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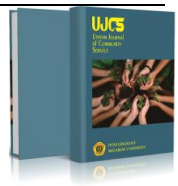

Socialization and Education on Biopore Infiltration Hole Construction at SMK Bina Profesi Pekanbaru Promoting Environmental Awareness and Sustainable Practices

Neri Puspita Sari[1*], Yulia Setiani[1], Desi Yasri[1], Zaiyar[1], Silfia Rini[1]

[1]Departmen of Civil Engineering, Sekolah Tinggi Teknologi Pekanbaru, Pekanbaru, Indonesia

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Corresponding Author:
Neri Puspita Sari
neripuspitasari@gmail.com

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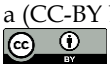

Abstract: Pekanbaru has experienced frequent flooding due to high rainfall intensity, exacerbated by the reduction of water infiltration areas, which have been converted into residential and commercial zones. Additionally, poor environmental awareness is evident from waste accumulation along roadsides, obstructing drainage systems and contributing to surface runoff. With limited available land and reduced natural infiltration capacity, biopore infiltration holes offer a viable solution for mitigating waterlogging. Biopores facilitate rainwater absorption through artificial infiltration, effectively reducing surface runoff during heavy rains. This study focuses on the socialization and implementation of biopore infiltration holes at SMK Bina Profesi Pekanbaru. The process involved awareness programs for students, emphasizing the environmental benefits and construction techniques of biopores. Observations of the surrounding environment were conducted to assess water infiltration conditions, followed by the preparation and installation of biopores. The initiative not only aimed to reduce flood risks and runoff but also addressed waste management by utilizing organic waste in the biopore holes. Decomposed organic matter is converted into compost, promoting sustainable waste recycling. The biopore program at SMK Bina Profesi successfully educated students on both environmental stewardship and practical techniques for managing water infiltration, contributing to improved local sustainability efforts.

Keywords: Biopore infiltration Holes; Flood mitigation; Rainwater management

Introduction

Pekanbaru is a metropolitan city with a population of over one million people, experiencing rapid infrastructure development. However, this growth is not supported by adequate facilities and infrastructure, as many roads are in poor condition, and waste management issues remain unresolved. The city's drainage system is ineffective due to the accumulation of waste, which blocks water flow and causes frequent flooding. During heavy rain, surface runoff often inundates the streets, leading to long traffic jam.

During the rainy season, rainwater must be absorbed into the ground. If not, the water will flow over the surface, causing flooding and making the soil soggy. When rainwater flows across the surface, it can erode the soil, accumulating in lower areas and leading to sedimentation. Biopores can reduce soil erosion and flooding, thus mitigating the negative impact of surface runoff on roadways, as noted in the study by Ali et al. (2024). The use of biopores has been shown to effectively reduce waterlogging, as demonstrated by Shafina et al. (2022).Biopore infiltration holes not only function to absorb water but also help address organic waste problems at households.

One of the main causes of flooding is the reduction of water absorption areas. Many natural infiltration zones have been converted into residential or commercial areas. The expansion of land development for housing and other infrastructure has led to a decrease in green open spaces, which are crucial for absorbing rainwater (Yulia, 2019). As water absorption areas

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shrink, the volume of surface runoff increases, contributing to local and even regional flooding. During the rainy season, rainwater should be absorbed into the ground. If it flows over the surface, the soil becomes waterlogged and muddy. As the water flows, it accumulates in lower areas, leading to sedimentation where the water stagnates.

One simple and easy step to raise awareness about optimizing the use of water resources is to conserve water through biopore infiltration holes. These biopore holes not only absorb water but also help manage organic household waste. Most importantly, they ensure that rainwater falling in the yard does not overflow into the surrounding environment. When water flows outward and accumulates in rivers, it can contribute to flooding. Several studies have been conducted on the effectiveness of biopore infiltration holes. For example, research by Rahmawati (2017), Alifa (2022), and Simanjuntak (2021) demonstrated that biopore holes significantly reduce waterlogging in urban areas. Another study by Susilo (2018) indicated that biopore infiltration holes can enhance the organic content of the soil and support plant growth. The implementation of biopore infiltration holes as a cost-effective and efficient method for reducing flood risks was highlighted by Naharuddin (2024). Biopore infiltration holes also play a vital role in waste management, as noted by Ruslinda et al. (2020).

The benefits of biopore holes are as follows:

1. Reducing Water Puddles: Biopore holes help rainwater infiltrate the soil more quickly, thereby reducing puddles and the risk of flooding.
2. Improving Groundwater Quality: By enhancing water infiltration, the quality of groundwater can improve as pollutants on the surface are filtered by the soil.
3. Natural Composting: Biopore holes can serve as natural composters for organic waste, reducing waste volume and producing compost that benefits plants.
4. Enhancing Soil Biodiversity: Microorganism activity in biopore holes improves soil fertility and biodiversity.

Method

Materials and tools used for creating biopore infiltration holes: Soil Drilling Pipe:

1. Can be a manual or electric drill with a diameter of 10-30 cm.
2. Organic Materials: Such as dry leaves, vegetable scraps, sawdust, etc.
3. Measuring Tools: A tape measure to measure the depth of the hole.
4. Protective Gear: Gloves and safety boots.

The steps for making bio pore holes can be seen in the scheme below:

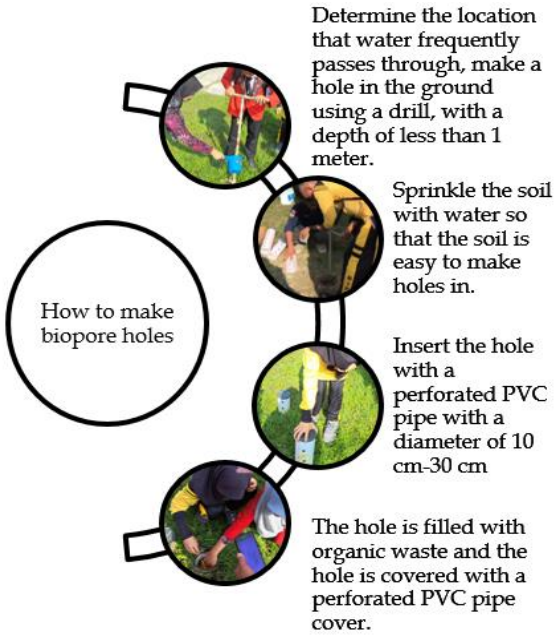

Figure 1. Steps for Making Bio Pore Holes

Biopore hole maintenance includes the following steps:

1. Routine Inspection: Check the holes regularly to ensure they are not clogged.
2. Regular Addition of Organic Waste: Add new organic waste periodically to maintain its function.
3. Cleaning the Surrounding Waste: Remove decomposed waste around the hole.
4. Utilization of Decomposed Compost: Use decomposed materials as natural compost.
5. Compost Harvest: After three months, the compost can be collected and used as fertilizer for plants.

Result and Discussion

Community service is one of the three pillars of the *Tri Dharma Perguruan Tinggi*, in addition to education and teaching, and research. Community service is an integral part of the three pillars, which is implemented synergistically with the other two pillars, and involves the participation of the entire academic community, including lecturers, students, administrative staff, and alumni. Through community service, Pekanbaru College of Technology (STTP) strives to be actively involved in the community and provide practical solutions to various community challenges.

In this context, the community service initiative by STTP lecturers and students targets students of SMK

Bina Profesi Pekanbaru. This program focuses on implementing socialization and education about making biopore infiltration holes at SMK Bina Profesi Pekanbaru.

Before the counseling and practice of making biopore holes, training participants filled out a questionnaire to find out the extent of their knowledge about biopore infiltration holes, 18 participants filled out the questionnaire. The results of the questionnaire can be seen in Figure 2.

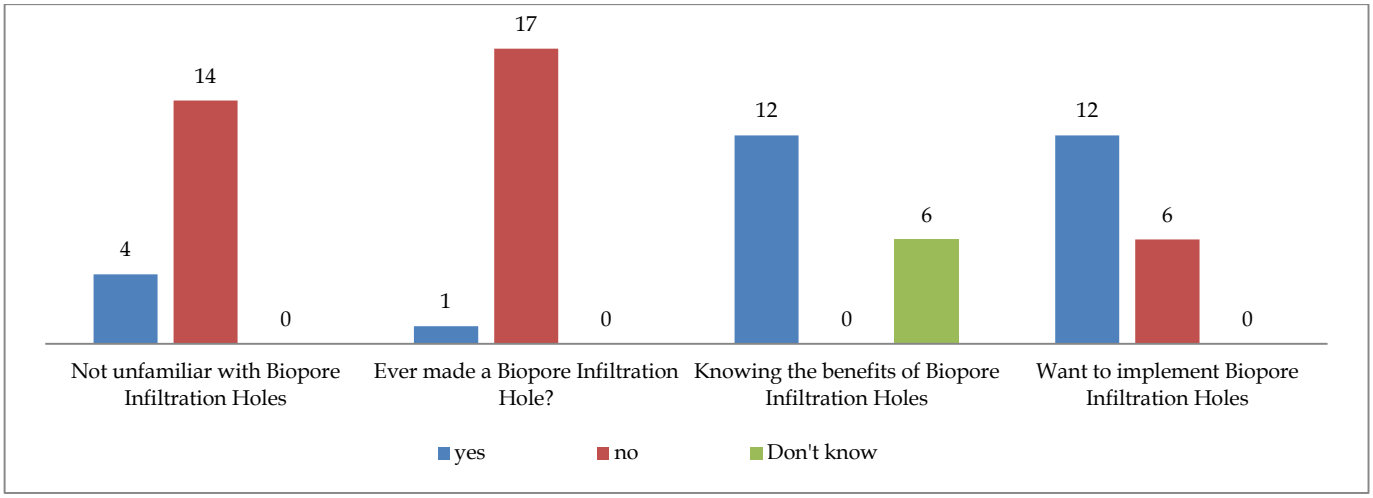

Figure 2. Pre-Socialization Questionnaire

Based on the results of the pre-socialization questionnaire shown in the graph in Figure 2, most students are not familiar with biopore infiltration holes, only a small number are familiar with them. Only one student has previous experience in making biopore infiltration holes. However, many students understand the benefits of biopore infiltration holes but do not know how to make them. Most students stated that they were very interested in learning and making biopore infiltration holes.

Students were educated on various aspects of biopores, including their definition, environmental challenges, and the benefits of biopore infiltration holes in addressing problems such as flooding and waste management. After the presentation, participants completed a post-socialization questionnaire to evaluate their understanding and interest in biopores. The results of the post-socialization questionnaire are presented in Figure 3.

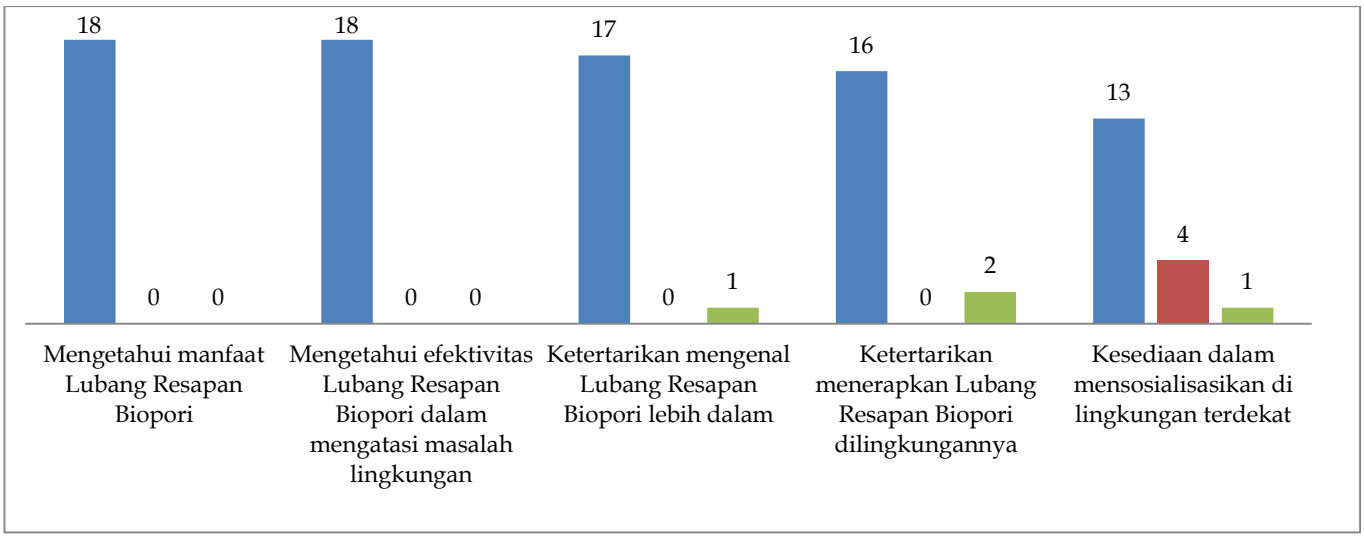

Figure 3. Post-Socialization Questionnaire

Based on the graph in Figure 3, all students showed understanding and awareness of biopore infiltration holes. They also expressed interest in implementing biopore infiltration holes in their respective

environments. Furthermore, most students showed their desire to promote the use of biopore infiltration holes in their environments.

Figure 4. Providing education about biopore holes

Figure 5. Community Service Location

Conclusion

Biopori adalah teknologi sederhana namun efektif untuk mengatasi masalah lingkungan merupakan solusi untuk mengatasi masalah genangan air dan sampah organik. Teknik ini meningkatkan daya resap air, mengurangi risiko banjir, dan mendukung pengelolaan sampah organik secara alami. Dengan sedikit usaha, kita dapat menciptakan lingkungan yang lebih sehat dan produktif. Implementasi lubang biopori di berbagai wilayah, terutama di daerah perkotaan, sangat direkomendasikan untuk mengatasi masalah lingkungan.

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