



# Cultivating Fish with the Yumina Bumina System as a Solution to Increasing Community Productivity

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## ABSTRAK

Sektor perikanan budidaya memiliki peran penting bagi pembangunan suatu negara. Akuakultur tidak hanya berperan penting dalam pertumbuhan ekonomi, tetapi juga dalam ketahanan pangan suatu wilayah. Perikanan budidaya menjadi penting karena sektor ini menghasilkan produk atau komoditas yang tidak hanya bernilai ekonomi tinggi tetapi juga bermanfaat secara fungsional. Oleh karena itu, tujuan dari pengabdian masyarakat ini adalah memberikan pendampingan budidaya ikan dengan sistem Yumina Bumina untuk meningkatkan produktivitas masyarakat. Kegiatan pengabdian diawali dengan mengumpulkan informasi melalui wawancara dengan pihak terkait mengenai kekuatan, kelemahan, peluang dan kendala dalam budidaya lele, kemudian dilanjutkan dengan penyuluhan kepada Pokdakan Mina Jaya tentang manfaat dan keberlanjutan serta dampaknya terhadap tingkat produksi dan pemasaran mitra. lele yang dihasilkan. Kegiatan pengabdian masyarakat ini dilaksanakan selama 2 bulan. Mitra dalam kegiatan pengabdian ini adalah Kelompok Budidaya Ikan Lele Mina Jaya yang berlokasi di Banjar Laplap Kauh, Desa Penatih Dangin Puri, Denpasar Timur dengan anggota 17 orang. Hasil dari pengabdian masyarakat ini adalah mitra dapat menerapkan sistem teknologi Yumina-Bumina. Implikasi dari kegiatan ini adalah peluang usaha, peningkatan pendapatan, dan penyerapan tenaga kerja.

## ABSTRACT

The aquaculture sector has an important role for the development of a country. Aquaculture not only plays an important role in economic growth, but also in the food security of a region. Aquaculture is important because this sector produces products or commodities that are not only of high economic value but also functionally useful. Therefore, the purpose of this community service is to provide fish farming assistance with the Yumina Bumina system to increase community productivity. Service activities begin with collecting information through interviews with related parties regarding strengths, weaknesses, opportunities and constraints in catfish farming, then proceed with counseling to Pokdakan Mina Jaya about benefits and sustainability and their impact on partner production and marketing levels. the resulting catfish. This community service activity was carried out for 2 months. The partner in this service activity is the Mina Jaya Catfish Cultivation Group located in Banjar Laplap Kauh, Penatih Dangin Puri Village, East Denpasar with 17 members. The result of this community service is that partners can apply the Yumina-Bumina technology system. The implications of this activity are business opportunities, increased income, and employment.

## 1. INTRODUCTION

Fisheries sector resources are an important resource for people's lives and have the potential to become the main driver of the national economy (Marisda et al., 2020; Nurdiansyah et al., 2022; Yusroni et al., 2021). The evolution in the US catfish industry, tempered by dynamic market forces, has resulted in the development of various farming practices (Kumar et al., 2020). Catfish farming continues to be the largest segment of US fish farming, and US catfish farmers have demonstrated resilience and resourcefulness in adapting to changing economic conditions (Billing, 2018; Engle et al., 2022; Nielsen et al., 2016). Bali Island is an area that has the potential to be developed. aquaculture. There is still a lot of land that has not been utilized optimally, considering that land area is an important element in the cultivation production process (Huwoyon & Gustiano, 2013; Özkan et al., 2019).

Denpasar City is the center of various economic activities on the island of Bali with various aspects, especially in the trade and tourism sectors. While other sectors are more as supporting sectors. One of these sectors is the aquaculture sector. Even though the volume of this sector is not very large, it is still quite

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potential as a source of the community's economy, because it is supported by large market opportunities as well as climatic factors, wind and rainfall, air temperature, air humidity and solar radiation, topography, groundwater and springs (Rantlo, 2022; Tariningsih, 2019). However, in its current development, the City of Denpasar is experiencing problems with the lack of availability of land for aquaculture. Availability of land is the main obstacle to the development of the freshwater sector in urban areas (Ansory & Nilawati, 2018; Instanes et al., 2016).

The Ngurah Rai University PKM (community partnership program) team has made observations of The Mina Jaya Catfish Farming Group (Pokdakan) in the Laplap Kauh Banjar, Penatih Daging Puri Village, Denpasar City, is chaired by I Made Gariyasa and has 17 members. This Pokdakan at this time really need help to deal with various problems encountered. The main obstacle that occurs in the development of this catfish farming business is the rapid development and increase in population which causes increasingly narrow land and reduced sources of water supply for various human needs. Another problem faced is members' lack of knowledge about online marketing, group management and simple bookkeeping.

The Yumina-Bumina system is one of the developments in water-saving and land-saving aquaponic technology by combining fish farming (aquaculture) and soilless plant cultivation (hydroponics) (Mardasarina et al., 2020; Sartika et al., 2023; Supendi et al., 2016, 2021). This aquaponic cultivation technique was first developed in 2005 by the Bogor Research and Development Center for Freshwater Aquaculture (BPPBAT), Marine and Fisheries Research and Development Agency (Supendi et al., 2016, 2021). Yumina stands for Nabati Mina which means Vegetables and Fish, while Bumina stands for Fruit and Mina which means Fruit and Fish (Maulana et al., 2018; Pantanella, 2018; Sarah & Pramulya, 2021). The concept combines fish farming with vegetable/fruit plants (Vegetables planted include kale, pakcoy, lettuce, ka and so on. Fruit plants can be selected from annual types such as chilies, tomatoes, eggplants and so on (Gebhardt, 2016; Kyriacou et al., 2017; Supendi et al., 2021).

With this aquaponic cultivation system, catfish and plants can establish a mutually beneficial relationship (mutualism symbiosis) (Andhikawati et al., 2021; Herjayanto et al., 2021; Sunaryo & Nuraini, 2021). Poisonous feed waste and catfish metabolism are used as nutrients for plants in growing media arranged around ponds. The distribution of pond water to plants can be regulated in various systems (Waningyun & Azizah, 2022; Widyastuti et al., 2022). The system that will be applied to the Pokdakan Mina Jaya catfish pond is an overhead system. Water is supplied upstream through a PVC pipe connected to a water pump in the catfish pond (Harianti et al., 2023; Oktavianna & Pratama, 2019; Zulfanita et al., 2021). The following Figure 1 presents the profiles of partners and ten catfish ponds in Banjar Laplap Kauh Penatih Village.



**Figure 1.** Photo of Community Service Activities Using the Yumina-Bumina System

## 2. METHODS

Increasing fish farming with the Yumina-Bumina technology system is expected to increase the productivity of catfish farming groups and group income. The PKM activity at Banjar Laplap Putih, Penatih Daging Puri Village, East Denpasar District, involved a team of proposals consisting of one chairman and one deputy chairman as well as three members, twenty-four students, and partners, namely the Mina Jaya Catfish Farmers Group (Pokdakan). This activity is planned to be carried out for two months, from October 2022 to December 2022. The stages of implementing this PKM activity are in the form of preparation, training and evaluation. This service activity begins with conducting interviews between the service team

and partners about the strengths, weaknesses, opportunities and obstacles in producing catfish. From the results of the interviews, then designing activities for future development is prepared by taking into account the existing potentials, weaknesses, obstacles and opportunities.

The next activity is training and mentoring to improve knowledge and skills. In the field of production, training activities are a follow-up to program implementation to increase total catfish production by 30%. Training in marketing and simple bookkeeping aims to increase partner sales by 30%. The implementation of the Yumina-Bumina technology system will be guided by Tri Hayatining Pamungkas, ST, MT and Anak Agung Gede Agung Indra Prathama, SH, MH. Simple marketing and bookkeeping training will be provided by the head of the proposing team, Dr. Nyoman Dwika Ayu Amrita, SE, M.Si who has a management economics background. Lectures and training in the field of group management will be provided by a team of proposers who have a background in social sciences and humanities, namely Drs. Dewa Gede Putra Sedana,

The last activity is evaluation, evaluation is carried out periodically in accordance with the progress of the implementation of this program which includes: (1) Evaluation During the Process, this assessment emphasizes aspects of theoretical understanding such as the correct application of the Yumina-Bumina system, online-based marketing, the importance of group management, management finance and bookkeeping simplification; (2) Evaluation of Results (Output), this evaluation emphasizes the monitoring and evaluation aspects of the PKM program to find out the increase in knowledge and skills of partners, considering the Pokdakan partnership pattern to increase the amount of production and market access and marketing, Pokdakan independence, given the limited time for monitoring and mentoring, and partner participation and cooperation.

The success of the Community Partnership Program is largely determined by the participation and cooperation of the partners. Forms of partner participation include providing meeting and training venues, preparing tools and equipment for the Yumina-Bumina system, providing consumption, and facilitating meetings with the Head of Penatih Village, Dangin Puri Village.

### 3. RESULT AND DISCUSSION

#### Results

The Community Partnership Program (PKM) focuses on community service activities that are comprehensive, meaningful and sustainable with the aim of one of the group's efforts in the region. This PKM aims to form and develop community groups so that they are economically independent and create jobs in the countryside. PKM activities provide options for solving problems faced by partners through an integrated approach through surveys and research in the field so that they can be used as a reference for submitting proposals to the related government with the aim of obtaining assistance funds for the development of tourist objects.

This community partnership program activity was carried out at Banjar Laplap Kauh, Penatih Village, Denpasar City. The implementation of this program was considered successful from two indicators. The first indicator is the positive response from village officials and the community, especially catfish cultivators in the Mina Jaya Fish Cultivation group, in participating in the program during the socialization of Yumina-Bumina technology and holding Group Management Training and Simple Bookkeeping Training which was held on December 5, 2022. The partners were very active during the discussion session and very grateful for the implementation of this program. The second indicator can be seen from the success of this program in adding insight to the research team to carry out this activity in a sustainable and structured manner later.

The application of the Yumina-Bumina technology system is expected to increase the productivity of fish and plants without destroying the natural order. This technology can indirectly improve people's living standards and increase the original income of the people in the Laplap Kauh Banjar area in particular and to preserve nature which is starting to be neglected, so as to be able to achieve economic, socio-cultural and ecological goals. By achieving these three goals properly, the balance of nature can be maintained, as stated in the Tri Hita Karana concept, namely Palemahan, Pawongan and Parahayangan. It teaches that humans always maintain harmony between nature, humans, and God. Therefore, increasing the productivity of Pokdakan is seen as having a very important economic potential to support the welfare of the community in the Banjar Laplap Kauh area, especially in the form of: (1) business opportunities, increasing the productivity of the Pokdakan is expected to increase the amount of income so that in general it will bring business opportunities to the people of Penatih Village; (2) Increasing income, in addition to bringing in business opportunities, PKM in Pokdakan Mina Jaya is expected to be able to provide additional income for people who participate in implementing the Yumina-Bumina technology system; (3) With the absorption of manpower, catfish farming can expand business opportunities and employment

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#### Discussion

Fisheries sector resources are an important resource for people's lives and have the potential to become the main driver of the national economy (Marisda et al., 2020; Nurdiansyah et al., 2022; Yusroni et al., 2021). The evolution in the US catfish industry, tempered by dynamic market forces, has resulted in the development of various farming practices (Kumar et al., 2020). Catfish farming continues to be the largest segment of US fish farming, and US catfish farmers have demonstrated resilience and resourcefulness in adapting to changing economic conditions (Billing, 2018; Engle et al., 2022; Nielsen et al., 2016). Bali Island is an area that has the potential to be developed. aquaculture. There is still a lot of land that has not been utilized optimally, considering that land area is an important element in the cultivation production process (Huwoyon & Gustiano, 2013; Özkan et al., 2019).

The partner in this program is the Mina Jaya Catfish Farming Group in Banjar Laplap Kauh, Penatih Village, Denpasar City. The implementation of this program is very much supported by partners and partners are very active in the implementation of this community partnership program, among others, by always attending meetings held by the PKM team, providing input and preparing infrastructure for meetings or discussions held, paying close attention to management training group and simple bookkeeping training held by the PKM team. The Yumina-Bumina system is one of the developments in water-saving and land-saving aquaponic technology by combining fish farming (aquaculture) and soilless plant cultivation (hydroponics) (Mardasarina et al., 2020; Sartika et al., 2023; Supendi et al., 2016, 2021). This aquaponic cultivation technique was first developed in 2005 by the Bogor Research and Development Center for Freshwater Aquaculture (BPPBAT), Marine and Fisheries Research and Development Agency (Supendi et al., 2016, 2021).

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#### 4. CONCLUSION

This community service activity program can be carried out properly and run smoothly in accordance with the activity plan that has been prepared even though not all trainees have mastered the material presented well. This activity was very well received as evidenced by the activeness of the participants in group management training and simple bookkeeping training.

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