

# Training on Making Liquid Organic Fertilizer from Catfish Waste in Lengau Seprang Village, Tanjung Morawa District

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## Abstract

Lengau Seprang Village, Tanjung Morawa District, has great potential in the fisheries sector, particularly catfish farming. However, the utilization of catfish harvests and waste is still not optimal, resulting in low economic value and waste often becoming an environmental problem. This community service activity aims to empower the local community through training in the production of Liquid Organic Fertilizer (POC) from catfish waste as a high-value processed product, as well as the utilization of catfish waste such as offal for poultry feed. The implementation method includes providing material (lectures), technical training in making catfish POC, demonstrations and practical POC making, and a question and answer discussion regarding the activity. It is hoped that this activity will improve skills, foster new entrepreneurs, reduce waste and increase community income. This activity also encourages the creation of a circular economy at the village level based on sustainable local potential to support sustainable agriculture.

**Keywords:** *Waste, Catfish, Organic Fertilizer, Liquid*

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## Introduction

Lengau Seprang Village, located in Tanjung Morawa District, Deli Serdang Regency, North Sumatra, is one of the centers of catfish cultivation in the region. Many residents cultivate catfish as a primary or secondary source of income. However, the majority of the catfish harvest in this village is sold raw to collectors at relatively low prices, thus limiting the added value received by farmers. In addition, the lack of skills in processing fishery products means that the community has not been able to develop derivative products with high economic value.

According to data, there are over 50 catfish farmers with a total of 120 ponds and an average monthly production of 15-20 tons. This significant potential not only provides economic benefits for local residents but also generates significant waste from the catfish production and processing process.

Catfish waste, consisting of heads, bones, fins, skin, and especially intestines, often becomes an environmental problem due to improper disposal. This waste is usually simply dumped into rivers or buried without adequate treatment, resulting in an unpleasant odor and pollution of the surrounding environment. Furthermore, the disposal of organic waste into rivers can increase ammonia levels and cause eutrophication, which is harmful to aquatic ecosystems. On the other hand, the agricultural sector in Lengau Seprang Village is also quite developed, with an agricultural area of 120 hectares dominated by food crops such as rice and corn, as well as horticultural crops. Farmers still rely heavily on chemical fertilizers, the costs of which increase year after year. This places a significant economic burden on local farmers and has resulted in a long-term decline in soil fertility due to the excessive use of chemical fertilizers.

Based on these issues, an innovation is needed that can transform catfish waste into a valuable product. Making liquid organic fertilizer from catfish waste is a viable solution to address two issues simultaneously: fisheries waste management and the provision of more economical and environmentally friendly organic fertilizer.

Liquid organic fertilizer made from catfish waste contains excellent nutrients for plant growth. Research shows that catfish waste is rich in nitrogen (N), phosphorus (P), and potassium (K), essential macronutrients for plants. Furthermore, liquid organic fertilizer made from fish waste contains amino acids, growth hormones, and beneficial microbes that can increase soil fertility and improve soil structure.

This community service program is expected to transfer knowledge and skills to the Lengau Seprang Village community in processing catfish waste into high-quality liquid organic fertilizer, thereby reducing environmental pollution, increasing agricultural productivity, and ultimately improving the overall welfare of the community.

Utilization of fish waste as animal feed can not only reduce environmental pollution, but also support the circular economy at the village level [1]. Seeing these potentials and problems, a community service program is needed with the title **Training for making liquid organic fertilizer from catfish waste in Lengau Seprang Village, Tanjung Morawa District with the aim of** improving community skills and income, and encouraging the realization of village economic independence based on sustainable local resources.

## Literature Review

Many residents of Lengau Seprang village cultivate catfish as a primary or secondary source of income, but most only sell their catfish harvest in the form of raw fish so that the price is lower and has no economic value. Here are some problems in this village, namely: 1) **Minimal Added Value of Catfish Cultivation Products, so that** the people of Lengau Seprang Village generally sell their catfish harvest in raw form to collectors. This results in low selling prices and limited profits, because there is no further processing that can increase the selling value of the product. 2) **Lack of Fishery Product Processing Skills**, where the community does not yet have the skills to process catfish cultivation results into processed products with economic value, such as catfish floss. This condition causes dependence on conventional markets and limits community access to a wider market. 3) **Catfish Waste is not**

**Utilized Properly**, such as heads, bones, and other unused body parts are usually thrown away, causing odors, polluting the environment, and potentially becoming a source of disease.

Catfish has the potential to be used as **Liquid Organic Fertilizer**, based on the results of laboratory analysis, catfish waste has a very potential nutritional content to be used as liquid organic fertilizer: Nitrogen (N) content of around 3-4%, phosphorus (P) 2-3%, and potassium (K) 1-2%, contains various micronutrients such as calcium, magnesium, and sulfur which are important for plant growth, Rich in amino acids and proteins that can increase the activity of soil microorganisms, can be produced with simple technology and easily obtained additional materials such as molasses and EM4, with relatively low production costs.

## **Research Methodology**

### **Approach Methods Offered**

Catfish waste is a problem, but it can be processed into something useful. One way is to make liquid organic fertilizer, a liquid produced by fermenting organic waste with sugar and water.

### **Procedures**

This Community Service Activity uses the Participation Action Research (PAR) method through certain stages [2]. The stages of implementing Community Service activities consist of: 1) Focus Group Discussion (FGD). FGD is conducted at the beginning of the activity between the Community Service team. This is done to provide a more detailed explanation regarding the activities to be carried out and to make a time contract for the implementation of the activity. 2) Socialization of Community Service activities to community groups, and In this socialization activity the team provides an explanation to community groups, about the technical and schedule of activities that will be carried out in the implementation of Community Service. The media used in this socialization activity is power point (ppt). 3) Education and practice on community empowerment [3] through training in making liquid organic fertilizer (POC) from catfish waste and its waste management, and motivation. The work procedures carried out include:

#### **1. Preparation Stage**

The team coordinated the planned community service implementation, including the schedule and location of the activities. The activities are planned for **Lengau Seprang Village, Tanjung Morawa, in May 2025.**

#### **2. Implementation Stage**

The implementation of activities is carried out in stages:

- a. Preparation of training modules/materials **for the utilization of catfish waste into POC**
- b. Lecture and discussion on POC creation
- c. Direct practice of making POC

Lecture material (presentation) is given to participants in the form of a training module, then followed by discussion (question and answer) and direct practice in the field.

## **Materials and Tools**

### **Material**

Catfish waste (head, bones, fins, skin) or specifically catfish intestines, molasses or brown sugar, EM4 (Effective Microorganisms) or Ecoenzymes.

### **Tools**

Knife, chopping board, gloves, fermentation container (plastic bucket/barrel with lid), wooden stirrer, sieve, bottle for storage.

## **Manufacturing Stages:**

### **Preparation of ingredients**

- a. Wash the catfish waste or catfish intestines thoroughly to remove dirt.

- b. Cut the waste into smaller pieces to speed up the decomposition process.

### Mixing process

- a. Prepare a tightly closed fermentation container.
- b. Put the catfish waste that has been cut into small pieces into a container.
- c. Add molasses or brown sugar (ratio 1:10 to fish waste)
- d. Add EM4 as a bioactivator (1:20 ratio with fish waste) or ecoenzyme.
- e. Add clean water until all ingredients are submerged (1:3 ratio between solid ingredients and water)
- f. Mix all ingredients until well blended

### Fermentation process

- a. Close the fermentation container tightly.
- b. Store in a cool place for 14-21 days
- c. Stir the mixture every 3-4 days to even out the fermentation process (Fig 1)



Figure 1. Practice of Making Liquid Fertilizer from Catfish

### Harvesting

- a. The fertilizer is ready to harvest when it no longer has a strong smell and the aroma has changed to a fresh, sour aroma like tapai.
- b. Strain the mixture to separate the liquid and solids.
- c. Put the liquid fertilizer into the bottle and close it tightly.
- d. The solid dregs can be used as compost.

### Application

- a. To use, dilute the liquid organic fertilizer with water in a ratio of 1:10 to 1:20.
- b. Use to water plants or spray on leaves

### Evaluation Stage

Community service participants, namely village communities, are invited to directly make POC from prepared catfish and make feed based on catfish waste.

### Results

Waste management is essential for both organic and inorganic waste. Inorganic waste requires special treatment, such as providing a final disposal site where waste or trash will be sorted or grouped, whether it can be recycled or not. Organic waste generated by the community can be organic waste from agricultural products, or household waste. Household waste can include fruit peels, or vegetable waste such as unused vegetable stems, which are

managed by making it into a multi-functional liquid commonly known as ecoenzyme or liquid organic fertilizer (POC).

In addition to household waste in the form of vegetable or fruit scraps, POC can also be made from household waste originating from fish such as fish bones, intestines, and fish heads. In this community service activity, catfish waste can be utilized as a by-product in the production of catfish floss. The community in Lengau Seprang village plans to make catfish floss into a UMKM product, thus resulting in a large amount of catfish waste. If not managed properly, this waste can become a further problem, especially for the environment, it can produce unpleasant odors that contribute to air pollution.

Therefore, it is necessary to manage catfish waste into a useful by-product, one of which is by making liquid organic fertilizer (POC) from catfish waste [4].

POC is useful in various fields, such as fertilizing the soil. In addition to agriculture, POC can also be used in the fields of animal husbandry, hygiene, and addressing cleanliness (sanitation) and environmental pollution in rivers, lakes, or others. In this session, the experiences of the research team or implementation team in using POC were also explained/shared, the benefits of POC for increasing production in shallots [5], soybeans [6], edamame soybean varieties whose production increased with the addition of POC. From several examples of events (experiences) above, it is highly recommended that the community immediately make their own POC, because it is not freely sold in stores. Homemade POC has a cheaper price than inorganic fertilizers purchased on the market (commercial).

The results of implementing this activity are documented in the form of photos and reports of community service activities.

## Conclusion

Catfish waste can be turned into a useful product, namely a liquid organic fertilizer made from catfish waste. The community enthusiastically welcomed this training program, as it addressed the scarcity and high cost of commercial fertilizers and reduced household waste. This activity can also be implemented in other villages to reduce the problem of fish waste and other household waste.

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