



Food Security's Pillar Reinforcement through Training on "Fish Farming in Buckets" in Indonesia

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ABSTRACT

Food Security is one of the government's long-term goals in terms of agriculture and food fulfilment. One of the pillars of food security is food availability. Communities can support this availability at the household level by utilizing available land. However, land use is also a problem in food security. Then, since the Covid-19 Pandemic which has an impact on the economy and people's productivity, people have also felt the impact as seen from the decline in income. Therefore, creativity in land use is needed. One of the businesses that can be done is to carry out fish farming activities in buckets and hydroponics. The purpose of this service activity is the application of fish farming in buckets with aquaponics. The result obtained is an increase in community knowledge and skills where in the short term, the community can use this cultivated harvest as a source of family food, in the long term it is hoped that fish farming in this bucket will create opportunities for the community to increase income.

Keywords: Budikdamber, Careng Village, Food Security, Hydroponics, Fisheries

I. Introduction

Food security is an important part of achieving development. The United Nations has targeted to end hunger, achieve food security and promote sustainable agriculture as part of the Sustainable Development Goals by 2030 (Broom, Douglas; Breene, 2020)Indonesia has adopted the SDGs goals into its long-term development plan, especially in the performance goals of the Ministry of Agriculture. Agriculture is an important part of the Indonesian economy. Agriculture is the second largest supporting sector for the Indonesian economy. Data-driven (Statistics, 2022), the gross domestic product (GDP) of agricultural businesses based on current prices (ADHB) reached IDR 2.25

quadrillion throughout 2021. This value contributes 13.28% to national GDP.

Regional development is the process of local governments and communities managing existing resources by forming a pattern of partnership between local governments and the private sector to create jobs and stimulate economic growth in the region. In an effort to achieve regional development, the need for containment and ability to assess the potential of local resources to design the regional economy (Tejo & Pabendon, 2022). However, the Covid-19 pandemic that occurred in Indonesia in early 2020 had an impact on aspects of people's lives, the economic crisis became one of the problems caused by the pandemic. The existing pandemic has also threatened Indonesia's food security. Various limited activities that cause a decrease in income and lack of national and international food supply flows require people to find alternative sources of income and daily food.

Careng Village is part of Careng District, Serang Regency, Banten Province. Most of the villagers work in the agricultural sector, this is supported by the condition of the Careng Village area which is a lowland area and has a temperate climate so that it has a direct influence on agricultural activities and planting patterns in this village. Most villagers use farmland for livelihoods. However, not all villagers can make maximum use of existing land, especially for residents who have limited land even just limited to their yards. Limited land is indeed a problem for villagers, one of which is the quality of environmental cleanliness. This can be seen from the problems of villagers who are struggling with existing garbage waste. Community skills in terms of cultivating and utilizing limited land are also a challenge to increase community productivity. To see the main problems to be solved related to



village agriculture, an USG analysis was conducted. Based on analysis and brainstorming using USG analysis (*Urgency, Seriousness and*

Growth), several problems that occur in Careng Village can be described.

Table 1. Problem Analysis through method

No	Problems	U	S	G	Total	Rank
1.	The problem of land use for garbage and people still littering	7	8	8	23	2
2.	Limited farmland	7	7	7	21	3
3.	The lack of interest and knowledge of the community in maximizing land use is limited.	6	9	9	24	1

Land issues from brainstorming with residents have high importance and urgency. However, problems about land use for waste disposal as well as waste management and limited agricultural land require more local government intervention in terms of funding, development and regulatory budgets. The lack of interest and skills of the community has the lowest value of urgency among the problems of waste land and agriculture, but has the highest value of seriousness and growth, because it is feared that in the future if left unchecked it will have an impact on other problems, because in fact land and environmental problems also start from the attitude and attitude of the community towards environmental problems. Therefore, the implementation team decided to take the issue as a priority issue.

Budikdamber (fish farming in buckets) and hydroponics activities are one solution to increase the productivity and creativity of the village community in a fairly simple way. In Adhrani et al. (2021), *Budikdamber* is taken from the word "aquaponics" which means fish farming and "hydroponics" which means a cultivation container in the form of a tub or bucket. According to Harianti et al. (2023) *budikdamber* as a way of limited land use through fish and vegetable farming in one system, fish used in the form of freshwater fish that are economical and available in the market, in addition to cultivating fish can also be used in growing vegetables and fruits. This utilization system can support food security and food independence in a sustainable manner.

Several journals of dedication to *budikdamber* have been carried out in several places. (Nebore et al., 2021) conducting dedication on *budikdamber* and hydroponics as an effort to meet food needs in Amban Village, West Papua which provides solutions to rural communities to be able to meet the nutritional needs of animals and help in increasing family income. (Abadi et al., 2022) also provided *budikdamber* skills for the people of Saoka Village, Sorong City which was

proven to provide alternative income for the community by producing fish products sold as much as 112 kg from the results of four months of fish rearing. Then (Jamiati et al., 2020) dedicating the application of *budikdamber* using aquaponics that provides knowledge for the people of Cinere, Jakarta. (Harianti et al., 2023) also conducted counseling on the development of *budikdamber* with the *yumina* technique to PKK mothers and members of FPKM farmer groups in Maharatu Village, Marpoyan Damai.

According to (Harianti et al., 2023) *Budikdamber* has advantages because it requires sober land as needed, minimal capital, tools and materials that are relatively easy to find, and the results of *Budikdamber* can be used as fulfillment of permits and food security, there are even opportunities to increase income through buying and selling *Budikdamber* products. (Herliani et al., 2022) He also stated that efforts in the fisheries sector can not only increase finances, but also improve the nutrition of daily family food.

Food Security

According to (FAO, 1997) Food security is a condition where all households have physical and economic access for all family members. Food security can be defined as a condition of food fulfillment for the country up to individuals, which is reflected in the availability of sufficient food, both in quantity and quality, safe, diverse, nutritious, equitable, and affordable and does not conflict with religion, beliefs, and culture of the community, to be able to live healthy, active, and productive lives in a sustainable manner.

Food security does not only revolve around "food", but covers a broader aspect because it has social and political functions. Economic development is carried out through the management of resources and added value. Food security has an important impact on the development of a country. Indonesia as a country



that has a large population faces quite complex challenges to meet its food needs.

The achievement of food security is also written in the strategic plan of the Ministry of Agriculture. One of the economic resource policies supported by agriculture is to increase the availability, access and quality of food consumption. To realize sustainable food security in Indonesia, there are several challenges, including the rate of population growth, reduced agricultural land area due to land conversion, meeting the needs of several commodities that depend on imports, and technology adoption problems in order to increase productivity due to low technology transfer from formal research institutions to farmers which means that the application of technology in agriculture is still low (Chaireni et al., 2020).

Aquaculture

Indonesia has a large biodiversity, one of which is fisheries. The results of this fishery have great economic value and can be profitable from the industrial side. Therefore, aquaculture has long been developed by the fishing community. Aquaculture is an activity to produce aquatic biota in a controlled environment to generate profits. Aquaculture is an effort to cultivate fish that usually live in the wild into aquarium fish. Aquaculture is also a method to increase water productivity. Profits from aquaculture production are influenced by the health of bio-bass at the end of the production season, operating costs and maintenance costs (Rahma & Razak, 2023).

Aquaculture is expected to provide a greater supply of fishery products than fishing. The development of aquaculture also aims to increase the income and welfare of fish farmers, improve production quality and productivity and meet the consumption needs of the community. Improving aquaculture technology is important in achieving these goals. Efforts to improve aquaculture are also carried out by paying attention to the potential of land resources, understanding of the feasibility factors of cultivation, the level of cultivation technology and the use of germplasm of cultivated fish.

There are factors that affect the success of fish farming, including independent factors and dependent factors. Independent factors consist of environmental factors such as land, land elevation, rain, water and weather. Then there are human factors such as skills and marketing. The dependent

factor consists of fish farming containers, fish species and technology (Sukadi, 2002). In rural communities, efforts to fulfill nutrition in the form of animal protein can be obtained from raising livestock at home. Pets commonly found in the countryside are various types of fish. However, there are obstacles in fish farming in the village, existing obstacles such as limited availability of land and clean water. One of these obstacles in being resolved is to carry out fish farming activities in buckets. Budidaa fish in a bucket with an aquaponic system has the advantages of being easy, saving water, not requiring large land and economical so that this activity can be one of the efforts to fulfil food independently.

Budikdamber is a form of aquaculture that combines fish farming with vegetable hydroponics in one bucket which is an aquaponics system (fish and vegetable polyculture). Aquaponics systems that usually develop during this time require pumps and filters, large land, expensive and complicated costs. However, *budikdamber* is the opposite of this complicated method. The *budikdambersystem* can be done on limited land and minimal cost. The process of managing fish farming with the *budikdamber* method is the main factor in the successful process of aquaculture, among others, the first, the selection of the right fish that will affect the development and resilience of fish. Second, water management by maintaining the pH of the water in the bucket. Third, give experts and be a bucket cleaner so that it does not smell. The last is the cleanliness of the bucket so that bacteria do not grow and maintain the clarity of the water. The target of the implementation of *budikdamberis* expected to be fish and vegetable farming to improve the community's economy which can also support the pillars of food security availability and community income (Rizkiana et al., 2022).

II. Method

The method used is the identification of agricultural land problems in the service location, which is carried out by USG methods, fishbone, in-depth interviews with several agricultural actors in village communities. Surveys and research were conducted for 6 months during the implementation of community service at partner locations. Based on the analysis of the economic situation and conditions, there are several problems related to economic problems



No.	Fist	Issues	Solution
1	Impact of Covid-19 Pandemic	Decreased income due to restrictions on activities carried out by the government, decreased purchasing power	
2	Land use issues	The problem of land use for productive activities and there are still many people who litter, as well as limited agricultural land	Fish farming training in buckets and aquaponics
3	Lack of education about land use	Lack of public education about innovation in agriculture and people's views on aquaculture and agriculture are complicated.	

In accordance with the order of problem identification, the justification of priorities and solutions to problems is, first, the impact of the pandemic is felt, especially on the agricultural sector, especially household income, lack of public socialization about agricultural and fisheries innovations and people are not familiar with fish and plant farming in buckets and management. At the macro level, the government has been striving to improve the economy through monetary and fiscal policies. The solution offered at the micro level carried out through community service is how to contribute to reviving the community's economy about agricultural and fisheries innovation. Therefore, fish farming training in buckets will be very suitable to be applied to the community.

The location and partner of this community service activity is Carenang Village, Carenang District, Serang Regency. The results of the data collected resulted in several service programs for several levels of society. This fish farming program in buckets has a target of young people, as many as 150 high school students. Respondents were selected considering that participants who have characteristics at productive age and have great potential to be able to continue to improve the skills and information agents of budikdamber itself.

III. Results and Discussion

The service process is carried out through the stages of survey and problem analysis, stages of preparation, stages of implementation and evaluation of activities and reporting. Before carrying out research and service activities, a survey of the location of activities was carried out, conducting discussions with village heads and the community regarding the identification of environmental problems in Carenang Village,

through scoring on problems and socialization of service activity plans, based on USG analysis that had been carried out and discussed previously, the use of agricultural land that was lacking by the community, even though if used properly, these lands could produce crops food. There are also people who have limited land.

Training Activities

The material presentation activity aims to provide information and increase participants' awareness about *budikdamber* with the lecture method, then the practice of making *budikdamberis* carried out by participants accompanied by the service team. The practice of making *budikdamberis* accompanied by a question and answer session so that participants can immediately apply and get answers if there are difficulties in applying *budikdamber*, how to maintain it and water change techniques so that the results obtained are good and maximal. The material presented included the cost of fish farming in buckets compared to other aquaculture systems, water quality management during the cultivation process and entrepreneurial management in the cultivation process.

Evaluation of activities is carried out in the form of participant satisfaction questionnaires. After completing counselling and question and answer activities, participants were given time to fill in several questions as follows.



No.	Description	Participant Answer Presentation		
		Already	Not yet	Don't know
1.	Has there been any training on fish farming in buckets?	0%	100%	0%
2.	Did the participants know about fish farming in buckets before the training?	19%	81%	0%
3.	Does training on fish farming in buckets increase the knowledge / knowledge of participants?	100%	0%	0%
4.	Are participants interested in keeping fish in buckets at home after training?	100%	0%	0%
	Are participants interested in doing fish farming in buckets after training as an effort to increase income?	84%	10%	6%

All participants said that the training that had been carried out increased the knowledge of participants and were interested in practicing this cultivation at home. Most (84%) participants were interested and saw the potential of fish farming as one of their additional sources of income, while the rest (10%) were not interested and the rest (6%) answered that they did not know or had not decided, this could be possible because the age of the participants was relatively young so they were still thinking about other businesses as an additional source of income.

Based on the results of the entire series of problem identification, research and service activities to the evaluation of activities, there are several solutions that have been carried out in several aspects. First is the human resources aspect. Service activities aim to improve the understanding and skills of participants. Service activities are carried out by lecture, persuasive and educative methods with the aim that participants can explore their potential and local resources. Second, based on technological aspects, this activity increases understanding and increases knowledge about aquaculture technology that they did not know before. This also shows the transfer of agricultural technology to the community. The three aspects of marketing, with this activity, are expected to provide understanding of how to utilize limited resources and land, which can produce agricultural output as well as fisheries, increase the skills and abilities of the community in meeting family food needs and even increase income if cultivation is carried out as a business.

IV. Conclusion

The increase in development and population density has had an impact on increasing population land, which has resulted in reduced

community land for growing food crops and raising livestock. The existence of Covid-19 has made things worse, due to restrictions on economic activities and low purchasing power of the people so that household income decreases. This problem also occurs in Carenang Village, Indonesia, which is a problem of limited land use, therefore training on fish farming in buckets and hydroponics have been carried out, with the aim of providing options to the community over limited land use but can be used as a source of income and family food sources. The results obtained after the activity are an increase in knowledge and public attraction to the management and cultivation of fish and hydroponics. In the future, the results of this activity are expected to also be one of the business opportunities to increase the income of rural communities. Input suggestions for community service activities in Carenang Village are sustainable *budikdamber* activities in the form of training for the resulting fish management and marketing stages.

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