

ENGINEERING

Biomass Hand-Press for Cameroon

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Many countries lack a sustainable supply of fuel for cooking or boiling unsafe water. Women can spend hours gathering wood to decrease the risk to their families from unsanitary water. To address the lack of cooking fuel, numerous NGOs have developed hand-presses to make low-cost, easily producible biomass briquettes to help reduce a dependence on wood as fuel and to utilize biomass material normally left to decompose. I conducted a comparative analysis of different hand-press designs and concluded that a design capable of producing higher pressure could utilize a wider range of biomass materials. I designed a prototype utilizing materials available in Africa so that the hand-presses could be built in-country to reduce cost and promote sustainability.

To test my prototype, banana peels and sawdust were soaked in water, then put into the hand-press and compressed to make briquettes. After drying for a day, the briquettes can be burned instead of firewood. Field

testing was conducted in western Cameroon and results compared to a design in use in the area. My prototype did produce denser briquettes but took significantly more time to produce. While in Cameroon, I interviewed consumers about what criteria was most important to them and conducted market research on pricing and availability of hand-press materials.

Consumers were most concerned with the cost of the hand-press, the time to make briquettes, and briquette burn quality. The design I developed is low-cost and makes a dense briquette, which would burn well. However, these positives are countered by the fact that this prototype does not produce briquettes quickly.

Research advisor John Lumkes writes, "Lack of sustainable fuel is a problem in many areas of the world. It is used to sanitize water in many parts of Africa and India, and provide heating in urban areas of the Middle East. This project researched technical solutions that were evaluated by local end-users in a developing country context."