

## Utilization of Biogas Waste (Sludge) as an Alternative to Fish Feed in Teluk Roban Sorkam Village, Central Tapanuli Regency

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### Abstract

Fish feed is one of the highest cost components in carrying out intensive system fish farming activities which makes the high price of feed will affect the continuity of the aquaculture business. For fish cultivators, high feed prices will cause difficulties because about 60% of production costs come from feed. The high cost of feed is partly due to the fact that some of the raw materials for feed are still imported. Biogas waste from cow dung is a potential source of alternative raw material for fish feed with adequate quality of carbohydrate nutrients accompanied by guaranteed quantities and availability throughout the year. The purpose of this activity is to socialize in the manufacture of fish feed from biogas waste from cow dung in Teluk Roban Village, Sorkam Tapanuli Tenah District. The method used is to carry out direct training activities with demonstrations of the procedures and stages of making fish feed in the form of pellets for fish cultivators and the community. The results obtained from this activity are expected to be later for fish cultivators or community groups to understand the manufacture of fish feed in the form of pellets from biogas waste from cow dung as a business that can fill the local market that has not been filled with much and can compete in the business of making fish feed. . With this activity, it is hoped that there will be an increase in the skills of making fish feed in the form of commercial-scale pellets for the local market,

**Keywords:** Biogas waste from cow dung, fish feed, fish farmers

### INTRODUCTION

Teluk Roban village, Sorkam district, Central Tapanuli, most of the people work as fishermen, fish cultivators, and cattle breeders. This illustrates that cow dung is still not optimally processed and tends to cause air pollution for surrounding neighbors which is characterized by a quite pungent smell of manure. The use of cow dung as a biogas producer has previously been socialized. However, observations show that farmers tend to accumulate cow dung biogas waste and place it on empty land on the edge of their cages.

In fish farming, the feed has an important role because the supply of feed is the highest-cost component. About 60% of production costs come from feed which shows that the high price of feed affects the continuity of the fish farming business. The price of feed is expensive because some feed raw materials still rely on imports, such as fish meal, soybean meal, and pollard flour, so it is necessary to look for alternative raw materials that are cheap, available all the time, and of good quality. Schmid (2007) stated that biogas waste in the form of solids (sludge) amounts to about 30% of cow dung material. Based on information from the field, the use of biogas sludge as fish feed material has begun to be carried out by fish farmers by mixing biogas sludge and feed concentrate (1:1).

Biogas waste from cow dung can be used as an alternative raw material to replace pollard flour, because it contains 17.08% protein content, 0.81% fat, and 38.85% carbohydrates, is easy to obtain, cheap, the quantity and availability are guaranteed throughout the year. The price of 1

kg of biogas waste from cow dung is Rp. 500, while the price of 1 kg of pollard flour is Rp. 2900. The use of biogas waste from cow dung as an alternative raw material for feed has been carried out by Utomo (2006), and it is said that the biogas sludge can be accepted by tilapia *Oreochromis niloticus*.

The use of biogas waste from cow dung as an alternative raw material for fish feed has been studied through formulations with other raw materials to increase nutritional value, as well as feed palatability, which has been carried out by Nugroho (2010), the use of biogas waste can replace pollard raw material up to 100% as raw material for carbohydrate sources in tilapia feed.

This community service activity focuses on making feed using biogas waste material from cow dung. It is hoped that through this activity the community will be able to independently produce their own feed so that they can reduce production costs. In addition, this activity is also a place to transfer knowledge and technology from academia to the community, especially tilapia cultivators in the Tapanuli Tengah area, the Aquaculture Study Program, Fishing Technology Study Program, and Fisheries Socio-Economic School of Fisheries and Marine Affairs Matauli, conducted a Community Service (PKM) activity, namely: "Utilization of Biogas Waste (Sludge) as an Alternative to Fish Feed In Teluk Roban Sorkam Village, Central Tapanuli Regency"

### **Destination**

The objectives of this Community Service activity are:

- It is hoped that this activity the community will be able to independently produce their own feed so that they can reduce production costs in the Central Tapanuli area;
- To be able to understand and understand the business activities of fish feed and proficient in the manufacture of fish feed;
- It is hoped that this new business opportunity will be better in managing fish farming and know how to sell strategies.

## **METHOD**

### **Location and Activity Participation**

This activity was carried out on September 5, 2022 in Teluk Roban Village, Kec. Sorkam Kab. Central Tapanuli, North Sumatra Province. This community service activity lasts 1 day and the participants or participants are fishing community groups, fish cultivators, MSMEs, as well as ordinary people and local village officials in the Teluk Roban village area. The location for this activity can be seen in Figure 1.



**Figure 1.** Map of the location of Community Service Activities (PKM)

### **Materials and Tools Used**

The materials needed in the manufacture of feed used in Community Service activities are Fish Flour, Biogas Waste, Soybean Flour, Homini, Oil1, Premix2, CMC3, and warm water. The tools used are hand scoops, digital scales, basins, and pellet printers.

### **Activity Implementation Method**

#### **Early socialization**

The socialization activity began with a visit to the partner location of the fish cultivator group. This socialization activity was carried out with various parties including fishery instructors and members of fish farming groups in the form of discussions. This activity aims to communicate PKM activities including goals, objectives, and forms of activities as well as the outputs of the activities to be carried out. This socialization is important so that PKM activities can run smoothly, effectively, and efficiently.

#### **Counseling**

The outreach activities carried out included training in making feed using the basic ingredients of sludge flour.

#### **Evaluation**

Evaluation is carried out at the end of the PKM program. The evaluation aims to determine the extent to which the knowledge and skills of the cultivator group have increased in making feed independently.

#### **Method of collecting data**

For the data collection method in this Community Service activity, it is to look at the level of satisfaction of the people served to register as participants, and are very satisfied and fun and when this activity is completed, the community is also very enthusiastic about wanting to make fish feed at their respective homes. with the knowledge that has been gained during this activity.

This activity can also change the paradigm of the community, especially the village of Teluk Roban Sorkam towards changes in knowledge and skills attitudes and increase soft skills and hard skills in making fish feed and designing packaging properly and correctly. The sustainability of this Community Service activity program should be: making a socialization program about the manufacture of certain fish feed so that it can be an additional income value to the community's income and creating an empowered source of willingness to learn new knowledge in feed manufacture, as well as solving problems in the supply of fish feed and demand for feed manufacture.

## **RESULTS AND DISCUSSION**

### **Socialization of Community Service Implementation Program (PKM)**

This community service activity is based on socialization and direct training is carried out in the village of Teluk Roban Sorkam, Central Tapanuli Regency. This activity began with outreach and visits to the houses of fishing community groups, fish cultivators, MSMEs, as well as ordinary people and local village officials in the Teluk Roban village area.

This socialization activity explains how to use cow dung in biogas. After that, the socialization continued to provide information about the utilization of waste from biogas activities that could be reused as an alternative for making fish feed that was appropriate because it involved the success of fish farming activities. Many participants initially did not know how to make fish feed with a good and correct composition. If the participants already have soft skills and hard skills in the fish feed business, then the reach in market demand will be easy for them to master.

In the socialization activities, discussions and questions and answers were also held, especially related to the utilization of biogas waste which was processed into flour to be used as raw material for fish feed. The community is quite enthusiastic in responding to the activities carried out. This is evidenced by the many questions asked by groups of fishing communities, fish cultivators, MSMEs, as well as ordinary people and local village officials in the Teluk Roban village area.

The training in making feed will be very useful because cultivators can make feed independently by utilizing fish feed by replacing pollard flour with flour from the biogas waste which can reduce the production cost of making fish feed independently. As stated by Ernawati

et al. (2016) that the cost of feed for fish rearing is very high, reaching 70-80% of production costs.

In addition, using fish feed by replacing pollard flour with flour from biogas waste, this does not have a bad effect on fish, and the content of biogas waste does not cause disease, and the processing of biogas waste into feed is good, this is in accordance with research conducted by Nugroho (2010), the survival rate of fish is said to be good because the survival rate of test fish is more than 90% after being given pellets from the use of fish feed by replacing pollard flour with flour from biogas waste.

This training in making feed is expected to reduce production costs and increase the income of fish farmers. Large capital produces large production. This is in accordance with the opinion of Mubyarto (2003) that the size of the invested capital is important in a business.

### **Description of Activity Goals**

The target in the implementation of this community service activity was followed by participants from some village communities, fishing groups, MSMEs and local village officials in the Central Tapanuli region.

### **Program Implementation**

The manufacture of feed is carried out on a demo which is carried out by a team of lecturers and members of the cultivation group. The manufacture of feed begins with introducing the ingredients used and the function of each ingredient. The feed composition is then formulated (Table 1) according to the feed formulation referring to Nugroho (2010), where the selection of feed ingredients is based on the nutritional needs of the fish.

**Table 1.** Feed Formulation

<b>Feed Ingredients</b>	<b>Composition</b>
Fish flour	18,50
Biogas Waste	16.00
Soy Flour	15.00
Homini	21.50
Oil1	6.00
premix2	5
CMC3	2
Total (%)	100.00
%Protein	29.05
C/P (kcal/kg)4	9.67
DE (kcal/kg feed)5	2936

Information:

1. Is a combination of fish oil and corn oil with a ratio of 3%: 3%.
2. Premix is a mixture of minerals and vitamins.
3. CMC = Carboxy Methyl Cellulose.
4. C= energy; P= protein
5. 1g protein = 3.5 kcal DE, 1 g carbohydrates = 2.5 kcal DE, 1g fat 8.1 kcal DE

The composition of the feed consists of protein, carbohydrates, fats, and vitamins. Sources of fat and vitamins come from fish oil and vitamin mix. After all the materials are available, the next stage is the manufacture of feed. All ingredients are mixed according to the dose according to the feed formulation given. After mixing well then give boiling water as much as 30% little by little until evenly mixed. After mixing the dough is then printed manually. The pellets that have been printed are then dried in the sun to dry (3-4 hours). After drying, pellets can then be stored in a closed, dry container (Figure 2).





**Figure 2.** (A) Drying and Packaging Process (B) fish pellets

On the first day of this training, the participants were given socialization and an understanding on how to use cow dung into biogas. After that, the socialization continued to provide information about the use of waste from biogas activities that could be reused as an alternative for making fish feed that was appropriate because it involved the success of fish farming activities. So, it is hoped that all participants will be able to fill the local market that has not been filled and compete and have soft skills and hard skills in making fish feed. This activity was carried out one day, after the socialization, we immediately demonstrated and directly practiced in making fish feed (Figure 3).



**Figure 3.** Demo Process for Making Fish Pellets

After the feed-making demonstration, discussions and questions and answers were held regarding the process of making feed, the method of feed formulation, and the types of materials that can be used other than those provided. The community is very enthusiastic because the information presented in the training is very useful and can provide good solutions to the problems they face, especially those related to fish feed (Figure 4).



**Figure 4.** The enthusiasm of the Roban Bay community towards socialization

### Monitoring and Evaluation

The PKM program is monitored from the preparation and implementation to the evaluation stages through the collection of participant attendance lists and documentation in the form of photos and videos. Monitoring is carried out to monitor the level of participation of participants at each stage of the activity. For program evaluation, mentoring was carried out by utilizing sludge

flour as one of the raw materials for making the feed to be applied to fish kept in concrete ponds in the community's yard. Feeding is given twice a day in the morning and evening. The success of the PKM program cannot be separated from the support and active participation of partners. In addition, the assistance provided by the campus is also an important supporting factor. Mentoring is a strategy that can determine the success of community empowerment programs (Karsidi 2002)

### **Obstacles Encountered**

There are several obstacles faced by this community service activity (PKM), namely: regarding the adjustment of free time owned by participants from different professional backgrounds. Gathering the participants so that they can attend is not easy, because some of the participants are fishermen, so finding the right time is very difficult. The solution is to find a time or day when the village conducts buying and selling activities or market days. Because the fishermen are in a state of rest to look for fish in the sea and switch to buying and selling activities in the market, after they are finished in these activities, then adjust to the activities that have been prepared. In addition, the obstacle faced is the difficulty of evaluating and assessing alternative feeds that are made so that the implementation of the assessment cannot be carried out, even though this assessment becomes feedback for improving the quality of the products mentioned above. If the results of the assessment show good numbers, it can be directly practiced in the community. However, if the assessment results show poor numbers for certain assessment components, it is necessary to improve the recipe and product quality (Jocom, 2022)

### **Impact and Sustainability of Activities**

The impacts that will arise and will occur when this activity is carried out are: it is hoped that this activity will bring out small business actors, especially in the field of fish cultivation, and be able to produce their own fish feed if there are people who want to cultivate fish because for fish cultivators the price of feed is low. High levels will cause difficulties because about 60% of production costs come from a feed.

For sustainability efforts in the next activity, which must be based on or business-based fish feed, the paradigm of the fishing community does not have to think that the source of income does not have to be from the sea, but can be from producing fish feed independently and others.

### **CONCLUSION**

The conclusion from the results obtained in this community service activity (PKM) is that it is hoped that the community service program activities by socializing the use of making feed using materials from waste from biogas activities as an alternative to pollard flour in making fish feed will run smoothly. Communities can make feed independently using Sludge flour and apply it to cultivation activities.

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