

Ornamental Fish Cultivation Development through Education and Entrepreneurship to Empower Youth

Bagus Dwi Hari Setyono^{1*}, Rangga Idris Affandi¹, Syawalina Fitria¹, Muhammad Sumsanto¹, Yuliana Asri¹, Septiana Dwiyanti¹, Rhojim Wahyudi², Rusmin Nuryadin², Abd. Saddam Mujib², and Sahrul Alim¹

¹Aquaculture Study Program, Faculty of Agriculture, University of Mataram, Mataram, West Nusa Tenggara, Indonesia

²Marine Science Study Program, Faculty of Agriculture, University of Mataram, Mataram, West Nusa Tenggara, Indonesia

*bagus.setyono@unram.ac.id

ABSTRACT

Freshwater ornamental fish farming has high economic potential, but youth participation in rural areas is still low due to limited access to technical training and entrepreneurial literacy. This community service program aims to empower youth communities in Bagek Nunggal Hamlet, West Lombok, by developing ornamental fish farming based on education and entrepreneurship. The implementation method includes technical training in ornamental fish farming (guppy, platy, molly) with a simple biofilter system, entrepreneurship training, and assistance in establishing community business units. Participatory surveys showed that 76.7% of respondents did not have cultivation skills, and 83.3% had never participated in business training. The results of the activities showed a significant increase in the participants' technical knowledge, entrepreneurial motivation, and digital marketing skills. This program succeeded in encouraging the formation of joint business groups and growing a sustainable local entrepreneurial ecosystem. This intervention proves that an integrative approach between technical training, entrepreneurship, and utilizing local assets can increase young rural communities' capacity and economic independence.

Keywords: Community Business; Entrepreneurship; Ornamental Fish; Technical Training; Youth Empowerment

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INTRODUCTION

Freshwater ornamental fish farming is one of the fisheries sub-sectors with high economic potential in the domestic and export markets. According to the [Kementerian Kelautan dan Perikanan \(2023\)](#), the export value of Indonesian ornamental fish in 2022 reached USD 34.6 million, an increase of 8.2% from the previous year. The main export markets include Singapore, Japan, Germany, and the United States, with freshwater ornamental fish such as guppies, koi, and discus dominating ([FAO, 2021](#)).

However, the involvement of local communities, especially young people in rural areas, is still very low. Low access to technical training, entrepreneurial literacy, and connectivity to online markets influences this. In Bagek Nunggal Hamlet, Peteluan Indah Village, Lingsar District, West Lombok Regency, the local youth community showed a collective spirit in social and environmental activities. However, the results of the initial participatory survey (n=30) showed that 76.7% of respondents did not have technical skills in ornamental fish farming, and



83.3% had never attended entrepreneurship training. This data is supported by in-depth interviews that show limited access to training, initial capital, and market information. Meanwhile, the potential of water and the use of yard land is sufficient to be developed as a household-scale cultivation area.

The gap between resource potential, technical skills, and market access requires structured and educational interventions. According to [Hakim et al. \(2021\)](#), technical skills in cultivation and marketing strategies are two important factors that determine micro-enterprises' success in the fisheries sector. Therefore, the solution offered is developing an ornamental fish cultivation training program that is integrated with strengthening entrepreneurship and creating community-based business units. This empowerment model refers to the principles of participatory, local asset-based, and market orientation ([Handayani et al., 2020](#)).

This program addresses the community's actual needs with an intensive training approach, business assistance, and strengthening partnership networks. A study by [Tongsakul et al. \(2017\)](#) showed that a contextual education approach based on local potential has increased economic empowerment and social cohesion at the community level. The program's main objective is to increase the youth's capacity in freshwater ornamental fish cultivation, foster an entrepreneurial spirit, and encourage the formation of sustainable and independent business units.

The selection of ornamental fish as the focus of the program is based on an analysis of economic and ecological feasibility. Fish such as guppies, platies, and mollies have a short life cycle, simple spawning techniques, and stable market demand ([Afriani et al., 2021](#)). According to [Endrawati et al. \(2021\)](#), a simple recirculation and biofilter system can be applied efficiently in household-scale ornamental fish farming. In addition, the potential profit margin from each cultivation cycle (40–45 days) can reach 60–85%, depending on production efficiency and marketing strategy.

Strengthening entrepreneurial capacity is an important pillar in this program in addition to technical aspects. Training includes business planning, financial recording, digital marketing, and product packaging. Good entrepreneurial literacy has been shown to increase the resilience of small businesses in the fisheries sector ([Muchlis et al., 2020](#)). Furthermore, support from local facilitators and collaboration with MSMEs also strengthen the success of the program, as shown by [Yuniarti et al. \(2022\)](#).

By integrating technical, educational, and entrepreneurial approaches, the ornamental fish cultivation development program in Bagek Nunggal Hamlet is expected to create sustainable economic, social, and environmental impacts. This model not only improves the skills and income of the youth community but also fosters an entrepreneurial ecosystem based on local resources that is adaptive to market and technological changes. This community service program aims to empower youth communities in Bagek Nunggal Hamlet, West Lombok, by developing ornamental fish farming based on education and entrepreneurship.

METHOD

This community service activity was carried out from March 8 to April 19, 2025, in Bagek Nunggal Hamlet, Peteluan Indah Village, Lingsar District, West Lombok Regency. This location was chosen based on the results of participatory mapping, which showed the enthusiasm of local youth for productive activities and the potential of waters that support ornamental fish cultivation. This community service is a continuation of previous activities by [Setyono et al. \(2024\)](#). The approach used was the participatory action research (PAR) approach, which actively involved the community in the entire process, from planning to evaluation. This method was chosen to increase the sense of community ownership of the program.

The activity stages consist of four main phases: (1) identification of community needs, (2) technical and entrepreneurship training, (3) household-scale ornamental fish cultivation practices, and (4) evaluation and follow-up. In the first stage, a needs survey was conducted through questionnaires and in-depth interviews with 30 local youth to identify ornamental fish preferences, initial knowledge, and technical and market barriers. A community SWOT analysis was also conducted to formulate targeted intervention strategies.

The second stage is a 14-day intensive training divided into two main sessions: a technical session and an entrepreneurship session. Technical training includes guppy and platyfish spawning techniques (3 days), water quality management and simple biofilters (4 days), and natural and artificial feed (2 days). The entrepreneurship session lasts 5 days, including business planning using a canvas model, simple application-based financial recording, digital marketing through social media (Instagram and TikTok), and attractive product packaging techniques. The quantitative target of the training is that at least 80% of participants ($n = 24$ out of 30 people) can understand and practice the training material based on a minimum post-test score of 75.

The third stage is the implementation of independent cultivation practices by participants. Each small group (3-4 people) is facilitated with one unit of 200-liter cultivation media, an aerator, fish seeds (± 30 fish/group), and feed for one cycle (45 days). Technical assistance is carried out twice weekly to ensure technical success and feed efficiency. Indicators of successful cultivation include survival rate (SR) of at least 85%, daily growth rate (SGR) of at least 2.5%/day, and feed efficiency (FCR) < 1.8 . The target is for all groups to be able to produce fish ready for sale in 6 weeks and be able to calculate simple business profit projections.

The final stage is the evaluation of the program, and the instruments used are pre-test and post-test measurements, direct observation, and focus group discussions (FGD). Evaluation is conducted to assess the increase in participant capacity, the effectiveness of training media, and the potential for business unit sustainability. Quantitative data are analyzed descriptively and comparatively, while qualitative data from FGDs are analyzed thematically. The final target of the program is the formation of at least five youth business groups with initial business plans that are ready to be incubated and recommended for further assistance programs for fisheries MSMEs.

RESULT AND DISCUSSION

The implementation of community service activities from March 8 to April 19, 2025, in Bagek Nunggal Hamlet, Peteluan Indah Village, Lingsar District, West Lombok Regency, produced several findings that showed a significant impact on increasing the technical and entrepreneurial skills capacity of participants. The initial survey showed that 76.7% of respondents ($n = 30$) did not have technical skills in ornamental fish cultivation, and 83.3% had no experience in entrepreneurship. After participating in the training, 80% of participants showed an increase in ornamental fish cultivation skills, as reflected in the post-test score, which averaged more than 75, with an increase in entrepreneurial skills recorded at 60%.

Technically, of the eight groups that participated in the cultivation practice, seven groups achieved a fish survival rate (SR) above 85%, with an average daily fish growth (SGR) of 2.8% per day, higher than the minimum target of 2.5%. Feed efficiency (FCR) was recorded below 1.8, with an average value of 1.5, indicating that the implementation of a biofilter system and good water quality management has succeeded in increasing production efficiency, which can be seen in Figure 1.

From the entrepreneurial side, 70% of participants could create a simple business plan by recording income and expense projections and conducting marketing through social media. The results of ornamental fish sales at the end of the cultivation cycle showed that five groups achieved a profit margin of around 60–70% by the set target. In addition, feedback from focus group discussions showed that 85% of participants felt more confident in running an ornamental fish cultivation business independently after participating in the training.



Figure 1 Youth implement good water quality management

The results obtained from this community service program indicate that the integration of ornamental fish cultivation technical training and entrepreneurship strengthening has a significant impact on youth empowerment in Bagek Nunggal Hamlet which can be seen in Figure 2. The increase in technical skills in ornamental fish cultivation is reflected in the high fish survival rate (SR), which is more than 85%. This follows the findings of [Endrawati et al. \(2021\)](#), which stated that applying a biofilter system in freshwater fish cultivation has been shown to improve water quality and the success of ornamental fish maintenance on a household scale. The simple biofilter system, which is taught in this training, can significantly enhance the quality of water, which leads to increased feed efficiency and accelerates the life cycle of fish.



Figure 2 Increased youth skills in ornamental fish cultivation

Applying proper spawning techniques also plays a vital role in the success of ornamental fish cultivation. Fish such as guppies and platies have a short life cycle and can be spawned efficiently using simple methods that participants have learned ([Andriani et al., 2020](#)). A study by [Tongsakul et al. \(2017\)](#) showed that community-based technical training that emphasizes practical skills can have a positive impact on increasing agricultural or fisheries productivity in local communities. In this context, participants' success in managing ornamental fish farming is a direct result of the application of spawning techniques taught in the training, which can be replicated in the future.

Overall, the household-based ornamental fish farming system implemented in Bagek Nunggal Hamlet showed high efficiency, with results approaching or exceeding the set targets. The ornamental fish seeds produced can be seen in Figure 3. The recorded profit margin of between 60% and 70% at the end of the ornamental fish farming cycle confirmed that this

program could contribute to improving the economic welfare of participants. These results indicate that freshwater ornamental fish farming has enormous economic potential, especially when integrated with proper water quality management, as reported by [FAO \(2021\)](#) in its report on the potential of ornamental fish farming in the international market.



Figure 3 Ornamental fish fry produced

However, although the technical results of ornamental fish farming are encouraging, the biggest challenge in developing this business lies in the entrepreneurial aspect ([Astuti et al., 2022](#)). The entrepreneurship training provided for two weeks showed that most participants had a pretty good basic understanding of business planning and simple financial records. However, there is a reasonably large gap in managing business capital and market access. [Muchlis et al. \(2020\)](#) also emphasized this, stating that adequate entrepreneurial literacy can strengthen business resilience, but business sustainability remains a significant challenge without sufficient financial support.

The problem of having no access to capital to start a business remains a significant obstacle for most participants. Although they have been trained to create a business plan and market products through social media, many participants find it difficult to access financial resources to purchase better equipment or raw materials. Research by [Hakim et al. \(2021\)](#) shows that to increase the competitiveness of small businesses in the fisheries sector, it is essential to provide easy and affordable access to capital and additional training on more in-depth financial management. Therefore, cooperation with local microfinance institutions or MSMEs is needed to facilitate the provision of working capital to participants ([Rahman et al., 2023](#)).

Meanwhile, digital marketing implemented by participants showed positive developments. The use of social media to reach consumers more widely has provided opportunities for participants to market their ornamental fish products. Digital marketing is one of the critical aspects in developing community-based businesses, which has been proven to be able to expand market access, as found by [Yuniarti et al. \(2022\)](#), who stated that collaboration with MSME actors and local facilitators can accelerate the adoption of digital marketing in fisheries communities. This shows that digital-based marketing training can potentially reduce dependence on limited traditional markets.

However, to improve the effectiveness of digital marketing, there is a need to develop a more comprehensive marketing strategy. Participants make more use of social media to introduce their products, but they lack skills in building a brand image or a more planned marketing strategy. This shows the importance of further training in marketing and branding strategies to strengthen their businesses. Research by [Mulyadi & Rizal \(2019\)](#) suggests that strengthening marketing competencies can increase the competitiveness of local products in the global market, which is especially relevant for ornamental fish products with international market potential.

Another obstacle that arises is the dependence on raw materials from natural feed, which are challenging to obtain in the area. Natural feed, such as silkworms and artemia, which are needed to support the growth of ornamental fish, is still limited in availability in the local market. This

can hinder the smooth production of ornamental fish cultivation, even though technically, the participants have mastered the fish maintenance system efficiently. One solution that can be applied is the development of independent natural feed cultivation by participants, which can be an additional economic value for the community. Research by [Sari et al. \(2020\)](#) shows that developing natural feed at the community level can increase the independence of ornamental fish cultivation businesses while reducing production costs.

The program evaluation conducted through focus group discussions also showed that most participants felt more prepared to run their businesses. As many as 85% of participants felt more confident after the training, but they expected further assistance related to capital management and market development. This reflects that although their technical and entrepreneurial skills have improved, there is a need for sustainability in business assistance. This is by the findings of [Tongsakul et al. \(2017\)](#), which showed that ongoing aid is essential to ensure that community-based businesses can develop well after initial training.

Overall, the training carried out in this program has succeeded in improving the technical and entrepreneurial skills of young people in Bagek Nunggal Hamlet. The improvement in ornamental fish farming skills and entrepreneurship has had a positive impact, as seen from better technical and financial results. However, the main challenges that need to be overcome are limited access to capital and the need for ongoing assistance in business management and marketing. This program has provided a strong foundation for developing sustainable household-based fisheries businesses in rural areas. Still, further support from various parties is needed to achieve long-term sustainability.

CONCLUSION

The ornamental fish cultivation development program based on education and entrepreneurship in Bagek Nunggal Hamlet is a strategic intervention that addresses the gap between local potential and the limited capacity of the community, especially young people, to access economic opportunities based on aquatic resources. By integrating technical training, entrepreneurial literacy, and community-based business assistance, this program not only improves skills and income but also strengthens the local entrepreneurial ecosystem that is adaptive, sustainable, and contextual to market and technological changes so that it has the potential to become a replicable empowerment model in similar areas.

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