



## PKM ISLAMIC BOARDING SCHOOL RIYADHUSSHOLIHIN ROCEK CIMANUK - PANDEGLANG IN WASTE PROCESSING MACHINE APPLICATIONS

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### Article Info:

Received: 2024-03-19

Volume: 3

### Keywords:

Organic & Inorganic Waste Processing, Recycled Products, Digital Marketing, Accounting Application System, Appropriate Technology.

Revised: 2024-05-19

Numbers: 2

### Abstract:

This paper presents a comprehensive study on the design, implementation, and performance evaluation of a Solar-Powered Submersible Water Pump (SPSWP) system tailored for agricultural irrigation in Subak Munduk Babakan, Sangeh, Bali. With a focus on sustainable agriculture and water resource management, the system addresses the challenges of water scarcity during the dry season in the absence of natural irrigation sources. The SPSWP system, consisting of solar panels with pump controller, a submersible pump, and a water tank, harnesses solar energy to power the pump, eliminating the need for extensive infrastructure. The research encompasses site survey and mapping, analysis and design, installation, benefits beyond irrigation, and technical measurements. The implementation shows promising results in overcoming water scarcity issues. The system's advantages include minimal maintenance, cost savings, and enhanced reliability. Additionally, the SPSWP system serves as an educational site for renewable energy study and awareness. Performance metrics, including solar irradiance, voltage, current, solar panel temperature, and water discharge, are measured and discussed. The results indicate fluctuating solar energy availability, with voltage and current aligning with solar panel specifications. The system demonstrates a water discharge rate of 0.56 liters/second, showcasing promising outcomes in addressing water scarcity challenges for agricultural irrigation. Further research and monitoring are required to assess the long-term performance and sustainability of the system.

Accepted: 2024-06-15

Pages: 72 - 77

## INTRODUCTION

Riyadhussholihin Islamic Boarding School is an Islamic educational institution in Rocek, Cimanuk, Pandeglang, and Banten that offers formal and non-formal Islamic education. Founded on July 1, 2010, the school was built on the TAQWA foundation, which focuses on the principles of the Qur'an and Sunnah. It also combines general knowledge and skills guided by domestic and foreign graduate teaching staff.

Along with its development, Riyadhussholihin Islamic Boarding School continues to improve facilities for its students. The number of students currently reaches around 1200 people, so the daily need for food is enormous. This increases the amount of waste produced in the kitchen. The waste at the Riyadhussholihin Islamic boarding school is around 3.5M3 daily. The cottage will separate the rubbish into organic and inorganic. Organic waste will be processed into liquid and solid fertilizers, branded and sold to the public.



Meanwhile, inorganic waste will be recycled to make valuable items such as tissue holders, plastic mats, and flowers, which will be sold to the public. The Riyadhushsholihii Islamic boarding school also has several business units already running, namely minimarkets, boutiques, etc. However, they still need an accounting application system to record transactions and report their finances.

Organic waste is goods considered unnecessary and thrown away by previous users, but can still be used if managed using the correct procedures [Sudrajat, 2014]. Organic waste comes from nature or is produced from natural activities. Garbage or organic waste can experience weathering (decomposition) and break down into smaller, odorless materials [Inawaty Sidabalok et al. 2014]. In general, the components most abundant in waste in several cities in Indonesia are plant remains, which reach 80-90%, sometimes even more [Moerdjoko S et al. 2002]. The same is true for rubbish at the Riyadhushsholihii Islamic Boarding School. Therefore, one way to handle it is to process it into fertilizer.

Inorganic waste is produced from non-biological materials, either in synthetic products or the results of technological processes for processing mining materials [Novi Marlioni, 2014]. One way to handle inorganic waste is recycling so that it can be turned into something that has value and function [Andy & Lina Purnama, 2019]. The definition of recycling here is using used goods to be reused into valuable goods or processed into goods that can be bought and sold [I Gusti Ayu Arwati et al. 2021]. This aims to reduce and overcome environmental pollution from plastic waste thrown into the environment. Farming is organic waste [Alfi Tranggono et al. 2021 ].

Accumulation of rubbish can cause disease. This is because inorganic waste, such as plastic, cannot be broken down. Therefore, one of the best alternatives is to process waste through recycling. Waste management aims to improve public health and environmental quality and turn waste into a resource [Zico Fakhrrur Rozi et al. 2021]. One way is to separate organic, inorganic, food waste and plastic trash cans. Aliva and Purwo's research results prove that people have become more skilled in processing waste people are more skilled in managing waste, and people can be creative with inorganic waste by transforming paper and plastic waste into works of art as added economic value [Aliva Rosdiana & Purwo Adi Wibowo, 2021]. With this recycling, it is hoped that environmental pollution can be overcome. This behavior helps advance the nation economically to improve the welfare of boarding school administrators, use and prepare students for entrepreneurship, contribute to preventing environmental pollution, and help the movement love the environment. In Figure 1, you can see a photo of the accumulation of rubbish at the Riyadhushsholihii Islamic Boarding School.



**Figure 1.** Piles of rubbish at the Riyadhushsholihii Islamic Boarding School

The high school curriculum does not contain subjects related to entrepreneurship. Therefore, there is a need for provision for students, especially class XII, namely provision related to entrepreneurship so that students can become entrepreneurs after graduating from the Riyadhushsholihii Islamic Boarding School. Apart from that, teachers can also increase their knowledge about entrepreneurship and practice it at the boarding school, which can improve the welfare of teachers.

Along with its development, the Riyadhushsholihii Islamic boarding school has also opened several business units such as minimarkets, boutiques, laundry, and canteen, and later, the results of this PKM product will be liquid fertilizer, solid fertilizer and handicrafts from recycled inorganic waste. With so many business units, a separate accounting system is needed from the educational accounting system at the Islamic boarding school. By creating a unique accounting system for this business unit, accounting records can be carried out efficiently, and financial reporting can be more accurate and reliable so that it meets the characteristics of financial reporting, namely relevance, reliability, comparability and timelines [Kieso, Weygandt, & Warfield. 2017]. Based on the situation analysis described above, the partner's problem stated as follows:

**Table 1. List of Problems**

No	Problem	Description
1	Accumulation of organic and unprocessed waste	The management and students collect organic waste and will be given training on making products from organic waste into fertilizer liquid and solid fertilizer and how to sell it.
2	Accumulation of inorganic and unprocessed waste	The Riyadhushsholihii Islamic Boarding School administrators and students collect inorganic waste and will receive training on recycling it to make goods. What is helpful, and how can it be sold?
3	There is no accounting application system for recording financial transactions and reporting	The management of the Riyadhushsholihii Islamic Boarding School, especially the accounting section, will be given training on recording accounting transactions to financial reporting and how to operates Zahir Accounting.

Based on the problems described above, the solution that will be implemented is to provide assistance to process organic waste through training administrators, students, and religious teachers using composers who produce liquid fertilizer and solid fertilizer, which are branded and sold to the public, provide assistance in the form of appropriate technological tools and how to use them, provide training assistance to process inorganic waste into recycled products in the form of tissue containers, plastic mats, plastic flowers etc. which will be sold to the public and provide assistance in preparing an accounting application system using Zahir Accounting for recording transactions and financial reporting with complete features for trading and manufacturing businesses and provide training to accounting staff to be able to apply it.

**METHODS**

Partners, in this case, are the management, students, Ustadz, and business unit accounting staff within the Riyadhushsholihii Islamic Boarding School environment, who are participating in



supporting this community service activity. Partners will provide facilities outside the team's RAB, such as land for waste processing, that the team needs. Partners will also follow all directions from the PKM TEAM. Partners will take part in learning, training, socialization, and implementing the manufacture of liquid fertilizer, solid fertilizer, handicrafts from inorganic waste, sales and application of the Zahir Accounting accounting application because this will benefit partners.

After each learning process has been completely implemented, an evaluation is carried out as a reference for feedback to ensure the partnership's sustainability. Program Achievement Stage, namely:

Stage I, partners can understand modules about making liquid fertilizer and solid fertilizer from organic waste and handicrafts from recycled inorganic waste, as well as determining product selling prices using digital marketing and accounting modules using Zahir Accounting.

In Phase II, partners can implement the manufacture of liquid and solid fertilizer, make handicrafts from recycled waste, determine product selling prices, market products using digital marketing, and apply accounting using Zahir Accounting.

Stage III: Continuous and consistent implementation from partners regarding making liquid fertilizer and solid fertilizer from organic waste, making handicrafts from recycled inorganic waste, and marketing products using digital marketing and a Zahir Accounting accounting system.

Stage IV. Analyze the shortcomings/weaknesses in making liquid fertilizer and solid fertilizer from organic waste, making handicrafts from recycled inorganic waste, and marketing products using digital marketing and the Zahir Accounting accounting system.

Stage V, Improving deficiencies/weaknesses in the application of making liquid fertilizer and solid fertilizer from organic waste, making handicrafts from recycled inorganic waste, marketing products using digital marketing and the Zahir Accounting accounting system

Stage VI, Developing the production of liquid fertilizer and solid fertilizer from organic waste and handicrafts from recycled inorganic waste for sale to the wider community, developing the marketing system to more practical methods and developing features in Zahir Accounting according to needs

## RESULTS AND DISCUSSION

The PKM team presented training material on making liquid fertilizer from organic waste. Then, practice with the participants. Organic waste that the cottage has separated is chopped and put into a composter machine. The waste consists of 70% wet and 30% dry organic waste. The PKM team explained it in detail and immediately put it into practice. After the organic waste is put into the composter, every 3 days, the composter window is opened to let the gas out after 21 days of silence.

Before being put into the composter, organic waste from the kitchen is reduced in size. Cut with a knife or with scissors. If you want composting to take place more quickly, you can add starter liquid for compost, such as EM4 or Boischa. This liquid contains microorganisms, which will help the composting process run faster. EM4 liquid can be dissolved first in molasses or sugar water to get more active microbes. The solution is stored in a closed container for several days until it smells of a distinctive sweet and sour aroma. After being sprayed/wetted with this starter liquid, the materials are put into the composter. This process can be done at any time until the composter is full.

Apart from producing solid fertilizer, it also produces liquid fertilizer/leachate in this composting process. Apart from containing the remaining compost starter water containing



microbes, this liquid comes from rotting organic material. The liquid collected at the bottom can be used as liquid fertilizer. Liquid fertilizer that is too thick or not cooked properly will make your plants overheat and even die. Liquid fertilizer needs to be diluted before use. Several practitioners prescribe one part of this liquid fertilizer to be mixed first with twenty-five parts of water and then given to the plants. Please experiment with the dilution, for example, 1: 10, 1: 15 or 1: 20.



**Figure 2.** Compost machine

Inorganic waste that the cottage has separated, cleaned and tidied up, sorted out what can still be used. Prepare tools and equipment such as scissors, knives, glue guns, zippers, needles, thread/sewing machines, etc. The craft items are bags, tissue holders, wallets, and other pockets. The PKM team practiced and was immediately followed by participants, including Ustadz's wives. The following items were made on September 29, 2023.

The PKM team and the team installed Zahir software on one of the business unit's computers, followed by launching and training the accounting staff responsible for managing the business unit to use the Zahir application in the business unit. The cottage business units already running are Butiq Haramain, Alfain minimarket, mineral water, and the production of environmentally friendly cleaners. The Zahir application can be implemented optimally. The Zahir application makes processing transactions in business units easier, so profit and loss can be known immediately.

The PKM team presented detailed digital marketing training material and continued with laptop practice. Participants immediately practiced using laptops to market products digitally using social media, such as creating an account and selling on YouTube, Shopee and the like. Most participants were high school students enthusiastic about participating in and practicing digital marketing.

## CONCLUSION

KM activities at the Riyadhushsholihiiin Rocek Cimanuk Pandeglang Islamic Boarding School have been implemented and completed according to targets, which include:

1. Processing organic waste into liquid fertilizer.
2. Processing inorganic waste into handicraft items.
3. Preparation of a business unit accounting system using Zahir Accounting.
4. Marketing strategy training based on digital/digital marketing.



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