RECYCLING AQUACULTURE SYSTEM (RAS) TECHNOLOGY IN THE MAINTENANCE OF EEL SEEDS BASED ON SUSTAINABLE ECONOMY DIGITAL

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ABSTRACT

In carrying out eel seed catching activities to marketing, problems are constrained, such as: The high mortality rate of caught eel seeds due to inappropriate fishing gear and very minimal shelters, only in the form of styrofoam boxes with aerators and lack of knowledge on how to maintain and handle proper eel seeds. Good, Marketing that has not been opened, only relies on word of mouth, this has resulted in many civilizing people who do not know the existence of eel seeds in Sukamanah Village, there is no recording of catches and sales results, Eel production and maintenance are not yet optimal. This activity will raise problems for coastal communities in Sukamanah Village so that the Banten Eel Group can continue to grow by providing solutions and implementation methods, such as: Applying appropriate technology in maintenance, namely Recycling Aquaculture System (RAS), Replacing fishing gear with new ones and which is more appropriate, Providing counseling, guidance and assistance on how to maintain good eel seeds so that their condition can be maintained, Building e-Commerce to help increase marketing expansion with digitalized information that can be accessed by the wider community via the internet. In achieving the target to solve problems, the programs carried out are: Implementing Recycling Aquaculture System (RAS) technology to reduce eel seed mortality, Preparing new eel seed fishing gear according to standards so that eel seeds are not injured when caught, Providing assistance on how to maintain with RAS technology regularly sustainable development, building website-based e-commerce, to expand production and marketing, both for the market in Java and outside Java, a group of banten eels that are trained in producing and maintaining good eels.

Keywords: RAS Technology, Eel Seeds, Economics Digital, Counseling

1. BACKGROUND

Eel species are in great demand in the international market, especially China and Japan, but not many fishermen in Indonesia know and develop this type of fish. The benefit of this species of eel is that it contains seven times more vitamin A than chicken eggs, reaching 4700IU/100g. And has an energy content that reaches 270 kcal/100g. (Agronet.id, 2021).

Eel fish is highly sought after by the international market, especially Japan because this species has many benefits, including improving brain performance because it contains omega 3 DHA and EPA which are believed to be very good for brain development, especially for children in their infancy, increasing endurance because it is believed to contain Omega-3 in this fish is believed to be able to fight various diseases and be able to prevent depression, the next benefit is being able to reduce bad fats in the body, good for growth, and can maintain eye health (Desprianti, 2021). This type of eel has a very high economic value and is one of the most sought after export commodities by East Asian countries, the United States, and Europe (Wakiya et al., 2019). This eel is caught in the waters when the seeds of this fish have an average weight of 0.15-0.17 grams per head which are then cultivated with a minimum weight of 5 grams and can be sold or reared alone until they reach a weight per head for export (Efendi et al., 2019).

Japan is the largest consumer country that consumes this type of eel. Every year the supply needs to Japan can reach 130,000 tons. There is even a special celebration, in one day Japanese people consume eel. While the production of this type of fish in Japan itself has decreased drastically, namely as much as 60 percent of the total international market demand of 250,000 tons. This is a great opportunity for the people of Indonesia to increase the production of eel which has tremendous demand in the world market (Putra, 2015).

There are twenty species of eel in the world, and nine of these eel species are owned by Indonesia (Chow et al., 2017). The nine species include Anguilla bicolor, Anguilla Neblosa nebulosa, Anguilla bicolor pacifica, Anguilla interiosis, Anguilla borneensis, Anguilla celebesensis, Anguilla marmorata, Anguilla obseura, and Anguilla megastoma (Sutiani & Suseno, 2020).

Based on the number of fish species owned, Indonesian waters have at least about 25% of the total fish species in the world (Ministry of Marine Affairs and Fisheries, 2015). Therefore, Indonesia is one of the world's mega biodiversity countries after Brazil. One type of fish that is currently widely used by the community is eel (Anguilla spp.) et al., 2016). The utilization of eel resources in Indonesia has been going on for quite a long time. Initially, this resource was used to meet the nutritional needs of the community and traded locally. Along with the growing demand for the

international market, eel trade from Indonesia has also penetrated to various countries. The reduced supply of eel seeds originating from the subtropics has resulted in a high selling value which has implications for increasing demand, especially in Indonesia (Fisheries, 2018). Such conditions cause problems in terms of sustainable eel seed management due to limited knowledge and information. The current population of eel seeds is not yet known with certainty (Nubatonis et al., 2020). Until now it is not known how much potential eel seeds. The main obstacle to being able to explain this problem is the nature of the catadramus, when the eel's spawning location cannot be clearly identified. The information used is the locations of finding eggs and larvae around the location of underwater volcanoes (Nubatonis et al., 2020). In order to overcome the limitations of data and information on eel seeds in potential eel areas, it is necessary to collect data and monitor eel populations that can describe the eel population as a whole (Yoshinaga et al., 2014). Eel seed data collection is very important because it is the basis for regulators to determine patterns of use and conservation measures for eels. Based on the results of surveys and interviews, it is possible to analyze several parameters related to the abundance of the eel seed population.

One of the regions in Indonesia that has the potential for natural resources in the form of glass eel seeds is Banten Province, Sukamanah Village, Malingping, Lebak. This area has great potential in producing eel seeds which can later be managed sustainably by utilizing natural resources with local wisdom (Windihastuty & Sutrisno, 2019). This sustainable management is community-based by involving the active role of the community as the main actor in managing existing resources. This management is also a step taken in order to help government programs in improving the social and economic life of the community by utilizing regional potential (Windihastuty, Fatimah, et al., 2019).

Natural resources play an important role in human life. This service activity is aimed at improving the community's economy by utilizing the potential of local wisdom that has a high selling value, thus fostering enthusiasm to manage various local potentials that can generate and improve the community's economy (Windihastuty, Kristanto, et al., 2019).

Sukamanah Village is an eel-producing area in Lebak Regency, Banten. Along the watershed (DAS) of Sukamanah Village, many eel seeds are found. Coastal communities take advantage of these natural conditions by utilizing eel seeds as a source of their livelihood. The water community of Sukamanah Village who works as a catcher of eel seeds formed an association which was later named the Banten Eel Group. The group leader is responsible for catching eel seeds, procuring fishing gear, maintaining shelter and packing and selling distribution.

The novelty in this activity is providing assistance to a group of Banten eel farmers in the village of Sukamah, Malingping, Lebak, Banten because there are no mentoring activities in the area. So far, academics only look for data for research purposes. With this assistance, it is expected to be able to improve the economy of the Banten eel farmer group community.
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2. OBJECTIVE

The wrong way of catching and treatment after capture is still careless resulting in high mortality in eel seedlings. Temporary shelters which are very far from the minimum requirements for holding ponds and the procedures and treatments during maintenance are also very lacking due to the absence of direction and assistance from these eel catcher farmers. In addition, improper water circulation also greatly affects the development of eel seeds. Broadly speaking, the main problems of the Banten eel group are:

a. The high mortality of eel seeds caused by improper fishing gear, wrong catching methods and treatment of newly caught eel lead to stress on eel seeds and lead to death. Another factor is the shelter that does not meet the requirements and maintenance that is not optimal.
b. Sales that are not supported by good marketing, resulting in the sale of eel seeds cannot be directly to cultivators but to collectors. The selling price of sidah seeds is low, if they are not sold immediately, there will be a buildup of eel seeds.
c. There is no good record in the entry of the proceeds from the sale of eel seeds as well as the costs incurred for the activities of catching eel seeds. Recording that is no less important is the results of the acquisition of eel seeds that can be used as data on sources of marine wealth in Sukamanah Village,
d. Maintenance and production of eels that are not optimal, such as unstable water temperature and pH. Oxygen levels in the water also greatly affect the seeds of eels.

With the Community Service (PKM) with the theme of implementing RAS Technology, it is hoped that it can reduce the mortality of eel seeds caught by the Banten Eel Group so that it can improve the economy and welfare of its members and can contribute to developing Sukamanah Village. The results of eel capture become more measurable and data can be stored digitally. Figure 1 is a place to hold the eel seeds before using styrofom box.

Figure 1. Styrofom box eel seed shelter

Based on the results of surveys and interviews with the community eel seeds, an analysis can be taken of how many parameters are related to the abundance of the eel population. Data based on arrests for 3 consecutive days with 5 catchers. The time of catching has entered the harvest period. The distance between the catchers is approximately 5-10 meters. The surface area of the water that becomes the fishing ground is about 2-3 meters from the shore. Capture data taken every 2 hours were weighed in grams and the weight results were rounded off. The capture parameters can be seen in Table 1.

Tabel 1 Observation Results of Catching Eel Seeds

Period day/hour	***Response Result (gr)***					***Sub Total***
Day -1/hour	***1***	***2***	***3***	***4***	***5***	
22.00	30	70	90	90	40	320
24.00	70	110	100	120	70	470
02.00	70	90	110	90	100	460
04.00	60	70	60	70	70	330
Total	230	340	360	370	280	**1580**
Day -2/hour	***1***	***2***	***3***	***4***	***5***	***Sub Total***
22.00	40	70	90	90	40	330
24.00	80	80	100	100	70	430
02.00	70	90	80	90	90	420
04.00	50	70	60	60	70	310
Total	240	310	330	340	270	**1490**
Day -3/hour	***1***	***2***	***3***	***4***	***5***	***Sub Total***
22.00	50	70	90	90	60	360
24.00	90	90	70	100	80	430
02.00	70	90	80	70	90	400
04.00	50	60	60	60	70	300
Total	**260**	**310**	**300**	**320**	**300**	**1490**

Selling to collectors is clearly different from selling directly to cultivators. actually the banten eel group wants to sell directly to cultivators, but due to the very limited scope of marketing, the banten eel group and its seeds are not widely known by cultivators. Eel seeds when sold to collectors start at 900,000/kg and collectors can sell eel seeds to cultivators up to 3 million/kg. Meanwhile, if sold directly to cultivators an average of 2.5 million/kg.

3. METHODS

The method used in the implementation of this service activity refers to the implementation of eel cultivation with RAS technology for the banten eel group in Sukamanah Malimping village. To support the implementation of this activity properly, it is necessary to carry out the stages of the implementation of these activities. The stages of implementing the proposed community activities, if a scheme is made, it can be described in a scheme as shown in Figure 2

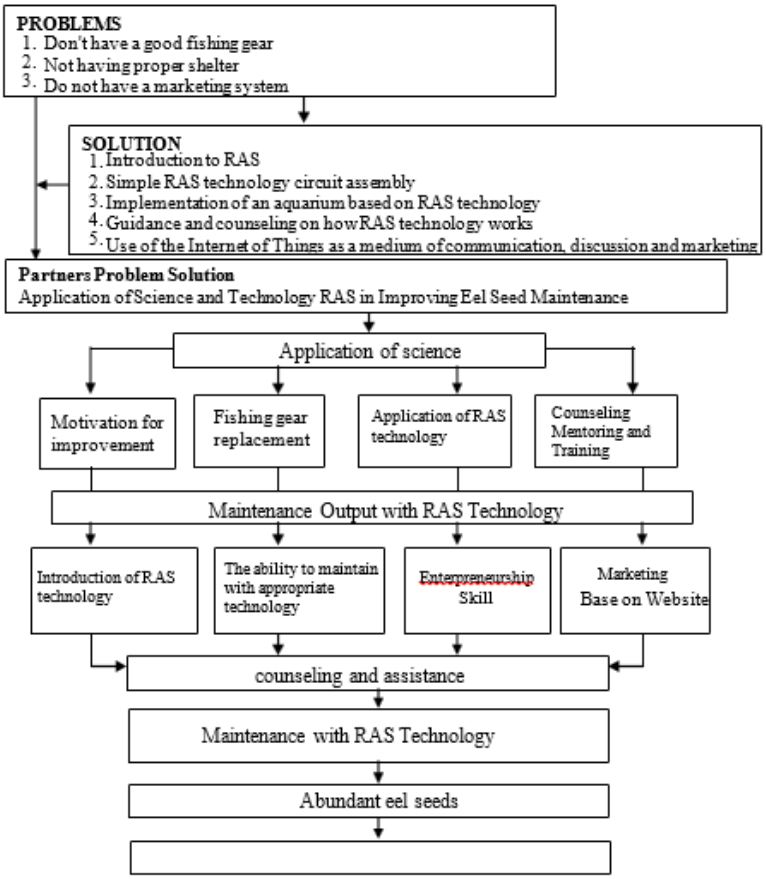

Figure 2. Activity Stage Scheme

The activity implementation stage scheme is designed in such a way as to make it easier for the proposer to carry out the activities step by step (Windihastuty & Kristanto, 2017). After observing and discussing several times with the community of the Banten eel farmer group, we compiled several steps and stages that we will take during this community service activity to help realize economic improvement for the local community. The stages are as described below;

a. Planning

Developing an activity plan is very important, besides that, it is no less important to arrange a schedule for the implementation of activities. After the implementation plan has been mapped out, a Group Discussion Forum is formed between the proposer team and the Banten Eel group to adjust joint activities, especially the problem of schedule and activity time.

b. Coordination

Coordination needs to be carried out, both for the Banten Eel Group as partners and other related parties such as Budi Luhur University, Jakarta as the proposing team institution, the local community as a provider of maintenance facilities as well as those who have the facilities needed to support the implementation of activities, the target area apparatus and other institutions. who play an active role in this activity. The result of coordination with all parties is to obtain an agreement on the time to start the implementation of the activities of making aquariums and RAS technology devices.

c. Material Purchase

This activity is the purchase of materials that will be used to make an aquarium, such as glass and glass glue as well as other materials such as pipes, hoses, pumps and so on to assemble the Recirculating Aquaculture System. The purchase of materials is carried out in stages, where the first stage of purchasing materials is focused on assembling the aquarium and for assembling the RAS. After the trial of the series is completed, then a large-scale purchase of materials is made according to how many aquarium units will be implemented. The results of the purchase of this material are the fulfillment of material needs to make an aquarium and a series of RAS that will be implemented so that the implementation of activities can run well.

d. Tools and Materials

The tools and materials used to safely catch eels are fishing gear that is in accordance with the characteristics of each habitat. The eel fishing gear used varies greatly according to the habitat conditions in each region (Imron et al., 2018). The eel catcher is a rectangular net that has a small frame and is operated using only human power, namely by hand. The fins and pokes are operated by means of the net being lowered towards the bottom of a relatively shallow river estuary with the face of the net facing upwards (Rahmia et al., 2022). After the eel seeds are collected, then the net is lifted towards the surface until the eel seed cluster is in the net. The catch is taken slowly from the net using a plastic plate. The fishermen who catch eel seeds all use fins to collect eel seeds. The 2 (two) tools are made of waring material with a size of 1 m x 1 m, waring material with a mesh size of 0.05 mm (S et al., 2020).

The strategy carried out focuses on developing, implementing and implementing RAS technology in maintaining eel seeds. The manufacture of aquariums and assembling of RAS technology is carried out in stages, which conceptually refers to the needs of the Banten eel group that acts as a partner, such as:

1) Coaching for eel farmers on how to catch the correct eel seeds,
2) Making eel seed reservoirs based on RAS technology,
3) Provide guidance, training and counseling in the context of good eel maintenance and management so that they can be used sustainably.

In addition to focusing on the development, application and implementation of RAS technology in the maintenance of eel fry, we also implement a marketing strategy by helping to find customers and marketing the community's eel seed products using prurchasing orders and personal selling to partners. At first people were confused about where to market these eel seeds, later they could be assisted in marketing by ordering by telephone, website and even our hope is that they can be exported (Bachtiar et al., 2013).

In the process of this activity, the enthusiasm and participation of the members of the Banten eel farmer group was very enthusiastic. Not only attended by experienced residents in terms of age, this activity also attracted the attention of students from the local area who attended discussions on the development and management of eel seeds. The students, as the next generation of the Banten eel farmer group, are always actively present in every activity carried out to make this citizen's eel business a business that is able to increase regional income, especially increasing the income of residents.

4. RESULTS AND DISCUSSION

From the activities that have been carried out in Sukamanah Village, Lebak, Banten, the following results were obtained:

a. Coaching for eel farmers on how to catch the correct eel seeds.

Guidance and counseling on how to catch good eel seeds is needed so that the eel seeds are maintained in good condition until they are ready to enter the holding aquarium. Assistance regarding procedures and stages after arrest should also be provided. Conventional shelters and maintenance are replaced with shelters and maintenance with RAS technology in the form of aquariums in which each aquarium is equipped with water pipes and pumps and aerators as components and RAS technology. Clean water reservoirs, pumps, diesel and oxygen cylinders also need to be prepared to anticipate problems in the shelters. Maintenance and care while the seeds are in the shelter are no less important than RAS technology. Packaging at the time of sale must follow rules such as the ratio of the number of eels, the volume of water, the amount of ice and oxygen given. Good management of eel seed packaging will ensure the quality of eel seeds to be sold.

b. Retention of eel seeds based on RAS technology.

With RAS technology-based eel storage, the eel seeds will be well maintained so that the Banten Eel Group does not have to worry about the death of the eel seeds, the eel seeds can be maintained properly for longer. Eel Farmers Groups do not need to rush to sell their catch of eel seeds. Eels reared with RAS technology will grow larger, this will increase

sales results because of the increased weight of the eel seeds. In addition, the eel Farmer Group can wait for buyers who are direct cultivators so that the price offered is according to the market price. In another sense, the income of the Banten eel group increased.

c. Provide guidance, training and counseling in the context of good eel maintenance and management so that they can be used sustainably.

Facilities and infrastructure also need to be considered, as well as good maintenance methods by meeting the required standards. With this, it is hoped that the community will be able to manage eel seeds well so that they can increase their income. This income is not only sufficient to meet their daily needs, but also becomes the parent of the residents' businesses, especially the members of the Banten eel farmer group.

In this activity, a trial of eel seed maintenance has been carried out using RAS technology as shown in Figure 3.

Figure 3. Trial of Seed Maintenance with RAS Technology

Next is a description of the community service activities that we have carried out with the residents of the Banten eel farmer group with various discussions regarding the maintenance of eel seeds which can be seen in Figure 4.

Figure 4. Forum Discussion Meeting

5. CONCLUSION

After conducting observations, discussions, training and counseling to the community of Banten eel farmer groups, assistance will be provided in the maintenance of eel seeds using RAS technology so that the glass eel mortality rate can be suppressed so as to be able to lift the economy of the local community in particular and the Sukamanah, Malingping, Lebak, Banten in general.

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