Final Evaluation Report

Your Details	
Full Name	Folaranmi Dapo BABALOLA
Project Title	Introduction of Efficient Biomass Cook Stove as a Strategy to Reducing Household Pressure on Natural Forests of Guinea Savanna Zone of Nigeria
Application ID	26613-2
Grant Amount	£5,000
Email Address	folababs2000@gmail.com
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1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
Acquisition of materials for production of prototype of efficient cookstove				All the indicated materials needed for production of the prototype of the efficient cookstove were procured as earlier indicated. These included lorry load of clay soil, lorry load of sand, cooking pots, mixing utensils, shovel, hoe and bucket. In addition, production of wooden moulds for making of bricks used in production of the cookstoves, with samples of the moulds donated to the communities.
Production and test-run of prototype of the efficient cookstove				Prior to introduction of the efficient cookstoves to the communities, prototypes were successfully produced, and test run by the project team for efficiency. At the onset, a dome-shape of the cookstove was proposed but due to the complexity in the production, this was changed to block-shape which is easier to make and maintained.
Teaching of project team				As planned, the project team was properly trained prior to commencement of the project. The training was on the technique of production and maintenance of the efficient cookstove. This was to make the team adequately prepared for production of the prototype of the cookstove and get used to practical maintenance of the efficient cookstove. Also, the team was trained on how to carry out demonstration which preceded introduction of the cookstove to the villages.
Sensitization in the villages				Sensitisation was successfully carried out in the selected communities. Prior to the introduction of the efficient cookstove, the project team carried out sensitisations in the villages on the

				project goal. Specifically, the messages during the sensitisation focused on the benefits of the efficient cookstove such as reducing firewood collection and consumption, hence reducing pressure on natural forests, and ultimately mitigation of climate change. The method adopted for the sensitisation was focus group discussions. Different days and time that the different villagers will be available were selected for the sensitisation. Evenings was chosen for film show on some success stories on production and use of efficient cookstove in other locations in Africa. Also, during the sensitisation, the villagers were informed of the materials to be used for the production of the cookstove. How they will obtain the materials were discussed. There were agreements on making the materials available before the demonstration days.
Public demonstration on production of the clay stove				Practical demonstrations on how to make bricks for production of the efficient cookstove were carried out in the three villages, namely Akewusola, Budo Aare and Oha Meje. The practical sessions at the communities included active involvement of the children, youth, women and men. The main reasons for the demonstration were to expose and teach the villagers how to measure and mix the clay, sand and water in making of the bricks and how to assemble the bricks in making the efficient cookstove. To make the steps of producing the cookstove easy to remember and follow by the villagers on their own, poster containing the steps of making the cookstove was produced and copies given to each of the households on the day of the demonstration. The experience gained during the demonstration

				assisted the villagers in making the cookstoves on their own and in their respective homes.
Selection of households for introduction of the efficient cookstoves				A total of 30 households (10 households per community) were randomly selected for evaluation of introduction and adoption of the efficient cookstove. The households were randomly selected in the three communities (Akewusola, Budo Aare and Oha Meje). The households selected were informed of their selection and they were informed to keep using the efficient cookstoves for adequate feedbacks.
Survey on adoption of the clay stove				A survey of 30 households was carried out to investigate level of adoption of the introduced efficient cookstove. A semi-structured questionnaire was designed and administered to the selected households for a period of 2 months. The survey involved monitoring of the usage, and advantages of the newly introduced cookstove over the traditional three-stone cookstove, and the challenges encountered in use of the efficient cookstove. The information obtained is valuable in determining the level of adoption and usage of the newly introduced cookstove. Also, the results provided information required for necessary modification required in improving the efficient cookstove. **Summary of the survey findings** All the respondents were female, with majority married, indigene of the communities, and above 40 years of age. Although most of the cookstoves were made by youths in the communities, however, majority of the women partook in making of the cookstove by gathering clay and sand and fetching water during production. Majority of the women used their newly introduced cookstoves for at least 3 hours for domestic cooking of

				two different meals a day. All the women (100%) affirmed that the efficient cookstove reduced their firewood usage, smoke emission in kitchen, frequency of firewood collection, and reduced time spent in cooking. Maintenance of the efficient cookstove is necessary to make it last longer. Over 90% of the women indicated that the cookstove is well designed to meet their cooking. However, those that with large family size and those that were involved in commercial cooking informed that the efficient cookstove needed to be increased in size to accommodate their large cooking. Hence, these households are still combining the use of traditional three-stone with the efficient cookstove. It is interesting to discover that 77.42% of the sampled women had created awareness of the new stoves to their family and friends within and outside their communities. Among some of the ways the women suggested in improving efficiency of the introduced efficient cookstove include increasing the size to accommodate large and commercial cooking, adding of cement to the bricks to make the cookstove stronger and withstand damage by direct rainfall, among others.
Environmental Education in schools				Due to the issue of COVID-19, preliminary environmental education was conducted in one secondary school. The school was Bukola Ansarul Islam High School located at Budo Are which is one of the communities under the project. A presentation was made to the teachers on benefits of the improved and efficient cookstove. Questions were entertained after the presentation and copies of the poster that detail stages on making of the

				efficient cookstove were given to all the teachers. Also, presentation was separately made to the students, and this took place under a tree in the school compound to create natural interactive environment. Also, interaction with the students focused on the benefits of the cookstove and this was followed with question and answer session. It is envisaged that the full environmental education with seminar and practical sessions shall be carried out under the third Rufford grant of this project.

2. Please explain any unforeseen difficulties that arose during the project and how these were tackled.

a) Delay in disbursement and receipt of the grant fund due to institutional bank account. Eventually, the fund was disbursed after provision of the institutional bank account.

b) The project started with a dome-shape design for the efficient cookstove. However, it was discovered that the design will not be easy for the villager to produce and replicate. The project team had to change and redesign to block-shape design which is easier to make by the local people.

c) There were misunderstandings among some of the villagers during sharing of the bricks. Those that did not participate in getting the material used in joint making of the bricks suddenly showed interest when they saw the progress and the bricks had been successfully made. Those that procured the materials (clay, sand and water) and made the bricks did not want to share with others; hence it led to exchange of words. The Village Heads had to intervene, and the issue were resolved. Extra bricks were made, and everyone eventually got their bricks for production of their efficient cookstoves.

d) The last stage of the project was to carry out environmental education in primary and secondary schools around the local communities. This could not be concluded due to outbreak of CIVID-19. Only one secondary school was eventually visited. Interactions with teachers and students were carried out during the short visit. There is still planning to carry out the environmental education in the third Rufford grant.

3. Briefly describe the three most important outcomes of your project.

a) **Development and Production of prototype of Improved and Efficient Biomass Cookstove:** The project developed easy to produce improved and efficient

biomass cookstove through the use of locally available materials such as clay, sand, and water. The local people were taught the process of making and maintaining the cookstoves themselves. To ease production process of the efficient cookstove, posters containing pictures of the production stages were distributed to the local households free of charge. The people attested that the poster eases the process of making of the bricks and assembling of the bricks to produce the cookstove.

b) **Successful introduction of the Efficient Cookstove:** another important outcome of the project is successful introduction of the efficient cookstove in the three communities (Akewusola, Budo Aare and Oha Meje) under this project. In the first month of introduction of the efficient cookstove, more than 50% of the community members had adopted the efficient cookstove in their homes. The number of adaptions keeps increasing on daily basis. Most importantly, the success of the introduction is that youth and children took the centre stage in making of bricks and production of the new stove in all the three communities with the assistance of women and men.

c) **Successful adoption of the Introduced efficient Cookstove:** all the surveyed households, and other visited households in the three communities, gave affirmation to complete adoption of the newly introduced efficient cookstoves. From their experience on usage of the efficient cookstove, the households gave benefits over their traditional three-stone cookstove, hence its adoption. More than 77.42% of the interviewed women indicated that they had created awareness of the new cookstove to their family members and friends that were located within and outside the communities. This has set the stage for easy expansion and introduction of the efficient cookstove in the adjoining communities.

4. Briefly describe the involvement of local communities and how they have benefitted from the project.

The villagers in the three communities (Akewusola, Budo Aare and Oha Meje) were actively involved at different stages of the project starting from the outset.

Firstly, the Village Heads gave approvals in carrying out the project in the different communities, and they assisted in bringing the villagers together during meetings as well as sensitisation and demonstration days. The women were coordinated by their respective women leaders in each of the community. The children and youth were best coordinated by the women, who happened to be their mothers and encouraged their participation in the project.

The villagers actively participated in the sensitisation and demonstration stages of the project. Specifically, prior to the day of demonstration stage of the project, the women coordinated the youth and children in bringing together the materials such as clay, sand and water used in production of the bricks and eventually production of the efficient cookstove. The men contributed hoe and shovel used for mixing of the clay, sand and water. The youth assisted in mixing of the clay, sand and water. Most importantly, the success of this cookstove introduction was based on the active

participation of youth and children in making of bricks and production of the new stove in all the three communities, though with the assistance of women and men. This makes the future of the project bright and sustainable.

During the household survey, the women gave their full support and participated by providing valuable feedbacks on usage and efficiency of the efficient cookstove. The women also provided answers to the administered questionnaire.

5. Are there any plans to continue this work?

Yes, there are plans to continue with this project. The plans include:

a) Expansion of the introduction of the efficient to more communities in the Guinea savannah. Since the efficient cookstove has been successfully designed and introduced at this stage, expansion will be easier, and the lessons already learnt will ease the process. The women are already creating awareness of the new improved and efficient biomass cookstoves to their family and friends. Some adjoining communities have already indicated interest and their Village Heads have invited the project team to replicate such introduction of efficient cookstove in their communities.

b) Increase the size of the mould to make bigger bricks and production of bigger efficient cookstove. The community observed that the size of the introduced efficient cookstove is not big enough for large and commercial cooking. These large and commercial cooking consumed high quantities of firewood than the domestic cooking, hence the need for this re-design and introduction.

c) Conducting more environmental education in primary and secondary schools around the community. The environmental education will centre on vegetation restoration and strategy to further strengthen adoption and use of efficient cookstove among the young ones. These messages will have long term sustainability on the adoption process.

d) Vegetation restoration project around the community. This is needed to plant and restore lost economic trees to firewood collection. There will be participatory process in selection of the trees.

e) Another innovative way to create more awareness of this improved and efficient cookstove is to use the power of sport in creating unity and building capacity for the rural youths. We plan to organise football competition to unite and bring together the rural youths and use the forum to create awareness on the need for adoption of the cookstove and restoration of the lost vegetation.

6. How do you plan to share the results of your work with others?

i) Final report and other publicity materials that emanate from the project will be uploaded on the website of Save Sahara Network

(www.savesaharanetwork.org), the non-governmental organisation (NGO) that collaborated in implementing the project.

ii) Lessons and findings of the project will be circulated on the social media (Facebook, Twitter, Instagram) of the NGO which already has quite a number of followers.

iii) Scientific articles will be developed from the project findings and published in peer reviewed journals and conference proceedings. There will be presentation of the research findings at scientific conferences and webinars.

7. Timescale: Over what period was the grant used? How does this compare to the anticipated or actual length of the project?

The project ought to have commenced in January 2019. But the fund was disbursed in July 2019 due to the issue of institutional bank account. The final report was submitted in July 2020, making it to still be within the stipulated 12 months of project completion.

8. Budget: Provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion.

Item	Budgeted Amount	Actual Amount	Difference	Comments
Refreshment during public demonstration, village meetings, and school seminars	600	600		Refreshments during meetings with the Village Heads, as well as during the sensitisation and demonstrations activities.
Appreciation to Village Heads	300	300		Purchase of gifts such as solar powered chargers and lights beneficial to communities due to inconsistence public electricity.
Stipend for Field Assistants	400	600	+200	Fund from feedings was carried over here to pay for field assistants.
Communication, stationary and consumables	300	200	-100	100 deducted here and used in production of poster containing stages of producing the efficient cookstove. Purchase of printing paper and toner for the printer to produce

				questionnaire and reports. Also, phone calls to contacts established in the communities and among the research team. Writing materials on the field, and internet bundle for browsing for materials on cookstoves.
Accommodation and feeding on the field for Research Team	1600	1300	-300	Fund was deducted here to cover procurement of materials for re-design of efficient cookstove and stipends for field assistants
Production of questionnaire	100	200	+100	100 was added to produce posters which contained stages involve in production of the cookstove
Projector and projector stand for film show and seminars in schools	350	350		Procurement of projector and screen used for film shows during sensitisation activity
Procurement of materials for production of prototype efficient clay stove	150	250	+100	Procurement of materials during the first stage of design and re-design of the prototype of the efficient cookstoves.
Transportation to and fro study sites by the 4 research team members	1200	1250	+50	Transportation costs for procurements of materials and transportation of project team to project sites.
Total	**5000**	**5050**	**+50**	

9. Looking ahead, what do you feel are the important next steps?

Going by the feedback and lessons learnt during execution of the project, the following are the steps the project team considered most important and decided to work on:

Step One: As reported by the women, we need to work on increasing the size of the cookstove to accommodate large and commercial cooking. As earlier said, large and commercial cooking consumes larger quantities of firewood; hence if our effort of fighting overexploitation of firewood for subsequent mitigation of climate change will yield positive impacts, then this needed to be addressed. To develop the bigger cookstove, the project team will increase the dimension of the mould, which will then be used in making bigger bricks. The bigger bricks will be used in designing bigger efficient cookstoves. Before introduction of the bigger cookstove to the communities, this will have to undergo another round of tests to determine its efficiency. The larger size efficient cookstove will then be introduced to the present communities as well as other new locations alongside the standard size cookstove.

Step Two: Introduction of the improved and efficient cookstove to more communities in the Guinea savannah of the state. As reported above, the design and introduction of the efficient cookstove is already a success. Expansion of the introduction of the efficient cookstoves to other local communities will be very easy and not be a problem. The experiences gained and skills built by the project team will be handy and assist in speedy introduction of the cookstove to other locations. As said, some women have started creating awareness of the new cookstoves and this will help in spreading the adoption process to adjoining communities.

Step Three: Embark upon intensive environmental education in primary and secondary schools, and among the youth within and around the communities. The environmental education could not be carried out in the just completed project due to the outbreak of COVID-19. The environmental education is considered important it is targeting student and youths which will be the future of tomorrow. We plan to organise seminars in schools, form and establish environmental clubs in the schools, and provide sensitisation and educative materials. For the youth in the different communities, we plan to use the power of sport, football to be specific, in bringing together the different communities' youths. We observed that football is a very powerful game that unites and brings people together. We will explore and adopt it in bringing together youths that we could not reach during the just completed introductory stage of the cookstove for more awareness and adoption. Specifically, young and mature men will be targeted through this channel. To implement, football competition with awards will be organised among different communities. During the football competition, we shall pass across the message on the need for forest protection and adoption of the efficient cookstoves. This channel will be far reaching in passing across our messages with long lasting memory and awareness of the cookstove thereby sustaining the adoption process.

Step Four: We are considering implementation of vegetation restoration project within the local communities. Due to the lost trees and natural forests, there is need for practical tree planting process. For this stage, there will be community participatory process of selecting economic trees. These trees will be raised in local nurseries and the people will personally plant and care for the tree seedlings to maturity. This will replace the already felled and lost trees within and around the communities.

10. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?

The Rufford logo was used in the poster containing production stages for making of bricks and production of the efficient cookstove. Copies of the posters were freely given to the households in the villages.

11. Please provide a full list of all the members of your team and briefly what was their role in the project.

Dr. Fola BABALOLA. Is the Principal investigator and coordinated the entire project, including production of the questionnaire, field activities, household survey, data collection, data analysis, interpretation and report writing.

Alex O. ONATUNJI. Involve in design if the efficient cookstove. Data collection and analysis. Keep records of field activities and involve in field survey and data collection.

Moses Oladele: Involve in design of the efficient cookstove as well as sensitisation and demonstration in the communities, and data collection.

Samuel Akolawole: Involve in design of the efficient cookstove as well as sensitisation and demonstration in the communities, and data collection.

Adedire Wale: Involve in design of the efficient cookstove, sensitisation and demonstration in the communities.

Olofinsao Ifeoluwaposi: Involve in design of the efficient cookstove.

12. Any other comments?

A sincere appreciation to The Rufford Foundation for the financial support used in carrying out this project. Also, the project team sincerely appreciates the Village Heads and entire communities of Oha Meje, Budo Aare and Akewusola for their cooperation and support during the different stages of this project.

Introduction of the efficient cookstove has really added innovation to domestic cooking, wellbeing of the local people, and protection of natural forests in the local environment. Already, there is evidence of reduction in quantity of firewood used by the households. This will definitely translate into reduction in firewood collection from the natural forest. Also, there are reductions in smoke emissions from the newly introduced efficient cookstove, thereby reducing indoor air pollution beneficial to health of the women, children and households.

We are planning to embark on massive expansion of the introduction of the efficient cookstoves to other communities in the savannah zone of Nigeria. We shall address all the identified suggestions toward improving efficiency of the efficient cookstove in the third Rufford Small Grant.