



FISH SMOKING TECHNOLOGY TO INCREASE INCOME OF THE "SENTONO ING NYAWIJI" CATFISH CULTIVATION GROUP, IN JANGET HAMLET, MORANG VILLAGE, KARE DISTRICT, MADIUN REGENCY - EAST JAVA

Andrew Joewono

Professional Engineer Study Program, Widya Mandala Catholic University Surabaya
Email: dyna@ukwms.ac.id

Adriana Anteng Anggorowati

Professional Engineer Study Program, Widya Mandala Catholic University Surabaya

Ivan Gunawan

Industrial Engineering Study Program, Widya Mandala Catholic University Surabaya

Hartono Pranjoto

Electrical Engineering Study Program, Widya Mandala Catholic University Surabaya

Dyna Rachmawati

Accounting Study Program, Widya Mandala Catholic University Surabaya

ABSTRACT

One of the MBKM programs is building villages, so the proposer applies science, technology, soft-skills and hard-skills to collaborate with partners to build villages. The theme chosen is food. Partner problems: (1). how to increase income from cultivating catfish which has a profit of under 10% to be greater than 40%. By using processing technology from catfish cultivation to produce products that are different from the general ones (fresh catfish). Catfish is processed into smoked catfish which is packaged and ready to be marketed. This has a positive impact, with an increase in income from the cultivation of catfish, into processed smoked catfish from the technology of processing catfish harvests using smoking. The solution to this problem is to make a fish smoker. The output is a multi-story fish smoker fueled by coconut fiber which functions to dry or preserve harvested catfish by providing space heating using smoke from the burnt fuel. The next problem, (2). how do partners have financial management skills, so that partners can run a sustainable catfish processing business, to increase income from the catfish cultivation business, including by marketing their products. As a continuation, it is hoped that catfish farming partners can advance to become MSMEs. The solution is to be given training in using financial governance with the SI APIK application from Bank Indonesia. The output of partner empowerment is being able to record bookkeeping and every financial transaction. The SI APIK application can be useful for small-scale individual businesses.

Keywords: Fish smoker; production cost; financial application program

INTRODUCTION

The Community Service Program is an activity that is actually carried out to help the community find solutions to problems (Bing-Jonsson et al., 2016). The Merdeka Belajar Kampus Merdeka (MBKM) activity, with one of its programs being building villages, is a step that can be implemented in real terms, lecturers and students involved in community service activities have the opportunity to apply science, technology, soft-skills and hard-skills to collaborate with the community to develop the village (Ariani, 2022).

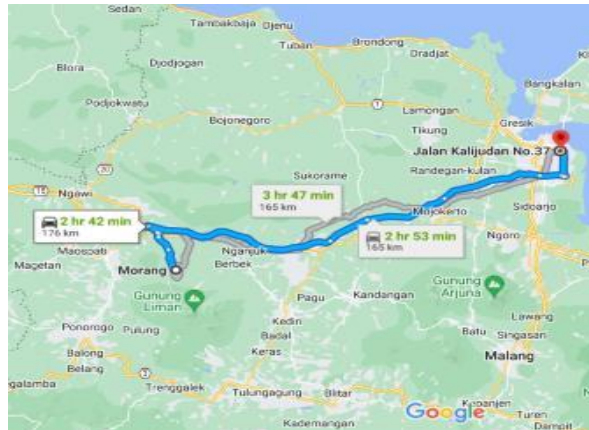
The proposing team chose a food focus area theme. The benefit of PKM activities is that it is one of the means for Widya Mandala Catholic University Surabaya (UKWMS) to form a strategic network in helping village development and at the same time becomes a means of actualizing lecturers in developing science and developing the Tri Dharma of Higher Education (Kim et al., 2022).

The activity partner is the Village Consultative Body (BPD) of Morang Village with the target of the "Sentono Ing Nyawiji" catfish cultivation group in Janget Hamlet, Morang Village, Kare District, Madiun Regency. Partner Profile is shown in Table-1.

Table-1. Partner Profile

No.	Explanatory	Identity
1	Partner	Morang Village Village Consultative Body (BPD) targeting the "Sentono Ing Nyawiji" Catfish Cultivation Group
2	Mitra Name of Partner's Person in Charge (PIC).	Mujiono
3	PIC position	Chairman of the Village Consultative Body (BPD) of Morang Village
4	Address	RT 035/ 016 Morang Village, Kare District, Madiun Regency
5	No. MOBILE PHONE	081322046996
6	Start Cultivating Catfish	In 2022 (3 harvests already)
7	Number of catfish harvests	1st harvest obtained 250 Kg; 2nd harvest of 100 kg; the 3rd harvest got 150 kg
8	Pool model	Using type D-2 tarpaulin for 3 pools, D-3 has 1 pool, 2 box pools and 2 pools on the ground. So there are a total of 8 pools

Located in Morang village, Kare subdistrict, Madiun district, map as shown below:



In Figure-1 you can see a catfish cultivation pond made of tarpaulin measuring D-2 and D3 in Janget Hamlet. This catfish pond is located in an empty yard around the house of a member of a catfish cultivator group. Use type D-2 tarpaulin for 3 pools, D-3 for 1 pool, 2 box pools and 2 pools on the ground. So there are a total of 8 pools. Use type D-2 tarpaulin for 3 pools, D-3 for 1 pool, 2 box pools and 2 pools on the ground. So there are a total of 8 pools.



Figure-1. "Sentono Ing Ngawiji" Group Catfish Cultivation Pond

Partner problems were discovered when the proposing team visited the partner's location and continued with observation of communication via telephone and Whatsapp. These problems can be detailed as follows:

(1). 1st priority, namely how to increase the selling value of catfish farming products, under existing conditions, catfish farming results are harvested within 2 to 3 months, with initial costs, purchasing fish seeds (4-5 cm in size) at a price of Rp. 1250,-/head, with seed distribution of 1000 birds/distribution period, with a calculation ratio of 1:1, meaning 100 kg of feed at a price of Rp. 12,000,-/Kg, will produce 100 Kg of fish (selling price Rp. 18,000,-/Kg), then the profit obtained, the selling price is reduced by the seed expenditure plus the feed expenditure. Calculation per 100 Kg,

	Income	Expenditure
Yields	100 Kg x Rp. 18.000,-	
Production of seeds		1000 ekor x Rp. 250,-

Feed production		1000 heads x Rp. 250,-
Other expenses (water, electricity)		100 Kg x Rp. 12.000,-
Amount	Rp. 1.800.000,-	Rp. 100.000,-
Profit/3 months	Rp.250.000,-	Rp. 1.550.000,-

Based on the data above, the calculation for the harvest period excluding investment costs for cultivation equipment, the profit is IDR. 250,000,-/3 month period, is a productive business that is not good, therefore additional efforts need to be made for the processing of cultivated products to increase income by carrying out the process of smoking the cultivated catfish and packaging them ready to be marketed directly, with the calculation assumptions (excluding investment costs) as follows:

			Expenditure	Income
Yield 100 Kg (1 Kg/9 heads)	900 heads	Rp. 2,000,-/head	Rp.1.800.000,-	
Seasoning the smoking process	10 Kg	Rp. 10.000,-	Rp.100.000,-	
Smoking fuel	20 Kg	Rp. 2.000,-	Rp.40.000,-	
Plastic packaging (20x30cm)	300 sheets	Rp. 1200,-	Rp.360.000,-	
Sales prediction after smoking process (1 pax/content of 3 fish)	300 pax	Rp. 20.000,-		Rp.6.000.000,-
Amount			Rp.2.300.000,-	Rp.6.000.000,-
Profit (after processing)				Rp.3.700.000,-

From the calculation data above, it can be seen that there is an increase in income from additional processing of the harvest to be used as processed food.

In terms of economic value, the business of processing harvests by smoking fish is very feasible as an effort to increase cultivation results.

As a community, the community has received a model of increasing family income by carrying out processing processes from catfish cultivation business groups in Morang village, so that it can then be planned to become a center for catfish processing.

(2). The second problem is how catfish cultivators and processors have the skills to organize financial management. The important thing to do together with partners is to manage financial flows in carrying out the continuity of the catfish cultivation business, as well as avoiding business uncertainty from uncertainty in the selling price of catfish (OGIDI, 2019). Can regulate the cultivation production cycle and process the catfish harvest regularly.

This partner problem will be resolved within 4 (four) months according to the standards determined by the PKM scheme (Wahyuningsih et al., 2020). This time period includes monitoring and evaluation activities which aim to ensure the sustainability and achievement of community service output targets.

The process of finding partner problems and providing assistance to the proposing team is the proposing team's awareness in implementing the Higher Education Key Performance Indicators (IKU) (Komarudin

et al., 2023). This PKM is one of the activities carried out by lecturers and students together to achieve higher education IKU, specifically IKU-2, IKU-3 and IKU-5.

Activities to dig up information to find problems in partners involve lecturers and students from the start, as well as visits to partner locations, by communicating and discussing to summarize partner problems (Cook-Sather et al., 2014).

Thus, through PKM, students gain learning experience outside campus (IKU-2). This experience of learning to live outside campus is important as a provision for later life when it is time for students to collaborate with the community (Inkelas et al., 2023). Likewise, lecturers carry out activities outside campus (IKU-3), lecturers work directly with the community to practice and apply the knowledge presented theoretically in lectures. The results of lecturers' work are also used by the community in accordance with IKU-5 (Warouw et al., 2023).

This activity has the main objective of increasing income from cultivating catfish, by processing the harvest into smoked catfish that have been vacuum packed, until they are ready for market (Jesmi et al., 2019). With the processed catfish produced by cultivation, it has a greater selling value compared to the results of fresh cultivated catfish which are sold directly to collectors (Pasch & Palm, 2021).

The activities carried out are a form of service to accelerate the success of the development of the "Sentono Ing Ngawiji" catfish cultivation group, to become a center for cultivating and processing catfish cultivation products, which will later be able to collaborate with other cultivation groups in Morang village. As well as one form of realization of the implementation of PKS between UKWMS and the Morang Village Government, in supporting government policy in implementing the Independent Campus Learning Program (MBKM)

This activity also has benefits for the catfish farming group "Sentono Ing Ngawiji" and UKWMS, as follows:

- a For the catfish farming group business "Sentono Ing Ngawiji", there will be an increase in income by diversifying processed products into smoked catfish with catfish smoking equipment and vacuum sealer packaging.

This is expected to have a positive impact on this business group financially and non-financially (Simon et al., 2015). Financially, it is an increase in business profits. Meanwhile, non-financially, it is empowering cultivation business groups in Morang village. This can provide inspiration and motivation for micro and small businesses in Morang village.

- b For UKWMS, it is about deepening the network fostered by cultural groups and micro and small businesses in Morang village. This activity can provide skills and learning experiences outside campus for students with MBKM in supporting government policies. In the future, micro and small businesses in Morang village can become fostered by business and technology incubators managed under LPPM UKWMS, as well as as a learning medium for MBKM

The partner for this activity is the catfish cultivation group "Sentono Ing Ngawiji", coordinated by the chairman of the Morang village BPD, Mr. Mujiono, who has been carrying out catfish cultivation activities since 2022, having had 3 harvests every 3 months. The location is in Janget hamlet, Morang village, Kare sub-district, Madiun district. The cultivation location situation is shown in Figure-1. This cultivation group produces 100 kg per pond each harvest, with a harvest period of 2 ponds, thus

producing 200 kg. The harvest is sold to collectors at a price of around Rp. 17,000,-, with an income of around Rp. 3,400,000,- (explained in the partner issues section).

Partners have carried out the process of processing pond water with a catfish pond communal filter (PKM Dikti Grant 2023) and channeling waste from the processed pond water to productive agricultural land for sacha ichi nuts.

From the efforts that have been carried out by partners, and working together with the proposer to carry out a sustainable business by processing the catfish harvest, using the smoking process to make processed smoked catfish which is packaged in a vacuum, so that the harvest from catfish cultivation will have significant economic value higher.

RESEARCH METHODS

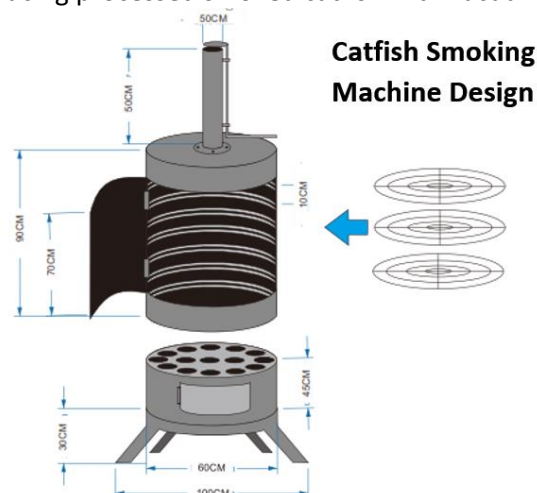
The method for implementing this activity was obtained from the results of discussions between the proposing team and partners. Initially, partners convey their problems to the proposing team. After meeting and discussing both in person and via telephone and online meetings, it was finally agreed on the solutions needed to overcome partner problems. These solutions are then outlined in a method so that it is easy for all parties, both partners and the proposing team, to implement.

The method for implementing the solution to the problems presented above is described in detail as follows:

A. Problems in processing catfish by smoking it until it is packaged

Problem	There is no equipment or business for smoking catfish or packaging with a vacuum sealer
Method	- Prepare and purchase the components and tools needed to make a smoking device - Assembling or assembling these components into equipment - Carry out trials on component assemblies that have become equipment - Transporting assembled equipment to partner locations - Conduct training for partners to use equipment - Provide assistance to partners so that equipment functions optimally in producing processed smoked catfish with vacuum packaging.

science and technology that will be applied



The role of partners	a. Determine the location of equipment for the production of smoked catfish b. Providing catfish and spices needed for processing catfish c. Participate in equipment use training d. Provide information to the proposing team if there are problems with equipment e. Follow the equipment usage guidelines that have been created by the proposing team
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B. Financial administration problems

Problem Method	Partners don't know how to calculate production costs and selling prices a. Search the literature to find training methods that are easy to understand by non-accounting participants b. Develop a module for calculating production costs and selling prices for fertilizer c. Collect data on production costs and selling prices from partners d. Provide training to use the module for calculating production costs and fertilizer selling prices e. Provide assistance to partners by answering questions outside of training activities regarding things that partners still don't understand
The role of partners	a. Providing training locations for calculating production costs and selling prices b. Prepare training needs such as: stationery, paper, consumption, for training purposes in calculating production costs and selling prices c. Providing data or information on smoked catfish production d. Actively participate in training on calculating production costs and selling prices e. Carry out tasks given during training

The impacts that will be seen, after implementing this activity, are as follows:

The creation of cultivation product processing activities as an effort to increase income by making processed smoked catfish with vacuum packaging that is ready to be marketed using appropriate technological equipment, a smoker with air flow regulation (Ninan, 2018).

The partner group has provided the ability to carry out activities together to overcome the problem of catfish cultivation which has small profits, as well as an agreement on village community development activities with an MOU between the Morang village government and UKWMS (Desmaryani, 2017).

Evaluation of the implementation of this activity will be carried out periodically and continuously, in the form of mentoring and coaching, as a form of agreement on the implementation of joint activities as stated in the MOU.

RESULTS AND DISCUSSION

In accordance with the activity planning, the results that have been achieved are the creation of production equipment for catfish smoking and packaging using a vacuum sealer (Rachmawati et al., 2019).

The function of the catfish smoking machine is to smoke catfish that have been cleaned by hanging them in a closed chamber (tube), which is directly connected at the bottom to a heating medium fueled by wood charcoal (arranged so that no flames occur, but only burnt smoke occurs) , until it fills the

smoking room, the catfish are hung in tiers (there are 3 tier racks). During smoking, the temperature of the smoking room is controlled between 100oC and 120oC, the smoking process lasts approximately 2 hours, with a capacity of 100 to 150 catfish.

After the smoking process, the smoked catfish is taken from the hanging rack and placed in a container until the temperature of the smoked catfish is at room temperature, followed by the packaging process, the smoked catfish is put into plastic containing 3 pieces and packed with vacuum sealer equipment, until ready to be marketed, following is the smoking process with equipment as in Figure 3.



Figure-3 Catfish smoking process with equipment.

Equipment specifications are as follows,

Equipment specifications

Fuel	Charcoal (wood/coconut shell/hardwood), separate from the place where the material is being smoked
Smoking place	Round metal diameter 60 cm, with tiered shelves (4 shelves)
Smoker capacity	150-200 heads
Dimensions (txdiameter) cm	180 x 60 cm

The procedure for running the equipment is as follows:

How to operate the smoker manually:

1. Place the catfish to be smoked (already cleaned), hang on the rack
2. Insert the hanging rack containing the fish, on the bracket in the smoking room (the bracket in the smoking room has 4 levels, according to the length of the fish so they don't touch), close the smoking room door with a lock.
3. Light the charcoal in the combustion chamber, at the bottom of the tool, and wait until the burnt is really smoldering, without any flame, if there is a flame, extinguish it by sprinkling water, causing

smoke to flow upwards to fill the smoking chamber, and close the opening. ¼ part of the combustion chamber door

4. The smoking process will take up to 2 hours
5. Check the temperature of the smoking room by looking at the size of the thermometer visible on the smoking tool
6. If the temperature is too low than the specified temperature (below 100oC), then check the combustion chamber, or open the combustion chamber door so that there will be more embers.
7. If the temperature is too high than the specified temperature (above 120oC), then open the chimney and close the combustion chamber door, so that there are fewer embers in the combustion chamber.
8. Carefully observe the combustion chamber temperature thermometer carefully to get maximum results
9. Once the smoking process is felt to be sufficient (in accordance with the provisions), check the smoking results, by opening the smoking chamber, and removing the smoking results into a clean container, and wait until the fish temperature is in line with room temperature.
10. The smoking results are ready to be packaged in vacuum plastic and sealed with a vacuum, the smoked catfish is ready to be marketed.

The impacts that will be seen, after implementing this activity, are as follows:

1. Creation of fish processing equipment with smoking to increase income from catfish cultivation, which is useful for increasing the income of the "Sentono Ing Ngawiji" catfish cultivator group and developed into the "Sentono Karya Mandala" MSME (Mr. Mujiono)
2. The emergence of new motivations from community groups who wish to carry out business processing fish farming products, to improve their family's economy.

CONCLUSION

The implementation of this community service program can proceed according to planning with the stages of observing partner situations, designing supporting equipment, and making supporting equipment for processing catfish harvests (charcoal fueled catfish smoker) which is used in business practices in catfish farming groups. "Sentono Ing Ngawiji" and will be continued by partners for the management of becoming "Sentono Karya Mandala" MSMEs (Mr. Mujiono), as well as introducing financial management by making simple financial records.

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