

Softskill and Hardskill Capability of Using Fish Pellet Machines in Fish Cultivation Groups in Ungaran

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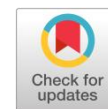
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ABSTRACT

The hard skills and soft skills of catfish farmers in Beji Village, East Ungaran District in making pellets for fish food need to be improved so that fish farmers can produce fish pellets independently. Through training activities in making pellets for fish feed using a fish pellet molding machine, it is hoped that hard skills and soft skills can be improved. The hard skills tested include the ability to turn on and set up a pellet molding machine, the ability to disassemble and reassemble a fish pellet molding machine, the ability to practically name the parts of a fish pellet molding machine, the ability to identify damage to machine spare parts. Meanwhile, for the soft skill criteria, the following sub-criteria are: ability to analyze damage to fish pellet molding machines, ability to explain the parts of fish pellet molding machines, ability to explain the function of parts of fish pellet molding machines, ability to explain how to maintain pellet molding machines. fish. The result of this training is that the hard skills and soft skills of the training participants from the fish cultivation group in Beji Village, East Ungaran District have increased.



KEYWORDS

Softskill
Hardskill
Feed



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1. Introduction

Beji Village is one of the villages in East Ungaran District, Semarang Regency, where there are two catfish farms, namely the Advanced Work Fish Farming Group and the Omah Jail Fish Farming Group. One of the obstacles in raising catfish is the provision of feed and the high price of feed which causes less than optimal income in the fish farming group. In general, the materials used in making these artificial fish pellets are crab, coconut cake, shrimp, fish or fish heads, flour, corn, and so on. In making fish pellet feed, it is made by mixing all the ingredients according to the composition or dosage. So that the mixture is even, use a dough mixer machine. After the mixture is mixed evenly, the next process is printing according to the desired size. To produce the same size of food, use a fish pellet printing machine. After the printing process is complete, the next stage is the drying process [1], [2], [3], [4].



Figure 1. Pokdakan Fish Cultivation Activities in Beji Village

Catfish is a fish commodity that is very popular with Indonesian people, so there are many food stall businesses that provide catfish, such as Padang stalls, Tegal stalls, catfish pecel businesses that can fulfill animal food needs [5]. Apart from its affordable price, catfish is also in great demand by the public. Catfish are very popular among Indonesian people as consumption fish in line with increasing market demand from time to time. Catfish production has several advantages, including very fast production times and ease in terms of maintenance [6], [7]. This is a demand and challenge for catfish farmers to meet the increasing demand for catfish by the community and also meet the catfish feed needs for the growth of the catfish. Catfish production continues to increase, which will directly result in an increase in demand for feed. Quality feed depends on the feed raw materials, so the availability of raw materials must be maintained in terms of quality and quantity [8], [9], [10]. Catfish cultivation in the Beji Village Fish Cultivation Group, East Ungaran subdistrict applies biofloc round pond technology. By using a biofloc round pond using tarpaulin, it is hoped that it can increase fish density and increase fish productivity. To optimize income from this biofloc pond system, one way is to make your own fish food as an alternative solution for healthy and cheap fish food. A fish pellet printing machine is a tool specifically designed for making fish food. To make your own feed, you need a fish pellet printing machine that has high efficiency using the screw working principle which utilizes the threads on the screw as a container that carries the material and presses it towards the end of the tube which has been designed in such a way that it will make the material form a solid pellet. The advantages of pelleted feed are increasing feed consumption and efficiency, reducing the amount of food that is spilled, extending storage time, ensuring the balance of feed nutrients and preventing vitamin oxidation [11], [12], [13], [14], [15].



Figure 2. Pokdakan Biofloc Pond Nursery Activities in Beji Village

The hard skills and soft skills of catfish farmers in Beji Village, East Ungaran District in making pellets for fish food need to be improved so that fish farmers can produce fish pellets independently. Hard skills are the mastery of technical skills from learning outcomes related to a particular field of science [16]. Hard skills are closely related to technical skills that are inherent or required for certain professions. Non-academic abilities are usually called soft skills and technical/academic abilities are usually called hard skills. Hard skills and soft skills are a combination that must be well integrated. Hard skills can be obtained in the world of formal education. Meanwhile, soft skills can be obtained through formal education and outside formal education [17]. Through training activities for making fish food using a pellet molding machine, training participants can improve their hard skills and soft skills by explaining the parts of a fish pellet molding machine, including the machine stand which functions to support the machine, the pulley which functions to connect the machine to the main shaft, the hopper which functions to insert raw materials, diesel engine as the main mover, dies as the material shaper, cutting knife as the material cutter to the desired size. Participants also need to know how the pellet printing machine works, such as how to start the diesel engine, set up the machine, how to put material into the hopper, how to set the cutting knife, check the motor oil, tighten the pulley and van belt [18], [19], [20].

In connection with the construction of a new campus for the Indonesian State Maritime Polytechnic in the Ngobo area, this activity was carried out in Beji Village, East Ungaran District as a means of introducing the new Polimarin campus. In determining the target partners, coordination was carried out with the Beji sub-district, and fish cultivation group partners (Pokdakan) were found in Beji sub-district, East Ungaran sub-district, where there are 2 pokdakan, namely the progressive work pokdakan and the omah jala pokdakan as productive small business partners through activities training in making fish pellets using a pellet molding machine and corn flour machine. Fish farming activities by the Fish Cultivation Group (Pokdakan) in the Beji sub-district, East Ungaran District have been going quite well but there are still several shortcomings in order to obtain maximum profits. The problem faced by fish farming group partners in Beji Village, East Ungaran District in making their own fish feed using a fish pellet molding machine is a lack of knowledge about how to operate and maintain the fish pellet molding machine. The

aim of this training activity is so that the fish farming group community can operate the fish pellet printing machine properly and can maintain the fish pellet printing machine themselves so that if there is a problem or damage to the machine they can repair it themselves by buying spare parts available at the nearest shop or can buy through the online shop [21], [22], [23], [24].

2. Method

Beji Village was chosen as the location for this research activity because there are two fish cultivation groups, namely the Karya Maju fish cultivation group and the Omah Jala fish cultivation group. The following explains the stages in conducting research.

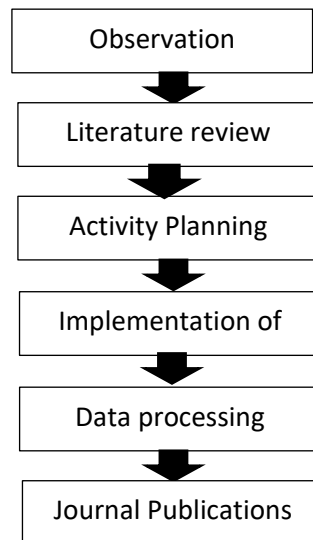


Figure 3. Flow of Research Activities

The research was carried out in several stages including:

1. Observation activities by identifying problems and determining priority problems being faced by fish farming group partners in Beji Village, East Ungaran District
2. Literature study was carried out to dig up information and make comparisons with previous studies related to soft skill and hard skill competencies
3. Designing activities by coordinating the types of activities to be carried out in coordination with research partners.
4. The training activity for making pellets for catfish feed is carried out by carrying out theoretical and practical activities for making fish feed using a fish pellet molding machine.
5. Data collection, namely recording data collection according to the results of the hard skills and soft skills assessment from the implementation of fish food making training activities.
6. The results of research activities are published in the form of a research journal.

In determining the abilities of training participants, assessment criteria are determined which are grouped into assessments based on skills, skills and hard skills. The criteria for this Hard Skill are obtained from several sub-criteria for training participants which have been determined using the following criteria

- a. Ability to turn on and set up the pellet molding machine.
- b. Ability to disassemble and reassemble fish pellet printing machines
- c. Ability to practically name the parts of a fish pellet molding machine
- d. Ability to identify damage to machine spare parts

Meanwhile, for the soft skills criteria, the following are the sub-criteria:

- 1) Ability to analyze damage to fish pellet printing machines
- 2) Ability to explain the parts of a fish pellet molding machine

- 3) Ability to explain the function of the parts of the fish pellet molding machine
- 4) Ability to explain how to maintain fish pellet printing machines. (F. A. Desiana et al, 2023)

3. Results and Discussion

Training on the operation of a catfish food pellet printing machine was carried out in theory and practice for fish farming groups in the Beji sub-district, East Ungaran District. Technical activities are carried out theoretically by giving lectures from resource persons followed by questions and answers to assess the understanding of the training participants. For practice, a demonstration was carried out on how to properly and correctly operate a catfish food pellet printing machine.



Figure 3. Delivery of material

This training is divided into three stages. The first stage of material delivery by the resource person was machine parts, machine operation and troubleshooting of pellet printing machines. The second stage is discussion and questions and answers to the participants. The third stage is direct practice in operating the catfish feed pellet molding machine. To find out and measure the level of success of this training activity, an evaluation was carried out by assessing participants in machine operation practices and troubleshooting fish pellet printing machines.



Figure 4. Practice of making pellets

Soft skills are a type of skill that is more related to the sensitivity of a person's feelings towards the environment around them. soft skills are related to psychological skills, so the impact is more abstract but can still be felt, such as polite behavior, discipline, the ability to work together, help others and so on. Hard skills are abilities that can be learned, evaluated, and measured. Hard skills are the main weapon for

a person or student to explore the world of work. (F. Fauzan et al, 2020) This research shows that training in making fish food using a pellet molding machine can improve hard skills and soft skills for fish farming groups in the Beji sub-district, East Ungaran District. This increase in competency is expected to increase the productivity of fish farmers so that it can increase knowledge, income and welfare of fish farmers.



Figure 5. Fish feed pellet printing equipment

3.1 Information

1. Driving Machine

This machine is used to drive raw material grinding equipment and pellet printing equipment. Drive engine specifications are:

- Engine Type: 4 Stroke Water Cooled, OHV 25 Inclined Cylinder Horizontal Shaft
- Displacement: 168 cc
- Compression Ratio : 7.0 : 1
- Maximum Power: 5.5 PS / 3600 rpm
- Maximum Torque (kg.m): 1.1 / 2500 rpm
- Ignition System: Transistorized Magneto
- Starting System: Recoil
- Fuel Capacity: 3.6 Litres
- Oil Capacity: 0.6 Litres

2. Raw material grinding tool

This tool is used to reduce the size / refine the size into flour.

3. Pellet printing equipment

This tool is a tool used to print raw materials into pellet form. Specification

- Model: KL 120P
- Motor Power: 6 – 10 HP
- Funnel diameter: 120 mm
- Holes: 2.5 – 10 mm
- Output: 40 -60 kg/hour
- Supply output: 60 – 100 kg/hour
- Clean: 70 kg
- Dimensions: 1050x420x800 mm

This training activity on the operation and maintenance of fish pellet printing machines was carried out based on the results of a research survey with the village head of Beji village because of the need for fish farming group partners in Beji Village, East Ungaran District, Semarang Regency. (Hendra et al, 2015). It is hoped that the machine being made can function to refine raw materials and print pellets.

3.2 The way to operate this machine is broadly divided into three stages:

1. How to start the drive engine

The steps are as follows:

- a. Make sure the fuel (pertalite) is filled in the fuel tank
- b. Turn the ON-OFF switch to the ON position
- c. Pull the lever until the engine starts

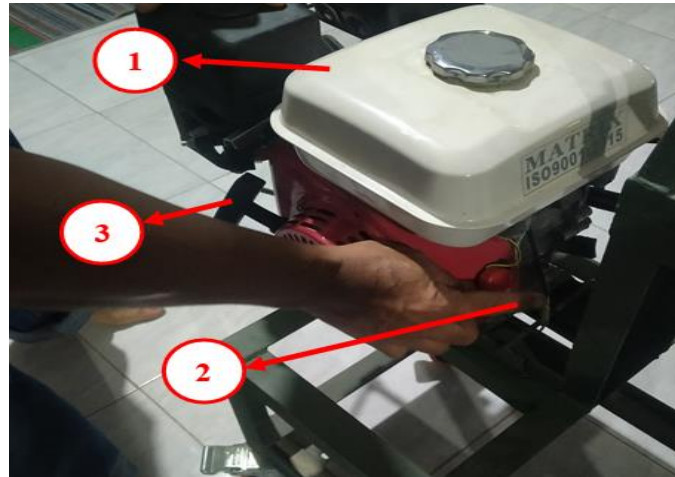


Figure 6. Machine that drives fish feed pellets



Figure 7. Raw material grinding machine

3.3 How to turn on the raw material grinding machine

The steps are as follows:

1. Attach the rubber belt to the drive motor pulley and the raw material grinding machine pulley
2. Turn on the drive engine
3. Change the position of the engine lever to the left

4. Add the raw materials to be ground
5. Collect the finely ground raw materials in a container

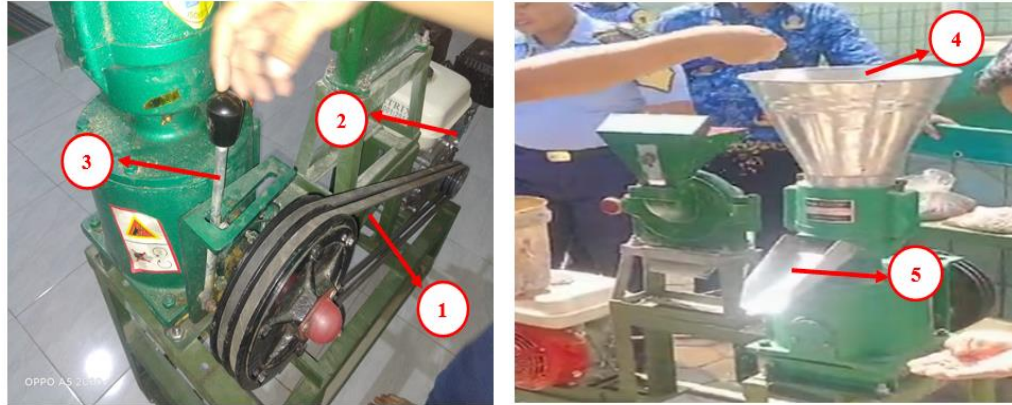


Figure 8. Pulley pellet printing machine

Before the lecture is given by the resource person, each participant is evaluated to determine the participant's abilities regarding the machine that will be used. This data can be seen in the following table

Table 1. Soft skills before training

Num	Criteria	Participant to							
		1	2	3	4	5	6	7	8
1	Ability to turn on and set up the pellet molding machine	X	X	X	X	X	X	X	X
2	Ability to disassemble and reassemble fish pellet molding machine	X	X	X	X	X	X	X	X
3	Ability to practically name the parts of a fish pellet molding machine	X	X	X	X	X	X	X	X
4	Ability to identify damage to machine spare parts	X	X	X	X	X	X	X	X

Table 2. Hard skills before training

Num	Criteria	Participant to							
		1	2	3	4	5	6	7	8
1	Ability to analyze damage to fish pellet printing machines.	X	X	X	X	X	X	X	X
2	Ability to explain the parts of a fish pellet molding machine.	X	X	X	X	X	X	X	X
3	Ability to explain the function of the parts of the fish pellet molding machine.	X	X	X	X	X	X	X	X

4	Ability to explain how to maintain fish pellet molding machines.	X	X	X	X	X	X	X	X
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After a lecture by the resource person and direct practice by the participants, each participant is evaluated to determine the participant's abilities regarding the machine that will be used. This data can be seen in the following table.

Table 3. Soft skills after training

Num	Criteria	Participant to							
		1	2	3	4	5	6	7	8
1	Ability to turn on and set up the pellet molding machine	V	X	X	V	X	V	V	V
2	Ability to disassemble and reassemble fish pellet molding machine	V	X	X	V	X	V	V	V
3	Ability to practically name the parts of a fish pellet molding machine	V	X	X	V	X	V	V	V
4	Ability to identify damage to machine spare parts	V	X	X	V	X	V	V	V

Table 4. Hard skills after training

Num	Criteria	Participant to							
		1	2	3	4	5	6	7	8
1	Ability to analyze damage to fish pellet printing machines.	V	X	X	V	X	V	V	V
2	Ability to explain the parts of a fish pellet molding machine.	V	X	X	V	X	V	V	V
3	Ability to explain the function of the parts of the fish pellet molding machine.	V	X	X	V	X	V	V	V
4	Ability to explain how to maintain fish pellet molding machines.	V	X	X	V	X	V	V	V

Evaluation was carried out by looking at the extent of the participants' abilities in operating and maintaining the fish pellet molding machine before and after training. Each participant is evaluated to determine whether the results of this training were successful or not. Each practical participant immediately operates and dismantles the fish pellet molding machine then reinstalls the spare parts until the machine can function properly. Of the 8 training participants, 5 people are proficient in operating and maintaining fish pellet printing machines. To increase the productivity of the fish farming group in Beji Village, Ungaran District, research found that training in making independent fish food using a fish pellet molding machine had a significant effect on the hard skills and soft skills of members of the fish cultivation group in Beji Village, East Ungaran District.

4. Conclusion

The hard skills and soft skills of the fish cultivation group training participants in the Beji sub-district, East Ungaran District have increased from before the training and after the training so that they can help the fish farming community, namely the Fish Cultivation Group (Pokdakan) in the Beji sub-district, East Ungaran District, to improve the quality and quantity of feed. Because catfish can produce fish feed independently, it can improve the economy of catfish farming groups in the Beji sub-district, East Ungaran District because most of the money from selling catfish is no longer used to buy feed.

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References

- [1] J. Lee, "A 3D food printing process for the new normal era: a review," *Processes*, vol. 9, no. 9, p. 1495, 2021. [Google Scholar](#).
- [2] H. Çakmak and C. E. Gümüş, "3D food printing with Improved functional properties: A review," *Int. J. 3D Print. Technol. Digit. Ind.*, vol. 4, no. 2, pp. 178–192, 2020. [Google Scholar](#).
- [3] S. Portanguen, P. Tournayre, J. Sicard, T. Astruc, and P.-S. Mirade, "Toward the design of functional foods and biobased products by 3D printing: A review," *Trends Food Sci. Technol.*, vol. 86, pp. 188–198, 2019. [Google Scholar](#).
- [4] A. Baiano, "3D printed foods: A comprehensive review on technologies, nutritional value, safety, consumer attitude, regulatory framework, and economic and sustainability issues," *Food Rev. Int.*, vol. 38, no. 5, pp. 986–1016, 2022. [Google Scholar](#).
- [5] Z. Hidayah and Z. Hidayah, "Encyclopedia of Indonesian Tribes," *A Guid. to Tribes Indones. Anthropol. Insights from Archipel.*, pp. 1–368, 2020. [Google Scholar](#).
- [6] S. Hegde *et al.*, "Technological progress in the US catfish industry," *J. World Aquac. Soc.*, vol. 53, no. 2, pp. 367–383, 2022. [Google Scholar](#).
- [7] G. Kumar *et al.*, "Economics of alternative catfish production technologies," *J. World Aquac. Soc.*, vol. 49, no. 6, pp. 1039–1057, 2018. [Google Scholar](#).
- [8] J. M. Munguti *et al.*, "Critical Aspects of Aquafeed Value Chain in the Kenyan Aquaculture Sector--A Review," 2021. [Google Scholar](#).
- [9] B. D. Glencross, J. Baily, M. H. G. Berntssen, R. Hardy, S. MacKenzie, and D. R. Tocher, "Risk assessment of the use of alternative animal and plant raw material resources in aquaculture feeds," *Rev. Aquac.*, vol. 12, no. 2, pp. 703–758, 2020. [Google Scholar](#).
- [10] S. A. M. P. Suryani, A. A. S. P. R. Andriani, I. G. A. D. S. Rejeki, and G. A. S. Pratama, "Training and Implementation of Catfish Feed Technology in the Sedana Sari Fish Farmers Group in Selat Village, Abiansema, Badung, Bali," *Asian J. Community Serv.*, vol. 2, no. 8, pp. 663–670, 2023. [Google Scholar](#).
- [11] H. P. S. Makkar, "Feed demand landscape and implications of food-not feed strategy for food security and climate change," *Animal*, vol. 12, no. 8, pp. 1744–1754, 2018. [Google Scholar](#).
- [12] H. S. Khalil, A. T. Mansour, A. M. A. Goda, and E. A. Omar, "Effect of selenium yeast supplementation on growth performance, feed utilization, lipid profile, liver and intestine histological changes, and economic benefit in meagre, *Argyrosomus regius*, fingerlings," *Aquaculture*, vol. 501, pp. 135–143, 2019. [Google Scholar](#).
- [13] T. Becker, O. K. Adeyemo, E. Danyer, and N. Saint-Erne, "Husbandry and Industries," *Fundam. Aquat. Vet. Med.*, 2021. [Google Scholar](#).

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- [14] T. Nguyen, "Feed not food: alternative feedstuffs for growing-finishing pigs: a thesis presented in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Animal Science at Massey University, Manawatu, New Zealand." Massey University, 2023. [Google Scholar](#).
- [15] G. Kulshreshtha, M. T. Hincke, B. Prithiviraj, and A. Critchley, "A review of the varied uses of macroalgae as dietary supplements in selected poultry with special reference to laying hen and broiler chickens," *J. Mar. Sci. Eng.*, vol. 8, no. 7, p. 536, 2020. [Google Scholar](#).
- [16] A. S. Putra *et al.*, "Examine relationship of soft skills, hard skills, innovation and performance: The mediation effect of organizational learning," *Int. J. Sci. Manag. Stud.*, vol. 3, no. 3, pp. 27–43, 2020. [Google Scholar](#).
- [17] J. S. Vogler, P. Thompson, D. W. Davis, B. E. Mayfield, P. M. Finley, and D. Yasseri, "The hard work of soft skills: augmenting the project-based learning experience with interdisciplinary teamwork," *Instr. Sci.*, vol. 46, pp. 457–488, 2018. [Google Scholar](#).
- [18] J. Van Loon and M. Flores Rojas, *Training of trainers manual on the operation, maintenance and repair of farm machinery*. Food & Agriculture Org., 2022. [Google Scholar](#).
- [19] R. Yahaya, K. Mekonnen, and M. Gebreyes, "Training Manual for Two-wheel tractor and ancillary equipment for operators, service providers, extension experts and workshop owners," 2023. [Google Scholar](#).
- [20] M. O. Okwu and O. D. Samuel, "Adapted hyacinth briquetting machine for mass production of briquettes," *Energy Sources, Part A Recover. Util. Environ. Eff.*, vol. 40, no. 23, pp. 2853–2866, 2018. [Google Scholar](#).
- [21] E. H. B. Jang *et al.*, "Trust and technology repair infrastructures in the remote rural Philippines: Navigating urban-rural seams," *Proc. ACM Human-Computer Interact.*, vol. 3, no. CSCW, pp. 1–25, 2019. [Google Scholar](#).
- [22] R. Frei, L. Jack, and S. Krzyzaniak, "Sustainable reverse supply chains and circular economy in multichannel retail returns," *Bus. Strateg. Environ.*, vol. 29, no. 5, pp. 1925–1940, 2020. [Google Scholar](#).
- [23] A. Chaudhuri, H. Rogers, P. Soberg, and K. S. Pawar, "The role of service providers in 3D printing adoption," *Ind. Manag. Data Syst.*, vol. 119, no. 6, pp. 1189–1205, 2019. [Google Scholar](#).
- [24] S. Svensson, J. L. Richter, E. Maitre-Ekern, T. Pihlajarinne, A. Maigret, and C. Dalhammar, "The emerging 'Right to repair' legislation in the EU and the US," *Proc. from Going Green–Care Innov.*, pp. 27–29, 2018. [Google Scholar](#).