Trip Report for WEFTA Visit to VHP Projects in Bench Maji Zone, Ethiopia

October 2021

INTRODUCTION

In October 2021, Water Engineers for the Americas and Africa (WEFTA) volunteers Scott McKitrick, P.G. (senior hydrogeologist), Stephen Parker (project engineer), and Emily Parker (project engineer) traveled to the West Omo and Bench Sheko Zones of Ethiopia in partnership with Village Health Partnership (VHP). The WEFTA volunteers traveled and worked with VHP Board of Director members Dr. Margaret "Migs" Muldrow and Cindy Nichol, VHP staff Carsen Jenkins, and University of Colorado researcher Dr. Margo Harrison. The purpose of the trip was to perform assessments of VHP-supported health care facilities (HCF) to identify gaps in the facilities' ability to provide clean and safe maternal healthcare. WEFTA volunteers supported VHP by performing assessments of each HCF's water and sanitation hygiene (WASH) assets. The WEFTA Volunteers also researched the feasibility of implementing chlorine generation and a hub-and-spoke model of distribution of chlorine in VHP-supported HCFs in the West Omo and Bench Sheko Zone. The rest of the VHP team performed additional assessments of each HCF's clean and safe healthcare (CASH) capabilities. Dr. Harrison also performed research at many of the HCFs visited. WEFTA and VHP worked closely with local partners during the trip to perform these assessments, including staff from Afro Ethiopia Integrated Development (AEID) and the Mizan Tepi University Teaching Hospital (MTUTH). This trip lasted from October 8 - 30, 2021.

Fig. 1 – WEFTA volunteers Scott, Stephen, and Emily en route to Ethiopia

The VHP/WEFTA team arrived in the capital city of Addis Ababa on October 10, 2021, and immediately flew to Jimma. In Jimma, the team met up with 5 drivers from Agree Ethiopia Land Cruiser Co. and drove to Mizan Teferi. The drivers drove and provided support throughout the 3 weeks the team was in Ethiopia. Mizan Teferi is located in the Southern Nations, Nationalities, and Peoples (SNNP) Region of southwest Ethiopia. Figure 2 shows the location of Mizan Teferi in the southwestern highlands of Ethiopia.

Fig. 2 - Map of Ethiopia showing the location of Addis Ababa, Jimma, and Mizan Teferi

On October 11, 2021, the VHP/WEFTA team met up in Mizan Teferi with the Ethiopian partners and community leaders from the Surma Woreda. The full group, which was comprised of the 3 WEFTA volunteers, 3 VHP staff, Dr. Harrison, 2 AEID staff members, 5 MTUTH staff, the community leaders, some of the community leaders' families, security personnel, and the 5 Agree Ethiopia Land Cruiser Co. drivers, traveled from Mizan to the Surma Woreda where the HCF assessments would begin.

The following is a summary of each HCF that the WEFTA volunteers assessed during their trip, along with 2 other WEFTA-sponsored projects in Addis Ababa. Due to the breadth of information collected during the assessments, only the water supply situation of each HCF is described in this report. For the scoring of each HCF which resulted from the WASH assessments, see Appendix A. Figure 3 shows a map of all the HCFs that the team visited during their trip.

Fig. 3 - Map showing the Location of Health Care Facilities

October 11 – 12: Kibbish Health Clinic

On Monday, October 11, 2021, the VHP/WEFTA team arrived in the community of Kibbish, located in the Surma Woreda of the West Omo Zone of the SNNP Region. The WEFTA volunteers, VHP staff, and Dr. Harrison camped in the Kibbish Health Clinic compound for the night.

On Tuesday, October 12, 2021, the team met with Woreda leaders to explain their purpose for visiting and receive permission to perform the assessments. Afterward, the assessments of the Kibbish Health Clinic began. The Kibbish Health Clinic has been without water for over a year. The clinic was formally supplied with water by the community deep-well, which has a submersible pump and diesel-powered generator. The generator is currently not working. The WEFTA volunteers assessed the possibility of supplying the clinic via hand-dug wells, rainwater catchment, a spring located 12-kilometers from the Clinic, the nearby river, a new deep well, and the existing community deep well. After consultation with AEID, the local head of the Kibbish Water and Mining Office, and VHP president Migs, WEFTA volunteers recommended that the solution to supplying the Kibbish Clinic should be to repair/replace the generator for the existing community well or replace the wells' generator with a solar-powered pump. The cost for this would be covered by the Woreda with a contribution from VHP. The WEFTA volunteers, VHP staff, and Dr. Harrison camped in the Kibbish Health Clinic compound for the night.

Fig. 4 – The team with community leaders in Kibbish

October 13: Tulegit Health Clinic

On Wednesday, October 13, 2021, the team traveled 45-minutes by land cruiser from Kibbish to the community of Tulegit, located in the Surma Woreda. The community of Tulegit, including the health clinic, is currently supplied by a small spring approximately 3-kilometers away. The WEFTA volunteers were not able to assess the spring due to tall grasses resulting from the rainy season, which was nearing its end at the time of the trip. The team did go with the water maintenance supervisor, Ngabacho, and other community members to look at the tank that the spring flows into by gravity. The community used to be supplied by a larger, more distant spring, but it was damaged by a neighboring ethnic group and remains a contentious issue between the groups. Prior to WEFTA's trip to Ethiopia, AEID had discussed with VHP the best solution for improving the water supply for the Tulegit Clinic. After assessing the situation on the ground, the WEFTA volunteers agreed with AEID and community members that the best option for improving the water supply at the Tulegit Clinic is to cap the currently used spring and improve certain sections of the water supply and distribution pipelines to the larger, more distant spring. It may be necessary to also construct water facilities for the neighboring ethnic group as a goodwill gesture, and negotiations will be necessary to ensure the system is not damaged in the future. The work will be funded, in part or wholly, by VHP through AEID and will be implemented by the former Tulegit leader and other community leaders.

Fig. 5 – The WEFTA team conducting the WASH assessment at the Tulegit HCF

Additionally, VHP will fund a new storage tank at the clinic to provide the clinic with water storage within the clinic compound. After the assessment in Tulegit, the WEFTA volunteers, VHP staff, and Dr. Harrison returned to Kibbish and camped in the Kibbish Health Clinic compound for the night.

October 14-15: Maji District Hospital

On Thursday, October 14, 2021, the VHP/WEFTA team left Kibbish and drove to the Maji Woreda in the West Omo Zone of the SNNP Region. The team met with Woreda leaders in the town of Tum to explain their purpose for visiting and receive permission to perform the assessments. After meeting with the Woreda leaders, the team drove approximately 20 minutes to the neighboring town of Maji. The WEFTA volunteers, VHP staff, and Dr. Harrison camped in a secure compoundin Maji. On Friday, October 15, 2021, the team assessed the Maji District Hospital. AEID was in the process of drilling a VHP-funded deep well at the Maji Hospital at the time of the team's visit. At the time of the visit, the well was 42m deep. Unfortunately, after the team returned to the States, AEID had to abandon the well location due to not finding sufficient water at 96 m depth. A second well location was attempted, but the boring failed at 28 m due to poor ground condition. A third well was attempted, and a successful well was installed to a depth of 52 m. The well has a production capacity of approximately 2.5 liters per second (l/s, equivalent to 40 gallons per minute, gpm). The team is currently working with AEID to specify the appropriate solar pumping system for the well.

If the hub-and-spoke model of distribution of chlorine in VHP-supported HCFs comes to fruition, Maji would act as one of the “hubs” that would generate chlorine using one or more Aqua Research chlorine generators. The hospital could use this chlorine for disinfecting the hospital’s water in the storage tanks located at the hospital and for cleaning the hospital. Chlorine would also be distributed to other hospitals and clinics in the area.

After the assessment in Maji, the team returned to the Maji compound for the night.

Fig. 6 – AEID drilling for water at the Maji District Hospital

October 16: Tum Health Clinic

On Saturday, October 16, 2021, the VHP/WEFTA team traveled back to Tum and assessed the Tum Health Clinic. The town of Tum, including the health clinic, is currently supplied by 2 springs that are captured by a single catchment box. From the spring catchment box, water runs by gravity to the community water storage tank and is distributed to the town. The Clinic is supplied by the town's distribution system and stored in several on-site water storage tanks. The water supply system of the Tum Health Clinic is sufficient, and no action is required by VHP for improvement.

If the hub-and-spoke model of distribution of chlorine in VHP-supported HCFs comes to fruition, Tum would act as one of the "spokes" that would receive chlorine that would be generated at the Maji Hospital. The town could use the provided chlorine for disinfecting the water in the town's storage tank. The clinic could use the provided chlorine for additional disinfection of its storage tanks and for cleaning the clinic.

After the assessment in Tulegit, the team returned to the Maji compound for the night.

Fig. 7 – The Tum water storage tank that supplies the HCF

October 17: Maji

Sunday, October 17, 2021, was a rest day for the VHP/WEFTA team. After breakfast, several members of the team hiked to an old Italian causeway outside of Maji called Na Faas Birr. After returning to Maji, the team had lunch, then Migs and Scott went back to the Maji Hospital to check on the progress of the well drilling. The rest of the team returned to the Maji compound to rest. After dinner in Maji, the team returned to the Maji compound for the night and made a bonfire in the yard of the compound.

Fig. 8 – View from Na Faas Birr

October 18: Tum / Maji

On Monday, October 18, 2021, the VHP/WEFTA team traveled to Tum to meet with Maji Woreda officials to discuss the WASH and CASH assessments of the Maji Hospital and Tum Health Clinic. In the words of the Maji Woreda Health Official, “It is essential to have clean water service around health care facilities”. After the meeting, the WEFTA volunteers went to one of the local restaurants in Tum and relaxed under the large mango tree outside the restaurant while Migs debriefed with the CASH team. The team then returned to Maji and were treated to a special dinner by the Maji Woreda officials. After dinner, the VHP/WEFTA team returned to the Maji compound for the night.

Fig. 9 – Emily and Stephen drinking coffee in Tum

October 19: Jemu Health Clinic and Chiruharoot Health Clinic

On Tuesday, October 19, 2021, the VHP/WEFTA team traveled from Maji to Jemu in the Me'enite Shasha Woreda and met with Woreda leaders to explain their purpose for visiting. Upon request by the Woreda officials, Migs and Scott traveled to the Chiruharoot health center while the rest of the team stayed in Jemu and the CASH and WASH teams assessed the Jemu Health Clinic.

In Chiruharoot, there is a water system that supplies the community, but the health clinic is not currently connected to the system. Migs and Scott recommended that the Woreada connect the health clinic to the community water system to provide water service to the clinic. Woreda officials seemed to be amenable to this suggestion. VHP will likely fund the piping installation to connect the HCF to a nearby water distribution line located approximately 130 m from the clinic.

In Jemu, the town is supplied by two springs that flow into a concrete tank. The water is then pumped to two elevated storage tanks and distributed to the town. The Clinic is supplied by the community distribution system. The water supply for the Jemu Health Clinic is sufficient and there is no action required to take to improve it.

That evening, the Woreda officials treated the VHP/WEFTA team to a special dinner at a local restaurant. Afterward, the VHP/WEFTA team stayed in a new hotel located in Jemu.

Fig. 10 – The spring box that supplies the town of Jemu

October 20: Kuju Health Clinic

On Wednesday, October 20, 2021, Dr. Harrison and her Ethiopian research partners left Jemu early in the morning to travel to Mizan. After breakfast, the CASH team traveled to the city of Bachuma in the Me'enite Goldie Woreda to perform a CASH assessment at the Bachuma District Hospital. Meanwhile, Migs and the WEFTA team traveled to the Kuju Health Clinic in the Gorrigesha Woreda to perform a WASH assessment and partial CASH assessment of the clinic.

The Kuju health clinic is currently supplied by a hand-dug well located within the compound. The hand-dug well is approximately 15m deep and only has water during the rainy season. The community gets its water from a nearby spring, which has low flow and dries up in the dry season. When the springs dries up, the community members must travel 7-8-kilometers to a nearby river to haul water.

Fig. 11 – Examining the hand-dug well at the Kuju HCF

While performing reconnaissance on the water situation, Migs and the WEFTA team came upon the Gesha Village Coffee Estate, which is owned by an American. The team gained entrance into the coffee estate and was treated very hospitably by the local manager.

October 20: Kuju Health Clinic (Continued)

Afterward, Migs and the WEFTA team met with the local water officials, who said that UNICEF is planning on capping another spring for the community's water supply. Additionally, they said that UNICEF and the Ministry of Peace are planning to drill a borehole well in the community for water supply. Migs and the WEFTA team agreed that the best solution for the community would be a new borehole well for the community water supply which could also supply the health center. Migs planned on trying to make contact with the owner of the Gesha Village Coffee Estate in Addis Ababa.

Afterward meeting with the local water officials, Migs and the WEFTA team drove back to Jemu so that Migs could meet with the Woreda officials again. At that meeting, Migs learned that the Woreda's top priorities are getting water supply and solar power at the Bachuma District Hospital. Migs and the WEFTA team then drove to Bachuma to meet up with the CASH team for dinner. That night, the VHP/WEFTA team camped in the compound of the Bachuma District Hospital.

Fig. 12 – VHP/WEFTA Team Camping at Bachuma District Hospital

October 21: Bachuma District Hospital and Chebera Health Center

On Thursday, October 14, 2021, the WASH team assessed the Bachuma District Hospital, while the CASH team traveled to the Chebera Health Center in the Me'enite Goldie Woreda for the CASH assessment. The WASH assessment at the Bachuma Hospital included a lengthy assessment of the well that VHP sponsored but had not been working for several months. Something had failed in the control panel of the well approximately 6 months after the well was drilled. In response, the hospital wired the well directly to the power breaker and turned it on/off manually. Running the well directly without its control panel likely burned out the pump motor. The recommended solution from the WEFTA volunteers was for the hospital to fix the control panel and pull the pump to determine the extent of the damage to the pump.

The hospital's power supply currently comes from grid power and a backup generator. These sources go down regularly, which makes it difficult to perform c-sections and other surgeries in the hospital, as well as power basic medical equipment like oxygen supply. While the VHP/WEFTA team was visiting the hospital, there was a baby in the hospital who had sepsis and was on multiple medications and oxygen. While some of the team was visiting the baby, the power supply fluctuated and caused the oxygen machine to restart, leaving the child without oxygen supply for a period of time.

The Bachuma hospital is also the only HCF, other than the Mizan Tepi University Teaching Hospital, that the team visited during this trip that is currently performing c-sections. However, the hospital currently has to schedule the surgery during hours when the generator is running to have a consistent power supply. This is why obtaining solar power for the Bachuma Hospital is one of the Woreda's top priorities. VHP plans to contribute to funding a solar power system for the hospital.

Fig. 13 – Scott and Shimeta discussing the well at the Bachuma District Hospital

If a hub-and-spoke model of distribution of chlorine in VHP-supported HCFs comes to fruition, the Bachuma Hospital would act as one of the "hubs". The hospital staff would generate chlorine using a chlorine generator provided by Aqua Research. The hospital staff could use this chlorine for cleaning the hospital facility and disinfecting the hospital's water in the storage tanks. The hospital staff and Woreda officials would also coordinate distributing additional chlorine to several nearby HCFs, the "spokes".

After the WASH assessment in Bachuma, the WASH team drove to the Chebera Health Center to join the CASH team. The Chebera Health Center is currently supplied by a water catchment system that VHP funded. However, this supply does not seem to currently be sufficient for the HCF. The WASH team recommended that the HCF staff be educated on water conservation to make the water last longer during the months when there is no rain. The VHP/WEFTA team discussed the possibility of drilling a well to supply the community and HCF. However, assistance and funding from another NGO would be required to pursue drilling a well at Chebera.

Fig. 14 – Children washing their hands at the Chebera HCF with water from the rain catchment

After the assessment in Chebera, the team returned to Bachuma for lunch, and then drove to Mizan for the night, where they stayed at the Salayash Hotel. During dinner at the Salayash Hotel, it was decided that the VHP/WEFTA team would not visit two planned HCFs in the Bero Woreda due to security concerns.

October 22: Siz Health Clinic, Siz District Hospital, and Mizan Tepi University Teaching Hospital

On Friday, October 22, 2021, Stephen and Emily went to the Mizan Tepi University Teaching Hospital (MTUTH) and the adjoining Mizan Aman Health Science College (HSC). The purpose of their visit was to better understand the facility's water systems and to assess the feasibility of implementing chlorine generation at MTUTH using Aqua Research chlorine generating machines. MTUTH staff from the Quality Improvement Unit and other departments assisted the WEFTA team and provided information on the water systems. The MTUTH staff was very enthusiastic and excited about the prospect of implementing the chlorination generating machines and setting up a hub and spoke model that could supply surrounding HCFs with chlorine. Stephen and Emily wrote a summary of the MTUTH and HSC water systems, which is included in Appendix B.

Fig. 15 – Water hauling at MTUTH

Meanwhile, the rest of the team drove to the Siz Health Clinic and Siz District Hospital in the Shey Bench Woreda for CASH and WASH assessments. The Siz Health Clinic has historically been provided water from the municipal water system, but road construction sometime in the last year cut the line, which hasn't been replaced to date. The facility has one hand-dug well equipped with an Afridev hand pump, which is functional and supplies water for the facility. VHP or AEID will contact officials to determine if the water connection to the local system can be replaced.

The VHP/WEFTA team did not know of the visit to the Siz District Hospital prior to our arrival. The hospital construction began in 2017 and was opened in August 2021. The facility has no water supply currently. The local water system does not extend to the hospital and is not sized to provide water to the hospital. The facility has adequate water storage capacity, with 35 cubic meters of ground tanks, and a five cubic meter elevated tank with a transfer pump. The facility appears to have electric service problems, and the electrical system is not functional.

The facility is located approximately 150 meters from the Kashu River, which indicates that groundwater is likely present at a relatively shallow depth below the facility, and a supply well of 50 meters would likely be adequate to supply the facility.

After lunch, the team met back at the Salayash Hotel in Mizan. Several members of the VHP/WEFTA team went to MTUTH to tour the new gynecology ward, while the rest of the team rested at the hotel. Dinner and a coffee ceremony were held at the Salayash in the evening.

October 23 - 24: Mizan

Saturday, October 23, and Sunday, October 24, 2021, were spent in Mizan, primarily at the Salayash Hotel. During this time Migs reviewed the CASH and WASH assessments with the respective CASH and WASH teams from the previous several days. On October 23, Stephen and Emily met with Andualem Henok, the CEO of MTUTH to discuss findings from their visit to MTUTH and the HSC on the previous day. On October 24, Scott and Migs met with AEID staff to make plans and a budget for the next two years of VHP projects.

Fig. 16 – Stephen, Emily, Cindy, Dr. Hailemariam, and Carsen at the Salayash

October 25 – 26: Addis Ababa

On Monday, October 25, 2021, the VHP/WEFTA team drove from Mizan to Jimma and then flew from Jimma to Addis Ababa. The AEID staff and Agree Ethiopia Land Cruiser Co. staff drove from Mizan to Addis Ababa. The VHP/WEFTA team stayed at the BSCO Guest House while in Addis.

Fig. 17 – From right, Stephen, Emily, Carsen, Migs, and Scott getting on the plane in Jimma

On Tuesday, October 26, 2021, the VHP and WEFTA team along with Shimeta from AEID met with Paul and Rebekah Mosely, the country representatives for the Mennonite Central Committee (MCC) to request MCC support for drilling wells for the Siz District Hospital, Chebera HCF, and Kuju HCF. A plan was made for Shimeta to amend the current project proposal that AEID has with MCC to add the three wells. If funding is available, some or all of the wells will be funded over the next 3 years by MCC.

After meeting with the MCC representatives, the team had lunch with Tedla Mulatu, the in-country director for the Millennium Water Alliance, which has implemented Aqua Research chlorine generating machines in the Amhara Region of Ethiopia. Tedla explained the process that the MWA went through to import the machines into Ethiopia. This knowledge was very valuable to VHP and AEID in planning how to import the same machines for use in the West Omo and Bench Sheko Zones.

After the meeting with Tedla, the team visited the Clinton Foundation to meet with Dr. Rahel Belete, the Deputy Country Director, and Zelalem Demeke, the Senior Program Manager from the Clinton Health Access Initiative (CHAI). They described the work that the CHAI was doing in Ethiopia, and Migs shared about VHP's work in the West Omo Zone.

October 27: Daughters of Charity Saint Mary's and Gesha Village Coffee Estate

On Wednesday, October 27, 2021, the VHP / WEFTA team was COVID tested in preparation for returning to the USA on October 29.

After COVID tests, the WEFTA volunteers visited the Daughters of Charity Saint Mary's Convent and School. The Convent houses 13 Sisters and the school has approximately 1,000 students. WEFTA president Pete Fant has assisted the Daughters of Charity with the supervision of the drilling of a well and the installation of water storage tanks at Saint Mary's. Local hydrogeologist Tilahun Azagegn, in coordination with the construction contractor oversaw the drilling of the well, construction of water storage tanks, and construction of the water distribution system at Saint Mary's. During the visit to Saint Mary's, the WEFTA volunteers had the opportunity to meet Tilahun and the construction contractor team and see the newly constructed tanks and water system.

The well was operational and pumping water into two ground-level 10,000 litre tanks. Each tank has aeration equipment for oxidizing iron from the groundwater and chlorinating the water. Two more 10,000 litre tanks will be constructed alongside the existing two. From these tanks, the water is pumped to two 10,000 litre tanks located on a 16-meter tall platform. The water is distributed to the school, convent, and adjoining HIV clinic from the elevated tanks. The Sisters are also planning with Tilahun's team to create a tap stand that can be placed outside the Saint Mary's property for use by the surrounding community, most of which is very poor and does not have access to clean water.

Fig. 18 – The WEFTA team with Tilahun and some of the Sisters at the St. Mary's well

After lunch with the Sisters at Saint Mary's, the WEFTA team joined the VHP team and Shimeta from AEID to visit the office of the Gesha Village Coffee Estate. The team met with Adam Overton and his wife Rahel, the owners of the Gesha Village Coffee Estate located near the Kuju HCF. They agreed to help coordinate communication between the Woreda and VHP/WEFTA.

That evening, the VHP/WEFTA team joined Shimeta's family for dinner at Habasha 2000, a restaurant that serves authentic Ethiopian food and has authentic Ethiopian singers and dancers.

Fig. 19 – The team with Shimeta's family at Habasha 2000

October 28: Daughters of Charity Saint Catherine's

On Thursday, October 28, 2021, the WEFTA volunteers visited the Daughters of Charity Saint Catherine's Seminary in Addis Ababa. Saint Catherine's is used as a center for the formation of younger Sisters, and a retirement home for older Sisters. A large new building is being built on the property of Saint Catherine's that will be used to house Sisters and as a retreat center. The Sisters have requested that WEFTA again assist them in supervising the oversight of a new well for the Saint Catherine's compound, which WEFTA has agreed to.

Fig. 20 – Construction at St. Catherine's

After departing from the Sisters at Saint Catherine's, the WEFTA volunteers met up with the VHP team and had lunch with members of EECMY DASSC who partner with VHP in Dembi Dollo in western Ethiopia serving women through VHP's Screen, Transport, and Treat Program.

After lunch, Stephen, Emily, and Carsen went souvenir shopping while Migs and Scott met again with EECMY DASSC members. In the evening, the WEFTA/VHP team went to Shimeta's home for a special meal prepared by his family as a celebration of the good work that was completed during this trip.

October 29 – October 30: Addis Ababa and Return to the States

Friday, October 29, 2021, was the VHP and WEFTA teams' last day in Ethiopia. After packing bags and a final run to get souvenirs, the team had lunch with EECMY DASSC members once more. Then the VHP / WEFTA team went to AEID's office to meet with AEID staff once more and discuss some final topics regarding the projects that VHP has planned with AEID for the next two years.

Fig. 21 – Migs, Scott, Stephen, Cindy, Emily, and drivers Alam and Asa on the last day

In the afternoon, the VHP/WEFTA team was driven to the Addis Ababa airport. After four security checkpoints, the team got to their departure gate and said goodbye to Carsen, who was leaving on a different flight. The flight from Addis Ababa to Washington D.C., which included a layover in Ireland, took 17 hrs. The team landed around 8 am EST on Saturday, October 30, 2021. After breakfast, the WEFTA team said farewell to Migs and Cindy. After several hours in Washington D.C., the WEFTA volunteers flew to Houston, TX. After another layover of several hours, the WEFTA volunteers flew home to Albuquerque, NM, arriving around 9 pm MST.

Appendix A
Summary of the WASH Assessments

WASH Assessment Master Score Sheet

Scoring 0 - Poor, 1 - Fair, 2 - Good

Health Care Facility	Kibbish Health Facility	Tulegit Health Facility	Maji District Hospital	Tum Health Center	Jemu Health Center	Chiruharoot Health Center	Kuju Health Center	Bachuma District Hospital	Chebera Health Center	Siz Health Center	Siz District Hospital
Location	Kibbish, Surma Woreda	Tulegit, Surma Woreda	Maji, Maji Woreda	Maji, Maji Woreda	Jemu, M'enite Shada Woreda	Chiruharoot, M'enite Shada Woreda	Kuju, Gorrigesha Woreda	Bachuma City, M'enite Shada Woreda	Chebera, M'enite Shada Woreda	Siz, Shey Bench Woreda	Siz, Shey Bench Woreda
Team	Scott, Emily, Stephen, Shimeta	Scott, Emily, Stephen, Shimeta	Scott, Emily, Stephen, Shimeta	Scott, Emily, Stephen, Migs	Scott, Emily, Stephen, Amdesa	Scott, Migs	Scott, Emily, Stephen, Migs	Scott, Emily, Stephen	Emily, Stephen, Cindy	Scott, Migs	Scott, Migs
Date of Assessment	10/12/21	10/13/21	10/15/21	10/16/21	10/19/21	10/19/21	10/20/21	10/21/21	10/21/21	10/22/21	10/22/21
Compound	1	1	2	2	1	2	1	2	0	1	2
Drainage/Standing Water	2	2	2	1	2	2	2	2	2	2	2
Vector Control	2	0	2	1	0	0	0	0	0	0	0
Facility	0	1	2	1	1	1	1	2	1	1	2
Biohazard Area	0	0	0	2	1	0	0	1	1	1	1
Latrines	0	0	2	2	1	1	0	2	2	1	2
Handwashing Stations	0	1	0	1	1	0	0	0	1	1	0
Water Source	0	1	2	2	2	0	0	0	1	1	0
Facility Storage	0	0	2	2	2	0	0	2	2	1	2
Facility Water Treatment	0	0	0	1	2	0	0	0	0	0	0
Facitliy Wastewater System	0	0	2	1	0	0	0	2	0	2	2
Facility Power	0	1	2	2	2	1	2	1	1	1	0
Facility O&M	0	0	2	2	0	0	2	2	1	2	2
Facility Tools and Equipment	0	0	2	2	0	0	2	2	1	2	2
Total:	5	7	22	22	15	7	10	18	13	16	17

Notes:

Kibbish:	VHP: Repair Unicef tank & get it plumbed in; Woreda: Biohazard area; Joint: repair/replace generator at town well
Tulegit:	VHP: Cap spring, repari central pipeline, install tank at HCF & plumb in (have John do); Them: Bury 2 latrines, do biohazard area
Maji:	VHP: Complete well & install pump; Them: Biohazard area
Tum:	VHP: Nothing for now; Them: clean up expired meds, dig out gutters, bury old latrine, stabilize tap at MWA fill in boundary area w/ grass
Jemu:	VHP: Nothing for now; Them: clean trash, biohazard area, bury old latrine
Kuju:	VHP: Latrines & MWA; Them: biohazard area. Also, figure our water supply - Unicef & Government are supposed to drill well.
Bachuma:	VHP: Contribute to solar power; Them: Fix well
Chebera:	VHP: Try to see if Mennonites can drill well for community & HCF; Them Biohazard area & hazardous waste pits, educate on water conservation
Siz:	VHP: Nothing for now; Them: Biohazard area, hook MWA to water system.

Appendix B
WEFTA Summary of the MTUTH and HSC Water Systems

October 24, 2021

WEFTA Summary of the MTUTH and HSC Water Systems

Written by Emily and Stephen Parker, WEFTA Volunteers

Introduction

In conjunction with Village Health Partnerships (VHP), Water Engineer for the Americas and Africa (WEFTA) volunteer engineers Emily Parker and Stephen Parker visited the Mizan Tepi University Teaching Hospital (MTUTH) and Mizan Aman Health Science College (HSC) on September 22, 2021 and conducted a brief review of facility water systems. The purpose of this visit was to gain a better understanding of the water system(s) at MTUTH and the HSC. MTUTH faculty from the Quality Improvement Unit and other departments assisted the WEFTA engineers and provided information on the systems. MTUTH and the HSC have independent water systems, and each are summarized below based on the WEFTA engineer's understanding of the systems. Also below are the WEFTA engineer's recommendations for improvements to the water systems.

HSC Water System

The HSC is currently supplied with water from a borehole well that was drilled approximately 1 year ago. The well is approximately 230-meters deep and has a capacity of 5-liters per second. The WEFTA engineers have no specifications for the well's pump at this time. The power for the well comes from the Mizan City's grid power, which has frequent outages. Due to these frequent outages, the well is not functioning at its full capacity. There are currently nine (9) 10,000-liter tanks and one (1) elevated 25,000-liter tank at the HSC. However, only three (3) of the 10,000-liter tanks are being used. This seems to be due to a lack of a booster pump and power to supply the elevated tanks with water. Therefore, students and staff from the HSC must carry water into the buildings by buckets.

MTUTH Water System

MTUTH is currently supplied by water that is trucked in from the City's reservoir that is located seven (7) -km from MTUTH. Currently, 5,000-liters of water is trucked in to MTUTH five (5) times a day, for a total of 25,000-liters per day. This is not sufficient water supply to meet the Ethiopia National Guidelines for WASH in Healthcare Facilities. The MTUTH faculty stated that MTUTH currently needs 50,000-liters per day of water to meet the National Guidelines. The water that is trucked onto the campus is stored in ten (10) 10,000-liter ground-level storage tanks around the MTUTH campus. There is a 120,000-liter elevated water storage tank (the blue square tank) on the campus of MTUTH, but it is not currently used. Most of the buildings at MTUTH have indoor plumbing, showers, and outdoor tap stands. WEFTA's understanding is that the indoor plumbing is not currently functioning. However, there are some outdoor tap stands which are functioning and water from the tap stands is carried into the buildings by buckets. The MTUTH staff members said that the lack of functionality of the plumbing inside the buildings is due to lack of water.

In addition to the borehole well that currently supplies the HSC, another borehole well was drilled approximately 1 year ago. However, this well has not yet been equipped with a pump and controls, and therefore is not currently functioning. When it is finished, this well will serve as the water supply for MTUTH. The well is approximately 252-meters deep and has a capacity of up to 6-liters per second. A new 15,000-liter concrete storage tank has been constructed for the hospital but is not currently being used due to the well not being completed. When the well for MTUTH is completed, water will be piped from the well to the new 15,000-liter concrete tank, then pumped to MTUTH's existing 120,000-liter elevated water storage tank (the blue square tank) and then will flow by gravity to the indoor plumbing in the buildings.

Disinfection

Neither MTUTH nor the HSC are disinfecting their water due to a lack of chlorine. Currently, 50-liters per day of chlorine is used in MTUTH buildings for cleaning purposes. MTUTH faculty informed the WEFTA engineers that even though the water from the City reservoir is treated with chlorine for disinfection purposes, traces of coliforms were found in the 10,000-liter tanks at the hospital.

WEFTA's Recommendations:

Based on the WEFTA engineer's understanding of the MTUTH and HSC water systems, below are WEFTA's recommendations in order of priority for the water systems:

1. Complete new supply / distribution for MTUTH:
    a. Finish the well that will supply MTUTH by installing a pump, power supply, controls, fencing, and anything else necessary for its completion.
        i. It is WEFTA's recommendation that a solar power pump be considered for the power supply to the well that will supply MTUTH. The City's grid power has frequent outages and is not a consistent source of power. The City's grid power could be used as a backup source of power.
    b. Construct the pipeline from the well that will supply MTUTH to the new 15,000-liter concrete tank.
    c. Ensure that the new 15,000-liter concrete tank has a booster pump and power so that it can fill MTUTH's existing 120,000-liter elevated water storage tank (the blue square tank).
    d. Clean the existing 120,000-liter elevated water storage tank (the blue square tank).
    e. If needed, make any repairs that are necessary so that the indoor plumbing of the MTUTH buildings function properly and supply the buildings with water.
2. Make improvements to the HSC water system:
    a. Install booster pumps and anything else necessary to convey water to all the tanks at the HSC.
    b. Consider installing solar power at the well that supplies the HSC since the City's grid power has frequent outages and is not a consistent source of power. The City's grid power could be used as a backup source of power.
3. Implement disinfection of water for MTUTH and the HSC:
    a. A machine from AQUA Research that generates chlorine from salt and water has been proposed to MTUTH faculty by WEFTA engineers. This would enable MTUTH to generate chlorine for cleaning purposes and to disinfect the water for MTUTH and the HSC.
        - MTUTH faculty stated that 100-liters per day of chlorine would be sufficient for MTUTH and the HSC. This number should be evaluated to ensure enough chlorine is generated for both cleaning and water disinfection purposes, and for distribution to other Health Care Facilities (HCFs).
        - A 'hub and spoke' model was proposed to MTUTH faculty where chlorine generating machines would be implemented at MTUTH and then distributed to other HCFs. Additional machines could be implemented in the Bachuma and Mizan District hospitals to reduce transportation costs. This idea was warmly received by MTUTH faculty. MTUTH faculty said that staff from MTUTH's Environment Department could be trained to oversee the chlorine generation. Additionally, the DHIS2 data reporting system may be utilized for collecting data on the impact of additional chlorine usage.

October 24, 2021

Summary

It has been stated by MTUTH faculty that MTUTH's greatest problem is lack of adequate water. It is the recommendation of the WEFTA engineers that the well, pipeline, and pump for MTUTH should be finished as soon as possible to ensure an adequate and consistent supply of water for MTUTH. Additionally, it is the recommendation of the WEFTA engineers that a booster pump installed to convey water to all the tanks and a solar system be installed at the well. Finally, efforts should be made to introduce a means of disinfecting the water at MTUTH and the HSC so that the water is free of microbial contaminants.