



Empowering Fish Farming Groups Through Domestication and Cultivation of Environmentally Friendly Local Fish Species on Peatlands

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ARTICLE INFO

Kata Kunci: Adaptive Cultivation, Eco-Friendly Farming, Domesticating Local Fish, Peatland, Community Empowerment

Received : 3 August 2026

Revised : 18 September 2026

Accepted: 19 October 2026

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ABSTRACT

This community service activity aims to improve the knowledge, skills, and independence of fish farming groups (Pokdakan) in Bukit Batu District, Palangka Raya City, in developing local fish based on peatland. The method used is participatory, educational, and practical through stages of observation, needs identification, counseling, training, domestication practice, and continuous mentoring. The results of the service show that partners have developed skills in handling fish, acclimatization, monitoring water quality, feed management, and growth recording. This program serves as an initial foundation for managing local fish farming in a measured, adaptive, environmentally friendly, and sustainable way

INTRODUCTION

Bukit Batu District is an area in Palangka Raya City closely connected to wetland ecosystems, including peatlands and freshwater areas. The presence of bodies of water, canals, ditches, rivers, and peatland areas offers opportunities for developing fisheries based on local resources. However, community farming activities so far tend to rely on commonly cultivated commodities, while the potential of local fish has not been fully utilized as an alternative aquaculture commodity.

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In peatland areas, developing aquaculture requires special attention to water quality, input use, feed, and waste management. Water conditions, which can be acidic and contain relatively high levels of organic matter, mean that cultivation techniques need to be adapted to the environment. Managing water quality is a fundamental part of aquaculture because changes in the environment can affect fish metabolism, oxygen consumption, growth, and health (Boyd, 2020; Ardianor, 2023; Manihuruk, 2026).

Based on these conditions, this community service activity is designed to boost the capacity of fish farming groups in Bukit Batu Subdistrict through domestication and the implementation of cultivation techniques that are adaptive to peatland conditions. The approach places the community as the main actors, with the university acting as a facilitator of knowledge, technology, guidance, and evaluation

IMPLEMENTATION AND METHODS

The activities were carried out in Bukit Batu Subdistrict, Palangka Raya City, targeting fish farming groups (Pokdakan). The method used a participatory, educational, practical approach, along with continuous mentoring. The groups were involved from identifying conditions and needs, determining potential local fish, preparing facilities, domestication and cultivation, monitoring, recording, all the way to evaluation.

Activity Stages

The first stage involves coordination and initial observation to align perceptions, determine locations and participants, as well as identify facilities, water sources, maintenance containers, water management systems, and the group's experience.

The second stage involves identifying the partner's potential and needs through interviews, discussions, observation, and direct monitoring. This identification covers cultivation experience, knowledge of local fish, feed, water quality, fish health, record-keeping, and technology needs.

The third stage involves capacity building through counseling, training, demonstrations, practice, and discussions. The material includes the potential of local fish, principles of domestication, handling, acclimatization, maintenance, feeding, water quality, density, fish health, record keeping, and environmentally friendly cultivation.

The fourth stage involves preparation and the domestication process, including fish selection, preparation of containers and media, handling, acclimatization, controlled maintenance, observation of behavior, feeding responses, growth, and survival.

The fifth stage involves applying adaptive farming techniques by managing stocking density, feeding based on fish needs and responses, monitoring water quality, checking fish health, and managing the rearing medium. The final stage is joint monitoring and evaluation. The data recorded includes the number of fish, their condition, deaths, feeding, water quality, growth, and survival. This data is used to track progress and decide on corrective actions.

RESULTS AND DISCUSSION

Preparation, Coordination, and Partner Identification

The initial coordination focused on building an understanding of the goals, scope, division of roles, resources, and activity stages. Farmer groups were positioned as the main partners and implementers of the activities, while Palangka Raya University acted as facilitator, resource person, mentor, and evaluator. Observations showed that the technology applied needs to take into account the available facilities and the group's abilities, so the principle of appropriate technology becomes the basis for choosing methods (Figure 1).

The identification showed that the group has experience in fishing activities and local knowledge about water conditions, but still needs strengthening in domestication, water quality management, feed management, record-keeping, and the application of adaptive technology. The potential of local fish is seen as an opportunity for commodity diversification, but its development needs to be done carefully, taking into account adaptability, growth, survival, reproductive potential, economic value, and resource sustainability.



Figure 1. Implementation of Coordination and Initial Identification of Problems by the Fish Farming Group

Group Capacity Building

Counseling and training are designed based on identified needs. The material isn't delivered in a one-way fashion but is linked to the community's experiences and followed by demonstrations and hands-on practice. Groups are trained in fish handling, acclimatization, water quality observation, feeding, health monitoring, and record-keeping. The learning pattern of trying, observing, discussing, correcting, and trying again helps connect technical knowledge with field experience (Figure 2).

Introducing record-keeping has become an important part of capacity building. The group is guided to note down the conditions of the fish, feed, water quality, growth, and survival. These records serve as a learning tool and a basis for evaluation so that farm management gradually shifts from just relying on experience to more measured management.



Figure 2. Implementation of Capacity Building for Fish Farming Groups

Preparation and Domestication Process of Local Fish

Domestication is carried out as a gradual adaptation process from the natural environment to a controlled maintenance environment. Preparation includes selecting fish, containers and media, aeration equipment, nets, feed, and tools for measuring water quality. Handling the fish is done carefully because catching, moving, and transporting them can trigger stress responses. After handling, the fish are gradually acclimated by paying attention to water conditions, temperature, and media.

During maintenance, the group observes activities, physical condition, appetite, response to feed, growth, and survival. These responses serve as early indicators of adaptation ability. Feed acceptance is also an important part since fish from the wild may not immediately accept artificial feed. Feeding is done by observing the fish's response and avoiding overfeeding to reduce waste and organic material accumulation.

Water quality monitoring and recording are done regularly. Relevant parameters include temperature, pH, dissolved oxygen, and the general condition of the medium (Figure 3). Environmental data are then linked to the condition of the fish. This approach is important because water quality is one of the main factors affecting fish health and growth (Boyd, 2020; Marium et al., 2023). The activities carried out are the initial stage of domestication; maintaining fish for one period cannot yet be considered full domestication in a genetic sense. The next stage can

focus on broodstock maintenance, controlled reproduction, next generations, and evaluation of offspring performance (Teletchea & Fontaine, 2014; Akhter et al., 2021; Mamani et al., 2023).



Figure 3. Implementation of Capacity Building for Fish Farming Groups

The Application of Adaptive Farming Techniques on Peatlands

Cultivation techniques are applied by taking into account the characteristics of peatland environments and the response of the fish. Management includes stocking density, feed, water quality, fish health, and maintenance media. The group is encouraged not to use methods rigidly but to make adjustments based on actual conditions. This approach is important because peat environments can have water chemistry characteristics and hydrological dynamics that are different from cultivation systems on mineral soils.

Feed management is done based on the fish's needs and responses. Feed efficiency serves a dual purpose: supporting growth while reducing leftover feed that can increase organic load. Water management is also carried out preventively through regular observation and measurement. In this way, the group is guided to recognize changes in conditions before more serious problems arise. The technology used is simple, economical, easy to learn, and can be maintained by the group. This principle is important for sustainability because technology that is too complex or requires high operational costs risks not being continued after the mentoring is completed. In the context of empowerment, appropriate technology is not intended to replace all group practices, but to improve aspects that are the main obstacles.

The implementation of adaptive farming also integrates production and environmental aspects. Using feed and water efficiently, managing leftover feed and waste, and monitoring the condition of the environment are part of eco-friendly farming. This approach also relates to business efficiency since using inputs properly can reduce cost wastage. FAO highlights input efficiency and environmental management as important parts of developing sustainable aquaculture (FAO, 2017; FAO, 2024).

Program Monitoring, Evaluation, and Sustainability



Figure 4. Implementation of Program Monitoring, Evaluation, and Sustainability

Monitoring is done together by the group and the service team to keep track of the progress of domestication and cultivation. The data is used to assess growth, survival, feeding response, and environmental conditions, as well as to identify obstacles and determine corrective actions. This approach strengthens the shift in management from an estimate-based pattern to data-based management (Figure 4).

From an empowerment perspective, the important outcome of the activity is not just the ability to raise fish, but also the group's experience in systematically adapting the fish. The group gains experience in handling, acclimatization, feeding, measuring water quality, observing behavior, and record-keeping. This serves as a foundation for developing local fish as a farming commodity, while still keeping ecological and sustainability aspects in mind.

The activities also show that domestication should be seen as a medium- to long-term process. Future development should focus on maintaining the broodstock, reproduction, the next generations, and performance evaluation. Genetic and ecological aspects also need attention because the interaction between farmed fish and wild fish can have consequences if they are released into the environment (Lorenzen et al., 2012).

CONCLUSION AND RECOMENDATION

1. The community service activities have been carried out through stages of coordination, observation, identification of partner potential and needs, counseling, training, local fish domestication, implementation of adaptive farming, as well as monitoring and evaluation.
2. The activities have improved the group's experience and skills in handling, acclimatizing, maintenance, feeding, monitoring water quality, observing fish health, and recording growth and survival.
3. Cultivation techniques are adjusted to the characteristics of peatland through the management of stocking density, feed, water quality, fish health, and rearing media using simple and easy-to-apply appropriate technology.
4. This community service activity provides a foundation for the development of domestication and farming of local fish in a more measured, adaptive, environmentally friendly, and sustainable way through observation, recording, mentoring, and data-based evaluation.

ACKNOWLEDGEMENT

Thank you very much to the Faculty of Agriculture, Forestry, and Fisheries of Palangka Raya University for the financial support through the Community Service Grant for the 2026 Fiscal Year, the Bukit Batu District Government, fish farming groups as partners, and all parties who have helped the smooth running of this community service activity.

REFERENCES

- Akhter, F., Siddiquei, H. R., Alahi, M. E. E., & Mukhopadhyay, S. C. (2021). Recent advancement of the sensors for monitoring the water quality parameters in smart fisheries farming. *Computers*, 10(3), 26. <https://doi.org/10.3390/computers10030026>
- Ardianor, A., Yusuf, N. S., Handayani, T., & Hamdhani, H. (2023). Adaptation of African and striped catfish in peat water with low pH. *Jurnal Perikanan*, 23(2), 215–227. <https://doi.org/10.22146/jfs.78743>
- Boyd, C. E. (2020). *Aquaculture water quality management*. Wiley-Blackwell.
- FAO. (2017). *Aquaculture development: Guidelines for sustainable development*. Food and Agriculture Organization of the United Nations.
- FAO. (2024). *The State of World Fisheries and Aquaculture 2024: Blue transformation in action*. Food and Agriculture Organization of the United Nations.
- Lorenzen, K., Beveridge, M. C. M., & Mangel, M. (2012). Cultured fish: integrative biology and management of domestication and interactions with wild fish. *Biological Reviews*, 87(3), 639–660. <https://doi.org/10.1111/j.1469-185X.2011.00215.x>
- Mamani, N. C., Santos, L. J. C., Castro-Fuentes, A., Dominguez, O. L., Ramos, L. F., Soto, A. R., Lazo, J. P., & Duncan, N. (2023). Reproductive performance and egg and larvae quality from first generation peruvian grunt *Anisotremus scapularis* (Tschudi, 1846): A comparative analysis with spawns from wild broodstock. *Frontiers in Marine Science*, 10, Article 1287439. <https://doi.org/10.3389/fmars.2023.1287439>
- Manihuruk, W. J., Hasibuan, S., & Firmansyah, R. (2026). Influence of biomass *Lemna* sp. on the physical parameters of peat water in the rearing medium of Asian redbtail catfish (*Hemibagrus nemurus*). *Asian Journal of Aquatic Sciences*, 9(1), 53–65.

- Marium, A., Chatha, A. M. M., Naz, S., Khan, M. F., Safdar, W., & Ashraf, I. (2023). Effect of temperature, pH, salinity and dissolved oxygen on fishes. *Journal of Zoology and Systematics*, 1(2).
<https://doi.org/10.56946/jzs.v1i2.198>
- Milla, S., Pasquet, A., El Mohajer, L., & Fontaine, P. (2021). How domestication alters fish phenotypes. *Reviews in Aquaculture*, 13, 388–405.
<https://doi.org/10.1111/raq.12480>.
- Teletchea, F., & Fontaine, P. (2014). Levels of domestication in fish: Implications for the sustainable future of aquaculture. *Fish and Fisheries*, 15(2), 181–195.
<https://doi.org/10.1111/faf.12006>.
- Teletchea, F. (2018). Fish domestication: An overview. in F. Teletchea (Ed.), *Animal domestication*. IntechOpen.
<https://doi.org/10.5772/intechopen.79628>
- Toomey, L., Fontaine, P., & Lecocq, T. (2020). Unlocking the intraspecific aquaculture potential from the wild biodiversity to facilitate aquaculture development. *Reviews in Aquaculture*, 12(4), 2132–2146.
<https://doi.org/10.1111/raq.12430>