GAIA ASSOCIATION

ANNUAL PROGRESS REPORT
of
ACTIVITIES and PROJECTS
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Mission Statement

To promote clean, safe, sustainable, and renewable energy for cooking and other household needs, displacing the reliance on fossil fuels, firewood, and charcoal; reducing carbon emissions and deforestation by employing efficient alcohol-fueled stoves and other appliances.
ACRONYMS

ARRA - Administration for Refugees and Returnee Affairs
CC - Clean Cook
CO - Carbon Monoxide
FEPA - Federal Environmental Protection Authority
IAP - Indoor Air Pollution
PM - Particulate Matter
UNHCR - United Nations High Commissioner for Refugees
USEPA - United States Environmental Protection Agency
NCF - Nordic Climate Facility
FWFCA - Former Women Fuel Wood Carriers Association
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I. PROJECT OVERVIEW

In most parts of Ethiopia communities use low grade household energy sources including wood, dung and crop residues for cooking, heating and lightning. As in many other countries, 94.7% of total energy supply in Ethiopia is mainly biomass based (World Bank, 2001)\(^1\).

The use of low grade energy for household cooking causes indoor pollution-related health problems, rapid deforestation & environmental degradation. It creates heavy burdens for women and children who are responsible for collecting firewood. The World Health Organization estimates approximately 4 million people die each year from illnesses caused by household air pollution. The primary cause of this indoor air pollution is household fuel use, particularly from traditional fuels burned in highly inefficient stoves.

The collection, supply and/or use of firewood and traditional energy sources have also been associated with a variety of harmful consequences for refugee populations. These include but are not limited to: rape and assault during firewood collection, environmental degradation, and respiratory and other illnesses caused by the indoor burning of biomass materials. In common with the local community, refugees in Ethiopia use firewood for their household consumption. Most of the areas where the refugees are housed are almost completely deforested or in the process of desertification. Energy for cooking is a vital need for the refugees and the lack of firewood is creating severe hardship for the refugees in the UNHCR administered camps. It is also causing serious problems for the UNHCR in their management of the camps, as confirmed through the UNHCR Participatory Assessment measurement tool.

Gaia Association is an Ethiopian Resident Charity established in 2005 to revolutionize the household energy economy in Ethiopia, across a range of households; from private homes in Addis Ababa to refugee camps. Gaia has been introducing ethanol as a household fuel which can replace existing traditional household fuels, primarily firewood and dung. Together with the Administration for Refugee and Returnees Affairs (ARRA) and the UN High Commissioner for Refugees; Gaia Association implemented its projects in the Eastern refugee camps of Kebribeyah, Awbere and Sheder. Gaia’s objectives in the camps are to: reduce cooking energy requirements through the provision of fuel-efficient devices & alternative energy sources, contribute to the enhancement of refugee protection, and to relieve women from the tedious task of firewood collection and risk of Gender-Based Violence (GBV), while also improving indoor air quality.

Gaia Association has partnered with Stockholm Environment Institute (SEI), City Government of Addis Ababa Environmental Protection Authority, Bureau of Women, Children & Youth Affairs, Solid Waste Recycling and Disposal Project Office and the Former Fuel Wood Carriers Association (FWFCA) for the implementation of a project financed by the Nordic Climate Facility\(^2\). The project aims to supply ethanol and ethanol fuelled cooking stoves to 1,000 low- and middle-income households in the Kolfe-Keranio community on the outskirts of Addis Ababa by

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\(^2\) NCF is financed by the Nordic Development Fund and is implemented jointly with the Nordic Environment Finance Corporation (NEFCO).
establishing a community owned and run Ethanol Micro Distillery at Akaki Kaliti Sub- City, Gelan site.

Beginning in 2012, in an effort to address the environmental and social problems associated with the overreliance on traditional biomass for household cooking, Gaia Association in partnership with the Ethiopian Environmental Protection Authority is piloting a project to demonstrate small scale, community owned and driven ethanol production from sugarcane (Ethanol Micro-Distilleries) in Amhara, Oromya & Gambella Regional States. Partial installation of the EMDs has been completed in two of the three regional states.

II. REFUGEE ASSISTANCE PROGRAM

Gaia Association's Eastern Ethiopia Refugee Assistance Program is running with the intention of promoting and providing safe and clean fuel with appropriate cooking appliance for household consumption. For the fulfilment of this objective Gaia is distributing ethanol and ethanol fuelled cooking appliances as an alternative to traditional biomass household energy at Kebrabeyah, and Awbere Refugee Camps. This program is also vital in order to alleviate the environmental stress, rape, and other gender-based violence related to fuel wood gathering. Gaia is also engaged in providing kerosene fuel and stoves at Shedder Refugee Camp.

1. Ethanol & Kerosene Transportation

During the year of 2013, Gaia Association transported a total of 500,000 liters of ethanol from Fincha Sugar Factory to the refugee camps. A total of 270,000 liters and 230,000 liters of ethanol respectively went to Kebrabeyah and Awbere refugee camps. Of the entire transported amount, quality was ensured and denatured by blue dye and a bitter compound, bitrex, to help beneficiaries identify ethanol easily from other liquids. Gaia Association has received 387,290 litres of kerosene from UNHCR Sub Office Jijiga to supplement the limited ethanol fuel supply in Shedder and Awbere refugee camps.

2. Ethanol & Kerosene Distribution

The distribution of ethanol in Kebrabeyh and Awberre refugee camps was conducted every month in four different sessions based on the stated distribution norm with close collaboration of respective UNHCR & ARRA camp offices.

To ensure transparency every distribution session is witnessed by a refugee central committee and women association members. In the last twelve months a total of 526,240 liters of ethanol has been distributed for an average of 4,211 refugee households at Awbarre and Kebribeyah refugee camps. Around 377,523 liters of kerosene was also distributed for an average of 4,286 refugee households at Awbarre and Shedder refugee camps.

Gaia Association is playing a pivotal role for the enrollment of primary school students in all the three camps. In the year 2013, a
total of 1700 liters of kerosene has been provided for the three primary schools institutional kerosene stoves. The kerosene provision was also extended to an inpatient feeding program at ARRA Health centers in these camps. A total of 3,200 liters of kerosene was provided for the purpose.

3. **Clean Cook Stoves, Solar Lanterns, Jerry Cans and Pitchers Provision**

At Awbarre Refugee Camp, during the year of 2013, a total of 152 CleanCook stoves have been distributed for grouped single households and single households living in separate homes. These recipients were supplied with jerry cans and pitchers for storage and safe use. At Kebribeyah, 2,135 ten liters capacity jerry cans were replaced for 2,135 families to ensure the safe storage of the fuel. Gaia Association also participated in the solar lantern demonstration training provided for 1,800 solar lantern beneficiary households during the distribution of solar lanterns by ARRA at Awbarre refugee camp.

4. **Awareness Creation an Safety Trainings**

To supplement awareness raising activities, six billboards with the message of kerosene and ethanol safety instructions were erected in all camps. Safety manuals (color pages with hard paper) was prepared in Somali language. It became a major instrument of delivering the intended message to refugee beneficiaries and serves as a standard manual to conduct safe handling training of ethanol and kerosene fuels; ethanol and kerosene stoves; and proper storage of fuels inside the refugee homes. A fourteen minutes demonstration video has been prepared on ethanol/kerosene fuels and stoves safe handling with the intention of assisting awareness raising activities with regard to household energy. The community workers in the three camps have visited 600 houses every month and provided the necessary support. To strengthen the house to house visit and household safety training, an additional six community workers were hired; two in each camp. Gaia Association together with other concerned implementing partners celebrated the World Environmental Day (WED) on June 5, 2013.

Indoor air pollution sensitization training has been conducted in all three camps involving different representatives from refugee community (RCC, Women Association, and Youth Association & different camp based associations), implementing partners, and representatives of UNHCR & ARRA. The scenario was a good opportunity to transmit the intended message to refugee representatives

5. **Project Facility Improvement**

To better facilitate the distribution of kerosene and ethanol and ensure the refugees protection, expansion was made to the existing waiting shades. Ramps were also constructed to all in all project offices to ensure physical accessibility for all. The fire extinguisher and generator houses were also constructed.

**Challenges vs. Measures taken**

- Despite the efforts made, ARRA influenced UNHCR to take over the fuel (ethanol and kerosene) distribution from Gaia Association in 2014, as a result six national staff were displaced from their work – Gaia proposed UNHCR to be involved in pilot testing of new technologies, provision of safety trainings and denaturing of ethanol fuel.
III. ADDIS ABABA ETHANOL MICRODISTILLERY

This pilot project assesses the feasibility of locally produced ethanol for household cooking in Addis Ababa, Ethiopia. The overall objective of the project is to contribute to poverty reduction and climate mitigation by enabling access to clean, safe, renewable and locally produced household cooking fuels to displace the traditional use of biomass for cooking in Ethiopian communities. The immediate objective is to supply ethanol and ethanol fuelled cooking stoves to 1,000 low- and middle-income households in the Kolfe-Keranio community on the outskirts of Addis Ababa by establishing a community owned and run Ethanol Micro Distillery.

1. Conducting Environmental Impact Assessment

A local consultancy firm was hired to conduct the environmental impact assessment. The consultant assessed the environmental impacts of the project and recommended mitigation measures. The report highlighted the several benefits of implementing the project stating the creation of new job opportunities to reduce poverty. It also mentioned the negative impacts through increasing health hazards if safety materials are not properly used. But the report recommends measures to these negative impacts to reduce to acceptable level through a holistic planning and implementation of the environmental management plan. Thus, it has concluded that the project benefits outweigh its adverse socio-economic and socio-ecological impacts as these can be mitigated by proper utilizations of the suggested mitigation measures in the report. Conducting the EIA has highly reduced the need for conducting environmental monitoring.

2. Agreements with Regional Authorities Obtained

During the reporting period the persistent land problem was solved. A new project partner, Addis Ababa City Government Solid Waste Disposal and Recycling Project Office (AACGSWDRPO) provided 400m² of land for the project. This led to signing of the long awaited project implementation agreement by all parties. The parties included Addis Ababa City Government Finance & Economy Development Bureau; Addis Ababa City Government Women, Children & Youth Affairs Bureau; Addis Ababa City Government Environmental Protection Authority (AACGPEA); AACGWRDPO and Gaia Association. The project agreement gives the legal ground for Gaia to implement all project activities and get the required support from concerned government authorities. Proper land use agreement was also signed among all concerned parties to use the land only for its intended purpose. It is the signing of this project agreement that has provided Gaia to import the EMD equipment free of duties and tariffs. This will also help Gaia to get the same privilege for the importation of the cookstoves which is ongoing.

A joint NCF-SEI supervision mission and meeting with concerned government authorities in June 2013 played a very significant role in obtaining land for the project and signing of the project agreement. Similarly the World Bank helped in putting additional pressure on the concerned government authorities to resolve the land stalemate. It is these efforts that led AAEP to take practical action to look for alternative land for the project. They linked Gaia with AACGWRDPO, who have proven to be a good partner in supporting the project implementation.
3. Importation of the EMD Equipment

The first EMD container had been shipped in February 2013. Due to lack of project agreement that allows for duty free importation, it was detained in Djibouti port for more than six months as the project could not afford to pay the high duty. The signing of project agreement with relevant government offices was one of the main requirements to get the duty free privilege for the importation of EMD. Following its signing, Gaia got all the required support letters from the Charities and Society Agency for the importation. Despite some delays on the part of the supplier to transfer the original bill of lading documents to the transistor, Gaia succeeded to get the first EMD container released from customs in early December, and is now stored at the Gaia project office. SEI provided the Donation Certificate needed for the release of the container.

4. Alternative Feedstock Analyses

Gaia in partnership with HoAREC has conducted an assessment on alternative feedstocks for the EMD. Spent grain from brewery waste was one of the potential feedstock assessed by the joint team, the two big beer factories in Addis Ababa - Saint George Beer Factory and Meta Abo Beer Factory - were targeted. Due to high dependency of the surrounding community on the spent grain for animal feed and the low ethanol yield from the grain it was not found to be a suitable alternative feedstock.

Cheese is the second dominant product in most milk processing industries of Addis. With the current technological capabilities of most industries during cheese production, from the given amount of milk around 4/5 of is a cheese whey. This cheese whey is one of the by-products of milk during cheese production and theoretically it can have about 50% of ethanol yield if appropriate technology is used.

The very large quantity of cheese whey produced in the assessed five dairy industries is disposed as a waste. Therefore this could be one of the potential alternative feedstock for the EMD if it is supported by laboratory test. HoAREC and Addis Ababa University are finalizing the laboratory testing report.

5. Feedstock Procurement

Molasses will be the main feedstock to be used for the ethanol micro distillery. Gaia is working very closely with Ministry of Water Irrigation and Energy (MoWIE) Bio-fuel Directorate to get molasses allocated to the EMD. MoWIE is in the process of coordinating a meeting between Gaia and Sugar Corporation to secure the required molasses supply for the EMD. The EMD annual feedstock demand was developed by Gaia and sent to MoWIE to facilitate the discussion. MoWIE is very positive about molasses supply in 2014. Our discussions with the Ethiopian Sugar Corporation provided results recently with the approval of our request for molasses allocation for the EMD. We are now waiting for the Proforma invoice from the sugar corporation to make the advance payment. To ensure the sustainable supply of molasses, Gaia is continuing discussions with the sugar corporation.
Gaia is also working closely with RATSON local NGO operating in Wenji area with the Sugar Factory which can easily access molasses for community support. Gaia is drafting MOU to be signed with RATSON that can help Gaia easily access molasses.

6. Civil Work Contracts Signed

Gaia has contracted only the labor part of the fence, main gate and sentry construction to reduce the already raised cost of construction as a result of delay in project implementation. Besides the change in the project site has also contributed to the rise in the cost of civil works due to change in the soil structure of the new project site which requires additional excavation and civil works. Similarly, even though it increases burden to Gaia Administration section, it will continue supplying construction materials and contracting only the labor part which has significant implication on the budget.

7. Prepare Land/Foundation for EMD

The fence, gate and sentry construction have been completed. Gaia is working on the civil works design and engineering estimate for EMD foundation construction to accommodate all the required facilities within the 400m² land. Gaia has received the site plan from Spectrum and is working with the construction consultant on the design to fit it into the available land space. Gaia is finalizing the EMD foundation plan to start the construction, but the delay in the overall implementation of the project raised the cost of construction significantly.

To fill the construction cost gap Gaia requested from SEI budget reallocation and has got approval. The civil works are expected to be finalized before the release of the second container from Djibouti port to Addis.

8. Establish Office at Project Site

The project document was prepared considering the Kolfe Keraneo project site, the two year project duration and unavailability of project vehicle. But these situations have changed over the course of the project period. The project site has changed from Kolfe Keraneo to Gelan, the project is now left with only 10 months and the FWFCA has acquired a vehicle for the project implementation. These are the major changes that initiated us to revise our plan of establishing a project office at the new site. The already structured FWCCA office will continue serving as the project coordination center. The revision has given us two major advantages; help the project ensure sustainability through the integration of the project with other similar projects of the association and it enables the ethanol and stoves sale to be conducted at close proximity to the majority members of the association.

9. Stoves and Fuel Business Plan

Gaia has signed a contract with the Women Bureau’s representative, who is also the FWFCA Coordinator, to coordinate activities of the group. This includes securing business license, drawing plans for stove and fuel distribution, and overseeing implementation of all FWFCA activities related to the project. She is best placed to carry out these tasks since she is trusted by the women,
is the representative of the women in government, and the project links with government ones hence she has access to resources such as vehicle which is not budgeted for in the EMD project. A contract has also been signed with the driver. 

10. EMD Installation

EMD installation has delayed because of delay in supplying the equipments on time from the supplier side. Currently the second container is shipped and is expected to reach the project site at the end of March, 2014. All other remaining activities such as technical staff recruitment, safety and EMD operation training attached with the EMD installation will be commenced soon.

Challenges vs Measures Taken

- Delay in agreement signing from relevant government counter parts resulted in the EMD equipment to detain at Djibouti port for 6 months. It also delayed the project implementation.
- Change in the project site as a result of Green Area makes the project area far from the beneficiaries’ residence.
- The soil structure at the new site requested additional cost for civil works and excavation – budget reallocation is requested to SEI to cover the difference.
- Delay in shipping the second container from the supplier side.

IV. REGIONAL ETHANOL MICRODISTILLERIES

With the grant secured from formerly known FEPA for a pilot project to introduce ethanol micro distilleries at sugarcane growing areas of three regional states, Gaia received 20m² plot of land for project implementation at Mekdela Wereda of Amhara region, Sekoru Wereda of Oromya region and Godere Wereda of Gambella region. The following are the major activities of the regional EMD’s in 2013:
1. Project Facility Construction

Construction of a 6m x 5m concert floor, iron sheet wall, shade, stand for 3,000 liters capacity water tanker, pipeline water connection of the project site, land strengthening of the site have been completed in all three camps.

2. Cooperative Introduction with the Community

Workshops have been held at Masha, Sekoru & Meti towns with the intention of introducing cooperative members with the community. Potential sugarcane producers of the area had been identified and invited in the workshops. These producers had been oriented about the establishment of EMD in close proximity of their farms, which demands a continuous sugarcane supply for feedstock.

3. Installation of the EMD

Placement of distillery tankers, installation of pipelines which will connect all parts of the EMD & boiler connection with the main part of the EMD is completed in Sekoru and Meti project sites. But due to the delegation of unqualified and inexperienced local technicians & the supply of law capacity EMD equipment from the supplier side, has delayed the full installation works at Sekoru and Meti and Mekdela towns. Currently following an intense negotiation among MoEF, UNOPS, UNDPS, Manseg and GAIA; Mansego technicians agreed to complete the installation works.

4. Launching Workshop

A consultative workshop was conducted at Meti, Masha and Sekoru towns to introduce the project with concerned local government officials, non-governmental organizations and community based institution representatives. The workshop tried to reflect the importance of alternative projects, production of ethanol from sugarcane, to protect the environment from destruction.

Challenges vs Measures Taken

- The mismatch of some of the EMD equipments with the specification
- Delay in the electric installation to the project sites from District Electric Power Supply offices at Meti and Mekdela – MEF has helped us through writing support letter to get priority.
- The assignment of inexperienced and unqualified local technicians for the installation of EMD – after evaluating their performance at Meti and Sokoru cites we decided the installation to be done by the technicians from the supplier so as to help the technology transfer.
V. STUDIES

1. Holistic Feasibility Study of a National Scale-up program Regarding Ethanol Stoves and Micro Distilleries

The “Holistic Feasibility Study of a National Scale-up Program for Ethanol Cookstoves and Ethanol Micro Distilleries (EMDs) Project in Ethiopia.” The Study’s main objective is to investigate the feasibility of an up-scaling plan for ethanol micro distilleries as small businesses and the potential of ethanol as a cooking fuel nationwide.

The study assesses the potential feedstocks for ethanol production, the technological capacity of local manufacturing of ethanol microdistilleries and analysis of policy gaps on the development of ethanol for cooking fuel in the country. The project also analysis policies, strategies and barriers (technical, financial, awareness, etc.) that act as impediments to ethanol fuel and stove market development and will identify and recommendations how to remove the identified barriers.

2. Performance Evaluation & Pilot Introduction of ICES’s Ethanol Stove

Gaia Association is working on the testing of twenty International Clean Energy Solutions (ICES), ethanol fuelled stoves. The Ethanol ICES stoves are supposed to use 60% of alcohol and 40% water mixture to operate. Gaia will conduct a baseline survey with beneficiaries selected for pilot introduction the stove performance through Water boiling tests (WBT), Controlled cooking tests (CCT), and Kitchen performance tests (KPT); and make commentary on the results. Through the home testing at the beneficiary households feedbacks will be collected to further improve the performance.

VI. STAFFING

Gaia Association has employees in Addis Ababa and employees in the refugee camps who continue to be proactive in the implementation of the various projects through technical assistance, facilitation, supervision, training, distribution, monitoring, pilot testing and evaluation

Due to the expansion of activities Gaia hired one Project Coordinator and one Program Coordinator at Addis Ababa Office.

VII. NETWORKING

Beginning in 2008, Gaia Association has been a dynamic member of Consortium of Christian Relief and Development Association (CCRDA). Gaia participated on different assembly meetings and workshops organized by CCRDA. Through our networking with CCRDA we were able to build the capacity of our staff through the participation in the capacity building trainings and workshops.
VIII. PARTNERSHIPS WITH GOVERNMENT

Gaia is working in close collaboration with federal and regional government Ministries and Bureau’s including the following:

1. Ministry of Environmental Protection & Forest / MoEF
2. Ministry of Water Irrigation and Energy / MoWIE
3. Ethiopian Sugar Corporation/ESC/
4. Ministry of Agriculture/MoA/
5. FDRE Metal and Engineering Corporation
6. Addis Ababa City Government Women’s, Children and Youth Affairs Bureau / AAWCYB/
8. Addis Ababa City Government Finance and Economic Development Bureau / BoFED/
9. City Government of Addis Ababa Environmental Protection Authority / AAEPA/
10. Gambella Peoples National Regional State
   a. Water and Energy Resources Development Bureau
   b. Finance and Economic Development Bureau
   c. Land Utilization, Administration and Environmental Protection Authority
   d. Finance and Economic Development Bureau
12. Jimma Zone Agriculture and Rural Development Office
13. South Wollo Zone, Mekdela Wereda Finance and Economic Development Office
14. Mekdela Wereda Agriculture and Rural Development Office