

Impact Report

On

Hand pump Repair Programme

Zoba Maekel, Eritrea

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Key Impacts-Summary

The most significant Impact as perceived by the communities	
Impact Domain	Impact Indicators
# Beneficiaries impact and their structure	<ul style="list-style-type: none"> • Total Beneficiaries- 36,956 (7,400 households) • Women- circa 53% of total • Total Pumps Repaired- 47 pumps in 37 villages
Livelihood and Income	<ul style="list-style-type: none"> • Money saved for other economic and home use • Time saved for other income generating activities use, like producing and selling marketable handcrafts, poultry products, etc... • Time devoted to agriculture and non-agriculture activities
Health and Sanitation	<ul style="list-style-type: none"> • Significant reduction of diarrhoea- from 88% to 8% • Increased water consumption for drinking and other purposes • Clean water supplied (liters)/day- 591,200 • Increased level of cleanliness of community and condition of clothing • Improved personal hygiene
Education	<ul style="list-style-type: none"> • Increase in number of students attending school regularly • Reduction in absenteeism • Students have time for studying
Time	<ul style="list-style-type: none"> • Reduced time and labour for fetching water • Increase in women's participating in non-domestic activities • Changes in women's workload • Reduced time saved collecting fire wood for boiling water
Social	<ul style="list-style-type: none"> • Time spent collecting water reduced from an average of 4-5 hours to less than one hour • More time spent with family • Social/community interaction increased
Environment	<ul style="list-style-type: none"> • Deforestation and erosion decreased • Wood saved (metric tons)- 6,387 per year • 12,000 tonnes reduction of CO2 emissions per year

1 Background

Access to water has been a central focus of Eritrea's national development plan; as articulated in the 2014-2018 National Indicative plan which is to ensure 100% supply of safe drinking water by 2030.¹ Monitoring of progress and ensuring sustainability remains one of the highest challenges for developing countries as far as the SDG-6 is concerned and Eritrea is no different in this regard.

Long-term maintenance of water boreholes has become one of the most challenging tasks for the communities in Eritrea. Reports of the department of water show that of 864 hand pumps installed across the country in the 1990's, only 52% (450) remained functional. Of the remaining pumps, 43% (371) were no longer functional, and 43 were unaccounted for. Taking an average of 800 people per water point, this means that over 300,000 people are suffering the consequences of broken pumps. This impacts on livelihoods in terms of travelling further, not accessing potable water with attendant health and livelihood risks. In 2006 the average and median periods for which pumps were not working was recorded to be 2.83 years and 1.65 years respectively². Key informant discussion allude that, only a few communities have probably repaired hand pumps since 2006, hence, both the average and median has most likely increased by now.

Under the circumstances, communities are forced to fetch water from unprotected and unsafe water sources by travelling long distances, spending time on queues and compromising opportunities (health, education, income and livelihoods). Key informant experts of the Ministry of Health indicate that, diarrhea disease is one of the leading causes of mortality among children under five years of age, and morbidity among the general population in Eritrea. Moreover, these experts suggest that significant percent of hospital bed occupancy is attributable to water-borne diseases. With a typical cost of hospitalization being about 100 USD per case of diarrhea³, it is easy to understand the cost implications to poor countries like Eritrea.

As a local coping adaptation mechanism, communities are forced to boil the water that they collect from the unsafe water points. This project has initiated a new approach which also fits with the government's self-reliance principle. The Social Impact Investment approach raises money to contribute to the repair and maintenance of water points with investors being repaid from carbon offsets derived from the reduction of CO₂ emissions from saving firewood that they used to boil water.

This report presents, the socio-economic, health and livelihoods impacts of the initial trialing of this approach in Maekel region.

1 The State of Eritrea: Intended Nationally Determined Contributions Report (2015).

2 Water Resources Department (2006): Rapid Assessment of Rural Water Supply & Sanitation in Eritrea

3 <http://climatecare.org/tag/carbon-for-water/> (accessed 12/05/2015)

2 The Project

Although, access to and distribution of safe water has improved in Eritrea over the last two decades; there is a growing concern that these achievements might reverse as it has become increasingly difficult to sustain community water projects with around 50% existing boreholes in Maekel region broken or no longer functional.

Lack of safe water, along with poor sanitation and hygiene affects the livelihoods of the households. Women and girls are the most affected, with wasted hours spent carrying dirty, contaminated water. In addition, the negative impact on health from water borne disease is substantial. In conjunction with the water department in Maekel, Vita initiated the project because of the very apparent need of access to clean drinking water.

Overall objective: The objective of the pilot project was to create a sustainable, scalable and long term solution for access to clean drinking water in Eritrea.

Specific objective(s): The specific objectives of the project were to: (i) Increase access to water for some 12,000 people in the Maekel region of Eritrea, (ii) Establish Water User Associations in every village where pumps are repaired, (iii) Establish community payment plans for pump maintenance, servicing and repairs, (iv) Train community pump ‘caretakers’, (v) Ensure safe and sustainable water use across the region.

3 About this Report

This report is a follow on from an earlier interim impact report carried out as the project was being completed in November 2016. This report attempts to look at impact one year on from completion although it is recognised that the impact on issues such as opportunity costs and environment can only be robustly assessed after 3-5 years of project implementation.

This report was undertaken in all 37 villages using focus groups to validate or update results measured in the November assessment. In addition, this report looked at regular progress reports, relevant documents and with discussions with the Maekel water department.

4 Impact of the Project

The attainment of project specific targets can be noted against SDGs. The discussion of the impact of the project can be pinned into two categories, namely at an outcome level and compounded impact.

UNOSD (United Nations Office for Sustainable Development) highlighted that water-based goals naturally cluster into three categories:

- 1) water as a sector;
- 2) water as an enabler; and
- 3) water as a supporter (welfare impact).

The project intervention under discussion impacts on two of these; water as a sector (1) and as a supporter of development (3) to its different activities.

4.1 Water as a Sector - Impact

There are three relevant measures of impact:

- (i) Water access
- (ii) Water quantity
- (iii) Water quality

4.1.1 Water Access

The notion of ‘access to clean drinking water’ needs some clarification. In the project area the many people had access to clean water but it involved spending over 4-5 hours per collection as there was no safe water point nearby where they lived while others were forced to collect their water from unprotected sources. The term ‘ready access’ is possibly a more useful term to use in the context of this project. If a notional value of less than one-hour collecting is considered ready access, then all 36,956 persons in the project area now have ready access.

One interesting aspect that was noted through focus groups feedback was that when hand pumps were broken and distance to working water points were longer, those households with donkeys had an ability to carry greater quantities spent much less time collecting water. It could be concluded that this therefore was creating a form of socio-economic class stratification, i.e. those with resources (e.g. donkeys, labour, large containers) having greater access to water. With limited access to water it created tension and conflict at the very few functioning water points.

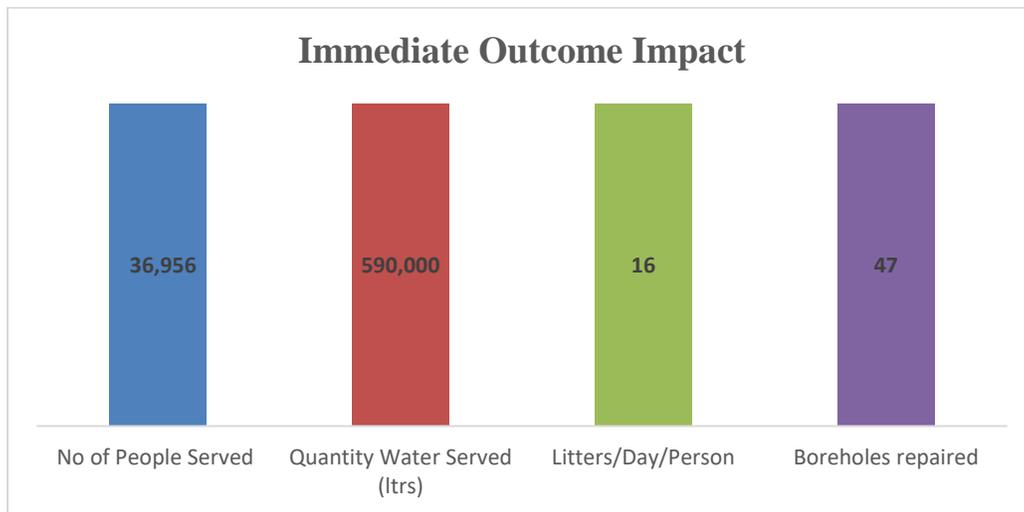
Now the WASH committee and the hand pump caretakers have protocols to ensure equitable and fair access to all; and since the distance to the water point is fairly short for majority households, it is easier for people to help each other when required. Now, times are set which are convenient and safe for women and others who have responsibility for collecting water, and all users are fully informed of when and where water is available.

4.1.2 Water Quantity

Prior to the project the average quantity of water used was 15.3lt/person/day but this was sporadic and from unsafe sources (rivers, unprotected well) and required long trips to collect

The quantity of water used post project has only risen marginally (c. 16 litres/day) indicating that about 592,000 litres of safe drinking water is supplied daily from all the rehabilitated boreholes. The focus groups meetings indicated that there had been no noticeable change in usage since the previous assessment.

This means that the average water use for drinking, cooking and personal hygiene in every household is at least consistent with the standards of the Humanitarian charter⁴ but below the WHO standard of 20 litres/person/day.



Source- Extrapolation from Impact Field Study (2016)

4.1.3 Water Quality

A water quality test done was done on all repaired boreholes immediately after the repair work and 28 (59%) of them had some bacteriological contamination while there was no chemical contamination. All contaminated wells were chlorinated properly, checked again and all of them were confirmed free of any bacteriological contamination after chlorination.

The project does have a commitment by Vita to check water quality each year and treat as required and it was confirmed that these were going to go ahead in November 2017.

Generally, the results show that water quality, with the exception of initial bacteriological contamination at the time of rehabilitation of the water points, was now of a reasonable standard and that households are taking adequate preventive measures in handling water.

To better understand the community's awareness of water quality surveillance, beneficiaries were asked if they were aware of the quality of their water supply. About 85% knew that their water quality was tested at the time of construction and that the quality will be tested and treated if necessary each year. Indeed, communities now identify the water from the repaired hand pumps as 'healthy water'.

The performance of the project against standard impact (intermediate outcome) include:

⁴ The Humanitarian Charter (2013): Minimum Standards in Water Supply, Sanitation and Hygiene Promotion

Standard impact (outcome) indicator related to water quality	Outcome
low risk of faecal contamination	Assessment shows that area around water points is protected and communities have instituted appropriate supervision mechanism
There are no faecal coliforms at the point of delivery	Water test by the department of water shows no coliforms at the point of delivery.
People drink water from a protected or treated source in preference to other readily available water sources	Communities ask “is the water ‘the healthy one’” to refer to the water from the repaired boreholes; apparently also referring the water from the previous water sources as ‘unhealthy’.
Minimise post-collection contamination	No post-delivery intervention was undertaken; but survey showed, domino-effect from improved health and reduced drudgery leading to improved awareness
At times of risk, water is treated	All boreholes were chlorinated properly and checked again. All of them were confirmed free of any bacteriological contamination after chlorination.
No negative health effect is detected due to short-term use of water contaminated by chemicals	No assessment was done into this; but no negative health effect was detected so far.

4.2 Water as supporter of Development – Impact

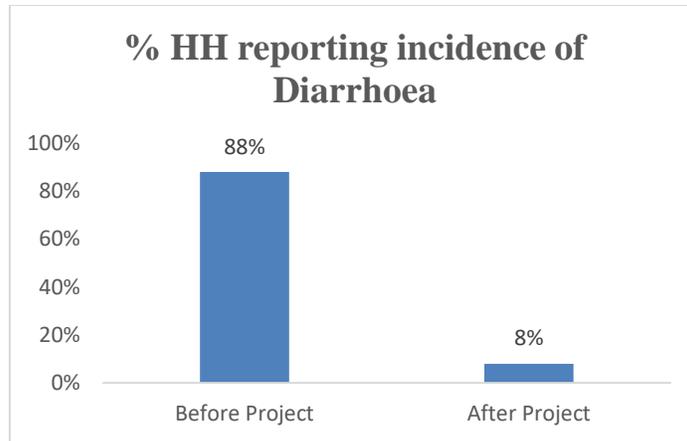
Project impact on household welfare was assessed based on the intended impact at project design and reported achievements at project completion. Four relevant impact areas were identified in the context of this project—health, education, environment and hours and money saved. Sustainability impact is discussed as a separate area.

4.2.1 Health Impact

Health impact was measured in terms of the incidence of illness, diarrhoea in particular, and the reduction in drudgery associated with fetching water, as well as muscle strain, and back pain by the sample household members.

The incidence of diarrhoea dramatically decreased after the repair of the hand pumps. Prior to the launching of the project, an estimated 88% of households surveyed had reported incidence of diarrhoea; and over 67% households reported illnesses other than diarrhoea but related to water borne disease.

Post project only 8% of the respondent households reported incidence of diarrhoea and only 2 cases of ‘other water related sicknesses’ reported since the launching of the project.



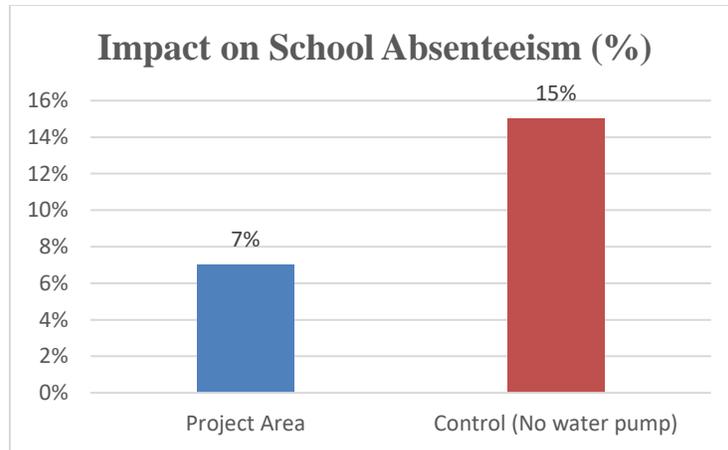
Source- Extrapolation from Impact Field Survey (2016)

Some 73% of households reported that they previously used firewood to purify water for drinking. Focus Group Discussants reported that this use of firewood for boiling did have other associated health complications; where headache, eye irritation and respiratory problems were mentioned as the ailments coming from indoor air pollution.

Women emphatically highlighted that the project has had significant impact in reducing the drudgery (represented by muscle strain, blisters, or backache) they experienced fetching water. Although, this couldn't be quantified in the present impact assessment; similar study done by the Red Cross society in 2014 showed that communities with working hand pumps experience about 20% less drudgery (incidence of muscle strain, backache, blisters) than those with no hand pump.

4.2.2 Education

The project's impact on education was assessed based on children's school attendance and tardiness. In this respect, key informants and focus group discussants affirmed that the repair of the hand pumps contributed to improved school attendance and reduced tardiness of students. For instance, the school principal from the Berik sub-zone noted that school absenteeism was lower for students from the areas with improved water supply sources compared to students who come from the areas which still depend on open water supply sources (7% versus 15%). Moreover, the school principal noted tardiness is as twice higher for students with no access to improved water sources compared to students with improved water sources.



Source- Discussion with School Principal (2017)

This was further substantiated during focus group discussions where participants noted that school attendance to have been very low before the repair of the hand pumps. Traditionally, fetching water is the responsibility of children (especially girls) or women in the families. Hence, families rather prefer to retain their children to fetch water and take the animals to the water points; especially when the mother has other household chores to attend (e.g. milling). The school principal emphasized that in the project areas girls accounted for about 50% of student population at elementary level; yet more than 60% them used to either come late or completely not come; as they have to fetch water, collect wood, which may take 4 to 5 hours' round trip. Closer to 30% of students were absent from school one to two days per week prior to the repair of the hand pumps. Additional reasons for absenteeism included diarrhea and other water related diseases.

4.2.3 Environment

Locally the rehabilitation of the water pumps has contributed to environmental protection by eliminating the need for fuel wood for boiling water for drinking although it is noted in the focus groups that not all water used by the households was boiled. Globally, there is impact due to reduction of emission of greenhouse gases consequent upon the combustion of fire wood.

The average amount of firewood burned for boiling during the baseline survey was 16.6 kg per household per week. At this rate, the total amount of firewood consumed for boiling drinking water by all households is 6,387 tonnes per year and this quantity of firewood represents the total saving after the rehabilitation of the water pumps. For a highly-deforested area like Zoba Maekel, this is a substantial saving, in terms of biomass. However, measuring direct impact on woodland cover due to this intervention is not possible.

The resulting CO₂ emission savings from project this are c. 12,000 tonnes /annum. Hence, the contribution of this project to the Paris climate agenda and the sustainable development goals is significant; especially SGD-13 and to which Eritrea has committed itself.

The government of the State of Eritrea has expressed that it is committed to reduce the CO₂ emissions from fossil fuels by 23.1% in 2020, 30.2 % by 2025 and 39.2% by 2030 visa-vis to the reference year. Hence, the project also contributes to the national plan of reducing emissions and contributing to the SDG targets.

4.2.4 Expenditure saving and Hours Saved

Only 11% of households indicated they have at times have to purchase charcoal to boil water; while the rest said, they collect firewood freely from the community woodlot. Expenditure savings for the whole project therefore are not substantial.

The amount of time saved is very substantial with a reduction from 4.5 hours per collection event to less than one hour. This has had a major impact on reduction of drudgery and health on women and girls as described previously but also creates ‘discretionary time’.

The previous study also tried to look at the availability of more work hours for farm work and other productive activities. Focus group discussants and key informants affirmed that people (especially women and children had more hours to help in the family and community works than before the project; yet there is no definitive indication as yet what the additional discretionary time is being used for. This is an impact area that could be examined in more detail in the future to ensure that there are no unintended consequences arising from having more time and to quantify what the benefits are.

Moreover, it has been already noted that students, particularly girls, had improved school attendance. While this was not also quantified, focus group discussants and key informants argued that reduced drudgery and time saving means more leisure time aside from school attendance. Leisure time was spent resting and on social interaction and caring for younger siblings.

4.2.5 Likelihood impact- Link to the SDGs

This project interfaces to all SDGs. But more so with SDG-6 and SDG13. It creates a unique platform of cooperation between Eritrea and Ireland (SDG17), in finding an innovative solution to access to clean water (SDG1) and reducing poverty among the rural poor (SDG1, SDG2) through the development of carbon financing (SDG13). It fosters gender equality and reduces inequality by reducing drudgery (SDG5, SDG10) and improved health conditions (SDG3)

To understand the project’s link to the SDGs it is desirable to see beyond the immediate outcomes discussed in the previous sections and use a ‘nexus’ approach. In this regard, the prime contribution of the project towards the SDGs falls within the SDG-6 “Ensure Availability and Sustainable Management of Water and Sanitation for All”. However, all other SDGs also interlock with SDG6. Since, this project emphasized the ‘Social Impact Investment’, it has high contribution to socio-ecological systems; a concept that captures the interdependency of human social systems to ecosystems as drivers and consumers of services.

Moreover, as note above the project lends to meeting SDG13 as expressed in the national plan of the government. The government intends to reduce the CO₂ emissions from fossil fuels by 23.1% in 2020, 30.2 % by 2025 and 39.2% by 2030 visa-vis to the reference year. If additional support is solicited, it can be further reduced by 36.4 % in 2020, 61.1% by 2015 and 80.6% by 2030.⁵

5 Sustainability

The sustainability of the project impacts depends on the sustainability of the benefits gained. The assessment has shown that the project has global, national, community and household level impacts. The global impact comes in terms of its contribution to global CO₂ emissions reduction. The CIDSE Poverty and Climate Justice Group has noted “Richer countries, those which have caused the current climate crisis should be the first to act, as they have the primary historical responsibility to. They should assist poorer countries to adapt to its impacts and pursue alternative, less polluting development models.”⁶ To this effect, the repaired hand pumps generate carbon certificates which have value in richer countries and in turn form a basis to raise capital to provide support to provision of clean water to poor communities. The generation of carbon certificates are structured under a seven-year carbon project and in order for the project to be able to sell certificates there is an annual audit to certify that all water points are working. This creates a unique win-win scenario whereby the water points must be fully functional for the full seven-year period.

At the community level, the necessary mechanisms for sustainability are put in place. All villages have established water users’ groups and/or WASH committees to manage their water and sanitation infrastructures. Each WASH Committee of seven members acting as chairperson, secretary, treasurer/cashier, caretaker/technician, sanitary and two members. It was also observed that proper training and technical assistance was provided to WASH committees from the beginning of the project and they all have a bank account. The management of the water and sanitation infrastructures is so far functioning effectively and the mechanisms in place ensure their sustainability. Aall the villages have established a formal water use payment system, the rate of which was agreed upon by the communities. This financial contribution will be used towards the repair and maintenance of their hand pumps. The water use payments agreed upon by the communities is a clear indication of community commitment to the sustainable use of the rehabilitated clean water supply systems. The villages indeed have now the organizational capacity to sustain the full operation of the water supply infrastructure in the long run. This is in contrast to the pre-project situation where the main drawbacks for sustainability were absence of strong WASH, financial mechanisms, access to spare parts, etc. A study done by the water resource department has documented the following realities in the Maekel region⁷.

5 Ministry of land, water and environment (2015): Eritrea’s Intended Nationally Determined Contributions (INDCs) Report

6 Vita (2015) Green Impact Fund Prospectus

7 Water Resources Department (2006): Rapid Assessment of Rural Water Supply & Sanitation in Eritrea

Sustainability measures	2006	2016
WASH Committee	77.4%	100%
Water Guard	35.7%	100%
Tariff Collectors	36.9%	100%
Maintenance Operator	19.0%	100%
Tariff Collection System	53.6%	100%
Bank Account	9.5%	100%

Source: Water Resource Department (2006) and Field Survey (2017)

As demonstrated in the above table, WASH committees were available in 77% of the villages with hand pumps. However, only 19% had designated maintenance operator and only 9.5% had bank accounts. There were irregularities in tariff collection and majority of hand pumps were poorly guarded. All these hitches have been addressed after the repair work, with simplified working operational manuals to ensure sustainability: a) community based water supply system management guideline; b) WASH committee management guideline; c) community water supply financial management guideline; d) Technical Water Supply System Management.

One key aspect of sustainability of the project is access to spare parts. The project has developed protocols with the water department to put in place a regional store for sufficient spare parts for two years. This will be then being replenished annually by Vita so communities always have access to affordable spare parts. Under the protocols agreed between the water department and the water user groups, Vita will also have responsibility for testing of water quality and for any required treatment.

At national level, there is government interest as the project contributes to the national vision of meeting the SDG targets by 2030 as expressed in Eritrea’s Intended Nationally Determined Contributions (INDCs) Report (2015) and the SDG alignment proposal of the Ministry of National Development (2016).

6 Conclusion

This project has demonstrated that it impacts primarily benefit women, children and vulnerable groups at the rural areas. In Eritrea, women are disproportionately affected by water demands due to the time and energy spent sourcing, carrying, and purifying water. The project reduced women’s drudgery which in turn frees up time for more productive activities, such as the education of children, economic or agricultural tasks.

The repair of the hand pumps has led to the clear improvement in health of communities with reduction of diarrhea reported by households (from 88% to 8%) and other related diseases including the likelihood of exposure to harmful indoor air pollution.

In the long run, access to clean water helps reduce deforestation which has been very serious issue in Eritrea. the compounded impact will yield in slowing soil erosion, the destruction of natural habitats, and loss of biodiversity.

The project has also ensured the establishment of relevant sustainability mechanisms through a partnership between Vita, the water user groups and the water department of Maekel by building on previous experiences, assessing drawbacks of previous initiatives and streamlining it with community tradition and national regulations.

At the community level the most significant impact as witnessed by the communities themselves has been the reduction in drudgery, access to clean water and the compounded impact on welfare, community cohesion, education, health and income.

Institutionally, the project acts as a blended finance model (investment plus grant) which can be replicated as it combines continued generation of revenue from reduced CO2 reductions which can be used to fix and maintain water points. Eritrea is among the few developing countries that discourages aid money and instead prefers support in its 'self-reliance' principle. Since this project demonstrates a link between 'development support' and 'self-reliance' it can be considered as a win-win approach for both donors and recipients.

The impact has demonstrated the project's interface with all the SDGs but with particular immediate contribution to SDG6 and SDG13. It also has closer contribution to SDG1, SDG2, SDG3, SDG5, SDG10 and SDG17. This interface coupled with the governments intent to meet the CO2 targets as stipulated in the 2030 agenda ensures that there is high level of continued institutional sustainability.

Annex-I People's Voices (Case Studies)

Our children are safer

Each morning my children and myself used to walk 3 km to fetch water from the stream. The water didn't taste good and we often experienced pain in our stomach and diarrhea. Animals were also drinking from the same source and many people especially the men used to bathe at the same source. During the dry season, the water was scarce and it changed its color. Since the rehabilitation of the water point/and/or hand pump, life has become less burdensome. The hand pump is only 200 meters away from my home and takes only about 10 minutes to reach it. My family and I will drink clean water, save time which my children can use for their studies and above all be healthy. Our committee are there to protect the interest of all of us. We are no more afraid for the safety of our children as the boreholes are secure.

Mrs. Almaz Tewelde of Adi Teklay village (Berik Sub Zoba) and a mother of eight children

A women's project

In my opinion this was a women's project. Sometimes we are shy to talk of our hardships. But there are certain things which are women only and which are not much noticed; especially the hygiene that women require during their menstrual period. In the past when water was difficult to obtain, we had problems with our menstrual hygiene as we could not wash as much as we wanted. I often had to argue with my daughter, because she wants to wash every now and then. Sometimes she had to stay at home at the expense of her school because she feels she wasn't clean. Now, we feel confident. We have the water close to our homes and we can bathe as much as we want during our cycle.

Mrs. Abeba Habtemariam from Shinjibluq village (Sub Zoba Berik)

Ample Time to Help and Study

I am a member of the parent-teacher association and in our meetings, we all note that school attendance has increased and tardiness is rare since the repair of the hand pumps. I have two daughters in the village school. They used to occasionally miss classes to help at home. Now they more regularly attend classes and have more time to study after class. The hand pump is only 300m away, and the fetching schedule is convenient to our needs. I have ample time to do other tasks in the house instead of spending much of my time fetching water. I am really grateful to the project.

Mrs. Leteab Weldegebrial from Shinjibluq

Strengthening Social Capital

When I deliver babies, I can now share my stock of water and be assured it will be replenished. Moreover, I now have more time visiting families and helping members of my community. I see children also having more time helping their younger siblings instead of rushing to fetch water after school. All in all, I feel the repair of the hand pumps have stimulated the strong community ties, our social capital.

Freweini Mesfin- Traditional Birth Attendant from Aid Arada