



A Monitoring and Evaluation Report on the Capacity Building Project on Improved Cook Stoves to Reduce Indoor Air Pollution Among Rural Women in Cameroon



Report Produced

By

Connect Lives Cameroon and ICENECDEV



Rural Women Posed after Training on Improved Cook Stove



Mbayi Josefa (Beneficiaries) Using Donated improved Cook Stove

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Abbreviations

ICENECDEV: International Center for Environmental and Community Development

SDGS : Sustainable Development Goals

UNEP :United Nation Environment Program

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INTRODUCTION

1.1. Background Information of Project

According to a publication of the world bank, 98.7% of Cameroonian low-income use only fuel wood/charcoal for cooking The wood demand form household energy largely exceeds the available renewable woody biomass. More than 80% of the local inhabitants along the mount Cameroon national are involve in poaching ,subsistence farming(Bush fallowing and shifting cultivation) in the mount Cameroon national park .Even though the government of Cameroon has already passed law/decree number 2009/2272/PM of 18th December 2009 creating mount Cameroon national with a surface of 58,178 hectares

Cameroon has recorded significant damage to its ecosystems in the last several decade following the unsustainable use and exploitation of natural resources. The 22 million hectares of forestland are receding by about 100,000 hectares per year. Especially the ongoing deforestation in the Cameroon s mangrove forests and mountain forests of mount Cameroon in the south west region is a serious concern for these ecosystem as the population pressure on the resources is increasing . More than 97% of the women use the 3 stone fire site with a lot of wood fuel producing smoke that affects their health conditions

In 2012, the World Health Organization (WHO) estimated that air quality causes between 7 and 8 million deaths every year. The makes air pollution the leading environmental cause of premature deaths. Exposure to indoor and outdoor air pollution is closely linked to increase in occurrences of cardiovascular disease, such as strokes and heart disease, as well as cancer and respiratory disease.

Around half of the estimated 7 to 8 million premature deaths annually are caused by indoor air pollution, the main source being cooking and heating with solid fuels – wood and other biomass based fuel – over open fires. The two actions that can dramatically lower biomass use and improve indoor air quality are the use of efficient cook/heating stoves and cleaner burning fuels.

1.2 Key Facts and Statistics

- 22 million hectares of forestland are receding by about 100,000 hectares per year.
- Estimated 7 to 8 million premature deaths annually are caused by indoor air pollution
- According to a publication of the world bank, 98.7% of Cameroonian low-income use only fuel wood/charcoal for cooking
- More than 97% of the women use the 3 stone fire site with a lot of wood fuel producing smoke that affects their health conditions

- In 2012, the World Health Organization (WHO) estimated that air quality causes between 7 and 8 million deaths every year

Technical specifications

- Stove size : 40 cm x 40cm x 30cm /for ideal homes 4-7 persons
- Stove Diameter: 25cm
- Stove weight : 20-25 kg
- Pot Support Size: 41.5cm x 41.5 x 18cm /3000kg/year
- Pot Support weight: 15kgs /burning 1-2kg/hr

1.3. Justification of Monitoring and Evaluation

The overall purpose for the monitoring and evaluation is to enable ICENECDEV, partners and beneficiaries to draw lessons learned and share best practices and incorporate the outcomes into planning, design, implementation, scaling up and replication of the project to other regions of the Cameroon to inspire policy change and take practical actions to reduce indoor air quality and improve upon the health condition of the people especially the vulnerable population(women and children).

1.4. Objectives of the Monitoring and Evaluation

Global Framework of the Project:

- The project contributes to the 2030 agenda for Sustainable Development and the 17 Sustainable Development Goals(SDGs 3,5,13 and 17)
- The project also contributes to article 11 and 12 of the Paris Climate Agreement- promotion of climate change education among the rural women

GLOBAL OBJECTIVES:

To Reduce indoor air pollution and improve on the health condition among rural women and children in Cameroon

Specific Objectives

- I. To assess the contribution of improved fuel efficient cook stoves in improving air quality among 100 rural women;

- II. To assess the contribution of improved fuel efficient cook stoves in improving the health condition of 100 rural women;
- III. To assess the contribution of improved fuel efficient cook stoves in enabling 100 rural women to adapt and mitigate climate change;
- IV. To assess the contribution of improved fuel efficient cook stoves in reducing the rate of deforestation by 10% among 100 rural women ;
- V. To assess the contribution of improved fuel efficient cook stoves in enabling 100 rural women to adapt and mitigate climate change;
- VI. To assess the cost of fuel wood saved as a result of the donation of improved fuel efficient cook to the 100 rural women ;
- VII. To share best practices and lessons learnt for future indoor air quality projects in the communities.

1.4 Methodology

The project methodology included: a review of relevant documents, households interviews, community consultations and focus group discussions with stakeholders and beneficiaries

- 1. Review of Relevant Documents:** These include; project documents, base line study reports, minutes of technical meetings, reports on project activities
Report of the global alliance on cook stoves, UNEP resolution on improve air quality at the second United Nations Environment Assembly(UNEA2)
- 2. Interviews:** in total, 100 key respondents were interviewed in village communities Buea subdivision(Tole, Mile 14, Mile 15,Muea, Bomaka,Great Soppo and Buea Town). Respondents included ICENECDEV staff and beneficiaries. The table in Annex 1 shows the breakdown of respondents per organization.
- 3. Focus Group Discussions:** a series of 10 focus group discussions were carried out in the project intervention areas Buea Subdivision to gather information to complement the desk- review and interviews.
- 4. Direct observations, SWOT (strengths, weaknesses, opportunities and threats) analysis and case studies etc were used where appropriate.**

1.5 Evaluation Scope

The geographical scope of the project evaluation covers 10 village communities in Buea Subdivision South West Region Cameroon. This included ICENECDEV staff and beneficiaries. The main emphasis was on measuring outcomes/impact and sustainability of the project.

1.6 Limitations

Although all resources and strategies were put in place and as well as to reach out to indirect and direct beneficiaries during the course of this monitoring and evaluation, a number of difficulties were faced for the complete success of the project. These limitations include:

- As a result of family commitments and social issues such as family meetings and funerals, few beneficiaries participated passively in community consultation ,focus group discussions and household interviews
- Due to time and resource constraints, it was not possible to visit the homes of all direct and indirect beneficiaries but progress is being made.



CHAPTER 2: EVALUATION RESULT

Objective 1: Improve air quality among 100 rural women in 10 village communities in Cameroon.

The project was successful in improving air quality to more than 100 rural women and children . During interviews and group discussions, 100% of the women reported to have witnessed significant reduction in one of the following ills: sneezing, coughing, fatigue, dizziness, and watery eyes. These women now breathe in less smoke with no ashes

Beneficiary Testimony: *Mrs. Agather Lum, 47 years old, mother of eight.*

Situation before

Whenever I cook, water comes out of my eyes, it pains so much and the pain is worsen at night. I had difficulties in sleeping because of the pains. In 2016,I consulted a doctor but the problem was not solved. I thought it was witchcraft.

Situation after

When I begun using the improved fuel efficient cook stoves, I realized that my eyes were no more paining even at night. It is at this point that I concluded that smoke was the cause and not witchcraft. I sleep well at night. I am very glad to be a beneficiary to this project. I believe that it is the answer to my prayers sent by God. I have suffered a lot with eye problem. I am relief. God bless you”.



Objective 2: Improve the health conditions of 100 rural women in 10 village communities in Cameroon.

The project has significantly improved the health condition of the 100 rural women.95% of the respondent report to have witness disappearance in at least one the following problems since they started using the stoves: eye and throat irritation, persistent coughing, watery eyes, fatigue, dizziness, headaches, upper respiratory congestion and burns.

This effort by ICENECDEV significantly reduces premature deaths linked with indoor emissions from inefficient open-air traditional fire-site and helps to meeting the health targets of the Sustainable Development Goals, especially among women and children who are often the most exposed to indoor air pollution.

Beneficiary Testimony: Mrs. Sama Grace, 54 years old, mother of eight.

Situation before:

Before, I was cooking using traditional fire side. I cook every day to sell in my restaurant. Since 2014, I have had persistent coughing, watery eyes, fatigue, dizziness, headaches and upper respiratory congestion. I have taken many types of drugs but no solution. I fasted and prayed but no solution. I was confused.

After the training

From the lessons I got from the training, I realized that indoor air pollution was the cause of the troubles. I now use a fuel efficient stove, I ventilate my kitchen properly. The persistent coughing, and watery eyes, fatigue, dizziness, headaches and upper respiratory congestion have disappeared. I now live a happy life.

Objective 3: Train 100 rural women to adapt and mitigate climate change with fuel efficient stoves.

The project has been successful in training women to adapt and mitigate climate change.

More than 70% of the women are using the improved cook stoves in the raining seasons to adapt to the low temperatures

An average beneficiary report to have cut wood usage by half. This is illustrated in the table below;

Table 2.1: Change in the amount of fuel-wood used

Average wood usage before/day	Average wood usage after/day	Average reduction in wood/day	Average reduction in wood per month(30days)	Average reduction in wood per year	Reduction in wood for 100 beneficiaries per year
6kg	3kg	3kg (50%)	90kg	1080kg	108000kg

Averagely, burning 1 kg of wood will generate 1.80 Kg of Carbondioxide (CO2).

Average Wood usage before;

If 1kg of wood -----1.80kg of CO2

216,000kg of wood -----216,000 x 1.80 =388,800kg of CO2

Average wood usage after;

If 1kg of wood \longrightarrow 1.80kg of CO2

Then 108,000Kg of wood \longrightarrow 108000 x 1.80 = 194400kg of CO2

Average reduction of wood per year; $216,000 - 108,000 = 108,000$ kg of wood

Average reduction of CO2 emission per year; $388,800 - 194,400 = 194,400$ kg of CO2

Therefore 194,400kg of Carbondioxide (CO2) emissions is reduced annually as a result of this project. This project contributes to the attainment of the Paris Climate Deal to keep global temperature below 1.5C by reducing carbon emissions.

The reduction of wood fuel reverses the rate of deforestation and contributes to the conservation of the Mount Cameroon Forest and wildlife. 72% of the beneficiaries reported to mitigate climate change by using the improved cook stoves for warming during extreme cold conditions (Raining seasons)



Supporting Rural Women with Improved Cook Stoves



Cross section of the women after training

Objective 4: Reduce the rate of deforestation by 10% among the 100 rural women in 10 village communities(in progress)

The project reduced the rate of deforestation by 50% among the rural women beyond the initial

target of 10%. 100% of the respondent reported a reduction in the amount of wood fuel using the fuel efficient stoves compared to the traditional stoves. An average beneficiary uses 50% less wood. To fuel their cooking fires, they often cut down trees in the Mount Cameroon Forest region.

Beneficiary Testimony: *Mrs. Florence Agbor, 34 years old, mother of four.*

Situation before

Before, I had to travel to the forest three times a week to gather enough fuel.

Situation after:

Using the fuel efficient stove, I fetch fuel only once a week because fuel efficient stove consumes less wood. The fuel efficient stove is movable; I can take it anywhere I have other chores, and do both at the same time, which is not possible with the traditional fire-site. This stove has made cooking very easy for me”.



Mrs. Florence Agbor designing a fuel efficient stove

Objective 5: Save the forest and cost of wood fuel among 100 rural women in 10 village communities in Cameroon(In Progress).

100% of the respondents reported that they spend less money on wood fuel using the fuel

efficient stoves compared to the traditional fire-site. This is indicated on the table below:

Table 2.2: Change in cost of fuel wood

Average cost per month before/ FCFA	Average cost per month After/ FCFA	Change	% change in cost
7500	3700	3800	50.6%

Table 2.3: Money saved from using fuel-efficient stoves

Average cost saved per month/FCFA	Average cost saved per year/FCFA	Cost saved for the 100 beneficiary per year/FCFA
3800	45,600	4,560,000

The fuel efficient cook stoves donated by ICENECDEV reduced the cost of wood fuel needed by 50.6% percent over traditional methods. An average farmer saves 3800 FCFA per month and 45,600 FCFA per year using this stove. With the improved fuel efficient cook the combustion efficiency increases, reducing cooking time and minimizing the fuel wood demand of a household and less pressure on the mount Cameroon Forest.

The money saved from fuel-wood purchase is used by beneficiaries to supplement nutrition and to pay school fees for children as well as healthcare.





Tole women Received Improved fuel-efficient Stoves

Gender Dimension of the Project

- During this project and reporting period total of 102 women and 5 men were trained on improved cook stoves(advantages and methods of usage). In response to this and previous training and sensitization included women in different leadership positions at the community level, performing roles as treasurer, secretary and vice-president in their schools, women groups and cooperatives
- In the project area, fuel wood collection and use is the primary responsibility of women who devote a considerable time to fuel collection, estimated at 4.5 hours per day. This strongly causes early school dropout among females affect academic performance of the school children.
- Using the fuel-efficient stoves, the time saved from fetching fuel wood enabled more girls to go to school and also enable women to engage in other economic activities such as agribusiness, sewing and petit trade

An Assessment of Cost and Benefits from the Donation

The direct benefits in terms of reduction of cost of fuel-wood derived through the donation of the fuel-efficient cook stoves outweigh their cost of purchased. This is illustrated on the table below:

Table 2.4: Cost and Benefits from the Donation

Total cost saved as a result of reduction in fuel wood demand per year/ FCFA	Cost saved for 5years(average lifespan of a stove)/FCFA C.S	Total cost of the stoves/ FCFA C.I	Benefits/ FCFA C.S – C.I	Benefit percent /%
4,560,000	22,800,000	1,052,000	21,748,000	206.7%

The cost incurred to implement this project is, **C.I = 1,052,000 FCFA.**

The projected cost of fuel-wood saved for 5 years as a result of this project will be,

$$\mathbf{C.S = 22,800,000 FCFA}$$

The projected monetary benefit of the project will be,

$$\begin{aligned} \mathbf{(C.I - C.S)} &= 22,800,000 - 1,052,000 \\ &= \mathbf{21,748,000 FCFA for 5 years} \end{aligned}$$

The project had 100 direct beneficiaries; therefore the benefit per beneficiary for 5 years will be;

$$= \frac{21,748,000 \text{ FCFA}}{100 \text{ beneficiaries}}$$

$$= \mathbf{217,480 FCFA per beneficiary}$$

The benefit percent of the project will be 206.7%, which implies that the project benefit will be 206.7 times more than the cost of the project.

CHAPTER 3: RECOMMENDATION AND CONCLUSION

3.1 Recommendation

This project should be scaled up by training organizations for them to replicate this project in other areas of Cameroon in order to save lives, uplift health, reduce pressure on forest resources and preserve biodiversity.

At present, the use of fuel-efficient stoves is not common in Cameroon especially in rural areas. A large majority of people still make use of the traditional fire-site which is harmful to both humans and the environment.

3.2 Conclusion

Project Outcome/Impact

- Improvement of air quality among 102 rural women (less smoke and air particulate)
- Improvement of health conditions among 102 rural women and quality of healthy life style.
- 100 rural women are trained to produce improved cook stoves to adapt and mitigate climate change in the raining seasons (low temperatures)
- 50% Reduction in the rate of deforestation among the 100 rural women in 10 village communities posing less pressure on the Mount Cameroon Forest
- More than \$40 of the cost of wood fuel saved among 100 rural women in 10 village communities in Cameroon.

Considering that all the impacts recorded from the various activities contributed in reducing indoor air pollution, improving the health condition of the beneficiaries, saved cost of fuel wood and reduced deforestation by 50% , it could be concluded that the capacity building of the improved fuel efficient stoves have achieved the set objectives and targets

Sustainability Mechanism

The creation of a rural women cook stove network will provide the opportunity for the women to contribute resources monthly in order to obtain access to finance to obtain and maintain improved cook stoves.

The network will also provide further training on improved cook stove production ,usage and importance of mangroves through its members and other women's groups. The trained rural women from this project will further train other rural women from other organisations and villages in Cameroon.

Project Challenges

During the project Implementation, monitoring and evaluation period the project faced the following challenges:

- As a result of social events such as market days and funerals, not all beneficiaries participated in focus group discussions and community consultations
- About 10% of the rural women as beneficiaries preferred using the donated improved cook stoves in Raining Seasons instead of using the improved cook stoves throughout the year.
- Access of the source of energy (Maize cob, waste residue and charcoal) for the improved cook stove makes it difficult for the rural women to often use their improved cooked stoves. The women have regrouped themselves into cooperative to obtain Maize cob, waste residue and charcoal in large quantities in order to facilitate the use of the improved Cook Stoves.
- 22% of the rural women farmers who benefitted for the training on the design and production of the improved cook stoves are faced with difficulties to obtain raw material such as clay and other inputs like metal, and kiln use in the production of the improved cook stoves for sales

Lessons learned

During this reporting period the following lessons were learned by the project:

- More than 70% women used the improved cook stoves in the Raining Season with low temperatures between 18 Degrees Celsius to 23 Degrees Celsius) to adapt to the cold weather conditions.
- More than 15 % of the women are using Maize cobs and domestic waste residue in the placed of Charcoal and wood as fuel for the improved cook stoves hence reversing the rate of deforestation in the mount Cameroon forest region.
- Income generation programs produce almost immediate results—this is great for beneficiary “buy-in” and provides motivation for other, new activities. More than 10% of the women are engaged producing and distributing improved cookstoves in village communities.
- It seems that self-organized women groups tend to be more active and willing to participate in project interventions. In general, ICENECDEV Team sense that commitment from women groups created with community mobilization from “outsiders” is less intense than the commitment, participation and enthusiasm evident among the women groups

Contact Information

Email: info@icenecdev.org or icenecdev2006@yahoo.com

Facebook: www.facebook.com/ICENECDEV

Twitters: www.twitters.com/ICENECDEV

Website: www.icenecdev.org

Tel: (00237) 674033583, 243609311