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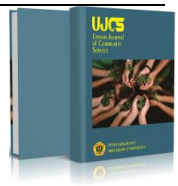

The Implementation of Solar Power Plant in Catfish Farmer Community at Kampung Lewihalu, Tigaraksa, Tangerang

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Abstract: Based on information provided by the Head of the Catfish Farming Village. The problem encountered in catfish farming villages during the breeding process after catfish farming is that many catfish seeds are eaten by bird pests at night, especially giant shrimp bird pests. According to the partners, the reduction could be up to 50-65% of the total amount of seeds added to the rearing pond. During a nighttime on-site investigation, it was discovered that the catfish pond area was not lit. Therefore, in this charitable activity, we try to provide a lighting solution for catfish ponds and repel kingfisher pests by using environmentally friendly energy, green energy, especially through the use of solar panels. The hope is to be able to reduce bird pests and not burden the partners with monthly electricity bills. From the results obtained in the field, it is known that the result the absence of lighting in the catfish pond area makes king prawn pests eat more catfish seeds than if lighting was provided using flicker flame LED lights and the installation of an off grid solar PV system was not burdensome catfish farmers regarding electricity bills used for lighting.

Keywords: Solar System; Catfish; Farming; Community Service.

Introduction

This community service activity was carried out in the catfish farming village, namely Leuwihalu Village, Tigaraksa, Tangerang. The catfish farming village is an area based on high-quality catfish goods, synergizing various potentials to promote the development of competitive and sustainable catfish farming operations, conserving fish resources and being supported by the community to ensure continuous and planned production. This catfish farming village has 150 ponds. The process of catfish farming in catfish farming villages includes breeding and rearing. The catfish farming villages use a biofloc system for breeding and rearing, which is a system that consists of a collection of different types of organisms grouped together in one clump. The organisms in question are fungi, bacteria, worms, algae, protozoa and others (Gaffar et al., 2020; Oktavia et al., 2022; Sugeng Haryadi et al., 2023).

Based on information provided by the Head of the Catfish Farming Village, Mr. Agus Setiawan. The problem encountered in catfish farming villages during the breeding process after catfish farming is that many catfish seeds are eaten by bird pests at night, especially giant shrimp bird pests. According to the partners, the reduction could be up to 50-65% of the total amount of seeds added to the rearing pond. During a nighttime on-site investigation, it was discovered that the catfish pond area was not lit.

Kevin (2024) Development of a solar-powered pest control agent using ultraviolet light and sound for rice cultivation. In his research, Kevin used a PLTS system to create an electrical power source for his devices. This device uses ultraviolet light to repel pests and the sound of a buzzer to repel birds. From the results of the tool testing conducted by the author, it can be seen that the tool created can work, but still needs further development (Martikha & Hermawan, 2024).

Syafri dkk (2022) Create a design for a bird pest repellent device based on Arduino Uno. In this research, ultrasonic sensors and buzzers were used to ward off bird pests. Ultrasonic sensors are used to detect

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incoming birds, while buzzers are used to scare birds away. Tool test results Tool error 2% to 4% (Manurung et al., 2022).

Derajat dkk (2022) have developed a tool to repel sparrow pests on rice crops using IoT-based automatic shockwaves. In this study, a buzzer was also used as a shock device to scare away birds in the rice fields (Hidayatullah & Sulistiyanto, 2022).

From these three previous studies, the objects of bird pests we want to anticipate are bird pests in rice fields, and all three use buzzers. This charitable activity now involves catfish farming and the use of light.

Therefore, in this charitable activity, we try to provide a lighting solution for catfish ponds and repel kingfisher pests by using environmentally friendly energy, green energy, especially through the use of solar panels. The hope is to be able to reduce bird pests and not burden the partners with monthly electricity bills. Apart from the aim of overcoming the problem of bird pests. This community service is also conducted to educate members and the community surrounding the catfish farming village about new renewable energy technologies and the installation and maintenance of a solar power system (PLTS). The PLTS system used in this community service activity is an off-grid PLTS system, meaning the system is powered only by solar panels and is not connected to other generators (Amalia et al., 2022; Muna et al., 2022; Napitupulu et al., 2023; Putra Ariantika et al., 2023). The solar panels (photovoltaics) are located on the roof of the building and use LED lights with flickering flames.

The output goals to be achieved for this non-profit work in the catfish farming village are: 1) The PLTS system product is handed over to the partner; 2) Partners and the community gain knowledge about PLTS systems for lighting; 3) Partners and the community have the skills to install, operate and maintain PLTS systems for lighting.

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Method

The stages of implementation of this charitable activity include: 1) site survey, which is carried out to determine the partner's situation; 2) design the PLTS system; 3) Collaborate with partners and the community to assemble and install the PLTS system at the site; 4) Testing the PLTS system; 5) Conduct training on the operation and maintenance of PLTS systems. The PLTS system built has an output of 330 Wp.

The wiring diagram of the created PLTS system is shown in Figure 1.

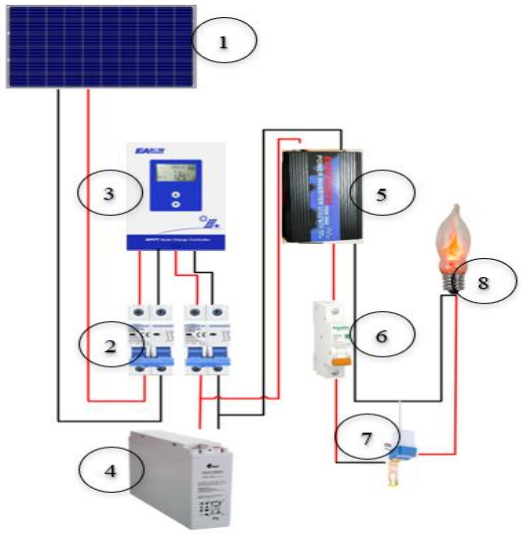

Figure 1. Wiring diagram of PLTS system

Figure 1 shows the circuit diagram of the PLTS system used and the devices used are marked with numbers 1 to 7. The names and specifications of the devices used are listed in Table 1.

Table 1. Name and specifications of the devices used in the PLTS system

Nama Alat		Spesifikasi Alat
Panel Surya	Merk	: Maysun
	Type	: Polycrystalin
	Pmax	: 330 W
	Imp	: 8.75 A
	Vmp	: 37.8 V
	Isc	: 9.15 A
MCB DC	Merk	: TOMZN
	Capacity	: 20 A
MPPT	Merk	: EASUN
	Rated Voltage	: 12/24V
	Rated Current	: 30A
Battery	Merk	: Shoto
	Capacity	: 170 Ah
Inverter	Merk	: Taffware
	Type	: PSW
	Capacity	: 3000W
MCB AC	Merk	: Schneider
	Capacity	: 4 A
Photocell Sensor	Merk	: SELCON
	Max Current	: 3A
	Max Power	: 600 Watt
LED flicker flame lamp	Merk	: Omega
	Quantity	: 30 Pcs
	Daya	: 3 Watt/pcs

The conductor wire type used from solar panel to MPPT, MPPT to battery and battery to inverter is PV-1F

2x6mm2 type, while the conductor wire used from inverter to flicker flame. The LED light tower uses NYYHY 2x type conductor wire 1.5mm2. The light pole is made of 2" PVC pipe with a pole height of 2m. The lampposts are made of 5 poles. Each pole is equipped with 6 3 watt flickering flame LED lights. This PLTS system is also equipped with a photocell sensor, so that the lights turn on and off automatically. Solar panels are installed on the pavilion roof because the solar radiation on the pavilion roof is stronger and no new land is required.

The PLTS system is tested during the day to test whether the MPPT is working or not and at night to find out whether the lights can be turned on properly or not.

Training on how to operate and maintain the 330 Wp PLTS system was carried out in the gazebo by inviting partners and the surrounding community. At the end of the training session, a questionnaire is given which must be filled in by all those present at the training.

Result and Discussion

After conducting a site survey, it wasfound that the condition of the catfish pond in the catfish cultivation village before the installation of solar panels and LED flicker flame lamp posts was as shown in Figure 2.

Figure 2. Conditions Before the PLTS System was Installed

From Figure 2, it can be seen that the catfish pond area has no lighting, and the blue roof of the pavilion receives maximum sunlight without any obstructions. Based on this, the location for placing the 330Wp solar module on the roof of the pavilion was determined, placing the module consisting of MPPT, inverter and battery on the unused goods shelf, and then placing the lamp pole between one pool and another. After determining the location of the solar panels, proceed to assembling the solar panels, charge controller modules, and light poles. The overall results of the installation are shown in Figure 3.

Figure 3. Results of installing solar panels, MPPT panels and light towers

Once everything is installed, the next step is to test the system. To find out whether the PLTS system is running well or not. The results of commisioning test PLTS system shown in Figure 4.

Figure 4. Commisioning test of PLTS system

During the commissioning test, it was determined that all systems in the PLTS were functioning properly. MPPT works well, the battery can store electrical energy from the solar panels well, the inverter can convert DC to AC well, and the lights turn on easily. Setelah dilakukan commisioning test dilanjutkan dengan pemberian pengetahuan dan pelatihan terhadap mitra dan masyarakat sekitar kampung budidaya ikan lele perihal pengoperasian dan perawatan PLTS. Situasi ketika dilaksanakan pelatihan diperlihatkan pada gambar 5.

Figure 5. Training on the operation and maintenance of PLTS systems

To make sure all the lights were on and there were no problems with the PLTS system, we waited until evening. The end result of installing a PLTS system for lighting with flickering flame LED lights is that all lights can easily turn on automatically. As shown in Figure 6

Figure 6. The condition of the LED lights flicker flame lamp at night

Based on information provided by the Head of the Catfish Farming Village, Mr. Agus Setiawan, after installing LED flicker flame lighting using a PLTS system. Unlike before, giant shrimp pests are rarely seen in the pool area at night.

Conclusion

Based on what has been explained in the results and discussion section, it can be concluded that the absence of lighting in the catfish pond area makes king prawn pests eat more catfish seeds than if lighting was provided using flicker flame LED lights and the installation of an off grid solar PV system was not burdensome catfish farmers regarding electricity bills used for lighting.

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References

Amalia, D., Abdillah, H., & Hariyadi, T. W. (2022). Analisa Perbandingan Daya Keluaran Panel Surya Tipe Monokristalin 50wp Yang Dirangakai Seri Dan Paralel Pada Instalasi Plts Off-Grid. *Jurnal Elektro Dan Mesin Terapan*, *8*(1), 12–21. https://doi.org/10.35143/elementer.v8i1.5187

Gaffar, A. A., Rasyid, A., & Suryaningsih, Y. (2020). Budidaya Ikan Lele Sangkuriang Dengan Sistem Bioflok Di Desa Jerukleueut Kecamatan Sindangwangi Kabupaten Majalengka. *Bernas: Jurnal Pengabdian Kepada Masyarakat*, *1*(3), 159–164. https://doi.org/10.31949/jb.v1i3.313

Hidayatullah, D., & Sulistiyanto, S. (2022). Perancang Alat Pengusir Hama Burung Pipit Pada Tanaman Padi Menggunakan Gelombang Kejut Otomatis Berbasis Internet of Things (IoT). *JEECOM Journal of Electrical Engineering and Computer*, *4*(2), 74–78. https://doi.org/10.33650/jeecom.v4i2.4464

Manurung, S. M., Wanto, A., & Gunawan, I. (2022). Rancang Bangun Alat Pengusir Hama Burung Berbasis Arduino Uno. *JiTEKH*, *10*(2), 84–90. https://doi.org/10.35447/jitekh.v10i2.581

Martikha, K., & Hermawan, A. (2024). Rancang Bangun Alat Pengusir Hama Tenaga Surya Menggunakan Sinar Ultraviolet dan Suara pada Pertanian Padi. *Jte*, *13*(1), 73–78. https://ejournal.unesa.ac.id/index.php/JTE/article/view/58524

Muna, W. Z. Z., Rachmanita, R. E., Nuruddin, M., & Faizin, N. (2022). Studi Evaluasi PLTS Off-Grid di Gedung Jurusan Teknik Politeknik Negeri Jember. *Indonesian Journal of Energy and Mineral*, *2*(2), 1–12. https://doi.org/10.53026/ijoem/2022/2.2/1017

Napitupulu, J., Sholeha, D., Sinaga, J., Sitohang, R., & Napitupulu, R. (2023). Study Perencanaan Plts Sistem Off Grid Skala Kecil Rumah Tangga. *Jurnal Darma Agung*, *31*(1), 289. https://doi.org/10.46930/ojsuda.v31i1.2998

Oktavia, R. P., Febrianti, D. A., Septianingsih, A. D., & ... (2022). Penerapan Metode Bioflok Pada Budidaya Lele di Greenhouse Kelurahan Pucang Sewu, Kecamatan Gubeng, Surabaya. *Karya Unggul …*, *1*, 316–321.

Putra Ariantika, I. P. D., Setiawan, I. N., & Sukerayasa, I. W. (2023). Analisa Ekonomi Rancangan Plts Off-Grid Pada Adidaya Workshop. *Jurnal SPEKTRUM*, *10*(3), 78.

https://doi.org/10.24843/spektrum.2023.v10.i03.p9

Sugeng Haryadi, Kundori, K., Lilik Budiyanto, Anata Sari, & Hari Sampurno. (2023). Pembuatan Bioflok Sebagai Pakan Lele dan Menjaga Air Di Pokdakan Lele Jaya Desa Sukoharjo Pati. *Batuah: Jurnal Pengabdian Kepada Masyarakat*, *3*(1), 19–25. https://doi.org/10.33654/batuah.v3i1.2121