | No trees      |             |             | footpath    |
| Number | Location                      | Depth | Output:                          | Input:                         | Market waste: | GTA: | Footpath:                          |
|--------|-------------------------------|-------|---------------------------------|-------------------------------|----------------|------|-----------------------------------|
| 2      | Lake Pedongan Kelan           | ± 4m  | River                           | Lake                          | Springs &     |       | Open Lake                         |
| 3      | Lake Rawa Kalong              | ± 3m  | Rare trees, Tourism             | Lake                          | Dirty lake    |       | Closed Lake                       |
| 4      | Lake Tipar                    | ± 5m  | Rare trees, Fish ponds           | Lake                          | Many trees    |       | Closed Lake                       |
| 5      | Lake Jemblung / Lake Lake Baru| ± 5m  | Many trees, Rainfed              | Lake                          | Very clean    |       | Lake border                       |
| 6      | Lake Rawa Gede / Tirta Gede   | ±1m   | Many trees, Shooting             | Lake                          | Not maintained|       | Closed Lake                       |
| 7      | Lake Cilodong                 | ± 2m  | Rare trees, Tourism             | Lake                          | Very clean    |       | Open Lake                         |
| 8      | Lake                           | ± 3m  | Dirty Lake, Rainfed              | Lake                          |                |       | Closed Lake           |
9. **Lake Sidomukti** ±2m
   - Input:
     - Drainage
     - Water springs & River from Permata Duta Housing
   - Output:
     - Drainase Warga
     - Many trees
   - Very clean
     - Rainfed
     - Tourism
     - Asphalt road

10. **Lake Pengasina** ±6m
    - Input:
      - Water springs & River
    - Output:
      - River
      - Very clean
      - Rainfed
      - Tourism
      - Footpath and asphalt road

11. **Lake Bojongsari** ±20m
    - Input:
      - Water springs & River
    - Output:
      - River
      - Half lake is not maintained
      - Rare trees
      - Rainfed
      - Tourism
      - Footpath and asphalt road

Source: by researchers.

**Figure 2. Lake Distribution Map**
Table 2. Level of Community Participation in Lakes

| Num. | Subdistricts | Lakes Name                           | Total Respondent | Level of Participation |
|------|--------------|--------------------------------------|------------------|------------------------|
| 1.   | Cimanggis    | Lake Rawa Gede / Tirta Gede          | 8                | Medium                 |
| 2.   |              | Lake Pedongkelan                     | 8                | Medium                 |
| 3.   |              | Lake Rawa Kalong                     | 8                | Medium                 |
| 4.   |              | Lake Tipar                           | 8                | Low                    |
| 5.   |              | Lake Jemblung / Danau Situ Baru      | 8                | Medium                 |
| 6.   |              | Lake Gadog                           | 9                | Low                    |
| 7.   | Cilodong     | Lake Cilodong                        | 9                | High                   |
| 8.   |              | Lake Bahar                           | 9                | Medium                 |
| 9.   |              | Lake Sidomukti                       | 8                | Medium                 |
| 10.  | Sawangan     | Lake Pengasinan                      | 12               | Medium                 |
| 11.  |              | Lake Bojongsari                      | 13               | Medium                 |
|      | Total        | Total Respondent                     | 100              |                        |

Source: by researchers

If the level of community participation to lakes is high it means the government will more easily develop lake to be better because the community around the lake has a high willingness to contribute to the lake. Lake Cilodong is the only one lake that has a high level of community participation and the only lake that has a dam on all sides. Its strategic location on the side of the highway is very profitable so it is easily accessible as a tourist destination for Depok City residents. Tourism in Lake Cilodong needs to be developed such as water play facilities, public toilets, trash cans, expanded parking lots and decent places to eat or restaurants for visitors. To more clearly see the distribution of levels of community participation can see Figure 3.

Figure 3. Community Participation in Lake Sample Locations Map

General description of community participation is as follows. The level participation of thought in the preservation of the lake is in the low category 33% or 33 people, medium
category 51% or 51 people and high category 16% or 16 people. Property participation in the preservation of the lake is in the low category 49% or 49 people, medium category 41% or 41 people and high category is 10% or 10 people. Power participation is in the conservation of lakes with a low category 37% or 37 people, medium category is 49% or 49 people and high category is 14% or 14 people. Skill participation is in the preservation of the lake with a low category 62% or 62 people, medium category is 32% or 32 people and high category is 16% or 6 people. Social participation in the preservation of the lake is in the low category 32% or 32 people, medium category is 53% or 53 people and high category is 15% or 15 people. The community's knowledge of lake preservation is in the low category 20% or 20 people, medium category is 44% or 44 people and high category is 36% or 36 people.

If the sig value is smaller than 0.05 (0.000 < 0.05), Ho is rejected and Ha is accepted, it is concluded that there is a significant correlation. Overall community participation has a significant correlation to lake conservation with total $r = 1.895$. The results of the scheme of the relationship of each variable $X$ to $Y$ in Figure 1 are as follows: $r_1 = 0.301$, $r_2 = 0.264$, $r_3 = 0.407$, $r_4 = 0.366$, $r_5 = 0.557$. To find out a value that states the magnitude of the relationship of the independent variable to the dependent variable used the formula of the Determination Coefficient, namely $KD = r^2 \times 100\%$ so as to get the following results, the participation of the thought forms contributes 9.06%, property participation is 6.96%, power participation was 16.56%, skills participation was 13.39%, and social participation was 31.02%.

This study also aims to find out the government's efforts to increase community role in the efforts to preserve lakes in Depok City. Government agencies questioned are department that have links to lakes both in terms of preservation, the environment and tourism. Agencies questioned are BLH (Living Environment Agencies), Bimasda (Clan Clergy and Water Resources), and Disporaparsenbud (Youth Sports Tourism and Culture Agencies).

These agencies have made every effort to preserve lakes in accordance with their respective work methods such as BLH who handles the environment around the lake, the quality of lake water and amdal by conducting empowerment studies in collaboration with community or join environmental group, holding reforestation competitions. This is has indirectly invited the community to participate. Another method is carried out by Bimasda which is more focused on conservation of lakes by maintaining the quantity of lakes, normalization activities, and installation of dams. While Disporaparsenbud handles lakes in tourism side as it empowers community to make small docks and community responsible for the maintenance of water games at tourist attractions.

But the problem is limited cost factors and road access making it difficult to repair lakes. The lake is quite a lot in Depok City and the high cost of maintenance is an obstacle so that the maintenance of lakes such as dredging and dam installation must be take turn. Road access that is not easy to reach makes heavy equipment difficult to enter the lake location so that it will take additional time and costs.

Each agency never provides assistance in the form of money to avoid abuse and replace it with assistance in the form of objects such as tree seeds for reforestation in the lake border area. Training of residents on how to conserve lakes is very important, this is usually done by the Central Government (Ministry of Public Works) which is supported by Bimasda so that these activities can take place well.

The level of thoughts participation people in Depok City is not high enough. The characteristics of people who have the highest diploma are in high school graduates and the second highest diploma is in junior high school graduates with each 25.45% and 19.45%. This
is in line with statement Soemanto R B, et al. [6] says that those who have a higher education will have a higher degree of participation in development, which is due to the increased awareness of development. With this, it is very limited to issue good thought for the preservation of lakes because of the low level of education. Thought participation can be realized on various occasions, such as through Neighborhood Association meetings or working group meetings by giving ideas for the sustainability of the lake in the future. It can also be in the form of channeling ideas through institutions in the surrounding environment. Develop programs that have never been done before about lake preservation.

Participation in the form of property is one of the most important parts of lake preservation but is still relatively low. The factors that cause low levels of property because of their higher living needs compared to the income they have. Inadequate income is due to the dominant job status of the people in Depok City working as laborers / employees. This is in line with Angel's statement [7] that it is cannot be separated each other because someone's work will determine how much income will be earned. Good work, good income and meet daily needs can encourage someone to participate in community activities. This means that to participate in an activity, it must be supported by an established economy. Type of work is also influenced by education, the higher the education make higher the type of work or occupation, then income will also increase. Property participation can be done by giving money for deposited on Neighborhood Association or working group savings. If the community feel heavy to giving money, they can replace it by lending their cleaning equipment while doing service in around the lake environment. Donating food and drinks is usually done by women because women are less involved in work that requires heavy labor. Another thing that can be done by the community in the participation of property is to make posters, banners, etc. which contain lake preservation events or in the form of commands to protect the lake environment.

Level of power participation people in Depok City is classified as medium. Participation in the form of this power is dominated by men because women are not strong enough to do heavy things so that women only help donate food and drinks to community who are working together. Like Angel's statement [7] that the values long enough dominant in various national cultures say that basically women's place is "in the kitchen" which means that many community the role of women is mainly taking care of the household, but over time the value of women's roles has been lost with the emancipation movement and women's education is getting better. Participation of personnel can be done by carrying out community service activities such as participate in cleaning the lake, following tree planting activities on the lake border area. While activities to make / renovate lake dam and dredge lakes are usually carried out by the Central Public Works, namely BBWSSC (Central Office of the Ciliwung Cisadane River Region) which is assisted by local community.

The level of skills participation in Depok City is not high enough. This is evident from the results of the majority of respondents who answered that they never held trainings in the context of lake preservation because according to community who usually conduct training are from the government. Even though there is nothing wrong if the Citizens Association management or working group organizes training for other community so that the whole the community understands the importance of preserving the lake. In line with Plumer's statement [8] knowledge and expertise. The knowledge base that is owned will affect the entire environment of the community. This makes people understand or not to the stages and forms of participation. Skill participation can be done by providing trainings on the importance of preserving the lake, providing good examples by protecting the lake
environment, and inviting other agencies or communities to become sponsors / donors in lake conservation activities.

The level of social participation owned by the people of Depok City is classified as medium. Characteristics of respondents dominated by residents aged 50-54 years as many as 27 people out of 100 respondents so this makes the level of social participation classified as medium because older people will certainly be more valued in the community so that it will be easier to invite the community and suggest to participate preservation program for lakes in Depok City. In line with Holil's statement [9] Intensive communication between fellow community and their leaders and between social systems in society and outside systems. Social participation can be realized by disseminating information about the existence of lake preservation activities, discussing the sustainability of lakes among fellow community, coordinating well among fellow community so that positive and harmonious activities can be created, after doing community work it is necessary to evaluate the work to make in the future better.

4. Conclusions
The contribution of community participation in the form of thoughts amounted to 9.06%, property of 6.96%, and skills of 13.40% classified as having a low relationship. While community participation in the form of power is 16.56% and social is 31.02% classified as having a medium relationship.

The level of thought is low because the highest diploma owned by the people of Depok City is at the high school level so to issue ideas for the preservation of the lake is very limited due to the low level of education. Low level of property because the needs of life are always increasing and higher than the income earned. Medium levels of power because the community is quite compact in working together, but gender differences are the different tasks when mutual cooperation so that men are more dominant in the field while women do less heavy work. Low skill level due to low level of education so that people are limited in developing their creativity for the progress of the lake. The medium level social is because the community has the willingness to make the lake better proven from the results of the questionnaire that people often talk about the lake, but the action is still limited. In addition, the age factor is dominated by the age of 30-34 so they will be more appreciated in the community and it will be easier to invite the community and suggest to join the lake conservation program.

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