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The Role of Cage System Fish Farming on the Empowerment and Economic Strengthening of the Community of Gredek Village, Gresik Regency

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Abstract: The implementation of cage-based fish farming in Gredek Village, Gresik Regency, serves as a key community empowerment strategy to enhance local welfare through aquatic resource utilization. This study aims to identify the challenges in implementing the program and provide recommendations for improvement. Using a qualitative descriptive method, data were collected through interviews with fish farmers, cooperative managers, and representatives from the Gresik Fisheries Department. Results show that 85% of farmers have basic cage management and feeding skills, yet 70% face difficulties in marketing and accessing capital. Around 65% lack knowledge of water quality and fish health, increasing the risk of crop failure, while 80% report fluctuating feed prices that reduce production efficiency. Despite these constraints, the program has improved community capacity and technical skills. For greater sustainability, efforts should focus on stabilizing feed prices, enhancing financing access, expanding marketing networks, and strengthening training in water quality and fish health management. Improved infrastructure is also essential to support long-term program sustainability.

Keyword: Raft System Fish Farming, Community Empowerment, Village Community Welfare

INTRODUCTION

Community empowerment is the responsibility of academics as part of educational institutions that play a role in improving community welfare. This empowerment is a strategy for building communities by focusing on local problems and needs (Setiawan et al., 2021). Considering the current situation of rural communities who are still living in poverty and economic backwardness, there is a need for empowerment programs that can improve the economic

conditions of villages, so that communities become more prosperous and independent by utilizing the resources they have.

A community empowerment program that has the potential to develop rural community resources is through aquaculture development. According to data from the East Java Statistics Agency (BPS) (2023), aquaculture potential reaches more than 1.2 million tons. Gresik Regency, including Gredek Village, is a major contributor to this sector. This data indicates that the fish farming sector has significant potential for further development in rural areas, including Gredek Village, which boasts natural resource potential and favorable market access.

The legal foundation supporting this empowerment program is Law Number 6 of 2014 concerning Villages, which states that villages have the authority to manage their natural resources and village assets to improve community welfare. In addition, Government Regulation Number 60 of 2007 concerning the Conservation of Fish Resources emphasizes the importance of sustainable fisheries resource management, making fish farming development a strategic step in enhancing community prosperity.

Fish farming serves not only as a primary source of income for many families but also as a means of providing employment opportunities for individuals who were previously engaged in agricultural or other less productive sectors. As this sector develops, the people of Gredek Village are able to improve their standard of living through stable and sustainable income generated from fish farming, directly contributing to their overall welfare.

Beyond its economic and health benefits, the fisheries sector also generates a multiplier effect on the local economy. The success of fish farming stimulates the growth of various supporting businesses, such as fish feed supply, fish distribution and sales, as well as fish processing industries. Fish farming thus creates an economic ecosystem involving multiple sectors, with its impact extending beyond fish farmers to other business actors engaged in the fisheries value chain (Mayasari, 2023).

The fisheries sector plays a vital role in stabilizing the village economy. In times of economic uncertainty, fish farming has proven to be more resilient to economic fluctuations compared to other sectors (Fianti, 2023). The relatively stable fish market and the continuously increasing demand, both in local and regional markets, have enabled this sector to sustain growth. This makes it a reliable economic buffer for Gredek Village, even during economic crises.

As the fisheries sector particularly fish farming continues to develop, the overall welfare of the community improves. Higher income from fish farming provides better access to healthcare, education, and other basic needs. Moreover, with a stable income, residents can invest in housing development, improve their quality of life, and contribute to the social and economic advancement of Gredek Village. Therefore, the fisheries sector, especially through cage fish farming, not only serves as the backbone of the local economy but also as a key element in promoting sustainable community welfare.

Like many other rural areas, the community of Gredek Village faces various socio-economic challenges that affect their quality of life. One of the major issues is poverty, which stems from limited access to economic opportunities. Most residents depend on traditional agriculture, which often fails to generate adequate income due to factors such as unpredictable weather, fluctuating commodity prices, and limited productive land. As a result, many families in Gredek Village live below the poverty line.

Unemployment also poses a significant challenge in Gredek Village. The lack of job opportunities outside the agricultural sector means that most of the working-age population does not have stable employment. Many are trapped in seasonal or informal work that fails to provide sufficient income to meet daily needs. The limited availability of alternative jobs has made it difficult for young people in the village to achieve economic independence, often leading to

migration to urban areas in search of employment—though this move does not always guarantee better economic conditions.

Restricted access to business capital is also a socio-economic problem faced by the people of Gredek Village. Many residents aspire to start or expand their cage fish farming operations but lack sufficient access to financing or capital support. This situation is worsened by the scarcity of credit programs that are accessible and favorable to small-scale farmers and fishers. Consequently, their potential to increase income through fish farming or other business ventures is hindered, further perpetuating the cycle of poverty within the village.

Community empowerment through fish farming using the cage system is an effective solution to address socio-economic challenges in Gredek Village. The cage system allows the community to optimize the use of local water resources to produce fishery products with high economic value. Through this program, residents are not only taught technical skills in fish farming but are also encouraged to become more economically independent by managing fishery enterprises sustainably.

One positive impact of the cage fish farming program is the increase in community income. By farming fish more efficiently, residents can boost production and sell it in local and regional markets. The rising demand for fish allows farmers in Gredek Village to earn a stable income while also creating new job opportunities in cage preparation, fish maintenance, and harvest distribution.

This program is often accompanied by training and technical assistance, enabling community members to learn about fishery business management, financial management, and more efficient and environmentally friendly fish farming techniques (Rofikoh, 2022). The development of these skills is crucial, as it provides opportunities for the community to continue growing and innovating. In addition, cage farming activities are typically conducted in groups, which helps strengthen social cohesion and solidarity among residents.

Based on the explanation above, the author intends to conduct a study entitled “The Role of Cage System Fish Farming on the Empowerment and Economic Strengthening of the Community of Gredek Village, Gresik Regency” This research aims to analyze the effectiveness of community empowerment programs through cage system fish farming, evaluate their socio-economic impacts, and identify the challenges faced in implementing the program.

METHOD

Type of Research

In this study, a qualitative method was chosen to analyze community empowerment through the cage fish farming system in Gredek Village, Gresik. The selection of this method aligns with the research focus exploring an in-depth understanding of how the empowerment program operates and its impact on improving community welfare. This approach also identifies supporting and inhibiting factors that influence the program’s success. The research results are expected to provide recommendations for developing more effective empowerment programs in the future.

Research Focus

The focus of this research is community empowerment through the cage fish farming system in Gredek Village, Gresik. The goal is to understand the extent to which the cage system can improve community welfare by optimizing local resources. The study also identifies supporting and inhibiting factors in implementation and examines its impact on economic independence and the management of the village’s natural resources. The analysis employs Jim Ife’s (1997) Community Empowerment Theory, which includes four key aspects: resource provision, opportunity, knowledge, and skills. These aspects form the analytical framework for understanding how local fishery potential can be utilized to promote sustainable community empowerment.

Research Location

The research location is the site where the researcher observes, explores information, and collects data. In this study, the research was conducted in Gredek Village, Dudusampeyan Subdistrict, Gresik Regency, East Java. This village was chosen because it has great potential in aquaculture, particularly in cage fish farming, and is one of the key contributors to fishery production in Gresik Regency. Additionally, the location provides good access to natural resources and local markets, which are essential supporting factors for this study.

RESULTS AND DISCUSSION

The results of the study show that the **role of fish farming in the cage system in empowering and strengthening the economy of the people of Gredek Village, Gresik Regency**, has a significant influence on increasing the skills, income, and economic independence of the community. This empowerment program is carried out through a participatory approach between the village government, the Fisheries Service, and fish farming groups (Pokdakan), who jointly design, implement, and evaluate activities to achieve the goal of improving the welfare of the village community.

Gredek Village is an area with considerable potential for water resources and favourable environmental conditions for fish farming activities. Most of the population makes a living in the agriculture and fisheries sectors, so cage system fish farming activities are one of the economic alternatives that are relevant to local potential. Supports for village infrastructure such as irrigation canals, stable water sources, and adequate road access also support the success of this program. The potential of these resources is used by the village government to develop sustainable community economic activities through a cage fish cultivation system in village waters.

The implementation of community empowerment programs through fish farming in cage systems is carried out in stages. The first stage is **planning and socialization**, which is carried out openly and participatively to ensure that the program is in accordance with the needs of the community. Furthermore, **technical training** was carried out, where the community gained knowledge about how to make cages, feed management, fish disease control, and good harvesting techniques. After that, the community received **field assistance** from Fisheries Service officers to ensure that the application of cultivation techniques ran according to standards and to help overcome technical obstacles in the field. The last stage is **institutional evaluation and strengthening**, which is carried out through the establishment of a fish farming group (Pokdakan) as a forum for collaboration, discussion, and program sustainability.



Figure 1. Implementation Activities of Empowerment

Based on the results of interviews with the community and related officials, most of the respondents stated that this program was effective in improving the technical capabilities and productivity of the community. Around **85% of participants** have been able to manage fish farming activities independently after participating in training and mentoring. Some participants have even developed new businesses based on fish product processing, such as making smoked

fish and processed fish feed independently, which have also increased economic added value at the household level.

From an economic perspective, the implementation of the cage system fish farming program has a real impact on increasing community income. On average, people experienced an increase in income **of 25-30%** compared to before participating in the program. The increase occurred because the community was able to increase production and save operational costs through innovation of locally sourced alternative feed. From the social side, fish farming activities also strengthen solidarity and the spirit of mutual cooperation between residents. Fish farming groups are a forum to share experiences, exchange knowledge, and help each other in overcoming business obstacles. This shows that the program not only improves the community's economy, but also strengthens social cohesion at the village level.

The results of the study also show that the success of this empowerment program cannot be separated from several **supporting factors**, including the potential of abundant natural resources, support from the village government and the Fisheries Service, as well as the enthusiasm and spirit of community cooperation. However, there are still a number of **obstacles**, such as fluctuations in feed prices that affect production costs, limited capital for small communities, and limited market access. Even so, the community has shown adaptive ability through alternative feed innovation and self-marketing strategies, which illustrates their increasing capacity and independence in the face of economic challenges.

Overall, the results of this study illustrate that the cage system fish farming program in Gredek Village has succeeded in empowering the community and strengthening the local economy through increasing skills, knowledge, and social solidarity. This program is a concrete example of the application of the concept of community empowerment based on local potential that is able to provide a sustainable socio-economic impact for villagers.

DISCUSSION

Community empowerment through fish farming in the cage system in Gredek Village represents an effective local potential-based economic development strategy to improve community welfare. Prior to the program implementation, the community faced several obstacles, including limited access to resources, lack of technical knowledge, and insufficient managerial capacity. Through the empowerment program facilitated by the village government and the Fisheries Office, the community received comprehensive support in the form of training, provision of facilities, and institutional strengthening of local fishery enterprises.

Based on the results, community empowerment in Gredek Village is reflected through four main aspects as outlined by **Jim Ife (1997)**, namely the provision of resources, the creation of opportunities, the enhancement of knowledge, and the development of skills.

First, the provision of resources is implemented through the distribution of fish cages, seeds, and financial assistance from the local government. This support has helped the community improve productivity and efficiency in aquaculture activities. Nevertheless, challenges remain, particularly fluctuations in feed prices and limited access to financing, which constrain business expansion. These findings align with the mandate of **Law Number 6 of 2014 on Villages** and **Government Regulation Number 27 of 2021** concerning the Implementation of the Marine and Fisheries Sector, both of which emphasize the sustainable utilization of local resources.

Second, the provision of opportunities is realized through the active involvement of community members in technical training and decision-making processes. This inclusivity fosters a sense of ownership and collective responsibility within the program. However, limited market access and unstable fish prices continue to hinder economic growth. This initiative aligns with **Law Number 25 of 2009 on Public Services** and **Ministerial Regulation Number 41 of 2014 on the**

Empowerment of Marine and Fisheries Communities, emphasizing the importance of public participation in development processes.

Third, knowledge improvement is achieved through continuous training and mentoring activities designed to strengthen technical expertise in fish farming, water quality management, and fish health maintenance. These efforts have proven effective in enhancing community understanding of **Good Fish Farming Practices (CBIB)** as stipulated in **Ministerial Regulation Number 49 of 2011**, leading to more sustainable and environmentally friendly aquaculture practices.

Fourth, skill development focuses on both technical and managerial aspects, including cage maintenance, financial recording, and production management. This increased skill capacity has made the community more professional and self-reliant in managing fish farming businesses. Such initiatives are consistent with **Law Number 20 of 2003 on the National Education System**, which highlights the importance of non-formal education in building community capacity.

Beyond these four main aspects, the study also identifies several supporting and inhibiting factors affecting program implementation. The supporting factors include the availability of adequate natural resources, strong support from the local government, and high community cooperation through joint business groups (*Pokdakan*). Conversely, inhibiting factors consist of feed price fluctuations, limited access to capital, narrow market reach, and suboptimal infrastructure facilities.

Overall, the empowerment program through the cage system fish farming in Gredek Village has generated a positive impact on enhancing the community's technical skills, knowledge, and income levels. The program has successfully developed the community's social and economic capacities, although further strengthening is still needed in market access and financial support to ensure sustainability.

These findings reinforce the **theory of community empowerment**, which emphasizes that the success of community-based development depends on active community participation and sufficient structural support. Therefore, empowerment through fish farming in the cage system not only increases income but also strengthens social independence and economic resilience within rural communities.

CONCLUSION

Community empowerment through fish farming using the *keramba* (floating net cage) system in Gredek Village reflects Jim Ife's theory, which emphasises four key aspects: resources, opportunities, knowledge, and skills. In this study, these aspects are interconnected in enabling the community to develop independent and sustainable fish farming practices using the *keramba* system. The provision of resources such as cages and fish seeds, the enhancement of knowledge through training, the creation of opportunities through market access, and the development of technical and managerial skills have become key steps in ensuring the success of this empowerment program, which ultimately aims to improve community welfare. The conclusions can be summarized as follows:

- 1) Provision of Resources: Community empowerment in Gredek Village through the *keramba* fish farming program has proven effective in improving community welfare by providing access to essential resources such as cages, fish seeds, feed, and financial support. This aligns with Jim Ife's theory, which asserts that the provision of resources is a crucial initial step in the empowerment process, as it ensures that the community has an adequate foundation to create sustainable and positive change. With the availability of these resources, the people of Gredek Village have been able to increase the productivity of their fish farming activities, although further evaluation is still needed to address constraints such as limited access to financing and fluctuations in feed prices that affect the program's sustainability.

- 2) Opportunities: The keramba fish farming program in Gredek Village provides opportunities for the community to participate actively in various activities such as technical training, mentoring, and fishery business management. These opportunities enable the community to enhance their aquaculture skills, optimize production outcomes, and participate in decision-making related to fishery activities. Although some challenges remain such as limited market access the program has had a significant positive impact on increasing community income and welfare.
- 3) Knowledge: The improvement of community knowledge in Gredek Village regarding keramba fish farming through training and mentoring plays an important role in enhancing productivity and business sustainability. The education provided covering topics such as cage management, feed application, and water quality control has helped the community gain confidence and independence in managing their fish farming activities. With better knowledge, the community is more capable of addressing challenges such as fish health management and environmental sustainability, which in turn have positive economic and social impacts on their welfare.
- 4) Skills for the Community: The skill development programs in keramba fish farming in Gredek Village have helped the community improve their technical, managerial, and marketing abilities, which are essential for running their businesses independently. These improved skills not only enhance aquaculture productivity but also build confidence among community members to manage their businesses, minimize financial risks, and take advantage of broader market opportunities. This positive impact demonstrates that well-targeted skill training can sustainably empower the community and make a tangible contribution to improving their welfare.

In conclusion, this study demonstrates that community empowerment through *keramba* fish farming in Gredek Village, Gresik Regency, has positively contributed to improving community welfare, although several challenges remain. Guided by Jim Ife's empowerment theory, resources, opportunities, knowledge, and skills have been applied through the provision of cages, fish seeds, training, and both technical and managerial mentoring, enabling the community to manage aquaculture more effectively. The program also aligns with Law No. 6 of 2014 on Villages, which emphasises utilising local potential to enhance welfare. However, issues such as fluctuating feed prices, limited access to financing, and distribution constraints continue to hinder program optimisation. Therefore, ongoing evaluation and development efforts are essential to ensure the program operates more comprehensively and delivers a greater long-term impact on the welfare of the Gredek Village community.

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