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Automatic Machine of Distributed Fish Feed Based on Arduino Uno

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Abstract

The need for feed in fish-keeping ponds is vital for the survival of the fish that are kept. Some fishpond farmers still provide fish feed manually and it is felt to be inefficient. On the other hand, the focus of farmers can be focused on maintaining fishponds. This PKM activity utilizes appropriate technology as an automatic feed tool for spreading tilapia fish feed. The driving of this feed is connected to a controller which functions to regulate the spreader of tilapia feed regularly and the design is made to achieve the spread of tilapia feed with a large capacity of 50 kg each e day. The use of this tool was conducted in tilapia fish maintenance/cultivation using ponds/ponds on land. The placement location is in the Karawang sub-district, West Java.

Keywords: automatic, fish feed, spreader, fish pool.

INTRODUCTION

The current COVID-19 pandemic has an impact on termination of employment and work restrictions. With the increasing number of unemployed people, several ideas for community empowerment emerged. One of them is the maintenance/cultivation of fish.

The increase in human population has also increased the need for food, one of which is in the field of fisheries. Fish contains several nutrients that are good for the body, especially protein. The high demand for fish consumption has forced several fish farmers to try to increase fish production (Hasan et al. 2020). In addition to mass production of tilapia, cultivating tilapia which is packaged in the form of a fishing pond business is also an alternative for the community to gain profits and become a small industry in fish farming (Fauzia et al. 2020).

The Ministry of Maritime Affairs and Fisheries (KKP) said the fisheries sector showed positive growth, up 9.69% in the second quarter of 2021 compared to the same period last year. The next breakthrough program that is being accelerated is the development of an aquaculture village. This program has been established by the Decree of the Minister of Maritime Affairs and Fisheries Number 64 of 2021. KKP will provide support in the form of assistance in the form of seeds, broodstock, independent feed machines, aquaculture certification (CBIB and CPIB), insurance premiums, pre-certification of land rights, integrated fish health service post, aquaculture facilities, and infrastructure, as well as technical guidance and counseling.

The development of intensive fish farming businesses is influenced by several aspects, such as water quality or cultivation environment, seed quality, and feed quality. Feed is a production factor which is the largest cost component in a fish farming business (Erlania et al. 2010).

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The technology improvement for spreading fish feed has been developed by micro-control. One of microcontrol is Arduino Uno (Badamasi et al. 2014). Arduino was formed by students from Massimo Banzi's who couldn't find affordable and efficient microcontrollers for a project they were working on (Galadima et al. 2014). Soon enough interesting designs using the Arduino microcontroller started springing up. Whether it was making things move or controlling things, measuring things and Arduino grew in popularity (Kushner, 2011).

FORMULATION OF THE PROBLEM OF FISH FARMERS

Feeding fish farms in ponds managed by farmers requires special attention. This is because the development/growth of fish is strongly influenced by the quality, amount, and frequency of feeding fish. Fish feeding is carried out every day by farmer workers in the morning and evening with a certain amount of feed. The problems faced by fish farmers are:

The first is giving discontinuous fish feed when the farmer cannot go to the fishpond due to another activity.

Second, feeding fish with human power is felt to be inefficient because the feeding time is done every day with a morning and evening frequency.

Third, the feeding of fish is more distributed on the edge of the pond, so that the fish in the middle do not get feed.

METHOD

The method proposed for the problem above is to use a fish feed spreader which works automatically by using solar thermal energy sources (Oktrialdi et al. 2020 dan Gunawan et al. 2022). Technology and science learned from the course have implemented, for example, Fluid Mechanics and Hydraulics Machines (Rajput et al. 2002), Machine Design (Khurmi et al. 2005), Pump and Centrifugal Blower (Church, 1990), and Solidworks Design (Hendi et al. 2015). Using this tool will reduce manpower costs and also eliminate discontinuous feeding. Figure 1 shows a flowchart of the stages of solving problems in fish farmers, where the initial stages are about problems, solutions, innovation results, and beneficial impacts, respectively,

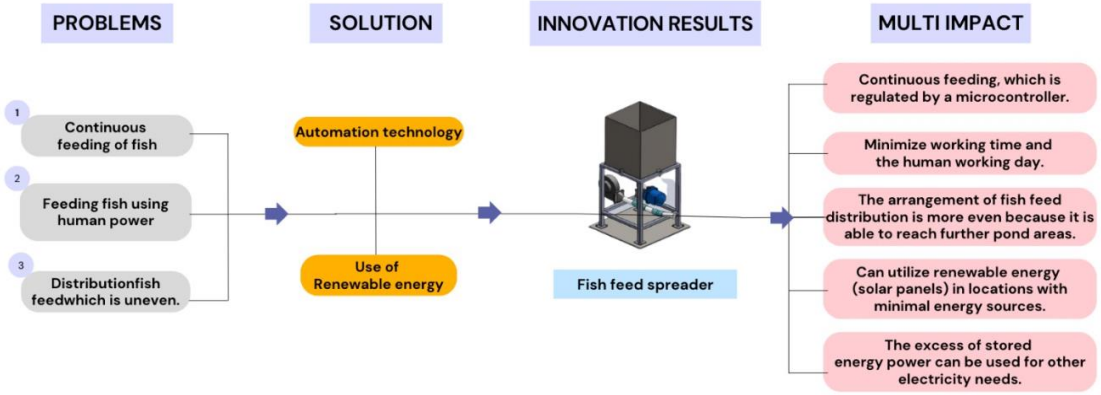

Figure 1. Problem flowchart to solution.

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Giving fish feed in ponds that is made has advantages in the use of automation technology and the use of renewable energy. This fish feeder will significantly replace the farmer's work because the farmer's job is only to fill the fish feed into the fish silo/hopper (50 kg hopper volume). Feeding will occur automatically using a controller system, where this controller system controls the operating time of the blower machine (air blower that spreads the feed). The feeding is connected to a source of electrical energy that uses solar energy (solar panels). This controller system controls the amount of feed (kg) and the time schedule each day. Feeding times are currently set at 09.00 and 17.00 according to the needs/recommendations of fish farmers.

This fish feeder also can spread fish feed more than 5 meters from the edge of the pond so that the distribution of feed is wider. Besides that, the advantages of this fish feeder replace human labor, so that the absence of farmers at the pond location can be substituted by the work of this fish feeder.

This fish feeder is the second generation made by students. The first generation of fish feeders has been tested on fish farmer groups in Dusun Poponcol RT 01 RW 05, Ciwulan Village, Telagasari District, Karawang Regency. The location of community service partners is depicted in Figure 2. From the results of using the first-generation fish feed equipment in the farmer groups. The information and suggestions for improvements were obtained so that the feed spreader could function more optimally and increase its capabilities.

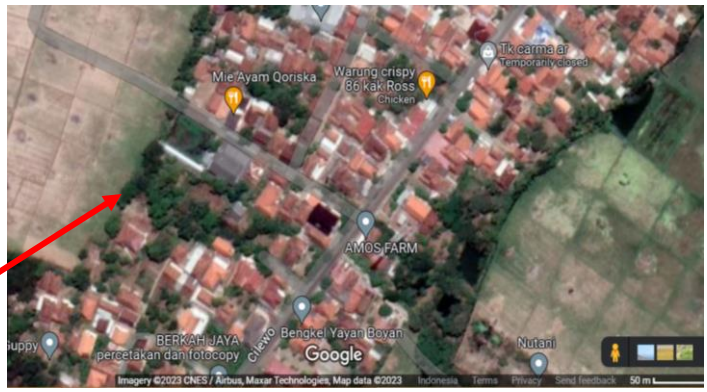

Figure 2. The location of the community service partners program.

RESULTS

This second generation of fish feed was developed by innovating the ability to spread the feed to a distance of at least 5 meters at a time that has been set according to the needs of fish farmers. Another important innovation is the feed capacity (hopper/silo) which has been enlarged to 50 kg. With the increase in the capacity, the working frequency of fish farmers in providing fish feed changes from feeding every day in the morning and evening to once every 3 days. Besides that, this fish feed technology innovation has changed the working pattern of fish farmers from sowing fish feed into ponds to changing to only filling the fish feed hoppers. The process of course greatly lightens the work of fish farmers.

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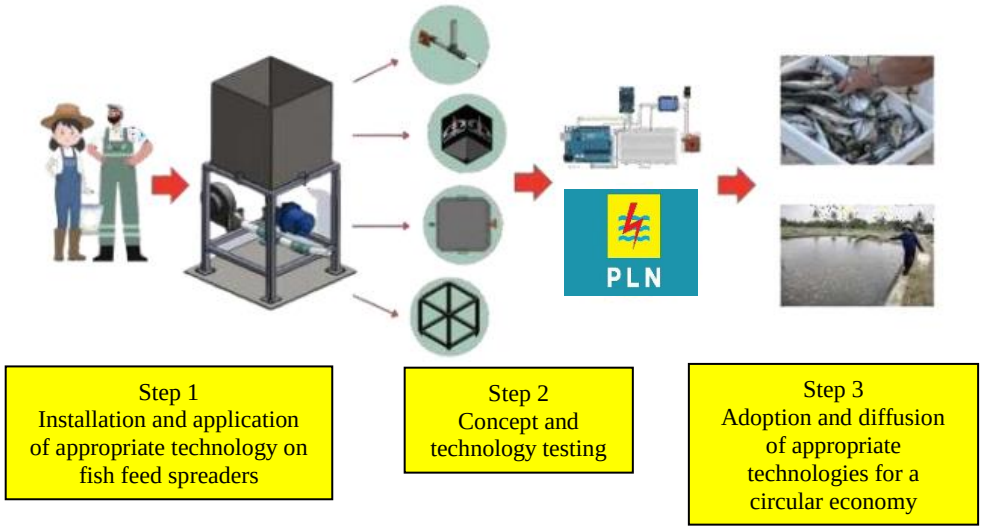

Figure 3. The steps for making a fish feed spreader.

Figure 3 describes the steps for making a fish feed spreader, where the first step is installation and technology application. The second step is testing the concept and technology used. The last step are adoption and diffusion of appropriate technologies for circular economy.

Figure 4. The community service program activity on the partner location.

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Figure 4 above shows the activities of placing equipment, installing electrical installations, and testing. The implementation team consisting of lecturers and students joined together with partners to help each other realize the implementation of this activity.

CONCLUSION

The program community service in Dusun Poponcol RT 01 RW 05, Ciwulan Village, Telagasari District, Karawang Regency has been conducted successfully. This fish feeder has been used and tested by partners. Collaboration with partners helps improve the economy of fish farmers. It is hoped that this program can be utilized by other fish farmer partners in the surrounding area.

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REFERENCES

Badamasi, Y. A. (2014, September). The working principle of an Arduino. In 2014 11th International Conference on electronics, computer and computation (ICECCO) (pp. 1-4). IEEE.

Erlania, R., Prasetio, A. B., & Haryadi, J. (2010). Dampak manajemen pakan dari kegiatan budidaya ikan nila (Oreochromis niloticus) di keramba jaring apung terhadap kualitas perairan Danau Maninjau. In Prosiding forum inovasi teknologi akuakultur (pp. 621-631).

Fauzia, S. R., & Suseno, S. H. (2020). Resirkulasi Air untuk Optimalisasi Kualitas Air Budidaya Ikan Nila Nirwana (Oreochromis niloticus). *Jurnal Pusat Inovasi Masyarakat (PIM)*, *2*(5), 887-892.

Galadima, A. A. (2014, September). Arduino as a learning tool. In 2014 11th International Conference on Electronics, Computer and Computation (ICECCO) (pp. 1-4). IEEE.

Gunawan, A., & Sekamdo, M. A. (2022). Inovasi Teknologi Budidaya Ikan Yang Berkelanjutan Di Provinsi Sumatera Utara. ABDI SABHA (Jurnal Pengabdian kepada Masyarakat), 3(2), 301-308.

Hasan, H., Afifa, N., Maulana, I., Elihami, E., & Aminullah, A. (2020). Budidaya Ikan Nila pada Kolam Tanah. *Maspul Journal Of Community Empowerment*, *2*(2), 24-33.

Kushner, D. (2011). The making of arduino. IEEE spectrum, 26, 1-7.

Oktrialdi, B., Harahap, P., Dewi, I., & Frapanti, S. (2022). Penerapan Solar Cell Pada Bkm Muhammadiyah Di Kota Medan Untuk Penunjang Program Budikdamber (Budidaya Ikan Dalam Ember). ABDI SABHA (Jurnal Pengabdian kepada Masyarakat), 3(2), 309-320.

R.S. Khurmi, J.K. Gupta. (2005). A Textbook of Machine Design. New Dehli: Eurasia Publishing House (PPVT) Ltd.

Hendi Saryanto, Darwin Sebayang. (2015). Proses Desain Elemen Mesin Menggunakan Solidwork. Yogyakarta: Andi.

Church A.H. (Alih Bahasa: Zulkifli), 1990, Pompa dan Blower Sentrifugal, Erlangga, Jakarta.

Rajput R.K., 2002, A Textbook of Fluid Mechanics and Hydraulics Machines, S. Chand & Company Ltd, New Delhi.

https://doi.org/10.35568/abdimas.v6i4.4027