CAFOD
Catholic Agency for Overseas Development

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Access to Clean Water Using Solar Power for Drought-Prone Pastoralist Communities in Afar, Ethiopia

Annual Report

July 2019 to June 2020

Isle of Man Government

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1. Executive Summary

This project is being implemented by CAFOD in partnership with its long-standing local partner, the Ethiopian Catholic Church - Social and Development Commission, Adigrat-Mekelle Branch (ECC-SDCOA-M). The main goal of the project is to contribute to the wellbeing of targeted men, women, boys and girls by improving access to safe water through the installation of solar pumps, pipeline extension, and hygiene and sanitation practices in the Aba'ala woreda (district) of the Afar region. Improved access to safe and adequate water and improved hygiene and sanitation practices for and among drought-prone pastoralist communities in Aba'ala district of Afar region are the key objectives of the project. The project runs from 1 July 2019 to 31 December 2020. Accordingly, the key achievements in the first year of the project (1 July 2019 to 30 June 2020) are as follows:

In both the Gubie and Geraed projects sites, 54 solar panels with the capacity to produce 14,040 watts of electric power each have been installed and protected with fencing. The structure converts solar power into electricity. Additionally, in order to pump water from the deep boreholes to reservoirs, submersible pumps with capacity of 9.2 kw each have also been installed in both sites. To make alternating use of generator and solar power, a change-over switch has also been installed. This has provided the community at both sites with access to safe water immediately.

Dokhole village and its primary school are situated approximately 2.6 km from the borehole and about 6 km from the water distribution point at Geraed village. The current water supply system was constructed to serve both villages (Geraed and Dokhole), but Dokhole village and its primary school did not get access to water because of budget shortages during the first construction by government. CAFOD has therefore allocated an additional £10,000 to the budget to complement this project and has as a result created access to water for communities in Dokhole. Accordingly, 2,260m of pipeline extension to this village has been constructed and a 25m^3 capacity reservoir and distribution points are currently under construction.

In order to ensure sustainable use of the water structures, the project has established two WASH committees with 6 (3 Female and 3 Male) members at each structure. As the technology is new to the community and government experts, they have both been trained on how to run the structure and perform minor maintenance. They were also provided with accessories and tools (such as multi meter, pliers, screwdrivers and soldering machines). Moreover, there was a plan to conduct WASCHO training in March, but it could not be implemented because of COVID-19 restrictions.

The project has been implemented with close monitoring by CST/CAFOD and excellent collaboration with community and all government structures or offices (from regional to district level).

To date, in the three villages, about 7,387 (3,766 female, 3,621 male) people and about 40,000 livestock now have access to safe water. When the project is fully completed, it is expected that the same benefits will come to 9,237 (4,728 female, 4,509 male) people and 40,396 livestock.

Project Summary

Project Title: Access to clean water using solar power for drought prone pastoralist communities in Aba'ala district, Afar Regional State, Ethiopia

Project Goal: To contribute wellbeing of targeted men, women, boys and girls through improving access to clean water by installation of solar pumps, pipeline extension, and hygiene and sanitation practices in Aba'ala woreda, Afar region.

Project Specific Objectives:

- To improve access to safe and adequate water to drought prone pastoral communities in Aba'ala district of Afar region.
- To improve hygiene and sanitation practices for and among drought prone pastoral communities in Aba'ala district of Afar region.

Project Location: Aba'ala woreda of Zone two, Afar Regional state, Ethiopia

Project Beneficiaries: 9,237 (4,509 male and 4,728 female) people and 40,396 livestock

Total Project Cost: 104,206.34 GBP

Duration of Project: *July 1, 2019- December 31, 2020 (18 months)*

Donor: Isle of Man and CAFOD through CST (CAFOD, SCIAF & Trocaire)

Project Activities

- Solar Pumping System Installation of Geraed site
- Solar Pumping System Installation in Gube village
- Pipeline extension 2km from Geraed to Kala and primary school
- Construction of 25 M^3 water reservoirs
- Construction of distribution point
- Solar Pumping System training to woreda experts and staff
- Solar Pumping System training to WASHCO members and operators
- Equipment support to WASHCO members and operators: Multi meter, pliers, screw drivers and soldering machine
- Visibility

2. Objectives

- To improve access to safe and adequate water to drought prone pastoral communities in Aba'ala district of Afar region.
- To improve hygiene and sanitation practices for and among drought prone pastoral communities in Aba'ala district of Afar region.

3. Progress towards Objectives and on Activities

3.1. Installation of solar water pumping system in Geraed and Gubie

Afar regional state is forever under the stress of a lack of safe water supply because most of the region lies within the East-African Great Rift Valley. The project woreda, Aba'ala, is one of the most populated districts in the region and suffers from a lack of safe/potable water supply. As a result, communities are forced to move from place to place in search of water for their household consumption and livestock. Therefore, different humanitarian organizations, development organizations and the government are trying to address the problem through different programs and projects. Accordingly, this project is one of the initiatives of ECC-SDCO-AD under implementation in the villages/sub-districts of Gubie and Geraed of the Afar region. The project aims to create sustainable access to safe water supply for the beneficiaries in the sub-districts by reducing the running costs of using diesel generators and by installing solar powered water pumping systems.

During the drought in 2015 and later years experienced in this region, the government had drilled deep boreholes for Gubie and Geraed communities with spot water collecting systems, using diesel generators. The communities tried to use the boreholes for a while but were later unable to manage it or cover running costs of the generator because of the ever-increasing cost of diesel fuel. For some years, the communities tried to get water by reducing their cost of fuel by filling the reservoirs at half or 25% capacity. People were not, however, even accessing water to the minimum standards level set by the government for daily consumption. In addition to the ever-increasing cost of diesel, community representatives also had to travel long distances to towns, with no formal transport systems, to physically access this fuel and bring it back to their community centres. During the project design phase, the communities were about to stop using the boreholes due to their inability to cover diesel fuel costs. Considering all the difficulties that the communities were suffering, the project formulated activities focused on minimizing the cost of running the water structures and creating access to potable water supply for day to day household consumption and livestock for the communities of Gubie and Geraed. In this regard, the focus was to reduce and/or avoid the cost of fuel and related maintenance costs and to avail safe water at close distances for the communities. The project has therefore supported the communities through the installation of solar pumping systems, which have avoided the costs of diesel fuel and its transportation cost from towns to the community centres.

Accordingly, for both the Gubie and Geraed sites, 54 solar panels producing 14,040 watts of power (260 watts per panel) per site have been installed, as well as a GRUNDFOS submersible pump of 9.2 kw installed at both sites. The solar panels collect direct current from the sun and convert it into electric energy by the convertor. A controller has been installed at the generator houses. The controller transmits the desired amount of alternative current to the pump for pumping water from the deep borehole to the reservoirs. A change-over switch to make alternative use of the generators and solar power has also been installed. The solar panel systems are fenced with wire netting to keep it safe from people and animals. The community of Geraed and Gubie began using water immediately after the generator pumping system was replaced by the solar pumping system because of the already existing reservoirs and pipelines.

The Geraed site water supply serves the Geraed and Dokhole villages and community. Dokhole is a village of Haridan Kebele (sub-district) and its community has not had access to water from this borehole because they are located more than 2.6km from the borehole and more than 6 km from the existing water reservoir. Hence, the project extended pipeline from the borehole of Geraed where the solar system is installed to Dokhole primary school. In addition, a reservoir of 25m^3 and one distribution point with six faucets were constructed through the project. A cattle trough was also installed through another complementing project (funded by CAFOD) for the community of Dokhole and their livestock. Because of the extended pipeline from Geraed to this site, the community and their livestock now have access to water at spots where the reservoir and distribution points are being constructed.

Moreover, given that the solar energy is a renewable, natural resource, programme participants have started appreciating the technology that enables them to use water with no quota limitations.

Pump and Solar system installation in Geraed and Gubie

Geraed Site

Gubie site

3.2 2km pipeline extension from Geraed to Dokhole village and primary school

Another very important activity of the project is extending the water system to the nearest site of communities in Dokhole village. Even though the community was able to save diesel costs and its related transportation cost from towns to the community centres for running the diesel generator, they still had to travel some distance to fetch water from the borehole at Geraed. Therefore, to provide access to water in this village the project has extended about 2,260 meters of water pipeline from Geraed borehole to Dokhole primary school after an earthen trench was excavated according to engineers' specifications. Thus, 2,260 metres of High Density Polyethylene (HDPE) with 16 bars (of which 1,760 metres of 63 mm diameter and 500 metre of 50 mm) size pipe was installed. The Dokhole community is now fetching water within a very short distance from their village.

Excavation and pipeline expansion works from Geraed to Dokhole

3.3 Construction of 25m^3 volume capacity water reservoirs and water distribution point

For the Dokhole community, the project is constructing a water reservoir of 25m^3 volume capacity. The reservoir is a sandwich structure, with two sides of stone and re-enforced in the middle by 10cm thick concrete to protect from water leakage and to strengthen the structure. With the exception of the top slab and some finishing works, the structure of the reservoir was constructed before March 2020. The remaining works were delayed due to COVID-19-related restrictions on staff movement from Tigray region to neighbouring regions. The main challenge on travel restrictions relates to travelling to Afar region and coming back to Tigray region. It is possible to travel to Afar, but it is necessary to stay in quarantine for two weeks upon arrival, which prevents staff from being able to leave quarantine to continue construction works.

The distribution point is constructed fully and fitted with plumbing of six faucets. This distribution point is not yet providing service because the reservoir is not yet finished and connected with the distribution point. Thus, people and livestock are using water from the extended pipeline to the village until construction of the reservoir is finished.

Reservoir and distribution point under construction at Dokhole village

The Community and livestock in Gubie, Geraed and Dokhole sites are using water as the solar and pipeline extension works were completed. Even though the reservoir in Dokhole is still under construction, people are using water directly from the pipeline on site. Thus, in the three sites more than 7,387 people (3,766 female) and about 40,000 livestock now have access to safe water.

People & livestock accessing drinking water at Dokhole and Gubie and construction of water reservoir and distribution point

3.4 Establishment and training of WASH Committees (WASHCO), operators and experts on solar pumping system

To put into place sustainable community based water management, the project had a plan to carry out WASH Committee establishment and training and mobilizing the community to recruit and train operators. In practice, while the major maintenance and operation is beyond the operators' capacity for the deep wells, (multi-village water systems and the solar system is the responsibility of the water resource office of the district) minor maintenance and management of the structures is the responsibility of the community. Hence, the project facilitated establishment of WASH committees for Geraed and Dokhole water systems with six members (three male and thee female) and one guard for each site, as previously there was no functional committee except the existing two diesel generator operators. Hence, the WASH committees were established and provided with awareness raising training on hygiene and sanitation practices.

Selection of WASHCO and community awareness raising on WASH activities before COVID-19 at Dokhole, Geraed & Gemelu villages

Moreover, as the solar pumping system technology and its installation is new for both the government experts and operators, the project familiarised them with the new technology during the installation of the solar panel and its accessory tools. In addition to this, the contractor has willingly trained them on how to install and run the system. Although the solar pumping system was mainly for operators and experts, WASH Committee members and kebele leaders also participated and observed how the system is operated. Currently, based on the training they received, the operators are running the system effectively and with full confidence.

In addition to this, there was a plan to provide capacity building training (including the operators) on operation and maintenance (fixing of accessories) of the solar system, water utilization and water structure management, hygiene and

sanitation practices, fee collections and guarding of the water distribution points. The training for WASHCOs is planned to be conducted within another complementing CAFOD project. Thus, the project had a plan to conduct the training in March 2020 by integrating the training budgets from both projects but was delayed because of COVID-19 travel restrictions.

Training on Solar System for Operators and Experts, WASH committees at Geraed and Gubie sites





3.5 Equipment support to WASHCO members and operators (Multi-meter, pliers, screwdrivers)

For sustainable and long-term operation of the structures, maintenance tools and cleaning facilities are needed. Hence, the project purchased and provided different tools for operating and maintenance such as screwdrivers, pliers, solar panel dust cleaning materials, and voltage and power measuring and checking tools. All have been supplied except for the multi-meters, which have not been delivered by the supplier who won the bid because of shortage of stock, but these items will be supplied in due course. This equipment will be provided to the government and the operators officially with a handing over format.

3.6 Visibility

These activities have not commenced yet but will be conducted in the remaining project period

4. Stakeholder Involvement

To create strong stakeholders' collaboration, smooth coordination and inclusive participation, the project started its

implementation through a project launching workshop that was conducted at District level. Key stakeholders from both woreda and each targeted Kebele/sub-district participated. During the workshop, all project activities and their intended outcomes were clearly presented with their planned budget and the collaboration and coordination expected from each stakeholder. During discussion, the stakeholders expressed their opinions on how the collaboration and coordination should be done by taking into consideration the planned project activities. They have shown commitment to collaborate and coordinate the project work accordingly. The target communities and their respective administrations are the primary stakeholders of the project. Accordingly, they strongly collaborated with the project during implementation and joint monitoring works of the project. For instance, the woreda office of water resource assigned experts during the solar pumping system installation and technically monitored with full commitment until the contractor completed the work. In addition, the water office contributed the existing riser pipe for the Geraed borehole pump installation.

Afar regional bureaus of water resource, health, plan & finance were invited during the project-launching workshop, but the bureaus of water resource and health could not participate due to workload and other overlapping duties they had at the time. Nevertheless, they have been involved during the project proposal review and signing of agreements. The project also shared twice to the bureau of Afar regional water resource the progress update of the project via email.

CST/CAFOD has been engaged through coaching and providing capacity building to ECC-SDCO-AD in general and to the project in particular. CST/CAFOD visited the project before the onset of the COVID-19 pandemic and provided feedback on the implementation of project activities.

These relationships developed mutual understanding among all stakeholders. They have also helped to exercise accountability to our concerned stakeholders (mainly the community and the IoM).

Monitoring with stakeholders during project implementation



5. Sustainability

To ensure sustainability of the project interventions the following activities were carried out:

- ***Strengthen participation of the community and Woreda/kebele sectors***: Stakeholders participated in overall processes of the activity in a way that can develop sense of ownership in the project. They have contributed their own

share to the project. Kebele/sub-district administrators mobilized the community and district office experts provided their technical support during planning, implementation and project monitoring.

- ***Institutionalization:*** the project facilitated the establishment of WASH Committees and planned to train them and develop local bylaws to manage the water supply system. In addition, the project equipped them with maintenance and operation equipment.

- ***Handing over:*** the project utilizes participatory ways of planning, implementation and monitoring with respective sector offices. Accordingly, respective experts of sector offices participated in every capacity building, input provision, and technical supervision so they can manage these project outputs upon the handing over and phasing out of the project. The project will hand over its outputs upon completion to respective trained committees and sector offices.

6. Challenges and Lessons Learnt

The project has faced the following challenges:

- Delay in signing project agreement with government. The main reason for the delay was because of long distance (476km by road) from Mekelle (Tigray) to Semera, the capital city of Afar regional state, and the change in staff at the concerned bureaus. There were consecutive travels back and forth for reaching an understanding and getting into agreement with the newly appointed officials.
- Labour shortage for skilled and unskilled workers in the area of construction. In Afar, it is quite difficult to get both types of labour (skilled and unskilled). Therefore, workers or labourers were recruited from Tigray and from zonal city of Afar (Tigrayans living in Aba'ala).
- Industrial material market cost increases
- Movement restrictions due to COVID-19 for the past three months starting from March 2020. The project is left with a few activities to be completed. If restrictions on movement are eased, the remaining work will be completed in one month and the remaining time until the end of the project will be used for monitoring and impact assessment.