

Progress Report

Project Title:

**Introduction of Efficient Biomass Cook Stove as a
Strategy to Reducing Household Pressure on Natural
Forests of Guinea Savanna Zone of Nigeria**



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1.0. The Origin of Your Work

Observations were made on increasing exploitation of natural forests by people in Guinea Savanna of Nigeria. The impact of the exploitation is resulting to fast disappearance of the natural forests adjoining rural communities. Meanwhile, about 730 million people worldwide rely on solid biomass for cooking with the use of inefficient cookstoves that cause air pollution resulting in premature deaths of nearly 600,000 in Africa each year, in addition implications on environment and biodiversity loss.

The first stage of this project has generated information on local use of biomass energy and importance of improved cook stoves for welfare of households. Firewood was discovered as the main energy used for cooking in the local communities. The firewood was collected freely in the wild twice a week within the distance of about 2 km. Almost all the sampled women agreed to change from their current inefficient three-stones stove to efficient cookstove proposed by the research team. However, the women preferred improved cookstove that is using firewood due to affordability and free accessibility.

This second stage of the study is therefore an intervention through introduction of efficient but simple to produced and maintained biomass cookstoves to households in local communities within guinea savanna zone of Nigeria. Unlike other projects where expensive and high technical cookstoves were introduced to local people, or where local people have to purchase or pay money to obtain the cookstove, the proposed biomass efficient cookstove can be easily produced with local materials, and is totally free and cost almost zero to produce. What is required include local materials such as clay, soil, water, personal labour and wooden mould for block making.

2.0. Factors considered in selection of the final Biomass Efficient Cookstoves

For the selection of the biomass efficient cookstoves adopted for this project, the project team made a search online for different cookstoves earlier made and introduced to local communities in Africa. Some of the major factors considered for final selection of the cookstoves include simple technology, materials used in making the cookstoves, shapes of the stoves and importantly ability to conserve heat and reduce smoke emission.

2.0.1. Simple Technology: Simple technology efficient cookstove was considered for this project. In previous projects (elsewhere) where already produced cookstoves were introduced to local communities, this normally faced with challenges such as shortage of further stove procurement, difficulty in maintaining the stoves as well as high cost implications for the local people. Hence, simple technology is a priority for our proposed biomass efficient cookstove. With this, the local people can easily produce and maintain the cookstoves.

2.0.2. Materials used for the cookstoves production: For the materials use in production of the cookstoves, availability and accessibility of the materials were considered important. By this, the team considered important material that are easily available and accessible to the local people at no cost. This will encourage adoption and production of the cookstove. Hence, materials such as clay, topsoil, manure, sand, and water were selected for producing the final cookstove.

2.0.2. Shapes of the cookstoves: The shape of the final cookstoves was also considered important because of ease of production. A number of shapes were observed ranging from dome to cylindrical, rectangle and square. However, the final shape considered easy for the cookstove production was either square or rectangle.

2.0.3. Heat conservation and smoke reduction: The principles behind biomass efficient cookstove include heat conservation and smoke reduction. Heat conservation is to stimulate quick cooking hence reduction in quantity of firewood and burden of firewood collection. Also, reduction of smoke emission is to reduce infections faced by women and children. Hence, the selected cookstove is to meet this criteria.

2.1. Project Activities

2.1.1. Selection of the Biomass Efficient Cookstove: As earlier stated, the plan of the project is to produce efficient cookstove from materials easily available at low or no cost in local communities. Also, the target cookstove must be simple technology that the local people can easily learn how to produce it themselves as well as carry out necessary maintenance. After extensive search online for previous cookstoves introduced to local communities in

developing countries, the fuel efficient cookstove made from clay blocks by Ripple Africa (2020) was adopted for this study. The cookstove has been introduced to more than 40,000 households in Malawi. Among the advantages of the fuel efficient cookstove include:

- ***Saves trees*** – reduces wood used for cooking, and uses one third of the firewood.
- ***Saves time and money*** – saves time collecting wood or saves money buying wood.
- ***Safer*** – less risk of burns and smoke inhalation.
- ***Faster cooking*** – two things can be cooked at the same time on the two burners.
- ***Easy and cheap to build*** – uses local materials and takes one hour to build
- ***Heat retention***: retains heat longer after the burning firewood has been put out.

2.1.2. Acquisition of materials for production of prototype of biomass efficient cookstove: The materials required for production of the selected fuel efficient cookstove include clay, manure, topsoil, water and mould for making blocks. However, for production of the cookstove prototype in the city, clay and topsoil were purchased. Wooden mould, which was used to produce the cookstove blocks was produced by a local furniture maker.

2.1.3. Teaching of project team: Meetings were organised among the project team members to learn how to produce the fuel efficient cookstove. This commenced with watching of videos produced by Ripple Africa on process involve in production of the cookstove. project team were be properly trained on the technique of production and maintenance of the clay cookstove. The learning process took a month prior to production of prototype of the fuel efficient cookstove. The lerning process is also aimed at preparing the project team for actual production of the cookstoves in the communities as well as practical demonstration and maintenance of the clay cookstove in the villages.

2.1.4. Production and test-run of prototype of the biomass efficient cookstove: Production of prototype of the clay cookstove was carried out by the project team. The production started with production of clay blocks. The clay, topsoil, sharp sand and manure were measure in equal parts. These were thoroughly mix together, afterwhci water was added and again thoroughly mixed together with shovel and then with hand for proper mixture.

The wet mixture was put into wooden mould, pressed with hand to produce the rectangular clay block. The shape of the prototype cookstove produced was rectangle (double phase) comprising of two square cookstoves joined together. The stove was test-run for efficiency and effectiveness after completion.

3.0. The Next Stage on the Project

The next stage of the project include:

- ***Awareness creation and sensitisation in villages:*** At this stage, the target local communities (selected during the First Rufford Small Grant) will be visited. The people will be informed about the project goal. There will be film show on the production of the biomass efficient cookstoves. The advantages of the cookstoves will be highlighted during and after the film show. There will be room for comments from the people as well as question and answer.
- ***Public demonstration on production of the biomass efficient cookstove.*** A day will be jointly agreed to by the villagers and the project team on when to come for the public demonstration on how to produce the efficient cookstove. The people will be asked to get ready some of the materials to be used for the production of the cookstove.
- ***Introduction of the cookstoves to households:*** some households will be selected for introduction of the biomass efficient cookstoves. At the households, the cookstoves will be produced for them for free and they will be taught the process of production and maintenance. The households will be monitored for some months on their usage of the stoves. Questionnaire will be administered during the monitoring process to assess the performance and adoption of the stove.
- ***Training and Empowerment:*** The project is aimed at training the local communities on how to produce the cookstoves themselves and maintain it to last longer. They will also be empowered through donation of the wooden moulds. They would be given approval to mass produce the wooden mould from local carpenter.

4.0. Reference

Ripple Africa (2020). Changu Changu Moto Fuel-efficient Cookstove. Assessed Online at:
<https://www.rippleafrica.org/environment-projects-in-malawi-africa/changu-changu-moto-cookstove-africa>

Project Photos on Production of Prototype of the Biomass Efficient Cookstove



Left: Wooden mould use for production of clay blocks (©Fola Babalola). Right: Mixing of clay, topsoil, manure and sharp sand with water by members of project team (© Fola Babalola).



Left: Hand mixing of clay, topsoil, manure, sharp sand and water, then putting of the mixture in mould to make clay blocks (© Fola Babalola). Right: removing of the clay blocks from the mould and assembling of the blocks to dry in sun (©Fola Babalola) .



Left: Assembling of clay blocks to make the biomass efficient cookstove (© Fola Babalola). Right: Making prototype of the biomass efficient cookstove (© Fola Babalola).



Left: Project team with prototype biomass efficient cookstove and the implements used to produce the cookstove (© Kemi Babalola). Right: inal prototype of the biomass efficient cookstove produced by the project team (© Fola Babalola).