



EMPOWERING THE KARANG TARUNA YOUTH ORGANIZATION OF KARANG HARUM VILLAGE THROUGH TRAINING IN CHARCOAL BRIQUETTE PRODUCTION AND THE IMPLEMENTATION OF AUTOMATIC BRIQUETTE MOLDING TECHNOLOGY BASED ON RICE HUSK WASTE

Arnisa Stefanie¹, Dicki Dian Purnama², Bahar Amal^{*3},
Zahra Kirani Nur Rahmah⁴, Arsa Anedtha Itsna Putri⁴

^{1,2,3,4,5} Universitas Singaperbangsa Karawang

*Corresponding Author: bahar.amal@ft.unsika.ac.id

<p>Info Article</p> <p>Received : 12 November 2025</p> <p>Revised : 09 Desember 2025</p> <p>Accepted : 06 Desember 2025</p> <p>Publication : 31 Januari 2025</p> <p>Keywords: Rice Husk Briquettes, Community Empowerment, Appropriate Technology, Renewable Energy</p> <p>Kata Kunci: Briket Sekam, Pemberdayaan Masyarakat, Teknologi Tepat Guna, Energi Terbarukan, Karang Taruna</p> <p>Licensed Under a Creative Commons Attribution 4.0 International License</p> 	<p>Abstract: Karang Harum Village, Bekasi Regency, has an abundant potential of rice husk waste; however, its utilization is still limited to low-value burnt husk. This community service program aims to enhance the community's capacity through briquette production training, the implementation of an automatic electric briquette molding machine, and business management assistance. The activities consist of socialization, technical training, managerial training, technology installation, and a four-month mentoring period. The results indicate a 61.3% improvement in participants' knowledge, an increase in production capacity from 0 kg to approximately 100 kg per week, and the establishment of a youth-based independent business unit. The implemented technology successfully reduced production time by up to 60% and produced briquettes with more consistent quality standards. This program contributes to income generation, agricultural waste utilization, and the development of village-based renewable energy businesses.</p> <p>Abstrak: Desa Karang Harum, Kabupaten Bekasi, memiliki potensi limbah sekam padi yang sangat melimpah, namun pemanfaatannya masih terbatas pada sekam bakar bernilai ekonomi rendah.. Program pengabdian ini bertujuan untuk meningkatkan kapasitas masyarakat melalui pelatihan produksi briket arang, implementasi alat cetak briket elektrik otomatis, serta pendampingan manajemen usaha. Kegiatan meliputi sosialisasi, pelatihan teknis, pelatihan manajerial, instalasi teknologi, dan pendampingan usaha selama empat bulan. Hasil pelaksanaan menunjukkan peningkatan pengetahuan peserta sebesar 61,3% (berdasarkan <i>pre-post test</i>), peningkatan kapasitas produksi dari sebelumnya 0 kg menjadi ±100 kg/minggu, serta terbentuknya unit usaha mandiri berbasis Karang Taruna. Penerapan teknologi berhasil mengurangi waktu produksi hingga 60% dan menghasilkan briket dengan standar kualitas lebih konsisten. Program ini berkontribusi langsung terhadap peningkatan pendapatan masyarakat, pemanfaatan limbah pertanian, dan penguatan ekonomi desa berbasis energi terbarukan.</p>
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INTRODUCTION

Karang Harum Village is located in Kedungwaringin District, Bekasi Regency, with an area predominantly consisting of rice fields. As one of the rice production centers in the region, the village generates a large amount of rice husk waste, reaching approximately $\pm 1,200$ tons of unhusked rice per harvest season. However, most of this waste is only utilized as burnt husk for planting media with relatively low economic value. The potential use of rice husk as a raw material for charcoal briquettes has not been optimized due to limited knowledge, inadequate processing technology, and insufficient production capacity.

The Karang Taruna youth organization plays a strategic role in village-based entrepreneurship development. Nevertheless, limited technical skills and lack of access to appropriate technology have hindered the development of rice husk briquette production activities. Meanwhile, the demand for environmentally friendly alternative energy sources continues to increase, particularly from small and medium enterprises (SMEs) and household sectors.

In line with the Sustainable Development Goals (SDGs), Higher Education Key Performance Indicators (IKU), Asta Cita (green economy and village-based downstreaming), and the National Research and Innovation Roadmap (RIRN) on renewable energy, this program was designed to enhance community capacity through the application of appropriate technology, technical training, and the establishment of a youth-based business unit focused on renewable energy production.

METHOD

The implementation method was designed based on partner needs identified through preliminary field observations and focus group discussions. The program was carried out through six sequential stages:

1. Program Socialization.

Initial socialization was conducted with Karang Taruna members and village officials to introduce program objectives, the economic potential of rice husk briquettes, and the implementation stages.

2. Technical Training on Briquette Production.

Training materials included rice husk carbonization, binder formulation, briquette molding, drying processes, and quality control (density, moisture content, and

calorific value). Participants were actively involved in hands-on practice under the supervision of lecturers and students.

3. Implementation of an Automatic Briquette Molding Machine.

An automatic electric briquette molding machine was installed at the partner site with specifications including a ½ HP electric motor, 550-watt power consumption, and a hollow steel frame measuring 4 × 4 cm, with a production capacity of 10–12 kg per hour. Installation was followed by performance testing and capacity adjustment.

4. Business Management Training.

This stage covered cash flow recording, cost of production calculation, pricing strategies, branding, and digital marketing using online platforms such as Shopee, Tokopedia, and Instagram.

5. Business Mentoring and Evaluation.

A four-month mentoring period was conducted to monitor product quality, production efficiency, financial management, and marketing performance. Evaluation methods included pre-test and post-test assessments, interviews, and production analysis.

6. Program Sustainability

Sustainability efforts included the establishment of a Karang Taruna-based business unit, development of production and marketing standard operating procedures (SOPs), creation of distribution networks, and preparation of a one-year business plan.

RESULTS AND DISCUSSION

Improvement in Participants’ Knowledge Capacity

Pre-test and post-test results indicated a substantial improvement in participants’ understanding of rice husk briquette production. The average pre-test score was **48.7**, while the post-test score increased to **78.6**, representing a **61.3% improvement**. This finding confirms that hands-on training combined with technology transfer is effective in enhancing community technical competence.

Table 1 Pre-test and Post-test Results of Participants’ Knowledge

No.	Evaluation Indicator	Pre-test Average Score	Post-test Average Score	Knowledge Improvement (%)
1	Understanding of rice husk carbonization	46.5	77.8	67.3
2	Briquette molding process	49.2	79.1	60.8
3	Binder formulation and mixing	47.8	78.0	63.2
4	Drying and quality control	51.3	79.5	55.0
—	Overall Average	48.7	78.6	61.3

Source: Primary data from community service activities, 2025



Figure 1 Community Service Program Implementation Stages

Source: Author documentation, 2025.

Technology Implementation and Production Efficiency

Prior to the program, no briquette production activities existed in Karang Harum Village. Following the installation of the automatic briquette molding machine, production capacity increased to approximately **100 kg per week**, while production time was reduced from **30 minutes per kilogram to approximately 7 minutes per kilogram**. In addition, the machine produced briquettes with more uniform dimensions and improved calorific consistency, demonstrating the effectiveness of appropriate technology in rural productivity enhancement.

Table 2 Comparison of Production Performance Before and After Program Implementation

Indicator	Before Program	After Program	Improvement	Indicator
Briquette production capacity	0 kg/week	±100 kg/week	+100 kg/week	Briquette production capacity
Production time	30 minutes/kg	±7 minutes/kg	-60%	Production time
Production method	Manual (not operational)	Automatic briquette molding machine	Technology upgrade	Production method
Product consistency	Inconsistent	Uniform size and density	Improved quality	Product consistency
Business unit	Not available	Established (Karang Taruna-based)	Sustainable operation	Business unit

Source: Field observation & production records of Karang Taruna Harum Village, 2025.



Figure 2 Rice Husk Briquette Production Training Activities

Source: Author documentation, 2025.

Social and Economic Impact

The establishment of the “Karang Harum Charcoal Briquette” business unit under the Karang Taruna organization generated tangible socio-economic benefits. Active members experienced income increases of approximately 40–60%, youth participation in productive economic activities increased, and rice husk waste utilization became more optimal. Furthermore, the use of rice husk briquettes contributed to reducing dependence on firewood and supported the implementation of a village-based circular economy.

Table 3 Social, Economic, and Environmental Impacts of the Program

No	Impact Aspect	Description
1	Social impact	Increased youth participation in productive economic activities
2	Economic impact	Income increase of 40–60% for active Karang Taruna members
3	Environmental impact	Reduced rice husk waste and decreased reliance on firewood
4	Institutional impact	Establishment of a Karang Taruna-based renewable energy business unit
5	Sustainability	Availability of SOPs and a one-year business plan

Source: Monitoring and evaluation results of the community empowerment, 2025.



Figure 3 Workflow of Rice Husk Briquette Production Process

Source: Author documentation, 2025.

CONCLUSION

The community empowerment program through rice husk charcoal briquette production training and the implementation of an automatic briquette molding machine successfully enhanced the technical and economic capacity of Karang Taruna in Karang Harum Village. The applied appropriate technology significantly improved production efficiency, product quality consistency, and business feasibility. The establishment of a youth-based business unit provides a strong foundation for program sustainability while supporting renewable energy development and green rural economic growth. Future programs are recommended to focus on expanding marketing networks and strengthening distribution channels to further increase economic benefits.

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