



Turning Waste into Wealth with Bricks Eco-Friendly in Indonesia

Muhammad Hanifan Rancaputra, Totok Wahyu Abadi*

Universitas Muhammadiyah Sidoarjo, East Java Province, Indonesia

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*Correspondence: Totok Wahyu Abadi

Email: hmadinathamrin@gmail.com

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Abstract: Plastic waste, especially from used bottles, poses significant environmental and health challenges due to its non-biodegradable nature. To address this, the 3R principles-Reduce, Reuse, and Recycle-are essential. This study introduces EcoBricks, made from used plastic bottles, as a sustainable solution to conventional building materials. Using a community-based participatory research approach, the project involves citizens in producing EcoBricks, aiming to foster environmental awareness and reduce the accumulation of plastic waste. The results show that EcoBricks provide a viable alternative to traditional bricks and raise ecological awareness among the community. The implications of this study underscore the potential of EcoBricks in sustainable construction, encouraging wider adoption and policy support for waste reduction initiatives.

Keywords: Ecobricks, Sustainable Construction, Plastic Waste Management, Community Involvement, Awareness Environment

Introduction

Waste is one of the environmental problems that has not been appropriately resolved in Indonesia. Population growth and population density lead to an increase in waste volume. The impact of an increase in the amount of waste that is not managed correctly includes environmental pollution, disease, ecosystem damage, water pollution, and various other negative impacts. The most common waste daily is paper, plastic, bottles, and cans ([Ihsan, 2022](#)).

Based on KLHK data, plastic waste ranks second in the amount of waste overall, reaching 12.4%. According to waste researcher Jenna Jambeck from the University of Georgia, Indonesia is ranked second in the world as a producer of plastic waste, with 187.2 million tons, after China, which reached 262.9 million tons. Plastic is widely used as packaging in everyday life because it is lightweight, cheap, and practical, so it is often used as disposable packaging ([Ramdan, 2017](#)).

Plastic equipment, especially drinking water packaging, is increasingly standard in Indonesia. Generally, people dispose of plastic bottle waste in public places such as rivers, roads, or empty yards ([Pratiwi, 2022](#)). The indiscriminate disposal of plastic bottle waste is

a severe problem. In general, people cannot manage waste properly, which results in the accumulation of plastic bottle waste. Plastic waste is difficult to decompose and causes environmental hygiene and health problems. Clean and Healthy Living Behavior (PHBS) reflects a family lifestyle that always pays attention to and maintains the health of all family members ([Nurlela, 2023](#)). All health behaviours carried out on awareness so that family members or families can help themselves in the health sector and play an active role in health activities in the community are another definition of PHBS. Clean and healthy living behaviour (PHBS) is one of the efforts (community prevention of a disease or health problem). "Waste, material that someone no longer wants, is often needed by other parties ([Setianing, 2023](#)). Waste becomes a problem when it is mixed with various types, which makes it difficult to recycle or use and reuse. To support the birth of clean behaviour, namely placing waste based on its type, so that waste becomes a blessing for those who need it or an object for social care development."

From the quote of A. S. Suryani, "Waste in the Effectiveness of Waste Management (Case Study of Bank Sampah Malang)," *Aspirasi: Journal of Social Problems*," One of the efforts to manage plastic bottle waste is through the recycling movement ([Jovi et al., 2024](#)). This movement is very beneficial for the environment. Therefore, there needs to be an effort in designing the correct utilization of plastic bottle waste to become something useful and have economic value ([Reisya & Darmaningrum, 2023](#)). This was done by the Sugihwaras Village community, which created a product called EcobrikQu. EcobrikQu is taken from the term "ecobrik," which refers to ecology, the science of the mutual relationship between living things and the surrounding environment. While "brick" means brick, stone, or red stone/wall, marketing the waste needs a container. I. L. Kusminah, "4r (Reduce, Reuse, Recycle, Replace) Counseling is a Step to Create a Clean and Economic Environment in a Village ([Sakanovein et al., 2024](#)). This combination of words defines environmentally friendly bricks, "Simulacra is defined as something that appears or is made to appear like something else and is also described as a copy so that the duplication and the original become

"EcobricksQu S. Suminto, "Ecobricks: an innovative and creative solution to the"PRODUCTUM Journal of Product Design can be an alternative to conventional bricks in building construction. Therefore, eco-bricks are often used as raw materials for furniture such as tables and chairs. Made by stacking used bottles, EcobrikQu aims to reduce plastic waste and recycle it using bottles ([Sakanovein, 2024](#)).

Methods

In researching "EcobrikQu as an Effort of Environmentally Friendly Movement in Sugihwaras Village, Candi District, Sidoarjo Regency," the author used descriptive qualitative research methods. According to the Charter, basic research consists of selecting a unique problem from any source and carefully solving it without considering social, economic, or community desires ([Hakim & AL, 2023](#)).

This method involves collecting data through direct observation and interviews with the people of Sugihwaras Village. The authors also used additional data from articles and journals about ecobrik products to obtain clear and detailed information ([Noparera & Rahman, 2018](#)).

1. Primary Data

Primary data was obtained through interviews with the Head of the Youth Organization and the Sugihwaras Village community. An interview is a data collection technique that involves communicating directly with sources or data sources. This dialogue is conducted orally, either directly or indirectly.

2. Secondary Data

Secondary data already exists and needs to be collected and validated for use in making EcobrikQu products. This data can be obtained from available books, articles, or journals.

Result and Discussion

In making EcobrikQu products as an environmentally friendly movement in Sugihwaras Village, the preparation, implementation, and final stages were carried out well according to plan. The Sugihwaras Village community, especially the Youth Organization group, gave a good and enthusiastic welcome during the product manufacturing process ([Riniarti et al., 2021](#)).

Through EcobrikQu product manufacturing activities, the Sugihwaras Village community can be more sensitive to the importance of plastic waste management and environmental sustainability, according to K. H. R. N. M. & A. E. Basuki, entitled "Building Community Awareness in Organizing a Beautiful, Comfortable and Healthy Environment," JMM (pp. 4 (1), 1-9) the waste that is targeted for containerization, collection, transfer, and transportation which is the DKP's daily task is 420.98 tons or $\pm 68\%$ of the existing potential generation. A total of 186.46 tons/day or 30% of potential waste is managed at the community level with the following treatment: composted 58.01 tons/day ($\pm 9.35\%$), processed at the household level (into crafts) or stalls (sold) 110.95 tons/day ($\pm 17.9\%$), Community participation in this movement can also be an example for other communities.

Other communities are addressing the plastic waste problem and creating a cleaner and healthier environment. However, it should be noted that further evaluation of the effectiveness and impact of using EcobrikQu products is needed. In this study, the main focus was on the manufacturing process and the product's benefits. Further evaluation could include sustainability, plastic waste reduction, and this movement's broader social and environmental impacts (Nabilah, 2019). ADI Community Service Overall, making EcobrikQu products as an environmentally friendly movement in Sugihwaras Village gave positive results, contributed to plastic waste management, and increased public awareness of the importance of maintaining cleanliness and environmental sustainability.



Figure 1. The Atmosphere of Concept Discussion with Youth Organization

The picture above shows the enthusiasm of the youth of Sugihwaras Village in making Ecobrik products. An ecobrick is a plastic bottle packed by inserting used plastic pieces in clean and dry conditions with a specific density that can be used to make a work of art or a beneficial building. Based on the understanding explained through the ecobrick.org website, in addition to using plastic, ecobricks can be made using the same non-recyclable and environmentally harmful materials such as Styrofoam, cables, small batteries, and others (Matanari et al., 2024).

But so far, ecobricking has been dominated by utilizing plastic waste. Ecobricks can be used as furniture (chairs, tables), planting space, walls, and a whole building. The steps for making EcobrikQu are as follows (Aniqoh et al., 2023):

1. Prepare tools and materials.

The preparation stage includes the collection of the primary raw material, namely used plastic bottles, as well as the preparation of the place and equipment needed. The Sugihwaras Village community actively participated in collecting used plastic bottles and provided a suitable place to conduct EcobrikQu manufacturing activities. Furthermore, the implementation stage is carried out by collecting used plastic bottles and preparing

the tools to make EcobrikQu. I was compacting the bottles into EcobrikQu. Sugihwaras Village community is directly involved in this process, both in the compaction of plastic bottles and in creating creative EcobrikQu designs and shapes ([Wahyunengseh et al., 2022](#)).

2. Waste washing and drying process,



Figure 2. The Process of Washing used Bottles with Running Water

Before being used as a manufacturing material, the types of waste that have been sorted and selected are washed with soap until clean and dry in the sun until all materials are dry and ready for use. This step ensures that the materials used in the EcobrikQu table are clean and sterile.

3. Pattern formation and framework of EcobrikQu table



Figure 3. Pattern Formation on a Plastic Bottle

Before the plastic bottles are glued together, insulation is used, and the first step is to form the EcobrikQu table pattern. This step ensures that the shape of the EcobrikQu table looks neat and beautiful.

4. Bottle coating using used cardboard



Figure 4. Coating using used Cardboard

This step involves coating the entire side of the bottle with used cardboard. This will keep the plastic bottle strong if used as a table for the EcobrikQu chair. After the side of the bottle is covered with cardboard, the top and bottom are also covered with round wood so that the EcobrikQu chair can be used.

5. Covering the EcobrikQu frame using foam or sponge

After all the frames are covered with cardboard, the next step is to cover the EcobrikQu frame using sponge or foam so that the resulting chair is soft and comfortable.



Figure 5. Sponge/Foam Feeding Process

6. Finishing and covering the chair

The final stage is the use and benefits of EcobrikQu products. This product has a high economic value so that it can benefit the economy of the Sugihwaras Village community. In addition, EcobrikQu also raises the movement of caring for the environment—the environment in the community, as this product is a friendly alternative—and the

environment in building buildings. The last step in making the EcobrikQu chair is to provide a blanket or cover so that the EcobrikQu chair looks beautiful.



Figure 6. Final Result of EcobrikQu Chair

By making EcobrikQu products, the Sugihwaras Village community can be more sensitive to the importance of plastic waste management and environmental sustainability. According to L. Fitria, regarding "ECOBRIK POTENTIAL," community participation in this movement can also be an example for other communities to overcome plastic waste problems and create a cleaner and healthier environment. However, it should be noted that further evaluation of the effectiveness and impact of using EcobrikQu products needs to be done. In this study, the main focus was on the manufacturing process and the product's benefits. Further evaluation could include sustainability, plastic waste reduction, and this movement's broader social and environmental impacts. Overall, the EcobrikQu product-making activity as an environmentally friendly movement in Sugihwaras Village gave positive results, contributed to plastic waste management, and increased community awareness of the importance of maintaining cleanliness and environmental sustainability.



Figure 7. Documentation with the Youth of Sugihwaras Village, Sidoarjo Regency

The process of making EcobrikQu an eco-friendly movement provides a more comprehensive understanding of the problem of plastic recycling ([Budhi, 2023](#)). In this process, the time that should be used for plastic recycling can be used to create new economic value products. Concern for the utilization of waste that is difficult to recycle is significant because awareness and actions taken today can impact the sustainability of nature in the future. In addition, the manufacture of EcobrikQu does not require a large amount of money and does not require special skills, as all materials used come from everyday items that can be utilized. " Journal of Wetland Environmental Technology By turning plastic waste into useful products such as EcobrikQu, we can reduce the amount of waste that eventually ends up in landfills or is wasted in the environment. This also reduces the negative impacts of plastic waste on the environment, such as pollution and ecosystem damage. Aside from the economic benefits, making EcobrikQu also has social benefits. L. F. Andriastuti, "Ecobrick Potential in Reducing Household Plastic Waste Journal of Wetland Environmental Technology" This movement can raise public awareness and participation in waste management and promote a more environmentally friendly lifestyle. Involving the community in making EcobrikQu creates a collective understanding and spirit of *gotong royong* in maintaining cleanliness and environmental sustainability ([Oktoberty et al., 2023](#)).

It is essential to continue educating the public on the importance of waste management and the reutilization of items that are difficult to recycle. In addition, broader campaigns and activities need to be conducted to expand this eco-friendly movement to a wider level and involve more communities. Movements such as the creation of EcobrikQu are expected to reduce the amount of plastic waste, increase public awareness, and bring positive changes in maintaining cleanliness and environmental sustainability ([Yusuf et al., 2023](#)).

Conclusion

The environment where we live will become more comfortable and beautiful if all individuals have the awareness and move together to create and maintain the beauty of the environment. Using EcobrikQu, plastic waste can be converted into building materials and furniture such as chairs, tables, and walls. This product has a high economic value to provide financial benefits for the community involved in manufacturing and utilization. Through the EcobrikQu manufacturing activity, the Sugihwaras Village community can practice and spread the eco-friendly movement to the wider community. By being a good example, they can inspire and invite others to get involved in waste management and reuse of materials that are difficult to recycle.

In addition to economic benefits, EcobrikQu products also positively impact the environment. By reducing plastic waste and converting it into environmentally friendly

building materials, we can reduce the negative impact of plastic waste on nature. In addition, using EcobrikQu can also reduce the use of conventional building materials that can potentially damage the environment. Through the development and promotion of EcobrikQu, this environmentally friendly movement is hoped to spread more widely, both in Sugihwaras Village and other areas. With active community participation and support from various parties, we can create a cleaner, healthier, and more sustainable environment for a better future.

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