

UTILIZATION OF AZZOLA PLANT (*AZOLLA PINNATA*) AS INCOME EMPOWERMENT OF COMMUNITY INCOME FARMING FISHERIES IN BAROS – SERANG

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Abstract

Empowerment of people affected by covid-19 in Baros Village, Baros District, Serang Regency by optimizing direct cash assistance from the government received by the community in order to empower the community to create income in accordance with the capabilities and competencies of the community to be empowered so that the community does not always depend on government assistance. Pellets and concentrate feed have been used by the community as fish and livestock feed. But the high price of feed makes this business less profitable. *Azolla microphylla* as fish and livestock feed has been introduced to Indonesia. Community service activities were participated in by 22 participants in RW 5, Baros Village, Baros District, Serang District. The community service was started from April to May 2023 with the aim to train the people of Baros Village, *Azolla Microphylla* cultivation techniques which will be used as food for food, fish and other livestock. This activity is carried out in the following stages; 1) Location survey, group formation and coordination. 2) Go to the field and prepare a location for the training. 3) Training of *Azolla Microphylla* growing substrate fermentation techniques. 3) Training to prepare *Azolla Microphylla* growing containers. 4) Training of *Azolla Microphylla* maintenance techniques. 5) Harvesting and giving *Azolla Microphylla* to livestock. 6) Monitoring and evaluating the results of activities. The results of initial monitoring in the second, third and fourth week after the training showed that these macrophytes could grow well. Some members have enlarged the maintenance container in the form of maintenance tanks .

Kata kunci: *Azolla Microphylla, Fish Feed, Animal Feed, Aquaculture, Community Service, Baros Village*

1. Introduction

Baros village which is 8 Km from the capital city of Banten Province is one of the villages designated by the local government as a tourism village pilot project . Baros Village is one of the villages located in Baros District, Serang Regency which has a lot of potential in the fields of tourism, trade and offices, both natural tourism and cultural tourism. Baros Village's strategic geographic location and beautiful natural conditions make it possible for tourism to grow rapidly. Baros Village has an area of 4.23 km² which consists of 5 hamlets, 5 community units and 11 neighborhood units. because it is a village that is classified as having a high number of poor people , 34% of households out of a total of 2273 households. The total population of this village reaches 6536 people, with a relatively balanced number of male and female residents . The land potential in this village is actually quite good, namely 94 ha of paddy fields with very good irrigation because there is a source of water, dry land 178 ha, public facilities 66.11 Ha out of a total area of 4.23 km². Quality. The low human resources of the villagers are the main problem in the use of natural resources. Based on their level of education, the number of residents who graduated or did not finish high school reached 79.7%. The majority of the population's livelihoods are factory workers, office workers and traders by 64.3 % , farmers reaching 1.2.9 % , unemployment 17% and the remaining 5.8% are government employees. One of the opportunities for alleviating poverty in this village is by utilizing the potential of available water sources quite well, including by developing poultry and fish livestock. Main problem In this village , currently the potential of the wetland is only used for lowland rice cultivation , and has not developed fish and poultry seriously . The results of interviews with community leaders show that the problem of developing poultry and fish originates from the high price feed.

proposing team showed that *Azolla microphylla* has potential as an ingredient in animal feed, especially poultry and fish, and can be used as a basic ingredient in organic fertilizer. Some of the potential of *Azolla microphylla* is that it has fast growth with a doubling time of only 3.7-6 days depending on the fertility of the pond so it is feasible to be developed as a stock of forage material (Supartoto *et al.* 2012). The biomass production of *Azolla microphylla* is very high, ie per m² the weight reaches 1-2 kg depending on the fertility of the pond (Supartoto *et al.* 2012), with a fairly high protein content, which is around 19-28% dry weight basis (Lumpkin and Plucknet. 1982. and Supartoto *et al.* 2013). With its high protein content, it turns out that *Azolla microphylla* is liked by almost all animals and fish. Entomologists really like *Azolla microphylla* and using *Azolla microphylla* on musk can save feed between 30-50% (Supartoto *et al.*, 2015). Giving *Azolla microphylla* to laying ducks, an amount of 100 g/head/day can improve the quality and quantity of duck eggs, make the yolk color orange to a scale of 12.2 out of 15, increase the stability of egg production, and the number of eggs (Supartoto *et al.* 2016 and 2017) and substitution of duck feed with azolla up to 30% on a dry basis did not reduce egg production compared to ducks fed national standard feed (NRC 1994).



Figure 1. Azzola Microphylla plant

Based right With the above conditions, community service activities have been carried out regarding the development of *Azolla microphylla* cultivation as a poultry feed ingredient. The objectives of this activity are (1) to socialize the potential of *Azolla microphylla* to optimize the potential of local natural resources, (2) to transfer *Azolla microphylla* cultivation technology, and (3) to practice the use of *Azolla microphylla* as a substitute for musk duck feed and organic fertilizer.liquid.

2. Activity Method

a. Location and Time devotion

This service activity will be carried out in Baros Village, Baros District, Serang Regency. The timeframe is April – May 2023.

b. Technique For Delivering Goals and Benefit Activity

The objectives and benefits of the activity are explained to all participants by the Team Leader and Members. This program involves students participating in the LPPM Real Work Lecture at Serang Raya University. The training materials are delivered in the form of video lectures, question and answer, demonstrations and hands-on practice. Starting with the delivery of introductions to the community service team members of LPPM Serang Raya University in Baros Village, Baros District, Serang Regency. It was then continued with a video showing the use of *A. microphylla* for tilapia, carp, native chickens, broilers, goats, ducks, ducks and cattle.

c. Growing Substrate Fermentation Technique *A. microphylla*

Community outreach activities on the cultivation of *A. microphylla* by the people of Baros Village, Baros District, Serang Regency began with activities of substrate fermentation or an energy source for the organisms being kept. The participants were first given an explanation about the

purpose and benefits of the activity. Then step by step taught how to ferment the substrate. The training materials provided include ; equipment needed (buckets, basins and scales), fermentation materials (cow dung, soil and grasses) and fermentation techniques (weighing of ingredients, fermentation and harvesting and control).

d. Growing Container Preparation Techniques *A. microphylla*

The next stage is preparing the cultivation container. The participants were given step-by-step explanations to be followed in preparing the containers. The material to be presented is in the form of; dosing (water and fermented materials), and placement of containers (shaded but still getting sunlight in the morning).

e. Growing and Maintenance Techniques *A. microphylla*

The participants were taught how to care for the plants until harvest. The prepared containers are then sown with *A. microphylla* seeds (the number of seedlings covers about 5% of the surface of the container).



Figure 2. Cultivation of Azzola Microphylla after one month

The next container is placed in a safe location. If the water in the container is reduced due to evaporation, add sufficiently .

f. Harvesting and Giving Techniques to Fish and Castle

If everything goes well, *A. microphylla* can be harvested on the 15th day after planting. The training participants were shown how to harvest and feed or serve it to fish or other farm animals. *A. microphylla* that has covered the entire surface of the container can be harvested in stages according to circumstances and needs. The trick is to use tangguk or even with your own hands. Up to this stage the ferns are ready to be fed to livestock.

3. Discussion

a. Dissemination of the potential of Azolla M. icrophylla in optimizing the potential of Natural Resources Local

increase motivation This activity is carried out by counseling methods and comparative studies . This activity began with counseling about the potential of *Azolla microphylla* based on the results of research that had been carried out by the implementing team. The socialized potential includes: high biomass production so that it can be used for feed stock, high protein content, can be used for poultry and fish feed , can be used to make liquid organic fertilizer, and is easy to cultivate. During the extension , videos were also played on the use of azolla to feed geckos, ducks, chickens, fish and the use of *azolla* ponds for intercropping with fish. The results of the socialization showed that the target participants who were present were very interested in growing *Azolla microphylla* , of the 22 people who attended, 22 people expressed interest in planting *Azolla* . For and the target participants' beliefs the following day , a comparative study was carried out in the Walantaka sub-district of Serang City, the villages assisted by the Implementation Team that have implemented the use of azolla for poultry feed , and there is even an integrated *Azolla*-based farming

system , which combines Azolla, carp, ducks, and manufacture of POC for sale. Comparative studies turned out to be very effective in arousing target participants' passion for developing Azolla.

b. Azolla cultivation technology microphylla

The transfer of *Azolla microphylla* cultivation technology is carried out in a manner The target participants were asked to make demonstration plots of azolla cultivation in plastic ponds. In accordance with those who were interested in the first counseling , the Team facilitated target participants who would develop Azolla with 10 units of 2.5 mx 2.5 m Plastic Azolla ponds and 12 units of 3 mx 4 m and Probiotics (EM4).



Figure 3. EM-4 probiotics

one unit of azolla ponds was made together and so on Target participants are asked to make their own on their own land , provided the land is open (gets full sun) and the pool water is fertile). The implementation team elicited the participation of the target participants by only providing plastic ponds, while the provision of bamboo for the ponds and labor was carried out by the target participants themselves. It turned out that the response of the target participants was very high, as evidenced by the construction of 22 units of Azolla ponds of various sizes. At first the team only provided 22 units of plastic for the Azolla pond, it turned out that there were 2 people from RW-4 who were also interested, and the size of the ponds also varied so the group leader request 10 additional units of azolla pool plastic. This shows the high enthusiasm of the target participants in developing Azolla. A list of Azolla growers is presented in Table 1.

Table 1. List of target Participants and the number of Azolla ponds created

No.	Name	Pool Size	Pool Area (m ²)
1	Dono	2.5m x 2.5m	6.25
2	Marto	2.5m x 2.5m	6.25
3	Siskarim	2.5m x 2.5m	6.25
4	Kusno	2.5m x 2.5m	6.25
5	Marwoto	2.5m x 2.5m	6.25
6	Andara	2.5m x 2.5m	6.25
7	Dharmawan	2.5m x 2.5m	6.25
8	Dhany	2.5m x 2.5m	6.25
9	Isnaeni	2.5m x 2.5m	6.25
10	Zaenurrlah	2.5m x 2.5m	6.25

11	Kasiman	3m x 4m	12
12	Henry	3m x 4m	12
13	Sadeli	3m x 4m	12
14	Wisno	3m x 4m	12
15	Bajakal	3m x 4m	12
16	Taryo	3m x 4m	12
17	Yaya	3m x 4m	12
18	Sarkani	3m x 4m	12
19	Eddy	3m x 4m	12
20	Buwono	3m x 4m	12
21	Pastika	3m x 4m	12
22	Rino	3m x 4m (2 units)	12
Amount		22 Participants	206.5

c. The practice of using *Azolla microphylla* as a feed substitute mussels and the manufacture of organic fertilizers liquid

The practice of using *Azolla microphylla* as a substitute for musk duck feed was carried out in conjunction with the construction of *Azolla* ponds . All target participants who build *Azolla* ponds are given a pair of 4 months old ducks , so it is hoped that after raising 2 months the ducks will start laying eggs. A total of 22 pairs of entogs provided by the Team , and only RW 5 residents received assistance . The list of musk recipients and their condition at the end of May 2023 is presented in Table 2. The results of the practice of using *Azolla* as a feed ingredient (substituting part of the musk feed) received very positive responses from the target participants. This is indicated by the 9 pairs of mussels that were given at this time that had laid eggs and of these, there were 4 broods that had hatched . Some of the Target Participants increase the number of Entogs by buying their own. This phenomenon is very positive because it shows, firstly, the participants are serious about raising musk ducks, And secondly, the target participants felt that the presence of *Azolla* greatly facilitated their raising of the mussels, which was indicated by the increase in the number of mussels kept. Even though previously the problem with muscovy ducks in Baros Village was the high price of feed, and after *azolla* they dared to increase the number of mussels, it means that *azolla* is very helpful to the target participants in feeding the mussels.

Target Participants' confidence in the potential of *Azolla* as a feed ingredient is even more evident at the change of seasons (July-November), which resulted in many *Azolla* plants growing languidly and dying. Target participants began to complain again about the high price of feed .

Table 2. List of mussel keepers and their development until the end of May 2023

No	Name	Division of Entog (Tail)		Entog Development
		Male	female	
1	Dono	1	1	Brood @ 6 points Bought 8 ducks
2	Marto	1	1	Incubating 7 eggs
3	Siskarim	1	1	Have laid 6 eggs
4	Kusno	1	1	Hatch 3 die 2 parent before laying eggs again
5	Marwoto	1	1	Haven't laid eggs yet

6	Andara	1	1	One lays 9 eggs	One hatched 9 tails
7	Dharmawan	1	1	Dead ducks 1	Bought 3 tails
8	Dhany	1	1	Brood 9 btr	
9	Isnaeni	1	1	Dead ducks 1	
10	Zaenurrah	1	1	Haven't laid eggs yet	
11	Kasiman	1	1	Already laying @ 5 btr	
12	Henry	1	1	Incubate	already gave birth to 4 tails
13	Sadeli	1	1	Haven't laid eggs yet	
14	Wisno	1	1	Already gave birth to 10 tails	1 dead
15	Bajakal	1	1	B hasn't laid eggs yet	Keeping ducks and ducks
16	Taryo	1	1	B hasn't laid eggs yet	Raising ducks
17	Yaya	1	1	B hasn't laid eggs yet	Bought 4 ducks
18	Sarkani	1	1	B hasn't laid eggs yet	Bought 4 ducks
19	Eddy	1	1	B hasn't laid eggs yet	Bought 6 ducks
20	Buwono	1	1	B hasn't laid eggs yet	Bought 8 ducks
21	Pastika	1	1	B hasn't laid eggs yet	Bought 4 ducks
22	Rino	1	1	B hasn't laid eggs yet	Bought 8 ducks
	Amount	22 Tails	22 Tails		

The results of the evaluation of the activities carried out jointly between the implementing team and the target participants indicated that the damage to the Azolla plants was not purely due to the change of season. The results of the interviews show that in fact so far the target Participants have only harvested azolla every day, without applying fertilizer to the Azolla pond . Fertilization is done after the plants languish. Based on this, so then a demonstration plot was made for making liquid organic fertilizer for Azolla ponds, with ingredients raw urine goat And azolla.

The POC creation demonstration begins by building a goat urine storage installation , because 50% of the raw materials Azolla fertilizer is goat urine . The raw materials for POC are 25 liters of goat urine , 4 kg of manure, 4 kg of chopped banana stems , 4 kg of Azolla , 0.5 kg of rice bran , 0.4 kg of molasses, and probiotics. A goat urine harvester was made in Madwiaro's cage (containing 8 goats), and the collected urine was used together members of the group. POC production demonstration plots were made in 2 units, and were also equipped with 2 probiotic propagation demonstration plots. This is done so that the target Participants become independent in the supply of raw materials , and can save costs because they are self- made . The POC results are used to fertilize Azolla ponds at a dose of 0.250 cc per m² of pond. Azolla pond fertilization is done every 10 days. The results of observations of ponds fertilized with POC showed that Azolla plants began to grow lush green, even though they had not filled the pond. However , this has given more confidence to the target Participants, it turns out that one of the damages to Azolla is because the pool water is no longer fertile again, and the azolla plants began to improve when done fertilization.

The technical aspects of the implementation of the activity of forming and fostering community groups that maintain *A. microphylla* in Baros Village, Baros District, Serang Regency, were also evaluated and the following records were obtained:

1. The attendance of participants in participating in counseling activities reached 100% of the expected number. This shows that the extension participants were very interested and interested

in the material presented during the extension activities.

2. The results of the observations showed that there was enthusiasm and seriousness from the participants during the delivery of the counseling material. Apart from that, it was also noted that the participants were not reluctant to ask questions to the resource persons and actively participated in discussions in the activities.

3. Participants were very active during the discussion activities, where participants showed good enthusiasm and enthusiasm during discussions regarding the material provided related to azolla cultivation.

4. Prior to the activity, the participants were asked several questions related to azolla cultivation. The results of the discussion showed that some of the participants said they had never heard of the program and did not really know about the benefits of azolla cultivation. After the extension activities were completed, the participants already had a clear picture of the business of managing and cultivating azolla. The participants promised to try to start azolla cultivation and fully support the program.

5. Based on the results of the evaluation carried out, the extension participants already have sufficient knowledge and understanding to carry out activities independently or in groups in the future in their respective homes.

4. CONCLUSION

- a. The potential of *Azolla microphylla* as a poultry feed ingredient has been well received by the target audience.
- b. The target audience can adopt the *Azolla* cultivation technique well, with a total of 22 azolla growers, with a total of 22 azolla ponds out of 22 target units.
- c. The azolla planting conditions were very fertile until 3 months after planting, but starting at the end of June the azolla plants were exposed to brown spots caused by changes in weather. The plants start green again after entering the rainy season and are fertilized with POC
- d. The target audience is able to make liquid organic fertilizer to fertilize azolla independently, and is able to procure raw materials for making POC, such as: having goat urine harvesting facilities, and being able to increase probiotics for making POC.
- e. The target audience feels that azolla is very helpful in providing gecko feed, with good growth of the mussels. The current development of the mussels is that 26 mussels have started to give birth, while the others are incubating and have laid eggs and there are also dead mussels.

5. SUGGESTION

It is necessary to form a group of *Azolla*-based musk breeders so that village funds can facilitate their development.

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