



Ecoplast Bricks Initiative

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Introduction

Plastic waste pollution is a growing environmental concern in Tanzania and globally. This project investigates the feasibility of recycling plastic waste into construction bricks, termed "Ecoplast Bricks." The aim is to provide a cost-effective and eco-friendly alternative to conventional clay bricks while addressing plastic waste management. The methodology involved collecting different types of plastic waste, cleaning and shredding them, and then mixing the plastic with sand in varying ratios. The mixture was heated and molded into brick shapes. Tests were conducted to measure compressive strength and water absorption. Results indicated that bricks made with a mixture of sand and plastics had the best balance of strength and durability. These Ecoplast Bricks were lighter and more resistant to water compared to traditional bricks. The findings support our hypothesis that plastic waste can be transformed into sustainable construction materials. This project proposes a dual solution to plastic pollution and affordable housing in Tanzania.

Background Information

Plastic pollution has reached alarming levels in Tanzania. Streets, waterways, and landfills are increasingly clogged with plastic waste, threatening ecosystems and human health. Simultaneously, the construction industry continues to extract clay and use firewood to produce conventional bricks, leading to deforestation and environmental degradation. Our research seeks to bridge this gap by turning waste into a solution—transforming plastic into durable, eco-friendly building bricks

Research Question

Can plastic waste be effectively recycled to produce durable and sustainable construction bricks that are comparable in strength and quality to traditional clay bricks?

Hypothesis

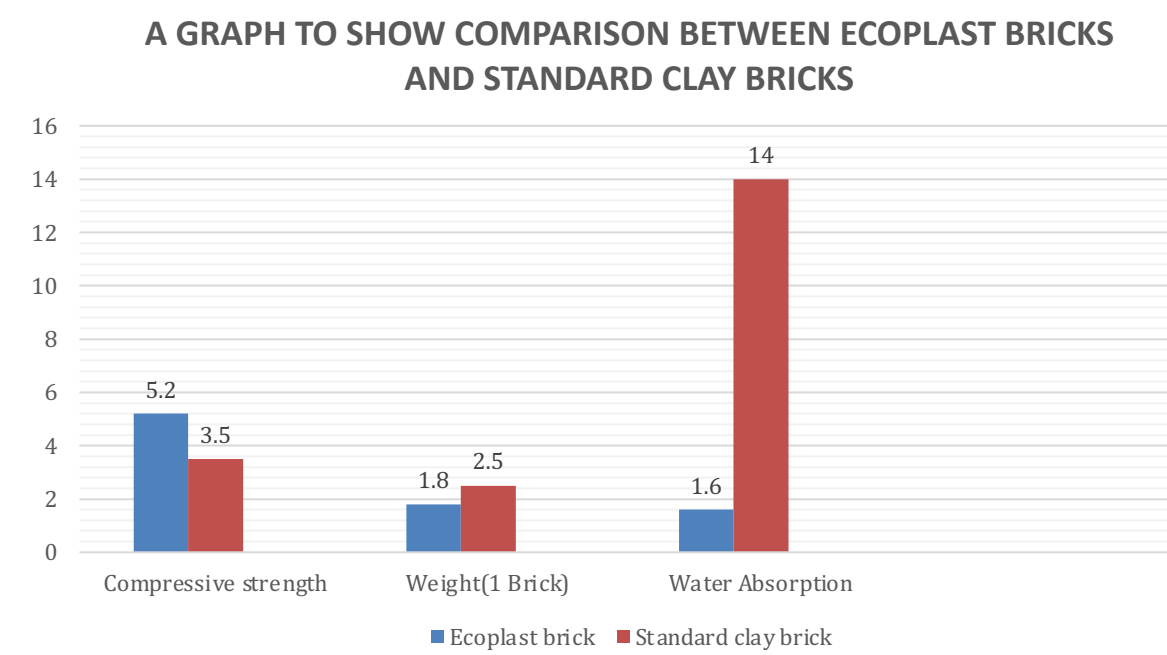
We hypothesize that plastic waste, when properly processed and mixed with sand in appropriate ratios, can produce bricks that are strong, water-resistant, and environmentally friendly comparable or even superior to conventional clay bricks.

Method

- 1.Collected plastic wastes :Are the main raw materials which are melted and molded Materials List into bricks.
- 2.Clean sand:Acts as filler to add bulk,strength and stability of the bricks.
- 3.Manual shredder :Is a simple,hand operated machine used to shred plastic waste into small pieces before processing it into ecoplast bricks.
- 4.Heat source (charcoal stove) :Provides controlled heat to melt plastic wastes safely and efficiently.
- 5.Brick mold (standard size: 19 x 9 x 6 cm) :Is a tool or frame used to shape and form the ecoplast bricks after the plastic and filler mixture is melted and ready to be molded.
- 6.Safety gloves and goggles:Are essential personal protective equipment when making ecoplast bricks especially during the melting and handling of the hot plastic materials.
- 7.Thermometer:To monitor and control temperature during the plastic melting process which ensures that plastics are melted at the right temperature.

Results

The experiment demonstrated that plastic waste can be repurposed into strong, durable bricks with excellent resistance to moisture and compressibility. The mechanical tests confirmed their suitability for construction. The ecoplast bricks are more resistant to water absorption and lighter as compared to standard clay bricks.



Test	EcoPlast Brick	Standard Clay Brick
Compressive Strength	5.2 MPa	3.5–4.0 MPa
Weight (1 brick)	1.8 kg	2.5 kg
Water Absorption	1.6%	14–20%



Conclusion

The results aligned well with our hypothesis. We expected the bricks to perform well, and the mixture mix not only met but exceeded some of the properties of conventional bricks.

Implications

These findings suggest a sustainable method of reusing plastic waste while contributing to eco-friendly construction practices. If adopted widely, this method could reduce environmental pollution and provide affordable housing solutions. Our research successfully proved that plastic waste can be used to produce reliable, eco-friendly bricks. The best-performing composition (30% sand, 60% plastic and 10% gravel) exceeded the quality of standard clay bricks in strength, water resistance, and heat insulation. The Ecoplast Bricks offer a dual benefit of reducing plastic pollution and lowering construction costs.

Acknowledgments

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DATE	ACTIVITY	DESCRIPTION	OUTCOME/NOTES
May 23, 2025	Materials Collection	Collected used plastic bottles,bags, wrappers from local areas and homes.	Gathered ~15 kg of plastic waste.
May 25, 2025	Design & Planning	Sketched initial brick mold design and mixing ratios.	Decided on a mix: 60% plastic, 30% sand, 10% gravel.
May 27, 2025	Cleaning & Shredding	Cleaned and shredded plastic waste for melting.	Improved sanitation and melt quality.
June 1, 2025	First Production Test	Heated plastic, mixed with sand/gravel, and molded into bricks.	Produced 5 test bricks.
June 3, 2025	Strength and Water Tests	Performed compressive strength and water absorption tests.	EcoPlast bricks passed strength standards.
June 6, 2025	Comparison Testing	Compared EcoPlast bricks with standard clay bricks.	EcoPlast was stronger, lighter, and more water-resistant.
June 9, 2025	Community Feedback	Built a test structure; interviewed community members.	Positive feedback: affordable, durable, and clean.
July 09, 2025	Visual Documentation	Took photos and videos of the production and results.	Media ready for YST presentation and poster.
July 10, 2025	Project Report Drafting	Wrote full report with data, analysis, and conclusion.	Edited and prepared for submission.