Community Empowerment Through Fish Farming Household Scale As An Effort To Increase Animal Protein Consumption

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Abstract.
Family food security can be obtained from the environment closest to where we live, namely by using the right method, one of which is through cultivating fish on limited land or better known as cultivating fish in buckets (budikdamber). This simple cultivation technique is carried out with the concept of planting fish and plants in the same container. So that the results from budikdamber can be the best alternative in meeting the needs of vegetable protein and animal protein in Situgede Village, Bogor-West Java, especially during the Covid-19 pandemic. In addition to meeting protein needs, this activity aims to be an alternative to creating jobs, if done with a good cropping pattern. So that fish and cultivated plants can be continuously obtained to meet consumer demand. As a result of the activities carried out, the Budikdamber activity is very good for the community in Situgede Village to continue to develop, because harvesting fish and vegetables can be done at once and repeatedly. This activity also opens up new job opportunities for the community that can be applied to other yards around Situgede Village.

Keywords: *Budikdamber, fish farming, situgede village, family food security and imited land.*

I. INTRODUCTION

The growth in the number of family members is closely related to the fulfillment of nutrition. As a country that has a very large population and a variety of diverse marine biological resources, fulfilling nutrition through sources of animal protein (fish) is very likely to be realized. However, data from FAO shows that in Indonesia, efforts are still being made to fulfill malnutrition, and this can be seen from the amount of fish consumption per capita in Indonesia which is still classified as low (Irfayani, 2021) when compared to other developing countries. Various efforts from the government in collaboration with the local community have been carried out to raise public awareness of the importance of consuming animal protein, one of which is through fish. The fond of eating fish (Gemarikan) program which was promoted by the Ministry of Maritime Affairs and Fisheries of the Republic of Indonesia is one of the efforts to increase the number of fish consumption figures to continue to move up (Mojiono, 2020).

Consumers' ability to consume is strongly influenced by income level (Ikram 2015), attitude, knowledge of nutrition (Fauziyah, 2022). Of course, the effort to raise fish in fresh water ponds near people's homes is an option that is quite effective in increasing the desire to consume fish later. In addition, these activities can also increase economic growth if they are developed in the freshwater fish farming business.Situgede Village, West Java, is located in West Bogor with an area of 232.47 Ha, a population of 19,000 people consisting of 34 RT and 10 RW. Most of the residents in Situgede are local residents who depend on the activities around them. A fairly dense population with limited land is one of the things that makes this village have limitations in fulfilling family nutrition. In addition to the problem of fulfilling nutrition in the community, the Situgede Village also has strategic potential to be developed in the agricultural sector by utilizing appropriate technology. However, if observed from the availability of land and public facilities that are very small to be used, while most of the existing land is used for residential areas as shown in Table 1.

Table 1. Existing Land in Situgede

Keterangan	Luas (Ha)
Pemukiman	68
Perkantoran	50
Sarana umum lainnya	13,47

II. METHODS

This activity was carried out directly to the community by applying technical understanding in the Situgede Village, West Java. Geographically, the Situgede Village is bordered by the Cisadane River in the north, and in the South, it is bordered by Sindang Barang. Meanwhile, in the West it is bordered by Cikawang Village and in the East, it is bordered by Bubulak Village (Situ Gede Village Profile, 2022) (Figure 1).

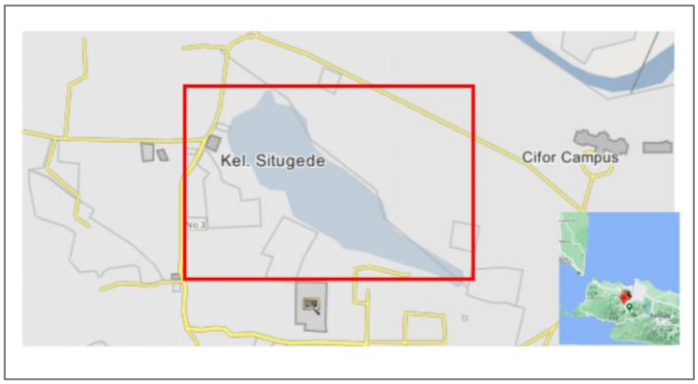

Fig 1. Location Map of Situgede Village, West Java

Community empowerment in the Situgede Village involves several stakeholders such as village officials, the community, fish farmers and universities. Primary data was obtained based on the results of interviews and discussions with the community.The stages of cultivation activities on this limited land start from planning (problem identification), activity preparation (preparing tools and materials), activity planning and socialization of making cultivation using cultivation containers. The tools and materials used in budikdamber can be seen in Table 2.

Table 2. Tools and Material for Making Budikdamber

No.	Tools	Material
1	Tanks or cultivation containers can be used with several options: - fiber tubs - artificial ponds - 80-liter buckets	Seed plant
2	Plastic faucet	Fish (juvenile)
3	Net pot, flannel	
4	Rockwool	
5	Container for sowing	

III. RESULT AND DISCUSSION

3.1 Number of Respondent

The activities carried out involved members of community groups in the Situgede Village by carrying out several stages, namely, observing site selection, designing and manufacturing tools, implementing fish farming, monitoring and evaluating activities. Several approaches were made to find out what fish farming model is suitable for Situgede Village. The limited amount of land and the type of selection of the right method need to be considered in fish farming. In addition, the selection of the right commodity also needs to be a concern so that it can continue to be applied on existing land. Based on the results of observations at the activity location, the selection of fish farming using buckets or what is known as "Budikdamber" is the best alternative in Situgede Village. With the selection of this appropriate technology, it is hoped that the community will not only cultivate fish, but also combine the use of plants.

So that the fulfillment of nutrition from the needs of animal protein and vegetables in the family can be fulfilled properly.The curiosity of the people in the Situgede Village is quite high, this can be seen from the many people who continue to follow the process of making the budikdamber even though they are in the same container or bucket used, grouped with several existing team members. Of course, this activity is one of the examples that can be implemented by the community, so that it is hoped that they will not only be

motivated, but will duplicate or imitate this method in their respective yards. This habit of starting to raise fish is then expected to encourage other communities or villages to try to do the same.

3.2 Stages of Activities

1. Tool design and manufacture

The tools and materials used are types that are very easy to obtain, both in the form of new goods and used (recycled) goods, including 80L buckets, rockwool/coconut charcoal, netpots/plastic cups, water faucets, wire, catfish seeds size 7 -12 cm in the amount of 60-70 heads, drill or saw, vegetable seeds. After the complete tools and materials are available, the next stage is the work process which consists of several processes:

a. Bucket Media Preparation

Prepare an 8l size bucket, where in the lid there are 6-8 holes to put rockwool or plastic cups. At the bottom, make a hole for a faucet that functions as an outlet (a place for draining water which also functions to make it easier to drain). Next, at the top, make a small hole to taste (aiming to maintain the amount of water that enters).

b. Preparation of Plant Media

The plant media used in this activity uses rockwool and also a net pot that is provided with an axis. The use of the wick serves to drain the water source into the plant media as one of the nutrients in the bucket used (Figure 2).

Fig 2. The process of preparing a cultivation container using a bucket

2. Preparation of cultivation containers, plant seeds and fish

After the cultivation container is ready for use, the bucket to be used needs to be filled with water first with a height of ¾ of the height of the existing pond. Next, let the water stand in the bucket for at least 1x24 hours in a place that has sufficient sunlight. Then, for the plants to be used, it is necessary to prepare media in the form of a basin or a place to sow vegetable seeds. Another alternative that can be used is that you can use a plastic cup with the seedling media first. The selected plant seeds are kangkong by placing 3-5 seeds in each rockwool. Furthermore, for 3-7 days, the seeds placed on the plant media will start to grow and can be moved in the bucket (Figure 3).

(a) (b)

Fig 3. (a) plant seeds for 3-7 days, (b) plant seeds are transferred to a bucket

The fish juvenile used are catfish with a size of 7-8 cm. The reason for choosing catfish is that it has a fairly good ability and can withstand extreme environmental conditions in small ponds and relatively easy feeding. Furthermore, as many as 60-70 tails are poured into the cultivation container (bucket), as shown in Figure 4.

(a) (b)

Fig 4. (a) catfish juvenile size are slowly transferred into a bucket,
(b) catfish are ready for cultivation.

In maintenance activities, feeding needs to be considered properly and regularly. Giving using the ad satiation method, namely feeding as full as possible. However, giving excessive amounts of feed can cause the water to become cloudy quickly, increase ammonia (Siegers, 2019; Agustono, 2009) which results in decreased oxygen content (dissolved oxygen) (Yanuar, 2017), so that it becomes one of the causes of death in fish.

3. Monitoring

The monitoring process is needed as an effort to ensure that the fish being cultivated are in good condition. Some of the things that need to be considered in monitoring include:

1. Change the water regularly (once every 2 weeks by replacing ½ of the total water in the bucket by opening the bottom faucet that has been made. Do not change 100% of the water, because this can cause fish to become disturbed and need to be readjusted to conditions new environment.
2. Make sure the bucket is located in a position that gets enough sunlight. This aims to process plant photosynthesis, so that the kangkong seeds or plants that will be used can grow well.
3. Checking the size and amount of feed available. Feeding catfish seeds and catfish that are raised needs to be adapted to not the mouth. This aims to optimize the amount of feed given and eaten by fish. So that the amount of feed wasted becomes small. Of course, this will affect the expenditure of the amount of feed purchased. Fish seeds and plants that are ready, placed in a location that gets enough sunlight (Figure 5).

Fig 5. Results activity ready to use

4. Evaluation Activities

Keeping fish in buckets needs to be considered carefully, especially for beginners who want to do fish farming as a family economic resource. However, fish farming in buckets (budikdamber) has positive and negative aspects that need to be known. The positive aspects obtained are saving land, saving electricity because it does not require electricity for aeration, cultivation activities can produce two products at once, namely catfish as a source of animal protein and kale as a source of vegetable protein. In addition, the cultivation time which is quite short for 3 months, is able to produce a source of vegetable protein up to 10 times, because the harvest of kale can be done every 2 weeks. Of course, this is one of the benefits of the community to continue to obtain food sources from the yard. Especially during the Covid-19 pandemic, many people found it helpful to raise fish using this budikdamber. In addition, there are negative aspects that need to be considered by the community when carrying out this maintenance, namely in terms of disposing of water (cultivation waste) in the environment. Considering that the distance between 1 household and other households is very close together, it is necessary for cultivators to provide a special place in the form of flowing water in disposing of existing waste. So that the distinctive smell of fish rearing does not result in air pollution for the surrounding community.The results of the study show that people's habits in consuming fish have a close relationship with the educational background of the community.

Most people also realize that people's purchasing power for fish is still very low. So far, food ingredients derived from vegetable protein in the form of vegetables and processed products have become a special attraction because prices are more affordable. This is also similar to a study conducted by Sutrio (2020) that the amount of protein intake provided in the family will affect nutritional status. As an alternative, in addition to carrying out fish farming activities, the community can also campaign "Love to Eat Fish" in the form of posters and interesting pictures from the Indonesian Ministry of Maritime Affairs and Fisheries.This fish farming activity is one of the simple developments of an aquaponic system by providing many advantages compared to the aquaculture or hydroponic systems themselves (Shafahi, 2014). Component costs and the use of unused goods or product waste are one of the advantages that have an output in the form of a sustainable food production system. In addition, through the use of recycling, many different waste components are modified from waste products to new uses. This allows for much lower system costs than if each component to be used was purchased as a whole. In addition, it is also necessary to pay attention to several parameters in the aquaponic system, starting from physical, chemical and biological parameters. This is in accordance with a study conducted by Krastanova (2022) because based on its design, an aquaponic system is a specific mini-ecosystem, analogous to natural processes, which combines aquaculture, hydroponics, and beneficial bacteria in a symbiotic environment. This activity is also expected to be used as a model for sustainable production, one of which is by implementing construction designs according to the types of fish and plants used (Zhang, 2022).

IV. CONCLUSION

The results of activities carried out from community service through fish farming techniques on limited land receive good attention in the community. In addition to tools and materials that are easily available, this activity has become one of the positive activities during the Covid-19 pandemic until now, because it has become an alternative for family food security. Thus, the fulfillment of nutrition from vegetable protein and animal protein in the community can be felt directly.

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