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COMMUNITY PARTICIPATION IN ENVIRONMENTAL MANAGEMENT AT JATILUHUR RESERVOIR TOURISM SITE, INDONESIA*

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Abstract

This study assesses community environmental awareness and community participation in environmental programs through the Clean Lake Jatiluhur Operations Program in Purwakarta Regency of West Java, Indonesia. The components of the program include social and ecological aspects. Published studies argue that people are aware of various environmental issues but are less involved. The study found that the lack of participation was due to a lack of time, interest, and awareness. Recommendations should encourage greater community interest and involvement, including strengthening coordination between the local authority and the community with other stakeholders in line with the program's objectives.

Keywords: community development, ecological awareness, social change, water management, West Java

1. Introduction

Dams are important for human life because they provide household , industrial and aquacultural water. The reservoir of Jatiluhur is one of the western Java, the Citarum River artificial reservoirs (Prinajati, 2019). The reservoir is used with a floating net cage framework for crude water sources, hydropower, tourism and even aqua culture. The floating operation of the net cages which did not meet the capacity needs of the reservoir was one of the factors leading to a decrease in water quality.

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Fish farming with floating net cages in the Jatiluhur Reservoir has been carried out since 1974. Fish farming activities with floating net cages are beneficial and help communities in reservoirs. Containment of floating net cages has been done since January 2015. Protests have taken place against the floating net cage cages of farmers and workers. People believe they will lose their livelihoods if the cages are removed. The number of cages reached 1536 plots in 2017, but many farmers have more than 20 plots (Perum Jasa Tirta II, 2020).

Floating net cage farmers earn a living through activities in the field of fish farming. They oppose the Clean Lake Jatiluhur Operations program's success because they do not want to deny their livelihoods. The level of participation in the environmental program can measure the level of environmental awareness (Altin et al., 2014; Juneman and Pane, 2013). Public awareness can be the basis for determining the environment and for taking sides (Abdullah et al., 2014; Laurens, 2012). Providing better infrastructure or incentives that encourage social norms may prove to be more meaningful in encouraging environmental and collective action (Kamaruddin, 2010; Musavengane, 2019; Steg et al., 2014). It is useful for local authorities to support the support of competent facilitators who are pro-environment.

2. Material and methods

The research involved the Cibinong Village of Purwakarta Regency's floating net cages and the authority of the Perum Jasa Tirta II Dam (PJT II). The data sources in this study consisted of two sources, namely primary and secondary data. The primary data source was the original object or document. The raw material of a party called 'first-hand information' The data collection method is used to obtain the study's data. The secondary data sources consisted of comments and interpretations in journals or theses that discussed the Clean Lake Jatiluhur Operations Program.

Researchers used techniques to collect data in this study: interviews, observation, and documentation. Interviews were conducted with questions about the main problems, namely the Clean Lake Jatiluhur Operations Programme. Observation had been done to determine how the existing cage lands in Lake Jatiluhur today. The documentation used is a record of the number of floating net cage farmers in Cibinong Village. Using the research methods used, it can help researchers to investigate the problem of floating net cages.

3. Results and discussion

3.1. Lake Jatiluhur Clean Operation Program

The Jatiluhur reservoir is one of the reservoirs in the province of West Java and is located in the Jatiluhur district of Purwakarta Regency (± 9 km from the center of Purwakarta City). This reservoir is the largest reservoir in western Java between the artificial reservoir trilogy, followed by the Saguling and Cirata reservoirs. The Jatiluhur Reservoir dams downstream of the Citarum River. The water flowing from the Citarum River enters the Saguling and Cirata Reservoirs first upstream and then downstream of the Jatiluhur Reservoir. This reservoir, which covers 8.300 ha, has an annual water supply potential of 12.9 billion m^3.

The construction project of the Jatiluhur reservoir began in 1957, which included the construction of a water system, a primary reservoir, and a hydropower plant. The reservoir, which has the primary function as a source of irrigation, has three areas belonging to the canal: East Tarum, North Tarum and West Tarum. The Citarum River begins from the reservoir, to the downstream and river mouths. The area is developing into an industrial and residential centre. It is estimated that the population and industry will also develop rapidly in the future.

There are six turbine units with 187.5MW of installed power in the Jatiluhur reservoir, with an average annual electricity production of 900 million kW / h. The electricity produced is then sold to the PLN and is one of the largest electricity producers in the West Java region.

There is also a fish farming business in the reservoir, which attracts tourists who love fishing. The reservoir can use its potential, but must continue to pay attention to the quality and carrying capacity of the environment. The fish farming companies in the Reservoir are the largest aquaculture companies in Purwakarta Regency, Indonesia.

Since 2015, the creation and extension of the licence in the Jatiluhur Reservoir had been abolished as part of the program's entry into force to control floating net cages. Fig. 1 demonstrates floating net cages panorama.

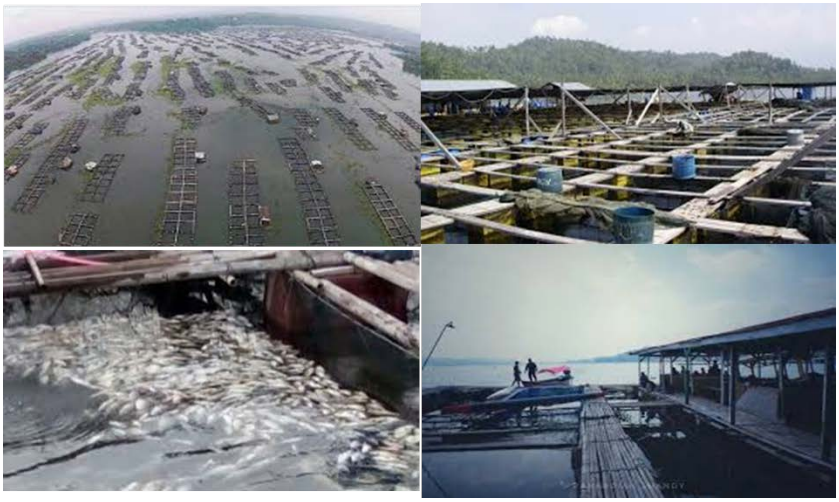

Fig. 1. Floating Net Cages in Jatiluhur

As of April 25, 2019, each farmer is required to re-register. The floating net cage aquaculture business will continue and pay attention to environmental conditions. The low coverage value is due to a circular letter of re-registration (monitoring) given by the task force team to all the owners. It is essential to consider that monitoring information needs to be increased to minimize the level of fraud.

Many farmers deliberately fill their ponds with fish seeds intended to be subject to control. No agreement has yet been reached against violators of the Regulation. Sanctions apply to floating net cage control officers who are responsible for carrying out their duties.

3.2. Rejection of the Utilitarian

As stated in the various community responses, the effectiveness of the Clean Lake Jatiluhur Operations Program (Fig. 2) will determine the program's success. Several barriers will be identified during this program that will affect the program's effectiveness. As expressed by the employee of the authority, most farmers believe that the community's negative impact will be more than positive, especially with regard to the socio-economic conditions of farmers after the reduction. It appears that community involvement in the Clean Lake Jatiluhur Operation program is crucial to the program's success. Many refused to do so because they did not want to lose their livelihoods. There were quite a few obstacles to the implementation of the task force team.

Fig. 2. Clean Lake Operation Program

It can be seen from the Fig. 3 that most (60 per cent) floating net cage farmers (36/60) reject the Clean Lake Jatiluhur Operations Programme. It is because their economic interests are considered to be more important and more useful to them than their long-term benefits, namely environmental hygiene.

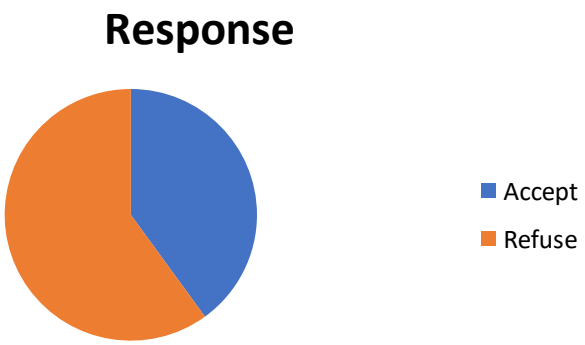

Fig. 3. Farmers' Response to the Clean Lake Jatiluhur Operation Program

It is rare for farmers to take part in the rescue of the Jatiluhur reservoir. Poor people can not be justified by behavior that seizes natural resources, writes author. The deterioration of their environment causes food shortages, exacerbating poverty's situation into a vicious cycle of poverty, he writes. Adequate water protection not only reduces natural disasters such as drought but can also fertilize the soil and maintain or increase productivity, he says. It is hoped that if farmers begin to feel aware of the Reservoir's status, the program to be implemented will receive full support.

Jatiluhur Reservoir is home to 3.500 workers and their livelihoods. Loss of livelihood is a significant threat to fish farmers in the Jatiluuhur reservoir. Labor is needed in the floating net cages aquaculture business, particularly in feeding and maintaining ponds. The number of workers has been reduced to reduce expenditure costs. Fish farmers are starting to feel worried

about planting fish in floating net cages for fear of being disciplined by the Clean Lake Jatileuur Operation Task Force team, so sometimes they leave some of their ponds empty.

In general, farmers in the Jatiluhur Reservoir have not yet wanted to replace their livelihoods. Only a few farmers want to change livelihoods to other business fields, such as trading or raising livestock. Changes in the direction of work cannot be separated from the influence of different factors, one of which is income level. The amount of profits generated by farming floating net cages keeps farmers alive in this business. The reduction in floating net cage plots has a significant impact on the level of floating net income cages farmers.

Clean Lake Jatiluhur Operation helps some farmers who find it difficult to meet daily necessities. Families with a large number of family dependents and the existence of dependents to finance children's educational needs.

3.3. Results of the Lake Jatiluhur Clean Operations

The Table 1 contains a summary of the comparative data between both the control operation targets and the number of floating net cages that were successfully disciplined in 2016-2019:

Table 1. Data Recapitulation of the Number of Targets of the Operation (SJ, 2020)

Year	***Controlling Targets (Plots)***	***Number of Floating Net Cages Reduced (Plots)***	***Total Net Cages After Reduced (Plots)***
2016	-	1.536	24.415
2017	2000	1.797	22.618
2018	3000	2.535	20.083
2019	5000	3.256	16.827
Amount		**9.124**	**16.827**

There were no targets for control operations at the beginning of 2016, as the project was still undergoing a trial period. In 2017, the target for reimbursement operations increased to 2,000 plots in one year in 2017. The plan for 2019 was approximately 5,000 cages, of which 3,256 cages were reduced within four months. The response of floating net cages farmers to the satisfaction of the various facilities provided by the Clean Lake Jatiluhur Operation Task Force should be analysed, says PJT II Employee (SJ, 2020). The facilities provided to support the floating net cage control program's implementation include tugboats, small boats, water polo boats, and individual control officers. 15,000 plots will reduce the number of floating net cages in the Jatiluhur Reservoir by the end of 2020.

First, there was a reduction in the amount of floating net cages. Fig. 4 shows that data in dynamics. Before the implementation of the Clean Operation Control Program for Lake Jatiluhur, various efforts were made to disseminate information on the program to be carried out to floating net cages farmers in the Jatiluhur Reservoir.

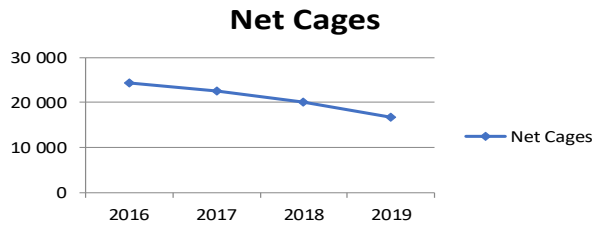

Fig. 4. Development of Reduction in Floating Net Cages in Jatiluhur Reservoir

Second, the number of respondents felt that the quality of the water had improved. The improvement in water quality is one of the planned production variables of the performance of the Operations program for Clean Lake Jatiluhur through the reduction in the number of floating net cages in the reservoir of Jatiluhur to improve water quality and make immediate sense of the benefits of people living near the reservoir.

The water quality has improved with the reduction of floating net cages. Chemical Oxygen Demand (COD) is one of the parameters that can be used to determine the number of organic substances in water. COD values in the Jatiluhur reservoir ranged from 65-172 mg / l in 2016- 2019. This value is above the standard threshold for drinking water quality.

Table 2 and Fig. 5 confirm a significantly reduction in COD since the program became implementing.

Table 2. Development of Water Quality in Jatiluhur Reservoir seen from COD (SJ, 2020)

Year	*COD detected*	*COD standardized*	*COD Excessed*
2016	160	10 mg/l	150
2017	130	10 mg/l	120
2018	100	10 mg/l	90
2019	65	10 mg/l	55

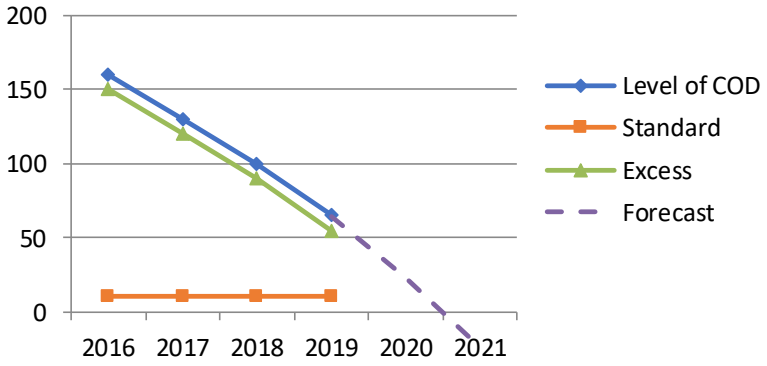

Fig. 5. Development of the Level of Bad Quality of Water in Jatiluhur Reservoir

We have also added the forecast trend to Fig. 5. It is seen that in the case of current trend continuation, the COD will meet the Standard requirements at the end on 2020 – the beginning of 2021. However, for now there are not statistical data for 2020 year.

Third, the control program for floating net cages belongs to all floating net cages of farmers. A plan will run more effectively if it has the full support of the community. The Purwakarta Regency Government's efforts to implement the Clean Lake Jatiluhur Operation program belong to all communities. For example, this is done by transferring professions from agriculture to services such as food and water sports equipment rental, so that fish farmers do not lose their jobs.

There is jealousy among the floating net cage farmers, because they feel they are being mistreated. Most farmers support the implementation of the program. If viewed from improving the environment's quality, some people believe that it will undoubtedly be valuable and beneficial. It is hoped that the local government will immediately provide a solution to minimize concerns about the negative impacts that will be caused, as feared by floating net cages in the Jatiluhur Reservoir. They are concerned about increasing poverty in Purwakarta, unemployment, the risk of children leaving school.

If the Jatiluhur reservoir is completely emptied from the cultivation of floating net cages, additional solutions are needed to supply the fish supply from the reservoir. The local government can also build a fish production center and a museum, and tourists can learn directly about the management of fish for marketing purposes. The existence of a recreational and educational pattern of fish cultivation development is about providing fish and creating new jobs, especially for farmers who have lost their livelihoods. But in order to make this happen, various kinds of challenges will, of course, be identified, such as the need for substantial funding.

Is it sufficient to base arguments for conservation on nature's inherent value, irrespective of the services and economic benefits of biodiversity to humans? This question is part of much of the recent debate, which has led to calls for a more inclusive approach to conservation. The utilitarian value (or instrumental value) of nature has also penetrated human beings. Utilitarian values are often linked to monetary valuations. If it exceeds the value of nature's inherent value, what happens is the destruction of nature itself. It is a problem that must always be faced by the community and the government. The natural environment can be maintained by preserving and rehabilitating existing natural resources.

Local authorities must continue to be a competent environmental facilitator. Governments in developing countries cannot fully undertake public works in water control due to a lack of budget and human resources. Community participation in water control must be encouraged.

4. Conclusions

Government attempts to enforce the program on the one hand and the numerous organizations/teachers' attempts to demonstrate the value of environmental conservation have contributed to a rise in the local population's consciousness and, despite the refusal of all farmers, the number of cages has decreased. Mental development is also necessary and may be effective with the help of organizational arrangements.

Acknowledgments

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