
# Terminal Evaluation (TE) Report

UNDP-GEF Project: Sustainable Fuelwood Management (SFM) Project in Nigeria

GEF Project ID: 5745 UNDP Project ID: 5366

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| **Country:** | Nigeria |
| **Region:** | Africa |
| **Focal Area:** | Energy, Infrastructure, Transport and Technology |
| **GEF Agency:** | United Nations Development Programme |
| **Project Duration** | 31st May 2017 – 6th February 2022 |
| **Project Budget** | US$ 4,410,000 (GEF grant) |
| **Executing Agency** | Energy Commission of Nigeria |


**September 2022**


# Contents

# Executive Summary

This Terminal Evaluation is undertaken on completion of the "Sustainable Fuelwood Management (SFM) project in Nigeria. The evaluation set out to assess the project performance (in terms of relevance, effectiveness, and efficiency), and determine outcomes and impacts (actual and potential) stemming from the project, including their sustainability. The evaluation has two primary purposes: (i) to provide evidence of results to meet accountability requirements, and (ii) to promote operational improvement, learning and knowledge- sharing through results and lessons learned among UNDP programmes and in the Government of Nigeria. The evaluation further aims to identify lessons of operational relevance for future project formulation and implementation.

This project, implemented from 2017 to 2022, intended to address the problem of deforestation in Nigeria. The stated objective of the project was to establish a sustainable fuelwood management in Nigeria that secures multiple environmental and socio-economic benefits, including reduced GHG emission from fuelwood consumption, enhanced carbon storage and sequestration, as well as improved rural livelihoods and opportunities for local development.

The project was implemented under a national implementation modality. According to the project document, the Federal Ministry of Environment (FME) was the lead implementing partner executing agency through the Energy Commission of Nigeria (ECN). FME appointed a senior officer as a Project Director to i) coordinate the project activities with the activities of other Government entities; and ii) certify that the expenditures are in line with the approved budgets and work-plans. A project steering committee (PSC) was also created.

The project was supported through a grant of USD 4,410,000 made available by the Global Environmental Facility. This funding was to be paired with USD 16,400 co-financing commitments from project partners, for a total project budget of USD 20,810,000.

The project sought to offer comprehensive technical assistance across four project components towards achieving the targeted objective of addressing the problem of deforestation in Nigeria. The four components included:

Component 1: Sustainable Fuelwood Supply

Component 2: Fuelwood Demand Management

Component 3: Domestic Industry for Clean Cook Stoves and Other Clean Energy Alternatives

Component 4: Financial Models for Sustainable Fuelwood Management

GEF funding was allocated under Components 1 to 4 to improve forest conservation and management and promote a set of alternative clean energy solutions.

## Evaluation Findings

**Strategic relevance**: This was an ambitious project for a short period of time. Needs and priorities at the regional, national, and local levels were addressed. Collaboration, interest, and dynamics were stimulated and generated at all three levels. The programme was aligned with GEF-5 Climate change mitigation strategy that seeks to remove the barriers to access to affordable alternative energy by introducing the necessary legal, institutional, and regulatory frameworks for scaling up of bioenergy solutions. The project was informed by an assessment carried out during the PPG phase through broad stakeholder consultation. The project and programme of work was aligned to important national development plans, strategies, and policies. The project was aligned to the NV20:2020, the National Energy Policy, the Economic Recovery and Growth Plan (ERGP), the ECOWAS Renewable Energy Policy

(EREP), the ECOWAS Energy Efficiency Policy (EEEP) among others. The promotion of renewable energy in Nigeria remains consistent with the strategic priorities of Global Environmental Facility, UNDP Country Programme (CPD 2018-2022), United Nations Sustainable Development Partnership Framework (UNSDPF) for Nigeria and the 2030 Agenda for Sustainable Development (SDGs). Relevance was reinforced by the significant response to the emerging expanding energy needs by BoP households in Nigeria. Relevance was rated as **satisfactory.**

**Quality of project design**: The project was found to be well designed and well-timed to coincide with expanded demand for energy by BoP households in the country. The implementation of two mutually supportive and integrated components viz. supply-side management through enhanced production of fuelwood and demand side management through the promotion of improved stoves in the domestic sub-sector to reduce fuelwood demand was found to be a sound mechanism for addressing the project of objective of addressing the problem of deforestation in Nigeria. Weaknesses in the design were found out to be (i) lack of clarity for institutionalizing of activities into state and national level governmental plans and reforms e.g., continued investment in production of fuelwood; and (ii) over ambitious EOP targets of establishing 3,003 hectares of woodlots and protecting 50,000 hectares of forest both of which heavily relied on implementation of the REDD+ programme, the latter of which was still in the readiness stage at EoP.

**Effectiveness** (*attainment of project objectives and results*): As a result of the actions carried out by the project, the outcomes were rated as **moderately satisfactory**. National and local capacities in sustainable fuelwood production and production of energy efficient cook stoves have been enhanced. Good nursery establishment manuals were developed. Positive institutional dynamics and partnerships were promoted, which led to effective networking. A lot of awareness was raised about alternative (renewable and more efficient) energy technologies for cooking and heating among local communities, but the adoption of sustainable fuelwood production by national and state institutions still needs improvement. Institutional uptake of SFM project activities by potential users and policy has to be enhanced.

*Component 1* on sustainable fuelwood supply was the one most weakly implemented. The project's EOP target relating to protecting 50,000 hectares of forest and establishing 3,003 hectares of woodlots was premised on the implementation of the REDD+ project which had still not taken off by project EoP and is still in the readiness stage. Only about 260 hectares of woodlots had therefore been established by EoP.

The project successfully implemented components 2 through 4. It managed to establish a highly credible framework for improved management of demand for fuelwood and other alternative fuels in Nigeria. The portfolio of outputs included training materials, communication and awareness building activities, production of improved cookstoves, disbursement of funds to households etc. Some of the key outputs included:

*For outcome 2 on improved management of demand for fuelwood and other alternative fuels, the project outputs were as follows:*

1. A market Segmentation study on efficient woodstoves in Cross River, Delta and Kaduna States was produced and validated
2. 335 women were trained and certified on social entrepreneurship for cookstoves sales and production
3. 21,010 stoves were produced and distributed under direct funding of the project
4. 433,307 tCO2e lifetime GHG savings was projected (including CO2, CH4 and N2O) out of which 92.7%result from the deployment and use of the clean cookstoves households (clean cookstoves and kilns deployed in institutions and industries yield 7.5% and 0.1% emissions reductions respectively)

*For outcome 3 on improved efficiency, quality and affordability of domestically manufactured cooking/heating appliances for BoP and Strengthened domestic supply chain for EE/RE cooking and heating appliances, the project delivered on the following:*

1. Five (5) working prototypes /physical samples of improved energy efficient cook stoves were produced
2. About 29,500 low-cost clean, energy efficient cookstoves were produced and sold

*For outcome 4 on establishment of a successfully operating consumer financing model for clean cook stoves/kilns, the project delivered on the following:*

1. Payment for Environmental Services & Community Forest Fund financial products were developed
2. US$335,000 was disbursed to communities
3. Over 1,650 households were sensitized on the benefits of clean, energy efficient cookstoves
4. Over 100 staffs (35 in each state) of MFI & MFBs were trained on disbursements of grants to fuel wood value chain actors

Despite not all outcomes being met in full, a robust framework has been established consisting of a sound base for sustainable fuelwood management, and definite growth in capacity and awareness among stakeholders.

**Efficiency**: The project execution was slow in the beginning, and delays happened due to state specific needs and policies but picked up in latter stages. The project was time-efficient and resource-efficient. The project's execution modality (Energy Commission of Nigeria being Agency working in conjunction with execution partners and UNDP) established an alliance that generated opportunities for inter-institutional synergies aimed at developing and strengthening knowledge and increasing the quality and impact of the intervention. Key informants expressed confidence in the competence and knowledge of ECN on the subject matter addressed by the initiative.

Taking into consideration the design of the project, the changes promoted, the results achieved, the outputs generated, and the activities carried out, it can be stated that the project had an organizational structure and financial resources that are well attuned to match the project requirements and to promote the different strategies aimed at achieving the programmatic outcomes.

The project further did a good job in facilitating stakeholder engagement by convening several workshops and meetings. Procurement of technical consultancies was successful in recruiting qualified consultants and service providers.

The assessment of project implementation and execution were generally satisfactory for the components that were achieved but overall efficiency was diminished by a lack of adequate adaptation measures in place to achieve the seemingly over ambitious target of establishment of new woodlots and forestlands in Delta and Cross River States during the initial stage of project implementation. Efficiency is therefore rated as **moderately satisfactory.**

**Sustainability**: On the supply side (sustainable forest management), the evaluation did not find adequate evidence that socio-political commitment, financial resources, institutional reforms and mainstreaming had been created to ensure sustainability without further support. Commendable efforts were however made in developing a State Forestry Policy that integrated the SFM model that is linked to the establishment of a national forestry trust fund. A forestry council that convened annually was also established. The risks identified at project development are however still in place due to non-implementation of the REDD+ project, the exclusion of project activities around forested REDD+ pilot sites and a lack of adequate community land to establish the woodlots. While country stakeholders were pro-active and motivated, sustainability will depend on their capacity to establish and maintain effective partnerships with “development-oriented” institutions in the SFM sector,

particularly at decentralized level. The uptake of sustainable forest management investments will still require national and state-level governmental commitments as a requisite for achieving scale.

On the demand side (clean energy access), the project played a significant catalytic role. Mainly through "champions" (SFM stakeholders), there was remarkable uptake by individual private manufactures of energy efficient clean cookstoves though there still was no significant institutional up-take and policy changes and mainstreaming. Replication and scaling-up of manufacturing of energy efficient clean cookstoves has started and is bound to grow. Sustainability and gains of SFM Project's outcomes, in particular of its support to EE market transformation for efficient cook stoves can be preserved through close involvement and collaboration of three (3) key stakeholders: local communities, manufacturers and financial intermediaries (MFBs and MFIs).

Sustainability is rated as **moderately likely**

## Conclusions

Having considered the TE findings, the evaluation makes the following conclusions regarding the performance of SFM Project:

- The SFM Project implementation framework was well articulated and opportunities for the success of sustainable fuelwood management interventions adequately considered and integrated in the Project implementation from lessons learned especially in the latter stages of the project. The overall SFM Project terminal evaluation rating is deemed **moderately satisfactory**.
- The SFM Project was timely and relevant, and responds to the prevailing conditions, national trends and statistics[1] which indicate that over 40 million people in Nigeria, or one-fifth of the country's population are engaged in fuelwood collection and charcoal production, and further provides an estimated 530,000 full-time equivalent direct jobs.
- The key ingredients for success of the SFM Project have been designing and implementation of effective training and capacity building instruments with an engendered focus to address critical areas of reducing vulnerability – include addressing climate change and creating sustainable livelihoods for women.
- Ownership of the project was well envisioned – but insufficiently embraced upstream, e.g., state governments needed to get more actively involved in implementation, sizeable land needed to be allocated by communities and state governments for establishment of woodlots. While state focal persons from the relevant Ministry of Environment have been part of the foundation of the project as implementation was done under their leadership, it is yet unclear how the State would take the process forward.
- To a large extent, the project has played a significant role in creating exposure to many Nigerians at the Bottom of Pyramid (BoP) who are mostly unaware of clean wood/charcoal cookstoves solutions. Women have played a key role in realizing the objectives of the SFM Project by engaging in manufacture and sales of clean cookstoves.
- SFM Project was expected to achieve greater environmental, biodiversity and climate benefits if all the activities were successfully implemented; key targets were however not met largely because it takes time for the woodlots to reach maturity and there is a lack of adequate land

[1] FAO, 2022: The State of the World's Forests (SOFO) 2022

allocated for woodlot establishment given the non-implementation of REDD+ and Agriculture's competition for land. This was a major project design omission that has been exacerbated by dynamics in the the socio–political context whereby there has been a spike in incidences of insecurity and which therefore has precluded access to the forest plantation sites for much needed maintenance.

### Recommendations

- To address the challenges of sustainable fuelwood management in future, this TE recommends restoration of degraded forests and other landscapes that do not compete with land uses associated with food production, establishment of fast-growing tree plantations/woodlots, improving the use of residues from wood harvesting and processing, and the recovery of post-consumer wood through its cascading use within a more circular economic framework.
- Secondly, establish and implement a national fuelwood strategy that is critical for coordinating actions across government agencies and ensures that interventions produce positive economic, social, and environmental impacts by addressing challenges in fuelwood production and demand in the near, medium, and long-term. The strategy should address issues around of lack of legislation, unclear institutional arrangements for supporting, guiding and controlling fuelwood management activities; inadequate enforcement and compliance; and limited investment and financing in this forestry/energy sector - all of which lead to poor governance of the fuelwood subsector.
- Third, generate evidence through timely capture of data for woodlots, tree nurseries and cook stoves distribution, specifically indicating important accomplishments as well as areas where performance has not been adequate. Technologies such as GIS and remote sensing are useful to aid such assessments. However, without proper institutional arrangements for supporting and regulating the fuelwood value chains, the subsector will remain uncompetitive and not generate enough returns and revenue to re-invest in proper production/consumption systems.
- Fourth, align future programmes with current policy development that follow climate change mitigation, and renewable energy development agendas to create momentum for building more effective fuelwood governance mechanisms. A more integrated fuelwood governance that considers climate, local context, informal markets and decentralized government entities is able to attain a more sustainable fuelwood value chain.
- Fifth, future projects need to earnestly emphasize and foster participatory sustainable forest management. This will include formulation of people-orientated fuelwood policies and laws, creation of public awareness, stakeholders' consultation, training and capacity building, provision of incentives and creation of market channels for forest/woodlots products. The aim is to underscore the potency of people-based fuelwood management system, which considers the peoples' interest and welfare while ensuring effective conservation of forest and fuelwood resources.

# Abbreviations and Acronyms

| | |
|---|---|
| BoP | Bottom of The Pyramid |
| CLCs | Community Learning Centers |
| CPD | Country Programme Document |
| CRS | Cross River State |
| ECN | Energy Commission of Nigeria |
| EE | Energy Efficient |
| EEEP | ECOWAS Energy Efficiency Policy |
| EoP | End of Project |
| EREP | ECOWAS Renewable Energy Policy |
| FMCs | Forest Management Committees |
| GACC | Global Alliance for Clean Cookstoves |
| GEF | Global Environment Facility |
| LGA | Local Government Area |
| LGC | Local Government Councils |
| MFBs | Microfinance Banks |
| MFIs | Microfinance Institutions |
| MFP | Multifunctional Platform |
| MTR | Mid-term Review |
| NACC | Nigerian Alliance for Clean Cookstoves |
| NAPA | National Adaptation Programme of Action |
| NBMA | National Biosafety Management Agency |
| NESREA | National Environmental Standards & Regulations Enforcement Agency |
| NIM | National Implementation Modality |
| NSC | National Steering Committee |
| PIF | Project Identification Form |
| PIR | Project Implementation Report |
| PM | Project Manager |
| PMU | Project Management Unit |
| PPG | Project Preparation Grant |
| PSC | Project Steering Committee |
| R&D | Research & Development |
| RE | Renewable Energy |
| REDD+ | Reducing Emissions from Deforestation and forest Degradation |
| REEIS | Project's Relevance, Effectiveness, Efficiency, Impact and Sustainability |
| SBAA | Standard Basic Assistance Agreement |
| SESP | Social and Environmental Screening Procedure |
| SFM | Sustainable Fuelwood Management |
| SFMS | Sustainable Fuelwood Management System |
| SLMCs | Sustainable Land Management Committees |
| SLM | Sustainable Land Management |
| SON | Standards Organization of Nigeria |
| TE | Terminal Evaluation |
| TVET | Technical and Vocational Education and Training |
| UNDP | United Nations Development Programme |
| UNFCCC | United Nations Framework Convention on Climate Change |
| WACCA | West African Clean Cooking Alliance |

# 1 Background and Context

## 1.1 Background

The United Nations Development Programme (UNDP) has completed the implementation of a GEF financed project in Nigeria titled "Sustainable Fuelwood Management (SFM) project in Nigeria" implemented through the UNDP as the Executing Agency and Energy Commission of Nigeria as the implementing partner.

The Sustainable Fuelwood Management (SFM) project in Nigeria was designed to address the problem of deforestation in Nigeria, given that over half of Nigeria's estimated over 215 million inhabitants live below the poverty line, with over 70% of the population still relying on biomass for fuelwood. Rapid deforestation is a major concern with over half of the country's primary forests cut down in the last 10 years, exacerbated by rapid population growth of 2.5%. The unsustainable production and utilization of biomass resources represents one of the key drivers of deforestation and land degradation in Nigeria. In response to this challenge, the Government of Nigeria secured funding from the Global Environment Facility (GEF) for a sustainable fuelwood management project. The project, which began actual implementation in May 2017, had a GEF grant of $4,410,000 and co-financing of $16,400,000.

The objective of the project was to **establish a sustainable fuelwood management in Nigeria that secures multiple environmental and socio-economic benefits, including reduced GHG emission from fuelwood consumption, enhanced carbon storage and sequestration, as well as improved rural livelihoods and opportunities for local development**.

## 1.2 Project objectives/results

The Project's Objective was to be achieved through

i.) *Supply Side Management*: the production and procurement of certified fuelwood from sustainably sourced feedstock from; a) woodlands outside the protected forests in Cross River and Delta State in the South and b) from farmer-managed woodlots in Kaduna State in the North

ii.) *Demand Side Management:* through the promotion of improved stoves/kilns in the domestic sub-sector as an inclusive business to reduce fuelwood demand, improve health and reduce greenhouse gas emissions.

iii.)

**Overall Objective / Impact:**
To establish sustainable fuelwood management in Nigeria that secures multiple environmental and socio-economic benefits

**Specific Objective/Outcome:**
Reduced GHG emission from fuelwood consumption, enhanced carbon storage and sequestration, as well as improved rural livelihoods and opportunities for local development.

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| **Output 1:** Fuelwood Sustainably Supplied | **Output 2:** Fuelwood Demand Managed | **Output 3:** Domestic Industry for Clean Cookstoves and Other Clean Energy Alternatives Established | **Output 4:** Financial Models for Sustainable Fuelwood Management Established |

To achieve this, the project was divided into four main components:

- Component 1: Sustainable Fuelwood Supply
- Component 2: Fuelwood Demand Management
- Component 3: Domestic Industry for Clean Cook Stoves and Other Clean Energy Alternatives
- Component 4: Financial Models for Sustainable Fuelwood Management

The following outcomes were expected from the SFM project:

**1.** ***Expected outcome of component 1:*** Models for sustainable fuelwood production demonstrated in:

a) At least 10 communities in Cross River and Delta State leading to:

- 50,000 ha of forestlands under improved multifunctional forest management
- Forest Management Committees (FMCs) created/strengthened in SFM

b) At least 10 communities in Kaduna State leading to:

- 3,003 ha of degraded land restored with Sustainable Land Management measures like woodlots
- SLM Management Committee created/strengthened in SLM

***2. Expected outcome of component 2:***

a) Improved awareness and acceptance of alternative (renewable and more efficient) energy technologies for domestic, institutional, and industrial sub-sectors in Cross River, Delta, and Kaduna States.
b) Increased penetration of improved/alternative energy technologies for domestic needs in targeted communities by at least 20% (BAU: 0.1%)
c) Avoided emissions of 40,000t $CO_2$ eq/year from combustion of un-sustainable biomass in inefficient cook stoves/kilns (replaced by more efficient or other alternatives)

***3. Expected outcome of component 3:***

a) Improved efficiency, quality, and affordability of domestically manufactured cooking/heating appliances for domestic, institutional, and industrial sub-sectors.
b) Strengthened domestic supply chain for EE/RE cooking and heating appliances

**4**. ***Expected outcome of component 4:***

a) Consumer financing model for EE cook stove/kiln successfully operates.
b) Sales of efficient cook stoves/kilns increased by at least 20% in Cross River, Delta, and Kaduna State.
c) Investment in sustainable forest management in Cross River and Delta State increased

The SFM project duration was 5 years starting from February 7, 2017, and ending on February 6, 2022 with an overall GEF budget of $4,410,000. The project was co-financed by UNDP $300,000, National Government (in–kind) $1,900,000, National Government (Grant) $2,200,000, MFBs/MFIs $3,000,000, UNREDD+ $ 4,000,000, SME $ 2,000,000, ICEED $2,000,000, DARE $1,000,000 for a total budget $20,810,000.

The project implementation has followed the UNDP's National Implementation Modality (NIM), according to the Standard Basic Assistance Agreement (SBAA) between UNDP and the Nigerian Government and the UNDP Country Programme Framework.

The Implementing Partner for this project was the Energy Commission of Nigeria with UNDP Country office support. The Implementing Partner was responsible and accountable for managing the project, including the monitoring and evaluation of project interventions, achieving project outcomes, and for the effective use of resources.

As the programme came to an end of its implementation and in accordance with UNDP and GEF M&E policies and procedures that requires all full- and medium-sized UNDP-supported GEF-financed projects to undergo a Terminal Evaluation (TE) at the end of the project, this TE has been commissioned to provide the project management team and stakeholders with feedback on the project's performance.

This document is a report for the Terminal Evaluation of the Project.

## 1.3 Context and rationale for intervention

Over the last decade or so, Nigeria has experienced steady growth, averaging over 7 percent per annum. Nigeria has the potential to make further strides toward rapid, more inclusive growth, which would reduce poverty further and create more opportunities for shared prosperity. The challenge for Nigeria is to pursue economic development and realize the Vision 2020 and Transformation Agenda (2013-2018) without creating additional burdens on natural resources thereby preserving ecosystems that are critical to maintaining the quality of life and providing environmental services to society. Climate change will impact on sectors that are strategic for the growth of the economy, such as agriculture, livestock, and water resource management. Increasing temperature, coupled with changes in precipitation patterns and hydrological regimes, will only exacerbate existing vulnerabilities.

### The Nigerian Forest Sector Transformation

Nigeria has the third highest rate of deforestation in the world: 3.7% or 410,000 hectares of forests annually, with some areas in the South losing over 1,000 hectares/year[2]. The country has lost over 50% of its forest resources between 1990 and 2010 when its forest area shrank from 17 million hectares down to 9 million hectares (FAO, 2010)[3]. With continuation of current trends unabated, there is great concern that Nigeria's scarce forests will be lost within a few decades.

Deforestation is the largest source of GHG emissions in Nigeria: it is responsible for 40% of national $CO^2$ emissions (SNC, 2014). According to the Second National Communication to the UNFCCC, baseline scenario emissions from deforestation will increase from 9.5 $MtCO^2e$/year in 1990 to 26.5 $MtCO^2e$/year in 2030 (based on a conservative deforestation rate of only 2.6%). The National Forest Conservation Council of Nigeria (NFCCN) estimates that a large portion of the forests in Nigeria will be cleared within a few decades if current rates of deforestation are not reduced. The lack of reforestation activity means clearing is not being offset by new plantings. With forests almost gone in the north of the country already, the loss of tree cover is also thought to be helping accelerate the spread of deserts and reducing farmland. A report by the NFCCN in 2008 estimated that 35% of arable land had been lost to desertification in the north over the last 50 years[4].

Unsustainable and constantly mounting consumption of fuelwood by Nigerian households, institutions (schools, prisons, hospitals, army camps) and cottage industries (e.g., fish smoking,

[2] *http://www.conservation.org/how/science/Documents/DeforestationGuide_CommoditySourcing_Nigeria.pdf*

[3] *FAO 2010. Global Forest Resources Assessment. FAO Forestry Paper 163. FAO: Rome*

[4] *Nigerian's Forest could go by 2020", Carbon Positive News Article, as reported in Atmosfair's POA Cookstoves.*

cassava processing, and palm oil processing, bakeries) is one of the main causes of deforestation and land degradation. More than half of the 9.6 million hectares of rain forest belt in the south of Nigeria has been used to meet the demand for fuelwood in rural and urban areas. Fuelwood use has grown from 50 million $m^3$/year in 1990 to 70 million $m^3$/year and accounts for a significantly higher share of forest product use than, for example, commercial logging; the latter amounts to only 11 million $m^3$/year in 2010 and did not register any major changes in the last decades (FAO, 2010). This increase is largely due to population and economic growth, and to the absence of affordable and more energy efficient alternatives, especially for the poorest consumers at the Bottom of Pyramid (BOP) market segment. This is further exacerbated by the rising prices and erratic supply of fossil fuels, forcing a massive shift from "modern" fuels like kerosene and LPG back to reliance on fuel wood, i.e., reverse substitution with fuelwood (FAO, 2010).

Apart from causing economic hardship for the poor, the use of inefficient stoves also causes serious health problems. The World Health Organization has estimated that for the mid-2000s, Nigeria's population's heavy reliance on inefficient cooking energy technologies has resulted in 95,000 deaths per year, mostly women and children from smoke inhalation related diseases making it the third cause of death after malaria and AIDS in Nigeria (WHO, 2008). Furthermore, the incomplete combustion of firewood in traditional inefficient stoves can cause black carbon emissions that contribute to global warming (IPPC, 2014).

The Second National Communication (SNC, 2014) estimates that about 4.5 million hectares of fuelwood plantations must be established in order to tackle the primary cause of deforestation and help address the looming shortfall of fuel wood resources. However, this analysis does not consider the significant, yet unrealized, potential to effectively reduce demand for non-renewable fuelwood through the promotion of more energy efficient cooking and thermal solutions, as well as through the use of alternative low-carbon energy sources, such as LPG, biogas, ethanol or solar energy.

Natural resources play a pivotal role in the lives of people in Nigeria with 75% of the population living in rural areas and over 70% employed by the agriculture and forestry sector. Increasing economic development and demographic pressure are changing agricultural and forestry systems in Nigeria and creating ever-increasing pressure on the natural resource base. The Government of Nigeria seeks to promote a paradigm shift towards low-emission and climate-resilient development pathways, to achieve economic efficiency in directly securing emission reductions at cost, and to support equity in the distribution of resources.

Internal migration to urban areas, poor enforcement of legislation and widespread poverty are some of the main contributing factors to fuel poverty and degraded natural resources. These trends are rapidly heading towards a state where over-extraction and insufficient re-planting of trees is threatening both people's ability to afford fuel wood for cooking and their ability to easily attain it in other ways. Coupled with this humanitarian issue, the deforestation and forest degradation that occur as a symptom of people's reliance on fuelwood (+70% of the population) is threatening the sustainability of the natural environment and its ability to perform ecological services in fragile areas.

## 1.4 Nigerian national strategies and regulatory framework for fuelwood management

The Federal Government of Nigeria took cognizance of the above-mentioned issues, and set up policies to balance the demand of fuelwood with sustainable and renewable supply through sound Forestry and Fuelwood policy and Renewable Energy and Energy Efficiency Policy (revised in 2015).

**Forest policies and programmes:** The National Forestry Policy was approved by the Federal Government in 2006. The Policy's overall objective is to achieve sustainable forest management, leading to sustainable increases in the economic, social, and environmental benefits from forests and trees, for present and future generations, including the poor and vulnerable groups. Specific objectives include: i) Increase, maintain and enhance the country's forest estates through sound forest management practices; ii) Address the underlying causes of deforestation, forest degradation and desertification; iii) Promote and regulate private sector involvement in forestry development, and create a positive investment climate in the sector; iv) Support schemes that facilitate access to carbon markets; and v) Encourage forest dependent people, farmers and local communities to improve their livelihoods through new approaches to forestry. The Federal Government of Nigeria revised the policy and on April 8, 2022, inaugurated the National Forest Policy for sustainable forest management and promoting good forest governance to improve livelihood in the country. The policy is focused on sustained management of forest ecosystems, environment, socio-economic growth and provision of goods and services for domestic purposes.

**Renewable Energy Master Plan, 2005 and 2015:** The Renewable Energy Master Plan (REMP), drafted by the Energy Commission of Nigeria and the United Nations Development Programme (UNDP) in 2005 and reviewed in 2015, expresses Nigeria's vision and sets out a road map for increasing the role of renewable energy in achieving sustainable development. The REMP does not specifically differentiate between on-grid and off-grid generation; however, it refers to integrating renewable energy into buildings, electricity grids and "other distribution systems". [ECN; 2013].

Simultaneously to the overall increase in power supply from renewable energy sources, the REMP targets higher electrification rates, from 42% in 2005 to 60% in 2015 and 75% by 2025. Below we shall return to the precise targets set for each subsector of renewable energy. However, in this context it is important to note that the REMP has still not been signed off by the government or formulated into a law governing the renewable energy development. Only once that has happened will investors have a clear path for drawing on the various financial incentives envisaged, such as pioneer status (tax exemption) and custom duty waivers.

**Fuelwood Policy:** Over 70% of Nigeria's population depends on fuelwood for cooking and other domestic uses. The consumption of fuelwood is worsened by the widespread use of inefficient cooking methods, the most common of which is still an open fire. This system has a very low thermal efficiency, and the smoke is also hazardous to human health, especially to women and children who mostly do the cooking in homes. The rate of consumption of fuelwood far exceeds the replenishment rate to such an extent that desert encroachment, soil erosion and loss of soil fertility are now serious problems in the country. The largest sources of fuelwood at present are from open forests, communal woodlots, and private farmlands. Supply from natural forest regeneration is continuously being diminished due to the additional activities such as the clearing of forests for development projects, agricultural and industrial activities. Since forests are essential for healthy environment, act as a check on wind and water erosion and desertification, and serve as energy sources, it is essential that they are extracted in a balanced, sustainable, and rational basis.

The fuelwood policy stipulates that:

i. The nation shall promote the use of alternative energy sources to fuelwood.
ii. The nation shall promote improved efficiency in the use of fuelwood.
iii. The use of wood as a fuel shall be de-emphasized in the nation's energy mix; and
**iv.** The nation shall intensify efforts to increase the percentage of land mass covered by forests in the country. There is also a need to restore degraded land and forests.

The objectives of the policy are:

i. To conserve the forest resources of the nation.
ii. To greatly reduce the percentage contribution of fuelwood consumption in the domestic, agricultural, and industrial sectors of the economy.
iii. To arrest the ecological problems of desert encroachment, soil erosion and deforestation.
iv. To facilitate the use of alternative energy resources to fuelwood; and
v. To reduce health hazards arising from fuelwood combustion.

## 1.5 Gap analysis

The Government of Nigeria, its development partners, public and private sector recognize the need to balance the supply and demand of fuelwood and the importance and benefits of sustainable fuel wood management both from the perspective of climate change mitigation, as well as the local socio-economic development standpoint; thus, a number of important initiatives and programs have been implemented and are on-going to address deforestation and desertification and their multitude root causes. However, as far as fuelwood is concerned, the baseline projects still fall short of providing a comprehensive and holistic approach to sustainable fuel wood management in Nigeria thus leaving some of the main barriers to sustainable energy and underlying causes of deforestation in the South and land degradation in the North unaddressed.

The sustainable energy sub-sector is plagued by a lack of coordination and integration between policies and projects addressing sustainability of fuelwood production and consumption at all levels from local to national. Despite obvious linkages and synergies, the two sides of fuelwood problem, demand, and supply, are being addressed in isolation. There exist two types of projects and programs interventions in the country have been largely running in parallel with little overlap programmatically and geographically, namely those dealing with

a) Sustainable Forest Management (supply side)
b) Clean Energy Access (demand side).

However, the only long-lasting solution to this problem is one where a) the importance and benefits, including economic ones, of sustainable forest management and restoration of degraded land are fully realized by local communities and b) affordable and sustainable alternatives are available to meet household energy needs. Piecemeal programs that only address one aspect of the demand-supply equation cannot be effective nor sustainable in addressing the root causes of the problem – and this is the cornerstone of the design of the SFM Project.

The key barriers to sustainable fuelwood management that the SFM Project is aiming to overcome include:

- **Under-developed domestic supply chain:** There has been a number of domestic clean cook stove manufacturers in Nigeria, but local production capacities remain limited, often do not provide adequate quality and quantity of the products, and rely on expensive imports, which drive costs up. Consequently, do-it-yourself (DIY) stoves are the most popular solutions, while penetration of efficient second generation cookstoves is less than 0.1% of the market. Pilot projects are very limited in scale or not affordable to average consumers (such as SAVE80 that can cost up to USD 100).

  Scaling up and a strong business case are needed to make local manufacturing viable and capable of delivering robust and affordable stove solutions for the base of the pyramid (BoP), e.g., developing clay stoves in the South where there are rich clay resources whilst developing metal stoves in the North where clay is scarce.

- **Affordability and access to consumer and start up financing:** In the absence of affordable stove solutions for the BOP, modern and efficient fuel stoves are priced significantly higher than

available traditional solutions or kerosene stoves resulting in an extremely low penetration rate for improved stoves. Despite three registered Programmatic CDM Stove programs, carbon finance has proven its limited effectiveness in improving the affordability of the final product: even with a carbon subsidy, SAVE80 is 3 times more expensive than traditional stoves and under the current circumstances, the prospects of attracting additional finance through carbon markets do not look promising. Hence, new financial sources and models are needed to address the affordability barrier, improve access to consumer financing and thus ensure wider replication and higher penetration rates of EE cook stoves.

Those few efficient stoves which are available on the market in Cross River, Delta, and Kaduna (mainly imported from China and elsewhere) are priced several times higher than traditional stoves: while the cost of a traditional stove is about USD 2, cleaner and more efficient products, like StoveTec cost USD 20 and above. Many of the micro-finance institutions operating in the three pilot states are not marketing or offering financial products or services for the production or purchase of clean stove/kilns. Component 4 of the project will address the affordability barrier by facilitating access to consumer and start up finance and partnerships with MFIs.

- **Low awareness and penetration rate of alternative energy solutions among rural households in Cross River, Kaduna, and Delta:** Less than 0.1% of households in CRS and Delta State use improved cookstoves. This is an indication of extremely low awareness and market demand for efficient cook stoves and other sustainable energy alternatives for domestic fuelwood use. Apart from the financial/affordability barrier, the main barrier to a higher penetration rate of improved stoves is the prevailing perceptions and attitudes of rural households, especially women, towards new technologies. People are reluctant to change their traditional cooking practices, have few technical and business skills and lack understanding of how modern technologies work (even in its simplest design). Also, the recognition of the linkages between deforestation and its negative consequences on the one hand and domestic energy use on the other is often missing. Component 2 of the project will address this barrier through awareness and training activities, as well as targeted investment in pilot communities
- **Limited manufacturing capacity and supply of efficient and affordable cook stoves in Cross River, Kaduna, and Delta State:** There is only one efficient cookstove program in CSR, the Ekwuk stove, designed and promoted by the Mfaminyen Conservation Society. However, its uptake remains limited. Even in the targeted communities only 4,500 products have been built. There is no information about the Ekwuk stove design available in other CSR areas, nor are there any other efforts or programs underway to promote more efficient cook stoves manufactured elsewhere. To facilitate wider replication of do-it-yourself stove design like Ekwuk or domestic manufacturing of efficient stoves, assistance has to be provided to local communities and enterprises to jump start the market, ensure quality and build a supply chain. But there is a need to conduct a detailed market segmentation study to ensure that the design of the proposed stove meets the needs of the household. Component 3 of the project will seek to address this barrier.
- **Lack of opportunity for private sector participation:** The private sector is the main engine of job creation and the source of nearly nine out of ten jobs in the world. Accordingly, Nigeria's job creation strategy needs to be embedded within the broader strategy, as articulated in the Transformation Agenda, to promote private sector growth and entrepreneurship. However, the existing legal framework suffers from poor enforcement. In addition, there is ineffective coordination among ministries regulating the private sector and between the Government and the private sector; and many ministries have limited capacity to implement reforms. Despite those challenges, Nigeria has significant private sector potential, with investment opportunities in the

agribusiness sector. If these opportunities are realized, they will provide substantial sources of job creation and diversified growth.

# 2 Purpose and Objectives of the Terminal Evaluation

The TE sought assess the achievement of project results against what was expected to be achieved and draw lessons that can both improve the sustainability of benefits from the project, and aid in the overall enhancement of UNDP programming. The TE promotes accountability and transparency and assesses the extent of project accomplishments. The TE also aims to learn from the project's experiences in developing models for sustainable fuelwood production and demand management, in order to improve access to clean cooking in the country and to aid the overall enhancement of the UNDP programming.

The TE assessed project performance against expectations set out in the project's Logical Framework/Results Framework. The TE assessed results according to the criteria outlined in the Guidance for TEs of UNDP-supported GEF-financed Projects.

The TE provides evidence-based on information that is credible, reliable, and useful. The TE reviewed all relevant sources of information including documents prepared during the preparation phase (i.e., PIF, UNDP Initiation Plan, UNDP Social and Environmental Screening Procedure/SESP) the Project Document, project reports including annual PIRs, project budget revisions, lesson learned reports, national strategic and legal documents, and any other materials that the team considered useful for this evidence-based evaluation. The TE team reviewed the baseline and MTR GEF focal area Core Indicators/Tracking Tools submitted to the GEF at the CEO endorsement and midterm stages and the terminal Core Indicators/Tracking Tools before the TE field mission began.

The key aim of the Mid-Term Review (TE) is to examine the performance of the SFM Project since the beginning of its implementation, in this regard, the TE included the following:

- the evaluation of the achievements in project implementation, measured against planned outputs set forth in the Project Document in accordance with rational budget allocation
- the assessment of features related to the process involved in achieving those outputs
- the potential impacts of the project, and
- the underlying causes and issues contribution to targets not adequately achieved

The TE also intended to identify weaknesses and strengths of the project design and execution after evaluating the adequacy, efficiency, and effectiveness of its implementation, as well as assessing the project outputs and outcomes and end of project. It also assessed signs of the project success or failure.

The evaluation was forward-looking and identified lessons and recommendations on what has worked well and could be built and expanded upon, and what has not yet been fully achieved and should be further strengthened and developed.

# 3 Methodology, Data Collection and Analysis

## 3.1 Data collection

The TE team established a collaborative and participatory approach in order to ensure close commitment with the Project Management Unit (PMU), government agencies and ministries, GEF Operational Focal Point, UNDP Country Office as well as UNDP Regional Technical Advisor, project beneficiaries among other key stakeholders.

The TE used information from both primary and secondary sources. Primary data was collected directly from key stakeholders through interviews, questionnaires, and checklists. Secondary data was obtained from literature sources through desk review. The following data collection methods and instruments were utilized:

### Desk review

The evaluators sourced documents in possession of the various key stakeholders. The documents were analyzed for secondary data and information. Some of the reviewed include: Project Identification Form (PIF), UNDP Initiation Plan, UNDP Project Document, UNDP Environmental and Social Screening results, All Project Implementation Reports (PIR's), Quarterly progress reports and work plans of the various implementation task teams, Audit reports, Finalized GEF focal area Tracking Tools at CEO endorsement and MTR of the SFM Project, Oversight mission reports, All monitoring reports prepared by the project, Financial and Administration guidelines used by Project Team among other.

During the TE process, the TE team regularly made reference to the following key documents: Project operational guidelines, manuals and systems, UNDP country programme document(s), Minutes of the SFM Project Steering Committee Meetings and other meetings (i.e. Project Appraisal Committee meetings) and Project site location maps.

### Key Informant interviews (KII)

Semi-structured questions were applied to the stakeholders in order to address the study objectives. The questions were aimed at obtaining both qualitative and quantitative data depending on the role of the stakeholder. KIIs were held with stakeholders both at the national and local levels. The KIIs involved face-to-face consultations with a wide range of stakeholders, using "semi-structured interviews" with a key set of questions in a conversational format (see Annex 2 – for the interview guide used in the field).

Triangulation of results, i.e., comparing information from different sources, such as documentation and interviews, or interviews on the same subject with different stakeholders, was used to corroborate or check the reliability of evidence.

Key stakeholders interviewed include the following amongst others: Staff of PMU and ECN, UNDP Nigeria Representative / Project Focal Point Person, GEF Nigeria Focal Point Person at the Federal Ministry of Environment, Director General - Energy Commission of Nigeria, Project Coordinator /Project Manager , SFM Project Administrative Officer, the selected state (Cross River) SFM Project's focal point persons, Officer at National Orientation Agency, Deputy Director at Federal Ministry of Finance, Budget and Planning, Chairman of Nigerian Alliance for Clean Cookstoves, Director and Deputy Director at the Federal Competition and Consumer Protection Commission.

In addition, the TE team interviewed various other stakeholders, project partners and beneficiaries like MFIs and MFBs representatives, clean cookstoves manufacturers, distributors, retailers and consumers. See Annex 4 for list of persons who were interviewed from across the 3 states.

Unfortunately, due to security restrictions and time constraints, the evaluation could not visit the field locations of project implementation.

## 3.2 Analysis and evaluation scope

The information collected, including documentary evidence, interviews and observations were compiled and organized according to the questions asked in the assessment (Annex 2: Interview Guide).

The TE team assessed the following four (4) categories of project progress:

**i. Project Strategy**

- Project design
- Results Framework/Log frame

**ii. Progress Towards Results**

- Progress Towards Objectives and Outcomes Analysis
- An assessment of Project performance was carried out, based against expectations set out in the Project Logical Framework/Results Framework, which provides performance and impact indicators for Project implementation along with their corresponding means of verification. The evaluation covered the criteria of: relevance, effectiveness, efficiency, sustainability and impact. Ratings were provided on the performance criteria. The rating is based on a 6-point scale, from highly satisfactory (6) to highly unsatisfactory (1). See (Annex 3).
- The evaluation framework is presented in in Annex 1, in a matrix with evaluation interview questions presented in Annex 2. The evaluation matrix also includes indicators and sources of verification. In general, the evaluation questions were distilled from the ToR for this evaluation and arranged around the evaluation criteria.

**iii. Project Implementation and Adaptive Management**

- Management Arrangements
- Work Planning
- Finance and co-finance
- Project-level Monitoring and Evaluation Systems
- Stakeholder Engagement
- Reporting
- Communications

**iv. Sustainability**

- Financial risks to sustainability
- Socio-economic risks to sustainability
- Institutional Framework and Governance risks to sustainability

The Terminal Evaluation addressed the following questions:

| |
|---|
| ***Relevance***: How did the project relate to the main objectives of the GEF Focal area, and to the environment and development priorities at the local, regional and national level? |
| ***Effectiveness***: To what extent have the expected outcomes and objectives of the project been achieved? |
| ***Efficiency***: Was the project implemented efficiently, in line with international and national norms and standards |
| ***Sustainability***: To what extent are there financial, institutional, socio-political, and/or environmental risks to sustaining long-term project results? |
| ***Gender equality and women's empowerment***: How did the project contribute to gender equality and women's empowerment? |
| ***Impact***: Are there indications that the project contributed to, or enabled progress toward energy self-sufficiency and reduced GHG emissions |

*Table 1: Evaluation Questions*

## 3.3 Limitations of the evaluation

Because of the unfavorable security situation in project implementation locations, in-person consultations with project implementers, counterparts and beneficiaries could not be done and only virtual consultations were conducted. These conditions were however specific and did not compromise the quality of the evaluation. They were mitigated by including key actors with direct knowledge and information about the project implementation from across the three states in the interviews.

# 4 Findings

The presentation of findings responds to the informational needs summarized in the questions and sub-questions of the evaluation matrix.

Evaluation findings and judgements are based on sound evidence and analysis as documented in this evaluation report. Information was triangulated/verified from different sources to the extent possible.

The evaluation assessed the project with respect to a minimum set of evaluation criteria grouped in four categories:

a) Attainment of objectives and planned results, which comprises the assessment of outputs achieved, relevance, effectiveness and efficiency and the review of outcomes towards impacts.
b) Sustainability and catalytic role, which focused on financial, socio-political, and ecological factors conditioning sustainability of project outcomes, including efforts and achievements in terms of replication and up-scaling of project innovations, lessons and good practices.
c) Processes affecting attainment of project results, which covers project preparation and readiness, implementation approach and adaptive management, stakeholder participation and public awareness, country ownership/driven-ness, project finance, UNDP supervision and backstopping, and project monitoring and evaluation systems.

Overall, the project received a **Moderately Satisfactory (MS)** rating in the Terminal Evaluation. The respective project ratings are summarized below:

| Criteria | Rating |
|---|---|
| Strategic Relevance | Satisfactory |
| Effectiveness | Moderately satisfactory |
| 1. Achievement of Outputs | Moderately satisfactory |
| 2. Achievement of Outcomes | Moderately satisfactory |
| Efficiency | Moderately satisfactory |
| Sustainability | Moderately likely |

*Table 2: Project Rating*

## 4.1 Project design

The proposed project was designed to comprehensively address one of the major causes of deforestation in Nigeria and in CRS specifically, the unsustainable use of non-renewable fuel wood in rural and peri-urban areas. To do so, the project was to, in partnership with UN-REDD program, support national and state-level efforts in CRS to improve forest conservation and management, thus sustaining supply of crucial forest resources for local population. At the same time, it was to work with national and international partners, technology providers, financial organizations, and local communities to identify and promote a set of alternative clean energy solutions to reduce their demand for fuelwood.

The project design was informed by PPG baseline study findings and broad stakeholder consultation. GEF funding was allocated under Components 1 to 4 to improve forest conservation and management and promote a set of alternative clean energy solutions. The project strategy was sound and based on the implementation in two mutually supportive and integrated components viz. supply-side management through enhanced production of fuelwood and demand side management through the promotion of improved stoves in the domestic sub-sector as an inclusive business to reduce fuelwood demand. This was to be achieved via a combination of downstream and upstream implementation.

The upstream implementation included planning processes, such as national and state-level policy, institutional and financial framework for sustainable forestry and fuelwood management. The design of the project did not clearly articulate a clear pathway for institutionalizing of activities into state and national level governmental plans and reforms. The sustainability of the SFM project relies heavily on the integration and uptake of project activities by the states beyond the project lifetime. Institutional ownership of the project beyond the implementation phase is therefore still unclear.

Secondly, the project design was over ambitious in establishing the benchmarks of project achievements. The EOP target related to protecting 50,000 hectares of forest under the REDD+ project had been set at an unrealistically high level and faced the challenge that the REDD+ programme is still in the readiness stage in Nigeria at EoP. To rely on another project (REDD+) to determine SFM project's success was a major design flaw. It was further established that technically and practically it was not feasible to implement SFM in highly forested REDD+ pilot sites given that the proposed REDD+ pilot areas are highly forested with indigenous highly valuable tree species and hence it was not advisable to introduce fast growing species that are mostly exotic. Consequently, and in the absence of adequate community land to establish the woodlots, the set targets were hard to achieve.

It is also unclear whether the project theory of change associated with some of the proposed outputs and outcomes was fully vetted. For instance, the indicator for Component 1 on sustainable fuel wood supply was given as “quantity of renewable fuelwood supplied by EOP”. This was not attainable because maturity of woodlands requires longer time periods than the 5-year project implementation phase. This resulted in the mid-term review recommending for a change of that indicator to a more feasible “hectares of renewable new forestland/new woodlot fuelwood supplied by EOP’’ to instead capture the targets in hectares for new forestlands and woodlots established. This is because, trees planted during the project could not have grown to be harvested in tons within the project implementation phase. In addition, new forestry laws in Cross River State banned the use of highly forested REDD+ pilot sites for any activity, including SFM. Consequently, the project team redirected activities towards the Northern part of the State, where land is very degraded and woodlots more expensive to establish. These high costs, combined with the lack of additional financial resources mobilized by the project, explains why only about 260 hectares of woodlots have been established, against an EOP target of 3,003 hectares.

## 4.2 Relevance

### Project alignment to relevant policies and strategies

The project was aligned to important national development plans, strategies, and policies. The degree of alignment is one of the elements that permitted the project to be strategically positioned as an important initiative for the country and key national stakeholders.

The TE team found out that the SFM Project is well designed and aligned with various relevant national, regional, and international policies as well as agreements / aspirations.

The project was prepared in a consultative manner with the Government of Nigeria, development partners, communities, and private sector stakeholders through a series of workshops and bilateral discussions. Inputs were received from the key relevant agencies of government such as the NCCS, Federal Ministry of Environment, Forestry Commissions, ECN, SON, NACC, NGOs (ICEED, CREDC, DARE, SME Fund) and financial institution (e.g. Fortis MFI). The process ensured that the project contained national energy priorities and objectives as defined by government policies and leveraged UNDP's comparative advantage. The process resulted in the project being aligned with key development plans, strategies, and policies, providing the basis on which the project built its programme of work.

Specifically, the TE found out the Project is consistent with the Nigeria Vision 2020 and Transformation Agenda (2013-2018). The Federal Government of Nigeria (FGN) put forth an ambitious vision for the country's economic development by 2020: Nigeria Vision 20: 2020 (FGN 2010). SFM project articulates well in its design and aligns to the following pillars of Vision 2020:

- *Institutional*: to promote responsible leadership, transparency, accountability, rule of law, and security of lives and property.
- *Social*: to improve the nation's prospects for achieving the Sustainable Development Goals (SDGs) and creating employment in a sustainable manner; and
- *Environmental*: to halt environmental degradation and promote renewable energy and climate change mitigation and adaptation.

The project fit into the government's Vision 20:2020 to replace 50% of firewood consumption for cooking by scaling up and replicating alternative clean bioenergy and reducing reliance on unsustainable firewood by promoting bioenergy standards and best practices.

With regard to alignment with regional and international agreement and aspirations, the TE found out that the Project is well aligned with the GEF-5 Climate change mitigation strategy that seeks to remove the barriers to access to affordable alternative energy by introducing the necessary legal, institutional and regulatory frameworks for scaling up of bioenergy solutions.

The SFM Project was designed to remove the technical barriers by providing the Government agencies, manufacturers, and communities with technical assistance. The Project also addresses the informational barriers with a component to carry out outreach programs designed to sensitize the communities on bioenergy and energy efficiency concepts and its potential for socio-economic development.

Additionally, the project was aligned to the region's priority for mainstreaming renewable energy and energy efficiency into their national policies. The Economic Community of West African States (ECOWAS), Renewable Energy Policy (EREP), and the ECOWAS Energy Efficiency Policy (EEEP) were adopted by the ECOWAS Council of Ministers and the Authority of Heads of State and Government in 2013. The vision of the EREP and the EEEP is to secure an increasing and comprehensive share of the Member States' energy supplies and services from timely, reliable, sufficient, efficient, cost-effective

uses of renewable energy sources enabling universal access to electricity by 2030 and a more sustainable, efficient, and safe provision of domestic energy services for cooking. ECOWAS' EREP and EEEP recognize fuelwoods (firewood and charcoal), which are used for domestic cooking purposes and commercial applications, as one of the renewable energy options that are not utilized efficiently but that have the potential for development in the ECOWAS region.

In the region, fuelwoods represent the bulk of final energy consumption, reaching up to 70-85 % in some countries. Within these policy frameworks and specifically under the programme for Supporting Energy Efficiency Activities in West Africa, a clean cooking initiative was launched in October 2012. The West African Clean Cooking Alliance (WACCA) sought to ensure that the entire population in the region has access to clean, safe, efficient, and affordable cooking fuels and devices by 2030. WACCA works both on the supply and demand side of the cooking chain.

With regard to country ownership of the SFM Project, the TE found out that the Federal Government of Nigeria signed the UNFCCC convention on June 13th 1992, and ratified it in August 1994. Nigeria ratified the Kyoto Protocol on the 10th of December 2004.

The SFM project was also well aligned with the measures highlighted in the INDC submitted by the Government of Nigeria to UNFCCC on 28 November 2015 to promote energy efficiency by 2% per year (30% by 2030) and promote climate smart agriculture and reforestation.

Further, the project aligns with the UNDP Country Programme Document (CPD 2018-2022)[5]: Pillar III on Environmental sustainability and resilience of the UNDP Country Programme Document asserts that will work with partners on six strategic interventions that are aligned to the project viz

i. Supporting the implementation of *Nationally Determined Contributions (NDCs)* in five sectors of the economy, National Policy on Environment, and the Sendai Framework and other multilateral and international related commitments (especially those focusing on biodiversity, desertification, chemicals and the Montreal Protocol)
ii. Strengthening national and sub-national capacities for participatory planning, policy formulation, national disaster management legislation, sound environment management, including land degradation, resilience to climate change, sustainable natural resources management, conservation of biodiversity and disaster management
iii. Strengthening national preparedness capacities to access the Green Climate Fund (GCF) and GEF, using UNDP global and regional expertise to augment national budgetary allocations, which will contribute to increased access to clean and renewable energy, reduce emissions from deforestation and forest degradation
iv. Raising awareness, empowering local communities, facilitating access to clean energy, and promoting environment related livelihoods opportunities downstream with a focus on South-South cooperation and the Middle Belt
v. Scaling up partnerships with the Bank of Industry (BOI), forging new partnerships for increased investment in clean energy for community development and to stimulate local economies.

Additionally, it was identified that the promotion energy efficiencies and the SFM project in general has a broad potential to contribute to at least 7 of the 17 objectives and goals established in the 2030 Agenda for Sustainable Development (SDGs). These include:

- Goal 7 Guarantee access to affordable, safe, sustainable, and modern energy for all.

[5] UNDP Country programme document for Nigeria (2018-2022)

- Goal 8 Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all.
- Goal 9 Build resilient infrastructure promote inclusive and sustainable industrialization, and foster innovation.
- Goal 11 Make cities and human settlements inclusive, safe, resilient, and sustainable.
- Goal 12 Guarantee sustainable consumption and production patterns.
- Goal 13 Adopt urgent measures to combat climate change and its effects (taking note of the agreements adopted in the forum of the United Nations Framework Convention on Climate Change).
- Goal 15 Sustainably manage forests, combat desertification, halt and reverse land degradation and halt the loss of biodiversity.

### Response to emerging issues

The project's response to emerging needs was appropriate.

The project appropriately selected the Cross River and Delta State as geographical focus areas of implementation and was designed to address one of the major causes of deforestation and land degradation and desertification in Kaduna State, specifically the unsustainable use of non-renewable fuel wood in rural and peri-urban areas. The UN-REDD+ selected CRS as a pilot to demonstrate its REDD+ readiness model whilst it targeted Delta State as the next state to replicate the success in Cross River and the focus communities have been sensitized on the REDD+ programme and its benefits.

The Project Design was found to be effective because it premised on empowerment; both to the government agencies, the fuelwood supply chain main actors and to the consumers in tackling the challenges of access to clean, safe and affordable cookstove and fuels in order to alleviate their livelihood challenges, environment and climate change impacts.

The empowerment interventions are also well inclined towards the most vulnerable (women, youth and children). The Project clearly integrates the four critical areas of intervention in addressing issues affecting fuelwood management, these are: (i) increasing supply of sustainable forestland and woodlot fuelwood products; (ii) increasing awareness and change of attitude for the acquisition of clean cookstoves by users and hence reduce the demand for fuelwood products through increased efficiency in the cleaning cooking and also to reduce carbon emission; iii) improvement of the clean cookstoves technology through enhance capability to their efficiency, quality affordability, as well as the growth and development of the entire sustainable fuelwood management supply chain; and iv) establishment of a working financial model for the entire sustainable fuelwood value chain.

The TE also found out that gender equality and female empowerment were central to project design. Women's participation, representation and access to resources and benefits was central focus of the Project design and hence focused on providing access to improved household energy through sustainable fuelwood and clean stoves/kilns.

The Project was expected to contribute towards social, economic governance transformations to empower women through specific activities like promotion of participatory and consultative planning for decision- making; improved women's capabilities through their involvement and their technical capabilities in setting up and maintaining multi-functional platforms, manufacturing of cookstoves, retailers and distributors / wholesalers of finished clean cookstoves, as well as consumers. Indeed, the project's MTR and this TE confirmed that various women beneficiaries of the project have become SFM role models and advanced their influence in decision-making as well as control over natural resources planning and use.

The SFM Project supply chain financing model assisted women in establishing RE and EE related businesses which they have traditionally been constrained to carry out due to family and traditional obligations, including a lack of access to credit, technology, and limited business skills. Additionally, the business development training carried out by the Project has had a specific focus on developing businesses run by women.

The project responded to the needs perceived by the different groups of beneficiaries. The demands identified and covered by the design and implementation of the project were as follows:

i. **Capacity development:** The training spaces offered by the initiative have covered an unsatisfied demand for training on clean wood/charcoal cookstoves. The trainings have been valued as relevant by the key stakeholders consulted, something which was further reflected in the high levels of and engendered participation in the different trainings offered.
ii. **Sensitization:** The awareness of Nigerians at the Bottom of Pyramid (BoP) regarding clean wood/charcoal cookstoves technologies was very low prior to the project. The programme made significant gains in responding to the demand from the target group and other key actors (Government, private sector – e.g. MFIs) on sensitization on clean wood/charcoal cookstoves which is considered a necessary precondition for investments in energy-efficient technologies and ecosystem in the country.
iii. **Institutional strengthening:** The ECN has had limited tools to promote the development of energy-efficient cookstoves technologies in country. The project, in addition to developing the capacities of public officials, supported the development of number of training materials.

In summary, the project design was pertinent and relevant for the advancement of national policies and strategies for Sustainable Fuelwood Management (SFM). The regulatory framework in which the project was inserted at the beginning corresponded to the one established by the relevant National policies. The project contributed to the sustainable fuel wood production and consumption for multiple socio-economic and environmental benefits, including carbon storage and sequestration. Through this project, the outcomes and projected benefits have presented a high level of alignment at the national level.

| | |
|---|---|
| ***Strategic relevance is rated as:*** | ***Satisfactory*** |

## 4.3 Effectiveness

As a result of the actions carried out by the project, the outcomes were rated as **moderately satisfactory**.

A lot of achievements with far reaching impacts on ordinary Nigerians have been recorded. Some of the key achievements are highlighted in the following:

Despite increased importance attached to land ownership and ancestral inheritance as well as the need for lands for other development, the project managed to successfully establish over 350 hectares of new renewable woodlots for sustainable fuelwood harvesting within Cross River, Delta, and Kaduna State.

The woodlots established have contributed to positive outcomes of carbon sequestration /capture, and additionally reduced deforestation.

Over 30,000 energy-efficient cookstoves were deployed in households across the 3 States of focus (Cross River, Delta, and Kaduna) to replace traditional and highly polluting 3-stone stoves. It is estimated that cumulatively about 15,000 households benefitted from using these energy-efficient cookstoves directly provided by the project. The catalytic support from the SFM project further led to local manufacturers producing another over 15,000 low-cost energy-efficient stoves. The use of these cookstoves has led to significant fuelwood savings and some GHG mitigation which is directly attributed to the project.

Over 250 young women and men were trained as business agents for the promotion of clean cookstoves and woodlot establishment in Nigeria. Fourteen (14) Micro-finance institutions have been capitalized and capacitated to provide sustainable fuelwood management financing models that enables low-income groups in the target communities to access no-interest loans for the purchase of the energy efficient cookstoves

Between 2020 and 2021, SFM woodlots were established within degraded forest reserves in the three States. With support from the State Government, this effort has continued beyond the project's life.

Four components of the project were fully implemented: One Multi-Functional Platforms (SFM Demonstration Centers) per State was established. Domestic cookstoves manufacturing took place in the three states. Community Energy Enterprise on Energy-Efficient Charcoal production with charcoal briquetting using agricultural wastes as alternative feedstocks as against cutting trees was included in Demo Centers in the states. The Demo Centers are currently also serving as Community ICT Learning Centers powered by Solar energy.

SFM project has further stimulated local manufacturing of energy-efficient wood and charcoal cookstoves thereby increasing market penetration of the stoves. It has brought in competitive market for cookstoves, because more youths and even women are now going into cookstoves manufacturing. Prior to SFM project, local manufacturers did not bother with engineering designs of their stoves as well as laboratory testing, but through this SFM project, locally made stoves were sent to the National Laboratory Testing Center for Cookstoves located in the National Center for Energy Research and Development (NCERD), University of Nigeria, Nsukka under the auspices of the Energy Commission of Nigeria (ECN).

Gender Sensitive Trainings were organized, and a total of 478 men and women trained and certified as social entrepreneurs (over 100 in each State). Over 60 youths trained on the production, use and maintenance of energy-efficient cookstoves. 15 MFI/MFB staff per State have been trained to support the establishment of appropriate financing model for sustainable fuelwood management in Nigeria.

The most critical risk encountered was insurgency and kidnappings in Nigeria. However, effort was being made to work with the local vigilantes and security agents in providing securities. Another risk was in aligning the SFM project with REDD+ activities in securing of 50,000 hectares of forest land in Cross River and Delta States, because the REDD+ is still at the same readiness stage it was during the PPG phase. The full implementation of the REDD+ has not started, resulting in the challenge of aligning with it as stated in the project document.

The SFM project successfully mobilized State actors in Delta, Cross River and Kaduna at policy, grass roots, microfinance, and academia levels to embrace an integrated approach to arresting of deforestation using innovative business models.

### Progress towards Outcomes Analysis

| ***Objective: Sustainable fuelwood management in Nigeria secures multiple environmental and socio- economic benefits, including reduced GHG emission from fuelwood consumption, enhanced carbon storage and sequestration, as well as improved rural livelihoods and opportunities for local development*** | |
|---|---|
| **Progress towards achieving the project objective is rated as:** | **Moderately Unsatisfactory (MU)** |

Achievement of the project objective is rated as **moderately unsatisfactory**

| Indicator | Baseline-Level | End-of-Project target | End Term Assessment | Rating |
|---|---|---|---|---|
| A Level / % of increased environmental services or values | REDD+ programme being implemented | - 50,000 ha forest protected under REDD+ programme by EOP<br>- 5,198,739 $tCO_2e$ sequestered over the lifetime of the project | • Not achieved<br>• EoP's target assumed that UNREDD+ would be implemented but this has not happened by EoP and UNREDD+ is still at readiness assessment stage. | *Highly Unsatisfactory (HU)* |
| Level / % of increased economic services or values | No formal woodlot system established in Kaduna State | - By EOP, 3,003 ha woodlot farms established<br>- 176,436 t of renewable fuelwood supplied by EOP and 705,744 t fuelwood supplied over lifetime<br>- 168,468 $tCO_2e$ avoided over lifetime | • 266.5 hectares of SFM woodlots established between 2018 and 2020 comprising of 50 hectares, 146,5 hectares and 70 hectares in Cross River, Kaduna and Delta States respectively.<br>• About 3,500 hectares, 2,000 hectares and 1,000 hectares secured in Kaduna, Delta and Cross River States respectively of forest reserves have been set aside for conversion into woodlots in future | *Moderately Unsatisfactory (MU)* |
| Level / % of increased socio-cultural services or values | No formal or fragmented stove supply chain | - 595,165 $tCO_2e$ saved by EOP | - 433,307 tCO2e saved (including CO2, CH4 and N2O) out of which 92.7% of the total lifetime GHG savings result from the deployment and use of the clean cookstoves[6] | *Satisfactory (S)* |

[6] Based on study of selected 26,264 clean cook stoves that have been produced and deployed through this project: this includes 25,938 Domestic Improved Cook Stoves (ICS), 320 Institutional ICS and 6 clean Industrial Kilns

*Table 3: Progress towards results, project objective*

This EoP's targets assumed that UNREDD+ would be implemented. The UN-REDD+ programme in Nigeria is still at the readiness assessment stage. There are various immediate, medium- and long-term achievements that were however realized in the lifecycle of the SFM Project. These achievements include:

- The establishment of over 266.5 hectares of farmer-managed community-based woodlot plantations in selected communities of Cross River, Kaduna, and Delta States.
- A State Forestry Policy that integrated the SFM model and linked to the establishment of a national forestry trust fund and a forestry council was developed.
- The council that the project put in place was a "Flagship" Annual High Level Political Forum (HLPF)/Summit which held meetings in Cross River, Delta and Kaduna respectively in 2017, 2018 and 2019 to secure the buy-in of policy and decision makers in the three states (due to COVID, the 2020/2021 Summit could however not be held).
- 3,500 hectares, 2,000 hectares and 1,000 hectares of forest reserves were secured in Kaduna, Delta, and Cross River States respectively for conversion to woodlots.
- Five tree nurseries were established in 2018 with 500,000 seedlings which were transplanted in 2019 in Cross River, Delta, and Kaduna States. Over 1,000,000 seedlings were raised in 2019 and have been transplanted to woodlots in 2020. Similarly, the project established 6 tree nurseries during the beginning of 2020 which have been replanted in 2021.
- In 2018, 2019, 2020 and part of 2021 gender sensitive technical and business trainings on SFM best practices were successfully conducted in Cross River, Delta and Kaduna States. Cumulatively, 335 women were trained by the project.

| ***Outcome 1: Sustainable Fuelwood Supply Management.***<br><br>***Models for sustainable fuelwood production demonstrated in:***<br>***a. At least 10 communities each in Cross River and Delta State leading to:***<br>***50,000 ha of forestlands under improved multifunctional forest management; 20 business agents trained in SFM; SFM and SLM Management Committees created/strengthened.***<br>***b. 3,003 ha of degraded land restored with Sustainable Land Management measures like agroforestry woodlots and Farmer Managed Natural Regeneration (FMNR); SLM Management Committee created/strengthened in SLM*** | |
|---|---|
| **Progress towards achieving Outcome 1 is rated as:** | **Moderately Unsatisfactory** |

Significant achievements were realized under Component 1 aimed at Sustainable Fuelwood Supply Management

Progress towards achievement of the Outcome 1 is rated as moderately unsatisfactory, as outlined below in Table 4.

| Indicator | Baseline-Level | End-of-Project target | End Term Assessment | Rating |
|---|---|---|---|---|
| Hectarage of forest protected and tons of CO2 sequestered by EOP. | No formal woodlot system established in Kaduna State | - By EOP, 3,003 ha woodlot farms established<br><br>- 20 nurseries established by year 3 (15)<br><br>- 9,000,000 seedlings raised, sold and planted by EOP<br><br>- 176,436 t of renewable fuelwood supplied by EOP and 705,744 t fuelwood supplied over lifetime<br><br>- 168,468 t CO2e avoided over lifetime | • 266.5 hectares of SFM woodlots were established between 2018 and 2020, (50 hectares, 146,5 hectares and 70 hectares in Cross River, Kaduna and Delta States respectively)<br><br>• 1 million nursery bags for tree nurseries produced and<br>• 15 nurseries successfully established i(5 in each state)<br><br>• No fuelwood supplied because woodlots are still growing<br><br>• No significant CO2e abatement benefits attributable to woodlots due to significantly low project achievement in area under woodlots by EoP | *Moderately Unsatisfactory (MU)* |
| No. of partners involved in the project towards reaching the project goal by EOP | REDD+ programme being implemented | - 50,000 ha forest protected under REDD+ programme by EOP<br>- 5,198,739 tCO2e sequestered over project's lifetime | • REDD+ programme has not begun implementation and therefore no indicator targets have been achieved[7].<br>• 50 partners involved during project implementation | *Highly Unsatisfactory (HU):* |

[7] EoP's target was based on the assumptions that UNREDD+ would be implemented in Nigeria, particularly, Cross River State. Unfortunately by EoP, the UN-REDD+ programme in Nigeria was still at the readiness assessment stage.

| Indicator | Baseline-Level | End-of-Project target | End Term Assessment | Rating |
|---|---|---|---|---|
| Number of viable multifunctional platforms (MFPs) established in Cross River, Delta and Kaduna State by EOP | - No Multifunctional platforms exist | - By the EoP, 3 multifunctional platforms established each in Cross River, Delta and Kaduna State | • Three (3) Multi-functional Platforms/SFM Demo Centers have been established (1 per state)<br>• Over 10 Forest Management Committees (FMCs) established and are operational. | *Satisfactory (S)* |

*Table 4: Progress towards Outcome 1*

Efforts were made to use States' Forest reserve land for the establishment of forests and to gain acceptance by communities and private landowners to allocate land for the establishment of woodlots in Kaduna State, as well as in the other two states. Several consultative meetings were undertaken at the State and community levels to sensitize and create awareness among fuelwood value chain actors. "Flagship" Annual High-level Political Forum (HLPF)/Summits were held in Cross River, Delta, and Kaduna respectively in 2017, 2018 and 2019 to secure the buy-in of policy and decision makers in the three States.

**Some highlight achievements of outcome 1 include:**

- Establishment of a total of 266.5 hectares of SFM woodlots between 2018 and 2020 using farmer-managed approach on degraded lands in the three States, comprising of 50 hectares, 146,5 hectares and 70 hectares in Cross River, Kaduna and Delta States respectively.
- Establishment of over 10 Community Forest Management Committees (CFMCs) in each of the Local Government Areas where the woodlots are located to get buy-in from community land custodians in the 3 States.
- Capacity Building and sensitization meetings on tree nurseries/ woodlot plantation establishment were held with forestry experts from the 3 States.
- Production of hands-on Training Manuals on tree nurseries and woodlot establishment and management for SFM. The manuals were disseminated and used in conducting a training held on 8th – 9th May 2018.
- Production of training manual for nursery development, and production of quality seedlings for the establishment of woodlots in 2019. This was used during the gender sensitive trainings
- Securing of land in the 3 States (3,500 hectares, 2,000 hectares and 1,000 hectares in Kaduna, Delta and Cross River States respectively) to be used for the establishment of woodlots and GIS mapping of these lands.
- Establishment of central nurseries in each of the three States and production of 1 million nursery bags for tree nurseries establishment.
- Engaging over 50 partners including civil society organizations, indigenous peoples, the private sector, and microfinance institutions in SFM project activities
- Establishment of three (3) Multi-functional Platforms (MFPs)/Demonstration Centers (1 per state). These MFPs are a one-stop -SFM shopping center that serve as a center of attraction for the popularization and dissemination of SFM Best Practices. The SFM Demonstration Center demonstrates the inter-linkages existing among fuelwood value chain actors (i.e, the supply and demand sides of fuelwood; energy-efficient woodstoves and Micro Finance Institutions (MFIs)/Micro-Finance Banks).

| ***Outcome2: Improved management of demand for fuelwood and other alternative fuels.***<br><br>***Improved awareness and acceptance of alternative (renewable and more efficient) energy technologies for cooking and heating among local communities in Cross River, Delta and Kaduna State. Increased penetration of improved/alternative energy technologies for domestic needs in targeted communities by at least 20% (BAU: 0.1%); Avoided emissions of 50,000 t CO2e/year from combustion of un-sustainable biomass in inefficient cook stoves (replaced by more efficient or other alternatives)*** | |
|---|---|
| **Progress towards achieving Outcome 1 is rated as:** | **Satisfactory** |

| Indicator | Baseline -Level | End-of-Project target | End Term Assessment | Rating |
|---|---|---|---|---|
| Report on Market Segmentation in Nigeria developed | Preliminary Global Alliance for Clean Cookstoves (GACC) market assessment report in 2012. | - By year 3, 1 detailed report on Market Segmentation in Nigeria developed | • Market Segmentation Study on efficient woodstoves in Cross River, Delta and Kaduna State produced and validated | *Satisfactory (S)* |
| Number of women sensitized and trained by EOP | No formal training. | 300 women trained and certified as social entrepreneurs by EOP (100 in each state) | • 335 women were trained and certified, on social entrepreneurship for cookstoves sales and production | *Satisfactory (S)* |
| Number of domestic cookstoves produced and distributed for BOP by EoP | No formal stove supply chain | 20,000 stoves produced and distributed for BOP by EOP | • 21,010 stoves were produced and distributed through direct SFM project funding | *Satisfactory (S)* |
| $tCO_2e$ saved by EOP and lifetime by EOP | No formal stove supply chain | - 595,165 $tCO_2e$ saved by EOP<br><br>- Avoided emissions of 40,000 t $CO_2$ eq/year from combustion of un-sustainable biomass in inefficient cook stoves/kilns | • Total Lifetime Direct Energy Savings of 6,479 TJ<br><br>• 433,307 tCO2e lifetime GHG savings (including CO2, CH4 and N2O) out of which 92.7% result from the deployment and use of the clean cookstoves households (clean cookstoves and kilns deployed in institutions and industries yield 7.5% and 0.1% emissions reductions respectively) | *Satisfactory (S)* |

*Table 5: Progress towards Outcome 2*

**Some highlight achievements of outcome 2 include:**

- Production of a market segmentation report in Nigeria and convention of a national stakeholder's validation workshop held in Lagos on 25th June 2019 to review and validate the report.
- Training and certifying 335 women on social entrepreneurship for cookstoves sales and production. The individuals trained have taken up cookstoves manufacturing, dissemination, sales and marketing as their business, which has created jobs and increased the use of energy-efficient stoves in Nigeria. These entrepreneurs have formed themselves into Sustainable Fuelwood

Cooperative Societies in each of the three States. Domestic cookstoves manufacturers have also formed a cookstove production cooperative groups named “Sustainable Clean Cookstoves Manufacturers Cooperative Society Limited" to jointly sustain domestic industry for clean cookstoves beyond the project's lifespan

- Production and distribution of 21,010 stoves through direct SFM project funding
- Capacitation and catalyzation of five domestic industries to produce and disseminate over 15,000 stoves through own private investments in cookstoves production businesses. These factories are:
    - *Nenu Engineering Limited, Gwazunu Road, Suleja, Niger State*
    - *Roshan Global Services (Manufacturers of Happy Cookstoves)*
    - *Evirolife (Ekwuk stove) - Ekwuk Stove. Alesi Community, Ikom, LGA, CRS*
    - *Greenland FatiGold Services Nigeria Limited, New Bauchi Road, Saminaka community, Kaduna State*
    - *MethanoGreen Clean Energy Nigeria Limited, Ushafa, Bwari LGA, Abuja*
- The SFM project stimulated local manufacturing of energy-efficient wood and charcoal cookstoves. This increased market penetration of the stoves. It also brought in a competitive market for cookstoves, because more youths and women were now going into cookstoves manufacturing. Additionally, prior to SFM project, local manufacturers did not bother with engineering designs of their stoves as well as laboratory testing, but through the SFM project, locally made stoves were sent for standard and quality testing to the National Laboratory Testing Center for Cookstoves located in the National Center for Energy Research and Development (NCERD), University of Nigeria, Nsukka under the auspices of the Energy Commission of Nigeria (ECN). Some of the manufacturers have even entered into agreements with international Carbon Credit Traders and are now producing thousands of cookstoves.

| *Outcome 3: Improved efficiency, quality and affordability of domestically manufactured cooking/heating appliances for BOP and Strengthened domestic supply chain for EE/RE cooking and heating appliances* | |
|---|---|
| **Progress towards achieving Outcome 3 is rated as:** | **Highly Satisfactory** |

| Indicator | Baseline -Level | End-of-Project target | End Term Assessment | Rating |
|---|---|---|---|---|
| Number of low-cost stoves designed, made and tested for each state by EOP | No specific number of clean cookstoves had been designed, made and tested for BOP market. | At least 1 low cost clean cookstove designed, made, and tested for each of the BOP market in Cross River, Delta and Kaduna State by EOP | • Five (5) working prototypes /physical samples of improved energy efficient cook stoves were produced | *Satisfactory (S)* |
| Number of low-cost stoves produced and sold by EOP | No formal local production for BOP market | 20,000 low-cost stoves produced and sold in Cross River, Delta and Kaduna State for BOP market by EOP) | About 29,500 low-cost clean, energy efficient cookstoves were produced and sold by EoP | *Highly Satisfactory (HS)* |

*Table 6: Progress towards Outcome 3*

**Some highlight achievements of outcome 3 include:**

- Production of five (5) working prototypes / physical samples of different cook stoves. Expert-Peer Review of the prototype stoves was held in July 2019 at Lagos. The SFM project then customized the wood/charcoal cookstoves and presented he same to local manufacturers for production. In 2019, a "Trademark" for the Stoves was designed and the stoves branded.
- Provision of catalytic support from the SFM project to local manufacturers who managed to produce over 15,000 low-cost stoves in addition to the 14,500 low-cost stoves paid for by the SFM project bringing the cumulative total of low cost stoves produced and sold to about 29,500 by EoP.
- In order to build local capacity in design and manufacturing of clean cookstoves, the SFM project organized participatory and gender sensitive and peer to peer training for local SMEs, distributors and community centers on June 2018 and July 2019 held in the three States

| **Outcome 4: Established and successfully operating consumer financing model for clean cook stoves/kilns**<br><br>**Consumer financing model for clean cook stove/kiln successfully operated. Sales of efficient cook stoves increased by at least 20% in Cross River, Delta and Kaduna State. Investment in sustainable forest management in Cross River and Delta State and woodlot in Kaduna State increased.** | |
|---|---|
| **Progress towards achieving Outcome 4 is rated as:** | **Satisfactory** |

| **Indicator** | **Baseline -Level** | **End-of-Project target** | **End Term Assessment** | **Rating** |
|---|---|---|---|---|
| -Number of financial products designed and tested and scaled up by EOP<br><br>-Volume of loans disbursed by EOP<br><br>-Number of households reached with clean stoves | No tangible financial products targeted for promoting production and distribution of Renewable Energy and Energy Efficient Cooking and heating technology to consumers. | -At least 2 financial products (matching rebate, startup loan) designed and tested and scaled up by EOP<br><br>-USD 500,000 disbursed by EoP<br><br>Households sensitized on clean stoves by EoP | • Payment for Environmental Services & Community Forest Fund financial products were developed in 2019<br><br>• US$335,000 was disbursed to producers of energy efficient clean cookstoves by EoP<br><br>• Over 1,650 households were sensitized on the benefits of clean stoves | *Moderately Satisfactory (MS)* |
| Number of MFBs and MFIs staff trained by EOP | No formal certified training | 20 bank/MFI staff trained in each state Cross River, Delta and Kaduna State by EoP | • Over 100 staffs (35 in each state) of MFI & MFBs were trained on grants management and disbursement protocols to fuel wood value chain actors | *Satisfactory (S)* |

*Table 7: Progress towards Outcome 4*

**Some highlight achievements of outcome 4 include:**

- Development of 2 financial products (Payment for Environmental Services & Community Forest Fund) that provide matching rebate and startup loans to producers of energy efficient clean cookstoves
- Disbursement of US$335,000 was to producers of energy efficient clean cookstoves
- Undertaking community-based sensitization campaigns for over 1,650 households on the benefits of clean stoves
- In 2020, at least 20 staffers of MFIs/MFBs in each State were trained using a prepared training manual. So, over 100 staffs of MFI & MFBs were trained on grants management and disbursement protocols to fuel wood value chain actors.

- Target end-users (fuel wood value chain actors) were trained and made aware about the existence of the grants and how to access the same.

| ***Effectiveness is rated as:*** | ***Moderately satisfactory*** |
|---|---|

## 4.4 Normative values

### Gender

Gender sensitivity was considered in all aspects of implementation within the project whether it was training or other activities, such as: tree nursery/woodlot establishment, wood/charcoal cookstove production, sales and distribution, value chain development, or planning and budgeting, participants/value chain actors must be aware of the gender dimensions of the project.

How women and men may differently use woodlots or cookstoves; how they have different access to technologies; their roles in livelihoods; the social factors that create different vulnerabilities towards natural hazards; how are they are affected by a program's activities etc. were all considered throughout the implementation of the project activities. The implementation of the Sustainable Fuelwood Management project took into account the needs, priorities, and expectations of both women and men while planning, implementing and evaluating activities in order to ensure that women and men received equitable benefits from the project activities

A total of 335 women were trained and certified on social entrepreneurs for cookstoves sales and production. The trainings focused on two aspects: sales/marketing of energy-efficient cookstoves (246 women) and the production techniques of the cookstoves (89 women).

The following tables provide a summary of gender sensitive trainings conducted by state.

| Year | Cross River State | | | Delta State | | | Kaduna State | | |
|---|---|---|---|---|---|---|---|---|---|
| | Male | Female | Total | Male | Female | Total | Male | Female | Total |
| **2018** | 10 | 16 | **26** | 15 | 30 | **45** | 0 | 30 | **30** |
| **2019** | 17 | 23 | **40** | 21 | 19 | **40** | 9 | 40 | **49** |
| **2020** | 9 | 11 | **20** | 9 | 11 | **20** | 3 | 18 | **21** |
| **2021** | 6 | 14 | **20** | 4 | 16 | **20** | 2 | 18 | **20** |
| **Total** | **42** | **64** | **106** | **49** | **76** | **125** | **14** | **106** | **120** |

*Table 8: Gender-sensitive training on Cookstoves' Business Entrepreneurs/Sales Agents conducted between 2018 and 2021*

| Year | Cross River State | | | Delta State | | | Kaduna State | | |
|---|---|---|---|---|---|---|---|---|---|
| | Male | Female | Total | Male | Female | Total | Male | Female | Total |
| **2018** | 30 | 15 | 45 | - | - | - | 91 | 40 | 131 |
| **2019** | 32 | 10 | 42 | 35 | 10 | 45 | 51 | 17 | 68 |
| **2020** | 51 | 13 | 64 | 53 | 10 | 63 | 83 | 25 | 108 |
| **Total** | 113 | 38 | 151 | 88 | 20 | 108 | 225 | 82 | 307 |

*Table 9: Gender sensitive training on maintenance for community farmers conducted between 2018 and 2020*

The project further undertook sensitization/awareness campaigns on the benefits of sustainable fuelwood management (SFM) and specifically targeted women and children who are the ones mostly affected by indoor air pollution (IAP).

Finally, the evaluation team was informed that grants disbursed through MFIs/MFBs were made more accessible to rural women without access to commercial banks, thereby enhancing productive activities and income.

## Partnerships

The project established a Project Steering Committee comprising of relevant Ministries, Departments and Agencies of government at Federal and States (Cross River, Delta and Kaduna). Many Civil Societies, Non-governmental Organizations and Private sector actors all who were fully involved in implementation.

Key promoters of clean cookstoves such as ICEED, SMEFund. DARE and industries active in Cookstove Manufacturing and Promotions such as Roshan Global Services; Envirofit Nigeria; SMEFund ; Ekwuk Stove, Cross River State ; Nenu Engineering; Greenland Fati Gold Services Limited; Methano Green Limited-Producer of Lafia Improved Charcoal and Wood Stoves as well as members of the Microfinance and Non-Bank Institutions, etc. became significant partners in project implementation.

Advocacy and awareness campaigns partners included CSOs like: Mfaminyen Conservation Society; Nigerian Alliance for Clean Cookstoves (NACC); NGO Coalition on Environment (NGOCE), Calabar; Coastal and Marine Areas Development Initiative (CMADI) Warri; Women Initiative for Sustainable Environment (WISE); Rural Women and Youth Development Initiative; UNIFECS Nigeria Limited (Centre for Gender and Social Policy Studies Obafemi Awolowo University Ile-Ife, etc.

Moreover, the project worked closely with State's Association of Micro-Finance Banks and Institutions, which supported developing appropriate financing model for the sustainable fuelwood management at community levels and local manufacturers of energy-efficient wood/charcoal cookstoves, which helped project surpass the target of 20,000 stoves projected by end of project.

The partnerships established during the project implementation led to the following positive results:

- Increased buy-in at community and State levels was because of direct partnerships with community leaders who assisted in the formation of Community Forest Management Committees (CFMCs);
- Increased awareness and acceptance of cookstoves as a direct outcome of engagement with NGOs and CBOs
- Creation of higher local capacity in the manufacturing of clay-metal based energy-efficient wood/charcoal cookstoves due to partnerships with the domestic cookstove producers
- Generated effective disbursement and management of grants meant for BoP end-users and fuelwood value-chain actors due to partnerships with financial experts and the members of the National Association of Micro-Finance Banks and Institutions within Cross River, Kaduna and Delta States in Nigeria;
- Development of new designs of cookstoves and laboratory testing of the locally made stoves to ascertain their level of efficiency which was a direct outcome of partnership with the National Laboratory Testing Center at the National Center for Energy Research and Development located in University of Nigeria, Nsukka, Nigeria.

## Social and Environmental Safeguards

The project was expected to enhance the availability, accessibility and quality of energy services for the base of pyramid (BOP) households, including potentially marginalized individuals and groups, and increase their inclusion in decision-making processes that may impact them. The project sought to also support the meaningful participation and inclusion of all stakeholders, in particular marginalized individuals and groups, in processes that may impact them.

The SFM project sought to balance the efficient demand of fuelwood with sustainable supply as an inclusive value chain business model where the poor, women and youth are empowered to participate as value chain actors. Training in business knowledge and technical skills was provided. During implementation, vulnerable communities, and groups, especially women, children, the elderly, and socially or economically disadvantaged groups were engaged in training, sensitization and awareness creation to ensure the inclusiveness in activities implemented.

As an example, one of the key contributions of the project was to reduce indoor and outdoor pollutions from traditional 3-stone open-to-sun method of cooking by promotion of improved cook stoves and other sustainable energy solutions. Cooking is a major and important human activity in Nigeria in every household because most of the food items must be heated, smoked, dried or cooked before consumption, whilst also being a source of health concern to many, especially women who primarily undertake the cooking chores. Over 29,000 improved cook stoves were distributed to BOP households over the course of the project. Improved cookstoves reduce open fire cooking and reduced the reliance on wood as a fuel source by promoting modern fuel usage and changed norms.

The gains from activities focused on sustainable forestry management, promotion of improved cook stoves, and other sustainable energy solutions were clearly visible during the evaluation exercise as is evidenced by the outputs in the preceding sections. These outputs while still at the early stages are expected to generate multiple environmental and socio-economic benefits, including reduced GHG emissions from wood fuel consumption, enhanced carbon storage and sequestration, as well as improved rural livelihoods and opportunities for local development.

It is worth noting that sustainable fuelwood management activities are being implemented around critical habitats and environmentally sensitive (as well as areas that face increasing insecurity during latter stages of implementation) locations, and there was a need to closely monitor safeguards risks. The initial SESP conducted in 2016 was never updated. UNDP is currently undertaking a deep dive assessment of selected projects around the globe (including the SFM project as a case study) to review biomass projects around aspects such as sustainability, environmental soundness, health considerations, and risks and safeguards which will be able to provide deeper insights into social and environmental risks of the SFM project.

The UNDP social and environmental screening process (SESP) was carried out as part of the project preparation phase (PPG). Table 10 presents an update on the project's social and environmental risks described in SESP and at EoP.

| Risk at project design | Risk at EOP | Mitigation measures that were taken during project |
|---|---|---|
| There was limited social and/or cultural acceptance (this applies to the improved cook stoves, as people needed to adjust their behavior, which was difficult to achieve). Although the project intended to address this directly, there were still aspects of it that are difficult to control. | It has become very difficult to get firewood (especially in the northern Nigeria), which has reduced the risk of limited social and cultural acceptance of improved cookstoves. In the south and west the risk is still moderate. | The project undertook sensitization and awareness campaigns at all levels to sensitize the communities. Community leaders were consulted to educate their members. Sample stoves were taken to the communities to demonstrate their effectiveness over the tradition stoves etc. |
| Climate change and ecosystems fragility are relevant threats. Macro-economic situation (due to COVID, inflation, impact of war in Ukraine etc.) and governance issues are also threatening factors.<br>Climate change is expected to change Nigeria's biomass production, accelerate land degradation, and modify the hydrological system. However, this is a longer-term risk. If the effects of this were to be experienced during project implementation, any potential operation of the project woodlots and biomass production would be affected. | This risk is increasing across the country but far more pronounced in the far northern part of Nigeria, and less pronounced in the southern parts | The implementation of the SFM project is squarely addressing the risks associated with climate change by reducing emissions from fuelwood combustion through use of energy efficient cookstoves and enhancing carbon sequestration through sustainable forest management |
| Project activities would have likely taken place near critical habitats and environmentally sensitive areas, including protected areas | The risk of using protected areas for the project is high, because communities are still reluctant to offer their farmlands for the project due to the individual nature of ownership under Nigerian Land Tenure System (NLTS). This encourages the use protected areas for continuance of project activities. | To avoid potential degradation of native forests and replacement with non-indigenous species which could lead to loss of diversity and composition of plant communities, the project redirected activities towards reforestation of degraded or clear-cut-harvested lands to facilitate succession and reestablishing native forests. This risk has been ameliorated as about 3,500 hectares, 2,000 hectares and 1,000 hectares have been secured to be used for the establishment of woodlots in Kaduna, Delta and Cross River States respectively |
| The project could lead to the introduction of invasive alien species | This risk may still be relevant in the future | No invasive species have been and plan to be introduced |
| The project involved sourcing firewood for charcoal in natural forests and reforesting and creating plantations which could modify site conditions | The risk is low, because most of the natural forests that are the focus of the SFM project have largely been degraded | The project focused on replanting trees that would be sustainably harvested and that enabled ecological restoration by reestablishing native forests |
| The project could lead to significant greenhouse gas emissions from fuelwood combustion and /or alternatives such as LPG | The risk is still relevant | Risk mitigated via expansion of area under woodlots and the widespread use of energy-efficient cookstoves with lesser emissions |

*Table 10: Update of SFM project's social and environmental risks (Safeguards)*

Additionally, incessant attacks by insurgents and herdsmen has emerged a serious social risk which poses serious security threats where woodlots are established. Security personnel and community vigilantes were often hired to provide security to people working within those communities.

## 4.5 Efficiency and adaptive management

The project was implemented with NIM (National Implementation Modality) modality. According to the project document, the Federal Ministry of Environment (FME) was the executing agency. The project appointed a Project Director to: i) coordinate the project activities with the activities of other Government entities; and ii) certify that the expenditures are in line with the approved budgets and work-plans. The approved CEO Endorsement request lists the following institutions as the project responsible parties.

1. United Nations Development Programme (UNDP)
2. Federal Ministry of Environment -National Government (in –kind)
3. Energy Commission of Nigeria - National Government (Grant)
4. MFBs/MFIs
5. UNREDD+
6. SME (Domestic Cookstove manufacturers)
7. Nigerian Alliance for Clean Cookstoves (NACC)

The project's execution modality (Energy Commission of Nigeria being Agency working in conjunction with execution partners and UNDP) established an alliance that generated opportunities for inter-institutional synergies aimed at developing and strengthening knowledge and increasing the quality and impact of the intervention. Key informants expressed confidence in the competence and knowledge of ECN on the subject matter addressed by the initiative.

The human and financial resources, as well as the organizational structure, were well adjusted to the necessary requirements of and to achieve the expected results of the project. Greater articulation and communication between the actors helped to strengthen and improve the quality and impact of the initiative.

Taking into consideration the design of the project, the changes promoted, the results achieved, the products generated, and the activities carried out, it can be stated that the project had an organizational structure and financial resources that are well attuned to match the project requirements and to promote the different strategies aimed at achieving the programmatic outcomes.

The available budget allowed the establishment of a qualified team of staff, experts and consultants, to hire external services of proven quality, and to make the appropriate equipment and infrastructure available to the project and to provide resources that allowed to address the operational expenses necessary to implement the different activities.

During the technical formulation and budget design, the establishment of a monitoring system was incorporated as a component of the project. This enhanced the execution of the project since the initiative incorporated an architecture and structure for a systematic technical and financial follow-up, which allowed the generation of relevant and quality information for decision-making by the different actors involved in the management and implementation of the project. The project further produced annual project implementation review (PIR) reports. The PIR reports addressed challenges the project faced, including on issues associated with the IPPs reaching financial close etc.

While the implementation of all the 4 components of the SFM Project illustrated proper management arrangements, work planning, finance and co-finance, project-level monitoring and evaluation systems, stakeholder engagement, reporting, and communications leading to reasonably efficient implementation of the Project, there were some shortcomings too.

During the earlier stages of project implementation, there were no adequate adaptation measures in place to achieve the seemingly over ambitious target of establishment establishing 3,003 hectares that

assumed that UNREDD+ would be implemented in Nigeria, particularly, Cross River State. Eventually, two years after the project had begun on 26th June 2019, an emergency Project Steering Committee meeting was held to specifically discuss the issue of aligning SFM with UNREDD+. It was then established that technically and practically it was not feasible to implement SFM in highly forested REDD+ pilot sites given that the proposed REDD+ pilot areas are highly forested with indigenous highly valuable tree species and hence it was not advisable to introduce fast growing species that are mostly exotic. However, there was exception in mangrove forest pilot site which was highly degraded and was considered as sites for SFM project. Consequently, and in the absence of adequate community land to establish the woodlots, the set targets were hard to achieve.

The Project Management did not adequately engage the various stakeholders, development partners and beneficiaries early enough to unlock synergies or approaches of achieving the desired targets and allocate enough funds to facilitate the achievement of the Project aspiration of increasing supply side of the sustainable fuelwood management equation within the project time frame. These issues were however resolved in the latter stages of the project; however, the key targets of realizing supply side protection of 50,000 hectares forestlands and establishing 3,003 hectares of woodlots were still unattainable under these new circumstances because the project relied on the implementation of the REDD+ project which had still not taken off by project EoP.

## Financial Expenditures

According to available expenditure reports provided by the UNDP CO, a total of USD 4,175,558 of the GEF implementation grant of USD 4,410,000 had been incurred through the project lifetime, or roughly 95%. The annual expenditure breakdown vis a vis the overall project budge is shown in Table 11.

**Table 11:** Annual project expenditures through end of project (USD)

| Component | Actual Expenditure (US$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | TOTAL | GEF ProDoc Budget |
| TOTAL | 0 | 290,850 | 960,203 | 1,016,440 | 839,244 | 866,748 | 202,073 | 4,175,558 | 4,410,000 |

*Table 11: Project expenditures through end of project (USD)*

## Cofinancing

It was difficult to obtain the complete picture of the cofinancing contributions during the project. Based on inquiries made during the TE mission, the UNDP CO provided some information regarding the landscape of cofinancing as presented in Table 12. Of the USD 300,000 of UNDP grant cofinancing (TRAC funds) confirmed at project endorsement, USD 264,270 representing 88% was incurred by end of the project. The USD 800,000 (42%) in-kind cofinancing from ECN was incurred during the project, according to the PMU. These contributions are represented by staff time, office space, vehicle use, etc. No other cofinancing was received from the five other sources that were confirmed at CEO endorsement.

| Sources of Co-financing | Name of Co-financier | Type of Cofinancing | Investment Mobilized | Amount ($) |
|---|---|---|---|---|
| GEF Agency | UNDP | Grant | Recurrent expenditures | 264,270 |
| Private Sector | Roshan Renewables Services | Equity Investment | Investment mobilized | 2,121,250 |

| | | | | |
|---|---|---|---|---|
| Private Sector | Nenu Engineering Limited | Equity Investment | Investment mobilized | 311,676 |
| Private Sector | Methano Green Clean Energy | Equity Investment | Recurrent expenditures | 37,857 |
| Private Sector | GreenLand Fati Gold Services Ltd | Equity Investment | Recurrent expenditures | 95,011 |
| Private Sector | EEMAN Corporate Business Ltd | Equity Investment | Recurrent expenditures | 3,100 |
| Private Sector | Flexible Credit & Integrated Serv. | Equity Investment | Recurrent expenditures | 1,750 |
| Recipient Country Government | Energy Commission of Nig | In-kind | Recurrent expenditures | 800,000 |
| **Total** | | | | **3,634,914** |

*Table 12: Project confirmed sources of co-financing for the project by name and by type (USD)*

## Adaptive Management

The COVID-19 pandemic slowed down implementation of project activities. Governments and individuals were taking safety measures to avoid contacting the deadly Corona virus and stay safe. There was a total ban on interstate travels and all local and international airports closed and activities/meetings were done remotely.
Another major challenge was the limited social and/or cultural acceptance to the improved cook stoves that required behavioral change. The "limited acceptance" was due to lack of knowledge of the benefits of the new cooking technologies. The project undertook sensitization and awareness campaigns at all levels to sensitize the communities. Community leaders were consulted to educate their members. Sample stoves were taken to the communities to demonstrate their effectiveness over the tradition stoves.

The Nigerian Alliance for Clean Cookstoves (NACCs), which is the National arm of the Global Alliance for Clean Cookstoves (GACCs) was engaged to conduct Road Shows and Awareness Creation Campaigns in each of the three States. In doing this, awareness and sensitization was highly enhanced. Market Squares in each State was used for the campaigns. Practical Cooking demonstrations with the energy-efficient cookstoves were carried out to show how efficient wood/charcoal cookstoves cook better, faster than the traditional open-to-sun three-stone stoves normally used in communities and even peri-urban centers.

Sales booths/Mini-Shops were fabricated and branded to attract end-users to buy the stoves. The sales agents/retailers trained during the several "Gender-Sensitive" trainings of business entrepreneurs on cookstoves and given the kiosks to use as mini Cookstove Shops for visibility. This further helped in creating awareness and people's acceptance of cookstoves.

More attractive and energy-efficient wood/charcoal cookstoves have been designed and produced within Nigeria, courtesy of the SFM project. The new designs are very attractive, thereby increasing public/end-users' acceptance.

Another area of concern was that project activities were likely to take place near critical habitats and environmentally sensitive areas, including protected areas. New forestry laws in Cross River banned the use of highly forested REDD+ pilot sites for any activity, including SFM. REDD+ pilot area is highly forested with indigenous highly valuable tree species hence avoid introductions of fast-growing species that are mostly exotic for the purpose of sustainable fuelwood harvesting and supply. Therefore having 36,000 ha of land for SFM in CRS implementation was not feasible.

Community dialogues and consultations were carried out to ensure that community land custodians and owners decide on the areas to be used for the woodlot establishment. Even, the State's Forestry entities were fully engaged in selecting areas for the project. Degraded areas in communities/forest reserves were proposed. In a situation where protected forest areas were used, CRS was considering degraded mangrove forest areas.

### Challenges

The most critical challenge was the insurgents and kidnappings in the northern part of Nigeria (Kaduna) and in some places in the South. However, effort was being made to work with the local vigilantes and security agents to providing security in support of project activities.
Another challenge was in aligning the SFM project with REDD+ activities in securing of 50,000 hectares of forest land in Cross River and Delta States. Because the REDD+ is still at the Readiness stage as it was during the PPG stage, full implementation of the REDD+ had not started by EoP, hence the challenge of aligning with it as stated in the project document (Prodoc) persisted.

Partners selected with regards to cookstove manufacturing like DARE focused on SAVE80 Cookstoves that were almost US$100 each, while the SFM project was targeting affordable and efficient cookstoves that within US$10 each and at most US$15. Moreover, most of the input materials for the stove were imported instead of using locally available materials. This challenge was addressed by building local capacity and promoting domestic industries for clean wood/charcoal cookstoves production. By EoP, more than five (5) local producers have been identified and are producing the targeted 40,000 efficient cookstoves

One other major challenge was that the communities at the bottom of pyramid (BoP) had little or no knowledge of SFM and energy-efficient cookstoves, thereby necessitating intensive sensitization campaigns. Local technical capacity of local producers of cookstoves was also insufficient, hence the gender-sensitive trainings for all value-chain actors. Working with people at Bottom-of Pyramid was sometimes a challenge due to their low educational ability; but continual educational campaigns addressed most of the concerns.

| | |
|---|---|
| ***Efficiency is rated as:*** | ***Moderately satisfactory*** |

## 4.6 Project sustainability

Generally, in Nigeria, there is lack of enough coordination and integration between policies and projects addressing sustainability of fuelwood production and consumption at all levels from local to national. Despite obvious linkages and synergies, the two sides of fuelwood problem, demand and supply, are being addressed in isolation in most parts of the country. These continues to be ongoing concern for the SFM Project's sustainability.

The SFM Project was however unique in its design in that, it endeavored with some level of success to bring together these two types of projects and programs. Through an integrated approach dealing both with a) Sustainable Forest management (supply side); and b) Clean energy access (demand side), the Project somewhat achieved a truly Sustainable Forest Management System for the three states within the activity sites.

The TE noted that, the sustainability and gains of SFM Project's outcomes, in particular of its support to EE market transformation for efficient cook stoves can be preserved through close involvement and collaboration of three (3) key stakeholders: local communities, manufacturers and financial intermediaries (MFBs and MFIs). It was the aspiration of the project to create such a business model

and ecosystem that will continue growing without further grant support. This is based on the following assumptions:

1. Demand for improved cook stoves will be sustained due to implementation of SFM activities in pilot communities.
2. Supply of affordable cook stoves will be provided by local manufacturers; and
3. Financing will be made available at affordable terms by partner MFBs and MFIs.

There are no major social or political risks identified during the TE that may jeopardize sustainability of project outcomes. Given the project design and the actual implementation, the TE revealed that that the project has a high level of individual private sector stakeholders' (but limited public) ownership that can allow project outcomes/benefits to be sustained even after end of the project.

From the interviews conducted during the TE, it was evident that various key stakeholders see that it is in their interest that the project benefits continue to flow. Throughout project design to implementation, there has been sufficient public / stakeholder awareness in support of the long-term objectives of the project. Through the various level of project monitoring, evaluation and reporting process, lessons learned have been documented by the Project Team on a continual basis. These need to be widely shared to appropriate parties, especially "development-oriented" institutions in the SFM sector who can in turn learn from the project and effectively adapt and-scale-up the project outputs.

The issue of getting adequate financing at the end of the project from other sources to support continuation of activities within some of the four components of the project remains a challenge to sustainability to the SFM Project outcomes. While commendable efforts were made to support the development of a state Forestry Policy that integrated the SFM model which is linked to the establishment of a national forestry trust fund, there was limited evidence indicating commitment on the part of federal and state governments to continue activities in expansion and maintenance of woodlots and plantations. A lot of hope is still placed on the commencement of the REDD+ project to move the supply side of the SFM project froward. There is need for these state and key non-state stakeholders and beneficiaries as well as development partners to come together and identify, design, and implement a plan a to mobilize human, technological and financial resources that can sustain the momentum that has been created by the SFM project. Empirical evidence that plantations are actually well managed and protected was also lacking. Enhanced sustainable woodlots and forest management will require better reporting and verification, more areas covered and enhanced implementation of sustainable forest management criteria and indicators in the future. Sustainability is rated as moderately likely largely due to the positive outcomes experienced on the demand side through EE market transformation for efficient cook stoves.

| ***Sustainability is rated as:*** | ***Moderately likely*** |
|---|---|

# 5 Lessons learned, conclusions and recommendations

## 5.1 Lessons learned

- The majority of the population in Nigeria at the Bottom of Pyramid (BoP) are not aware of clean wood/charcoal cookstoves technology solutions. Additionally, fuelwood subsector is characterized by low technology adoption, mostly due to lack of capital to invest in efficient biomass conversion and cooking technologies by producers and users. One other chronic problem is the limited budgets allocated to the subsector which frustrates all efforts to support research, and capacity building strategies, plans and initiatives.
- Increased scarcity of firewood and its high cost due to high rate of desert encroachment is a significant opportunity to enhance the use of energy-efficient cookstoves
- Increasing rate of insecurity requires strong engagement of security agents in planned development activities that also include afforestation related activities.
- Locally made clean cookstoves are easily adaptable by the BoPs than imported and sophisticated stoves that are very often, more expensive.

## 5.2 Conclusions

Having considered the TE findings, the evaluation makes the following conclusions regarding the performance of SFM Project:

- The SFM Project implementation framework was well articulated and opportunities for the success of sustainable fuelwood management interventions adequately considered and integrated in the Project implementation from lessons learned especially in the latter stages of the project. The overall SFM Project terminal evaluation rating is deemed **moderately satisfactory**.
- The SFM Project was timely and relevant, and responds to the prevailing conditions, national trends and statistics[8] which indicate that over 40 million people in Nigeria, or one-fifth of the country's population are engaged in fuelwood collection and charcoal production, and further provides an estimated 530,000 full-time equivalent direct jobs.
- The key ingredients for success of the SFM Project have been designing and implementation of effective training and capacity building instruments with an engendered focus to address critical areas of reducing vulnerability – include addressing climate change and creating sustainable livelihoods for women.
- Ownership of the project was well envisioned – but insufficiently embraced upstream, e.g., state governments needed to get more actively involved in implementation, sizeable land needed to be allocated by communities and state governments for establishment of woodlots.
- To a large extent, the project has played a significant role in creating exposure to many Nigerians at the Bottom of Pyramid (BoP) who are mostly unaware of clean wood/charcoal cookstoves solutions. Women have played a key role in realizing the objectives of the SFM Project by engaging in manufacture and sales of clean cookstoves.
- SFM Project is expected to achieve greater environmental, biodiversity and climate benefits if all the activities were successfully implemented; key targets were however not met largely because it takes time for the woodlots to reach maturity and there is a lack of adequate land allocated for

[8] FAO, 2022: The State of the World's Forests (SOFO) 2022

woodlot establishment given the non-implementation of REDD+ project and Agriculture's competition for land.

- The Nigerian Land Tenure system (NLTS) was a major hinderance to the realization of component 1 targets. This could have been overcome by engaging States Governments into agreements to allocate states' forest reserves for woodlot development and a creation of a framework that allows communities to access sustainable firewood and other forest resources from woodlots established in these State Forest reserves.

## 5.3 Recommendations

- To address the challenges of sustainable fuelwood management in future, this TE recommends restoration of degraded forests and other landscapes that do not compete with land uses associated with food production, establishment of fast-growing tree plantations/woodlots, improving the use of residues from wood harvesting and processing, and the recovery of post-consumer wood through its cascading use within a more circular economic framework.
- Secondly, establish and implement a national fuelwood strategy that is critical for coordinating actions across government agencies and ensures that interventions produce positive economic, social, and environmental impacts by addressing challenges in fuelwood production and demand in the near, medium, and long-term. The development of a State Forestry Policy that integrated the SFM model and linked it to the establishment of a national forestry trust fund and a forestry council was a great start but was not adequately comprehensive. A well thought out strategy should address issues around of lack of integrated legislation, unclear institutional arrangements for supporting, guiding, and controlling fuelwood management activities; inadequate enforcement and compliance; and limited investment and financing in this forestry/energy sector - all of which lead to poor governance of the fuelwood subsector.
- Third, generate evidence through timely capture of data for woodlots, tree nurseries and cook stoves distribution, specifically indicating important accomplishments as well as areas where performance has not been adequate. Technologies such as GIS and remote sensing are useful to aid such assessments. However, without proper institutional arrangements for supporting and regulating the fuelwood value chains, the subsector will remain uncompetitive and not generate enough returns and revenue to re-invest in proper production/consumption systems.
- Fourth, align future programmes with current policy development that follow climate change mitigation, and renewable energy development agendas to create momentum for building more effective fuelwood governance mechanisms. A more integrated fuelwood governance that considers climate, local context, informal markets, and decentralized government entities is able to attain a more sustainable fuelwood value chain.
- Fifth, future projects need to earnestly emphasize and foster participatory sustainable forest management. This will include formulation of people-orientated fuelwood policies and laws, creation of public awareness, stakeholders' consultation, training and capacity building, provision of incentives and creation of market channels for forest/woodlots products. The aim is to underscore the potency of people-based fuelwood management system, which considers the peoples' interest and welfare while ensuring effective conservation of forest and fuelwood resources.

# Annex 1: Evaluation Matrix

| Evaluation theme | Questions | Sources | Methodology |
|---|---|---|---|
| **Project Strategy** | | | |
| Project Design: | To what extent is the project suited to local and national development priorities and policies? | National development strategies, sector plans, medium term development plan, project document | Desk review, interviews |
| Project Design: | To what extent is the project inline with GEF operational programs? | GEF focal area strategies, project design,PIR reports | Desk review, interviews |
| Project Design: | To what extent are the objectivesand design of the project supporting environment and development priorities? | UNPDF, UNDP CPD, multilateral environmental agreements, etc. | Desk review, interviews |
| Project Design: | Does the project design remainrelevant in generating global environmental benefits? | GEF strategies, national and subnational development plans, PIF, project document, CEO endorsement request, reviews, PIRs | Desk review, interviews |
| Results Framework: | Does the results framework fulfilSMART criteria and sufficiently captures the added value of the project? | Strategic results framework, trackingtools, inception report, PIRs | Desk review, interviews |
| Results Frameworks: | What changes could be made (if any) to the design of the project inorder to improve the achievement of the project's expected results? | SMART analysis of results framework, current national and local development strategies | Desk review, interviews |
| Mainstreaming: | How are broader development objectives are represented in theproject design? | Project document, social and environmental social screening procedure, gender action plan, work plans for community activities, trainingrecords, monitoring reports of community activities, project steering committee meeting minutes, stakeholder feedback during TE mission | Desk review, interviews, field visits |
| **Progress towards Results** | | | |
| Progress towards Outcomes Analysis: | Has the project been effective in achieving the expected outcomes and objective? | PIRs, self-assessment reports by PMU, annual reports, monitoring reports, output level deliverables, midterm tracking tool, stakeholder feedback during TE mission | Desk review, interviews, field visits |

| | | | |
|---|---|---|---|
| Progress towards results: | To what extent has the project been effective in improving sustainable Fuelwood Supply and demand? | Progress reports, national and local development strategies, etc. | Desk review, interviews, field visits. |
| Progress towards results: | How has the project been able to contribute to improvement in Domestic Industry for Clean Cook Stoves and Other Clean Energy Alternatives? | Progress reports, national and local development strategies, budget allocations, increased level of awareness | Desk review, interviews, field visits |
| Progress towards results: | How has the project been able to contribute to the development of Financial Models for Sustainable Fuelwood Management? | Progress reports, national and local development strategies, budget allocations, increased level of awareness | Desk review, interviews, field visits |
| Risk management: | What were the risks involved andto what extent were they managed? | Project document, risk log, progressreports | Desk review, interviews, field visits |
| Lessons learned: | What lessons have been learnedfrom the project regarding achievement of outcomes? | Progress reports, lessons learnedreports, back-to-office reports | Desk review, interviews |
| Remaining Barriers to Achieving the Project Objective: | How are the project outputs addressing key barriers? | PIRs, annual reports, project steering committee meeting minutes, stakeholder feedback during TE mission | Desk review, interviews, field visits |

| **Evaluation theme** | **Questions** | **Sources** | **Methodology** |
|---|---|---|---|
| **Project Implementation & Adaptive Management** | | | |
| Management Arrangements, GEF Partner Agency: | How were lessons learned on other projects incorporated into project implementation? | PIRs, project steering committee meeting minutes, audit reports, feedback obtained during TE mission | Desk review, interviews |
| Management Arrangements, Executing Agency / Implementing Partner: | How effective has adaptive management been, e.g., in response to recommendations raised by project steering committee? | PIRs, project steering committee meetings, feedback obtained during TE mission | Desk reviews, interviews |
| Work Planning: | Are milestones within annual work plans consistent with indicators in strategic results framework. | Project document, multi-year work plan, annual work plans, PIRs, financial expenditure reports, feedback obtained during TE mission | Desk review, interviews |

| | | | |
|---|---|---|---|
| Finance and Co-Finance: | How efficient has financial delivery been? | Financial expenditure reports, combineddelivery reports, audit reports, project steering committee meeting minutes, PIRs, midterm co-financing report, feedback obtained during TE mission | Desk review, interviews |
| Cost-effectiveness: | How cost-effective have the project interventions been? | Analysis of progress towards results, financial delivery | Desk review, interviews, field visits |
| Project-level Monitoring and Evaluation Systems: | How timely has implementation of adaptive management measures been? | PIRs, midterm tracking tools, monitoring reports, annual progress reports, self-assessment reports by PMU, project steering committee meeting minutes, feedback obtained during TE mission | Desk review, interviews, field visits |
| Stakeholder Engagement: | How inclusive and proactive has stakeholder involvement been? | Stakeholder involvement plan in the project document, meeting minutes, records of exchange visits, stakeholder feedback obtained during TE mission | Desk review, interviews, field visits |
| Partnership Arrangements: | How effective have partnership arrangements been? | Partnership agreements, contracts, progress reports, co-financing realized | Desk review, interviews, field visits |
| Local Capacity Utilized: | Has the project efficiently utilized local capacity in implementation? | Contracts, financial expenditure records,progress reports | Desk review, interviews, field visits |
| Reporting: | Adaptive management measures implemented in response to recommendations recorded in PIRs. | PIRs, annual progress reports, midterm tracking tools, output level project deliverables, feedback obtained during TE mission | Desk review, interviews |
| Communication: | Project information is effectively managed and disseminated. | Internet and social media, press releases,media reports, statistics on awareness campaigns, evidence of changes in behavior, feedback obtained during TE mission | Desk review, interviews, field visits |
| **Sustainability** | | | |
| Risk Management: | How timely has delivery of project outputs been? | Project document, risk logs, PIRs, projectsteering committee meeting minutes, feedback during TE mission | Desk review, interviews |
| Lessons Learned: | What lessons can be drawn regarding sustainability of project results, and what changes could be made (if any) to the design of the project in order to improve sustainability of project results? | Progress reports, monitoring and evaluation reports, feedback from stakeholders, current national and local development strategies, and sector plans | Desk review, interviews, field visits |

| | | | |
|---|---|---|---|
| Financial Risks to Sustainability: | How has the project addressed financial and economic sustainability? | Budget allocations, progress reports, government publications | Desk review, interviews, field visits |

| | | | |
|---|---|---|---|
| | Are recurrent costs sustainable after project closure?<br>What evidence is available that demonstrates budget allocations have been or will be made to sustain project results? | | |
| Socioeconomic Risks toSustainability: | What incentives are in place or under development to sustain socioeconomic benefits?<br>What evidence is available that demonstrates capacities and resilience of local communities have been strengthened? | Project outputs realized, progress reports | Desk review, interviews, field visits |
| Institutional Framework and Governance Risks to Sustainability: | What is the level of ownership of approaches promoted by the project?<br>What policies are in place that enhance the likelihood that project results will be sustained? | Tracking tool, training records, evidence of policy reform, governance platform records | Desk review, interviews, field visits |
| Environmental Risks to Sustainability: | What evidence is available that demonstrate reduction of key threats?<br>Have any new threats emerged? | Tracking tool, budget allocations, training record, statistics on awareness campaigns | Desk review, interviews, field visits |
| **Progress towards Impact** | | | |
| Environmental stress reduction | What evidence is available that demonstrates progress towards environmental stress reduction? | Delivered outputs, progress reports, feedback from stakeholders, monitoring and evaluation reports | Desk review, interviews, field visits |
| Environmental status change | What evidence is available that demonstrates progress towards environmental status change? | Delivered outputs, progress reports, feedback from stakeholders, monitoring, and evaluation reports | Desk review, interviews, field visits |
| Community well-being | What evidence is available that demonstrates progress towards improving community well-being? | Delivered outputs, progress reports, feedback from stakeholders, monitoring, and evaluation reports | Desk review, interviews, field visits |
| Policies | What evidence is available that demonstrates progress towards changes in policies? | Delivered outputs, progress reports, feedback from stakeholders, monitoring and evaluation reports | Desk review, interviews, field visits |
| Governance mechanisms | What evidence is available that demonstrates progress towards | Delivered outputs, progress reports, feedback from stakeholders, monitoring and evaluation reports | Desk review, interviews, field visits |

| | | | |
|---|---|---|---|
| | changes in governance mechanisms? | | |
| Capacities | What evidence is available that demonstrates progress towards changes in capacities? | Delivered outputs, progress reports, feedback from stakeholders, monitoring and evaluation reports | Desk review, interviews, field visits |
| Unintended consequences | What unintended consequences have occurred? | Delivered outputs, progress reports, feedback from stakeholders, monitoring and evaluation reports | Desk review, interviews, field visits |

# Annex 2: Interview Guide

| ORGANIZATION: | | STATE: | LGA: |
|---|---|---|---|
| NAME OF PARTICIPANT: | | GENDER: | TEL: |
| **Aspect** | **Questions Guide** | **Answer** | **Rating (1-6)** |
| Relevance | Is the SFM Project doing the right thing? How important is the **relevance or significance** of the intervention regarding local and national requirements and priorities? | | |
| Effectiveness | Are the objectives of the development interventions being achieved? How big is the **effectiveness or impact** of the project compared to the objectives planned (Comparison: result –planning)? | | |
| Efficiency | Are the objectives being achieved economically by the development intervention? How big is the **efficiency or utilization ratio** of the resources used (Comparison: resources applied results)? | | |
| Impact | Does the development intervention contribute to reaching higher level development objectives (preferably, overall objective)? What is the **impact or effect** of the intervention in proportion to the overall situation of the target group or those effected? | | |
| Sustainability | Are the positive effects or impacts sustainable? How is the **sustainability or permanence** of the intervention and its effects to be assessed? | | |

| **Further Assessment & Observation** | | | | | | | |
|---|---|---|---|---|---|---|---|
| Planned Activities / Projects | Allocated Budget | Released Finance | Utilized Finance | Output | | Outcome | Impact |
| | | | | | | | |

# Annex 3: Rating Scales

Ratings for progress towards results:

| | |
|---|---|
| **Highly Satisfactory (HS)** | Project is expected to achieve or exceed all its major global environmental objectives, and yield substantial global environmental benefits, without major shortcomings. The project can be presented as "good practice". |
| **Satisfactory (S)** | Project is expected to achieve most of its major global environmental objectives, and yield satisfactory global environmental benefits, with only minor shortcomings. |
| **Moderately Satisfactory (MS)** | Project is expected to achieve most of its major relevant objectives but with either significant shortcomings or modest overall relevance. Project is expected not to achieve some of its major global environmental objectives or yield some of the expected global environment benefits. |
| **Moderately Unsatisfactory(MU)** | Project is expected to achieve its major global environmental objectives with major shortcomings or is expected to achieve only some of its major global environmental objectives. |
| **Unsatisfactory (U)** | Project is expected not to achieve most of its major global environment objectives or to yield any satisfactory global environmental benefits. |
| **Highly Unsatisfactory (U)** | The project has failed to achieve, and is not expected to achieve, any of its major global environment objectives with no worthwhile benefits. |

Ratings for project implementation and adaptive management:

| | |
|---|---|
| **Highly Satisfactory (HS)** | Implementation of all seven components – management arrangements, work planning, finance and co-finance, project-level monitoring and evaluation systems, stakeholder engagement, reporting, and communications – is leading to efficient and effective project implementation andadaptive management. The project can be presented as "good practice". |
| **Satisfactory (S)** | Implementation of most of the seven components is leading to efficient and effective project implementation and adaptive management except for only few that are subject to remedial action. |
| **Moderately Satisfactory (MS)** | Implementation of some of the seven components is leading to efficient and effective project implementation and adaptive management, with some components requiring remedial action. |
| **Moderately Unsatisfactory (MU)** | Implementation of some of the seven components is not leading to efficient and effective projectimplementation and adaptive, with most components requiring remedial action. |
| **Unsatisfactory (U)** | Implementation of most of the seven components is not leading to efficient and effective projectimplementation and adaptive management. |
| **Highly Unsatisfactory (HU)** | Implementation of none of the seven components is leading to efficient and effective projectimplementation and adaptive management. |

Ratings for sustainability (one overall rating):

| | |
|---|---|
| **Likely (L)** | Negligible risks to sustainability, with key Outcomes on track to be achieved by the project's |

| | |
|---|---|
| | closure and expected to continue into the foreseeable future |
| **Moderately Likely (ML)** | Moderate risks, but expectations that at least some Outcomes will be sustained due to theprogress towards results on Outcomes at the TE |
| **Moderately Unlikely (MU)** | Significant risk that key Outcomes will not carry on after project closure, although some outputsand activities should carry on |
| **Unlikely (U)** | Severe risks that project Outcomes as well as key outputs will not be sustained |

# Annex 4: List of Persons Interviewed

| S/N | NAME | GENDER | MINISTRY/ AGENCY |
|---|---|---|---|
| **Project Steering Committee (PSC) Members** | | | |
| 1 | Aleriwon Daniel O. | M | FMENV/GEF, Abuja |
| 2 | Yahya Saleh Ibrahim | M | KASU, Kaduna State (SFP) |
| 3 | Ejura Joy Obaje | F | Federal Ministry of Women Affairs |
| 4 | Stella Oneli | F | National Orientation Agency, Abuja |
| 5 | Ojeblenu C. Andrew | M | Min of Environment Delta State, Asaba |
| 6 | Idris Muazu Ibrahim | M | SFM Kaduna |
| **UNDP** | | | |
| 7 | Muyiwa Odele | M | Nigeria Country Office Focal Point SFM Project |
| 8 | Christelle Odongo-Braun | F | Regional Energy and Climate Change Specialist |
| **Domestic Cookstove Manufacturers** | | | |
| 9 | Binta Yahaya | F | Greenland Fati Gold Kaduna State |
| 10 | Linus Mbulta | M | Mfammyen Conservation Society, Mbok, Cross River State |
| **Trainers / Capacity Building** | | | |
| 11 | Monica Alagbile | F | UNIFECS |
| 12 | Precious Onuvae | F | NACC/ICEED |
| 13 | Olanike Olugboji | F | WISE, Kaduna |
| **Awareness Campaigners/ Retailers of SFM Cookstoves** | | | |
| 14 | Bette Peter Oru | M | CRS/SFM MFC's Calabar |
| 15 | Godwin Oyakhilome | M | SFM, Delta |
| 16 | Mercy Onoriode Ozeh | F | Merci Renewables, Delta State |
| **Micro Finance Banks/Institutions** | | | |
| 17 | Alice I. Achi | F | UNICAL MFB, Calabar |
| 18 | Obediah Okorafor | M | Owhoede FMPCS, Warri, Delta State |
| 19 | Abdullahi Musa | M | EEMAN Corporate Business Ltd, Kaduna |
| **Project Staff** | | | |
| 20 | Okon Ekpenyong | M | Project Coordinator-Energy Commission of Nigeria |
| **Community Forest Management Committee (CFMC)** | | | |
| | **Cross River State** | | |
| 21 | Ewung Emmanuel E. | M | CSS Utugwang, Obudu |
| | **Delta State** | | |
| 22 | Otuolile Victor | M | Abah-Uno/Adonte |
| | **Kaduna State** | | |
| 23 | Muhammad Lawal | M | Soba |
| **SFM Agroforestry Farmers maintaining the woodlots** | | | |
| | **Delta State** | | |
| 24 | Christopher Chukwu | M | Abah-Uno/Adonte |
| | **Cross River State** | | |
| 25 | Peace Friday | F | Ekinta, Akansoko, Akpabuyo LGA |
| | **Kaduna State** | | |
| 26 | Bulus Rana | M | Nimbia (Jemaa'a) |