

# Impact Evaluation of Water Purification Units

Guatemala – May 2015



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CLEAN WATER FOR THE WORLD

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## **Executive Summary**

An evaluation team visited two departments in Guatemala, Quiché and Sololá, in May of 2015 to determine the impact and condition of *Clean Water for the World's* water purifiers. A total of six water purifiers were visited within four different towns: Chinantón, Chicua II, La Puerta, and San Lucas. A fifth town was visited, San Juan, to deliver a water purifier to a new organization, ODIM, because it was not being used by the health clinic in San Lucas.

- Six water purifiers were visited by the evaluation team.
- Four of the six water purifiers were in use and two were not hooked up to a water source and had not been used for at least a year.
- Four purifiers are located at a school, one at a health clinic (ODIM), and one at a nonprofit organization (IMAP) focused on permaculture.

# Introduction

## Description of Organization

Clean Water for the World is a nonprofit organization dedicated to providing water purification systems that are simple and adaptable at no cost to communities without access to potable water. The three requirements for eligibility include: the water can be utilized by everyone, it can be utilized at no charge or cost, and someone takes responsibility for maintaining the water purification system in order to ensure the water is consistently purified.

## Evaluation Purpose

The initial purpose of the evaluation trip was to determine the water purifiers' impact in the areas of health, education, and economics in each community visited. The main objectives of the visit were to verify the impact of:

1. Increased consumption of purified water
2. Reduced water-borne diseases
3. Increased academic success
4. Reduced cost to communities

During the trip, the evaluation team realized their visit consisted of more than evaluating the water purifiers' impact. The team also promoted proper usage of the water purification units through training in maintenance, installation, and utilization. All in all, the team tailored its methods depending on what stage each community was at. This involved evaluation, maintenance, training, and even program development with the installation of one unit at a new location.

## Evaluation Questions

These questions pertain to each water purifier visited.

1. Is the water purifier working properly?
2. Is someone properly trained on maintaining the water purifier?
3. Is the filter being changed as needed?
4. Is the Ultra Violet light being changed as needed?
5. Does the location have refills for the filter?
6. Does the location have refills for the UV light?

## Evaluator Qualifications & Disclaimer

The external, independent evaluator, Mission Lift (previously Janet Ray & Associates), facilitated the evaluation process with a team of five traveling to Guatemala: Abigail Anderson, Ziola Benavides, Deborah Denzel, Janet Ray, and Maria Schmieder. Janet Ray is a University of Michigan School of Social Work adjunct faculty member and the president and founder of Mission Lift. She holds a Master's Degree in Social Work with a specialty concentration in Community Systems and Management and has 25 years of experience in the human service sector. Ms. Ray has been affiliated with Clean Water for the World for nearly 30 years and has evaluated water purification units in El Salvador. Maria Schmieder holds a Master's Degree in Social Work with a concentration in Social Policy and Evaluation. Abigail Anderson and Deborah Denzel are Master of Social Work students and Ziola Benavides has worked with Clean Water for the World in her home country, El Salvador. The affiliations of the evaluators have been disclosed to prevent interpretation bias of this data.

# Methodology

## Evaluation Design

A variety of data collection methods were used in order to accommodate each community. Specifically, the theory of participatory action research (PAR) framed the evaluation design and was utilized in every community the evaluation team visited. The PAR approach to research emphasizes both participation and action and is based on the understanding of the group or community that is impacted by the evaluation (Ozanna & Saatcioglu, 2008). PAR seeks knowledge, which will be employed for social change. The process of PAR is meant to be empowering for communities and lead to people having increased control over their lives. Aligning with the PAR theory, the evaluation team always arrived to each town with local health educators from the Caritas organization who were familiar with the towns, spoke their Mayan dialect, and knew the community members. This fostered empowerment among community members and the health educators.

To perform the evaluation, information was collected at three levels: family, school, and community. At the family level, focus groups were used with members of the community. Some community members completed a survey individually as well. At the school level, academic grades were reviewed before and after the installation of the Clean Water for the World (CWW) Purifier in the community. Prices for purchasing purified water for the entire school were also calculated and the principals were interviewed at each of the four schools. At the community level, the Mayor of San Andrés and the nurse auxiliary of the community of Chinantón were interviewed.

**Purified Water Consumption.** To determine if there was an increase in consumption of purified water, a customized survey was used, which asked community members how frequently they drink purified water, ranging from *never* to *every time* (See Appendix A for the survey tool).

**Water-Borne Diseases.** Rates of water-borne illnesses were determined via the customized survey, with questions asking how often the community member has been sick in the last six months and how often he or she has missed work or school because of being sick. The respondents also filled out this information about their family members.

**Academic Success.** To evaluate increased academic success, students' year-end final grades were collected (official government documents), which also disclosed a *pass* or *no pass* designation for each student. This data allowed the evaluators to determine changes in academic success among students that had a water purifier at their school. Interviews with school principals occurred as well as completion of a customized survey specifically created for the principals in Guatemala.

**Cost to the Community.** Annual expenses were calculated for the cost to cure diarrhea based on estimates of the number of inhabitants in each community and the number of cases of diarrhea over a six-month period.

## Instrument Description

The customized survey instrument, designed specifically for Clean Water for the World, was used as a guide for the semi-structured focus groups and for individual community members to complete. A second survey was created for the school principals to fill out (See Appendix B). The school surveys ask open-ended questions while the individual survey asks multiple choice questions to collect

quantitative data as well as open-ended questions. Surveys were translated into Spanish since none of the community members speak English. In communities where members spoke only their Mayan dialect and could not speak Spanish, health educators translated and read the surveys to them in their native language.

## Procedures for Data Collection

The local contact organizations, namely Caritas, organized and planned the visits to the small communities. This prior planning and contact with local community health promoters allowed for a larger sample size among the different towns because community members were informed of the evaluators' visit. The local health educators from Caritas mediated and facilitated the visits with introductions being the first affair when arriving in each town. Every water purifier site had the voltage checked and tested water samples before and after the unit was intact.

**Chinanton.** In Chinanton, community members formed focus groups of approximately 20 people and the health educator facilitated and filled out the survey. Academic records were documented, the principal filled out the school survey, and an interview with the principal and a teacher occurred.

**Chicua II.** Community members could not attend the visit because of a community event obligation. However, members of the **Parent Association** attended the visit and filled out a survey in a focus group format. Academic records were documented, the principal filled out the school survey, and an interview with the principal occurred.

**La Puerta.** In La Puerta, academic records were documented, the principal filled out the school survey, and an interview with the principal occurred.

**San Lucas.** In San Lucas, the principal filled out the school survey and an interview with the principal occurred. Because the San Lucas School and the San Juan Health Clinic (ODIM) are using other means of obtaining purified water, an evaluation to determine changes in sickness and academic success for measuring the purification units' impact is unfeasible. However, tracking changes in money spent and saved for these locations is a feasible option for evaluating the units' impact.

All data collected is intended to be confidential to the evaluation team and stakeholders. Although, community members did put their name for the purpose of identification in future evaluation. No names were viewed or utilized by the evaluators during the evaluation and analysis of data.

## Participants

Participants from Chinanton, Chicua II, and La Puerta were surveyed and/or interviewed. Since San Lucas and San Juan were in earlier stages of *program development* (units were either reinstalled or installed for the first time), there was not data collected at these sites. A purposeful sampling method was used, whereby all community members in the communities with a water purifier were invited to participate in the evaluation. Below are the sample sizes at each level:

- **Family Level:** 161 people participated focus groups, with a total of 15 groups. 36 individuals completed a survey.
- **School Level:** Four schools were visited and four school principals were interviewed.
- **Community Level:** 1 Mayor and 1 Health clinic nurse were interviewed.

## Results – Units Visited

As mentioned, the evaluation team visited six water purification units. The table below provides their location and affiliation to an organization when relevant.

**Figure 1. Water Purification Units Visited**

#	Town or Community	Local Organization Affiliate	Location
1	Chinanton	Caritas	At the school
2	Chicua II	Caritas	At the school
3	La Puerta Chinque	Caritas	At the school
4	San Lucas Toliman*	Friends of San Lucas Mission	In the Health Clinic
	San Juan Laguna*	ODIM	In the Health Clinic
5	San Lucas Toliman	Friends of San Lucas Mission	At the school
6	San Lucas Toliman	IMAP	At Main water source

\*The water purification unit at San Lucas health clinic was taken and reinstalled in a San Juan health clinic (ODIM).

### Chinanton

The Caritas organization drove the evaluation team to Chinanton. This was the first town visited by the evaluation team and took approximately three hours to get there from the Caritas compound, which is located in Santa Cruz Del Quiche. Upon arrival, community members were readily waiting and intrigued by the visitors. Caritas members, the evaluation team, and all community members gathered in their social center, which was located next to the school and church.



After introductions, the evaluation team went to meet with the school principal and interview him as well as interview a teacher. The principal also filled out the school survey. The evaluation team also visited the health clinic next door and interviewed the health clinician who is a government employee based in San Andres but visits many small towns around the region. This was an ideal opportunity for the evaluation team to discuss with the health clinician the functioning of the water purification unit. Specifically, the health clinician wondered if the unit worked properly because the water passed through it so fast. After discussion and explaining of the unit, the health clinician had a better understanding of the purifier's abilities. A concern in this town

for using the water purifier is the taste of the water that comes through it. This is because the water already has chlorine in it when it is coming through the water purifier.

As a group, the community health promoters and Caritas staff checked the water purifier as the evaluation team guided them when needed (PAR practices). The water purifier, which was installed outside the school, had all parts clean: the paper filter, UV Light, and quartz tube. This unit has been well maintained. In addition, focus groups with surveys were conducted with the water committee facilitating them and interviews with the mayor occurred.

Some of the community members of Chinanton were serving their term on the water committee, which rotates every few years so other community members have the opportunity to fulfill these positions. The current water committee reported out the results of the focus group they lead to the entire group.

A second unit was also installed at the other side of the community to encourage use and cut the walking distance.

## Chicua II

The evaluation team visited Chicua II with the Caritas staff. Chicua's water purification unit located in the school kitchen. The previous water committee uses a ticket system to supervise community members to obtain water from the school kitchen since they are afraid of burglary of the water purifier's parts. This is the reason for having it inside the school premises. This policy will be reviewed.

The current water committee consisting of eight members have two-year commissions. The unit was making a sound and the committee thought the UV light was burnt. The ballast number was more than 100. The light was, however, burnt on the bottom with some filaments loose in the light.

Because of this, the water committee and Caritas decided to replace the UV light. The Evaluation Team observed the water committee as they review the paper filter and changed the light and quartz for the empowerment approach. The evaluation team also helped to guide the water committee with resetting the ballast.



Chinanton welcome assembly



Chicua II focus group in school

In this town, a principal interview and focus group with the water committee occurred. Other community members could not attend the evaluators' visit because of a community event they were obligated to attend. Through the principal interview and focus group information, the evaluators learned that the unit gets much use from the community, especially the children during snack time. The principal disclosed that children are drinking less soda pop and are now drinking more water because of the purification unit. The evaluation team also educated the principal and water committee on how to interpret the E coli water sample plates and left a set with them.

## La Puerta

The La Puerta community does not have a water committee, and therefore, the main point of contact and maintenance are the responsibilities of the principal at the school. The evaluation team was brought to La Puerta by the Caritas staff. A principal interview occurred and the principal filled out the school survey. This unit was also installed the school kitchen, similarly for protection of parts being stolen. A Caritas staff and the principal worked together to change the paper filter. The principal was comfortable changing the paper filters while the Caritas staff trained the principal on how to check and change the quartz tube and UV Light. As of now, the children are the only ones using the water purifier, which is important for the school because the children are drinking a lot more water and less soda pop, especially after physical education. Parents are not currently utilizing the purifier because they live so far away (some children walk more than an hour every day to get to and from the school). The principal is certainly open to having parents take water from school kitchen though. The evaluation team also educated IMAP on how to interpret the E coli water sample plates and left a set with them.



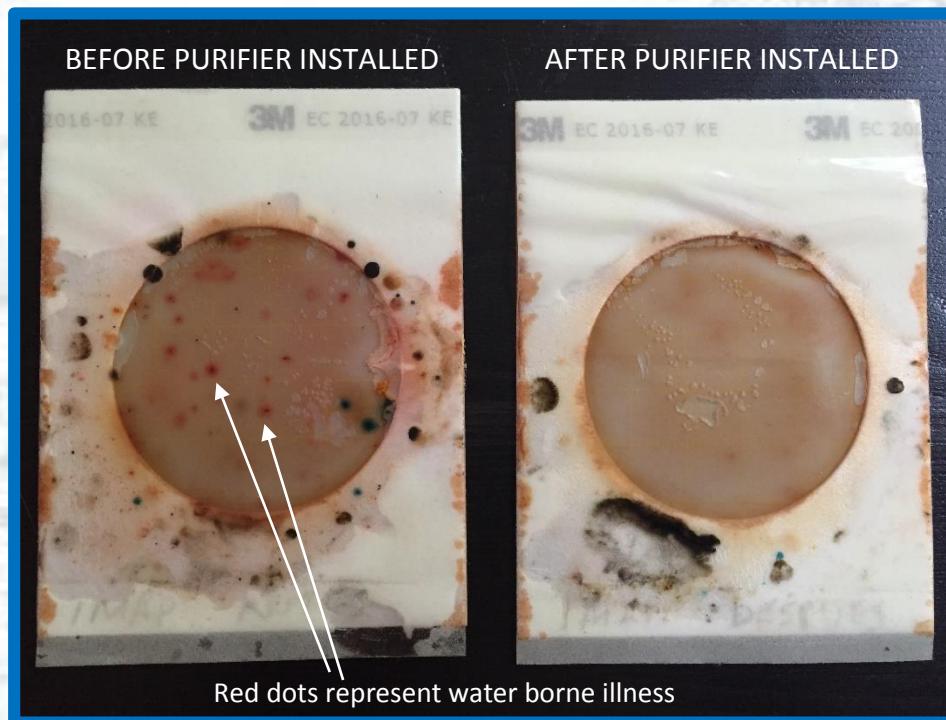
## San Lucas

A major finding in the San Lucas area was the dirtiness and contamination of their water source – Lake Atitlan. Locals explained that all runoff from the town spills into Lake Atitlan, including sewage. All paper filters in the water purification units in this area were very much discolored.

**IMAP Organization.** Specifically, an IMAP volunteer explained that they must change the paper filter as frequently as every two to three weeks. This is a result of the contaminated water source (Lake Atitlan) and could also be a result of the location of the water purifier – at the beginning of their water system. Because it is at their main water source, more water will be coming through this unit in a shorter period of time. This IMAP volunteer was the main person who changes the paper filter. However, he has never changed or knew how to clean the quartz tube.



The evaluation team trained the IMAP volunteer who said he would train a local Guatemalan on changing the paper filters and UV light. A new UV light, tube and paper filter were installed. The evaluation team also gave 15 more paper filters to IMAP. CWW needs to send at least 26 paper filters per year since they are getting raw water from Lake Atitlan and need to replace paper filter every two to three weeks. The replacement supplies were locked in the office, so it is uncertain the number of paper filters, UV lights and quartz tube that were on site but the IMAP volunteer believed there was not many left.



The evaluation team also educated IMAP on how to interpret the E. coli water sample plates and left a set with them. IMAP's executive director, Roni, and his partner, Miriam (Spanish and English Speakers), are interested in being CWW purifier promoters throughout Guatemala if CWW can help with outreach costs.

**School.** The unit was found in the school office unconnected and not being used for at least 2 years. The Principal was a new principal since the first initial installation of the water purifier. Therefore, she did not have much knowledge on what the unit even was. She was very receptive for the evaluation team to reinstall it. The evaluation team worked with the principal and the maintenance staff to install the unit in an optimal location. The school staff chose to install inside the school for burglary precautions. The system was installed on the outside wall of the school courtyard.

The principal took the pre and post installation water samples. The evaluation team also educated the principal on how to interpret the E coli water sample plates and left a set with her. After 4 days of incubation, pre plates showed 13 red colonies. Post plate had no change. The principal will share these results with parents and teachers. This will promote the usage of the unit and decrease the amount of purchased bottled water. It was calculated that the school spends Q3,000 (quetzals) per year on bottled water for the school's students and teachers. In addition, Heather, the long term volunteer coordinator, will work with Juan Carlos, who is the parish administrator to stop buying bottled water for the 1,600 United States volunteer delegations who visit the Friends of San Lucas mission each year.

**Health Clinic.** The unit was found in the hallway and not connected nor being used when the evaluation team arrived. The unit was unconnected in 2012 because the water tasted funny. The Rotary Club International installed a Sun Spring dual filter system of .02 micro size on the clinic roof that includes wind turbine and solar panels. The city water is pumped up to the roof by an electrical pump and stored in a tuft tank. The entire clinic tubing was connected to the roof unit. A tube is also sourced to the street fence to provide water to the community. Clinic personnel shared that steel container has a "secret of the owner" and did not know what was in the canister phase.

The CWW unit was removed from clinic with the supply box that contained 12 paper filters, two UV lights and two quartz tubes. This unit was then brought to San Juan, where it was installed in a health clinic run by the organization ODIM.

## **San Juan**

The nonprofit organization, ODIM, is supported by the United Methodist Church in Dallas, Ron Willheim, and executive Director Jeff Hasel. The rescued unit from the San Lucas Toliman health clinic was installed at the San Juan Health Clinic with the intention to pipe water to the outside wall of the dental clinic for community use. Three clinic workers were trained, along with the executive director for utilization and maintenance. Pedro, the clinic administrator, will be the lead maintenance person. The solenoid did not work and was stuck in the open positon. Thus, currently the water flows even when there is no electricity. ODIM has interest in installing other units in their clinic in another town, San Pedro Laguna, and into community pipes for complete community coverage. The faulty solenoid needs repair as soon as possible. A potential idea is to train the delegation from North Carolina that is going to ODIM in Guatemala in early June 2015.

## Results – Impact

### Factors that influence drinking purified water

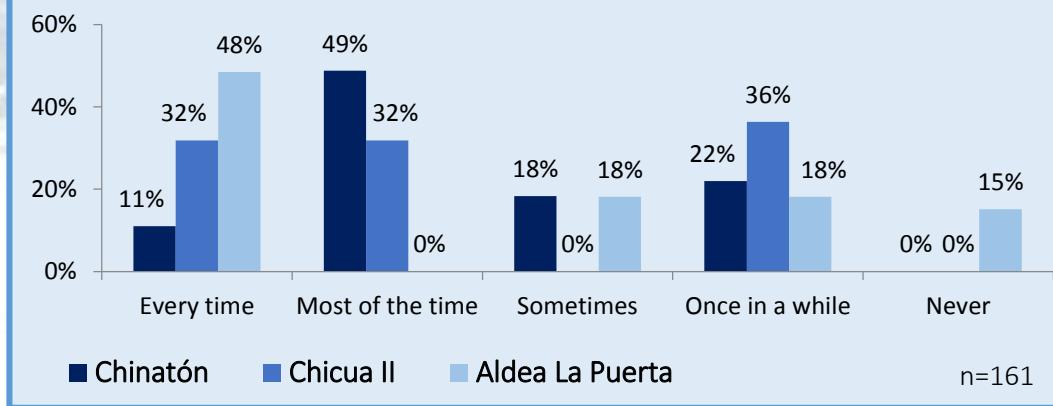
Figure 2. Influences for Drinking Purified Water

Factors that facilitate consumption	Factors that impede consumption
For students, accessibility of water at school	Water is far away from homes
Knowledge and education of importance	Lack of accessibility to water in the school
	Water has a bad taste

### Increase in consumption of purified water – Family Level

Community members disclosed how often they drink purified water.

Figure 3. Frequency of Purified Water Use



Source of information: focus groups

### Water-borne disease – frequency of diarrhea and sickness

Community members also disclosed how often they and their family members get diarrhea and have to miss work or school because of getting diarrhea.

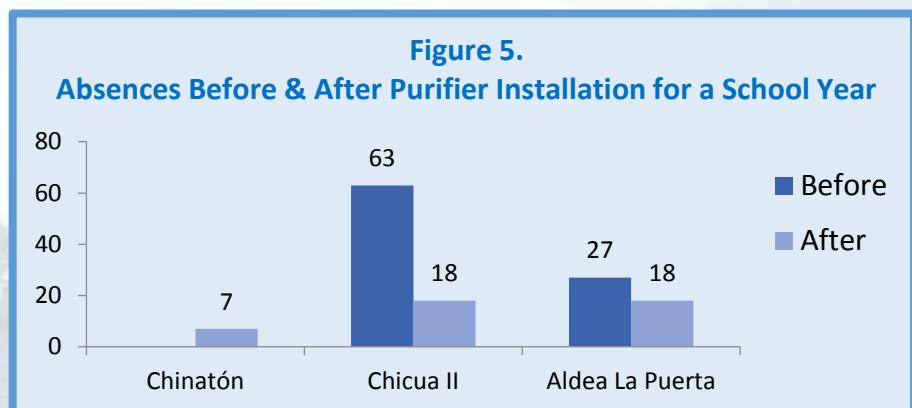
Figure 4. Frequency of Diarrhea

	# of times family member has had diarrhea in the last 6 months					# of days missed from work or school in the last six months				
	0	1	2	3	4+	0	1	2	3	4+
Chinantón	14	11	17	20	13	24	5	14	2	3
Chincua II	49	0	0	0	0	50	0	0	0	0
La Puerta	21	4	3	0	0	16	2	1	0	0

Source of information: surveys completed by members of the communities

### Water borne disease – impact on schools

All of the three school principals with properly working units said that the water purifier is making a difference in their school and have all noticed an increase in attendance.



Source of information: interviews with school principals (*Before* data could not be obtained for Chinanton).

### Water borne disease – frequency of disease in the community

The following data was measured by annual disease comparisons between Caritas and the Clean Water for the World community with other communities served by the health clinician the evaluation team met in Chinanton.

Figure 6. Disease in the Community			
	# of inhabitants	# of cases of diarrhea	% case / inhabitant
Chinantón	1500	150	10%
Other Communities	5000	1300	26%

### Student Academic Success

Students' rates of passing or not passing their grade level were measured to determine any changes in academic performance before and after the water purification units were installed. Principals all noted that students' grades have improved since the water purification units were installed.

Figure 7. Percent of students with that passed their grade level			
	Before purifier installed	After purifier installed	Change (%)
Chinantón	60%	-	-
Chincua II	60%	86%	28%
La Puerta	62%	79%	17%

Source: schools' grades records review (data for Chinanton after the purifier was installed were unable to be obtained).

### Cost to Society – number of water borne diseases (diarrhea)

If the rate of diarrhea in Chinantón was equal to the average of all the communities of San Andrés (26%), they would spend an estimated Q42,120. However, they had a disease rate of 10%, which would mean an expense of Q16,200. The community of Chinantón saves an estimated, Q25,920 per year.

Figure 8. Water Borne Illness				
	# of inhabitants	# of cases of diarrhea	Cost to cure	Annual expenses
Chinantón	1500	150	Q108	Q16,200
Other communities in the municipality of San Andrés	5000	1300	Q108	Q140,400
21 municipalities	---	---	Q108	Q2,948,400 \$393,120

## Discussion

### Limitations

Because each community is at a different stage with their water purification unit, not all data could be collected in every community. It is hard to measure if the water purification unit has changed water borne illness because places such as ODIM were already using purified water from other sources.

The team was only in each community for one to three days. This amount of time may have limited the amount of data they were able to collect and the richness of their observations and qualitative data. This limited amount of time did not allow the team to spend as much time with the local organizations and visiting the local towns. With more time, the evaluation team could have built stronger rapport with community members and obtained even more information on the communities' drinking behaviors and water usage. Language barriers could also hinder the evaluation. Some communities spoke only their Mayan dialect while the surveys were printed in Spanish.

### Conclusions

There is not enough data to know whether purified water consumption has increased since surveys were not administered before the purifiers were installed. However, the post installation survey results show us that community members drink pure water between 48% to 64% of the time.

While one of CWW's requirements is that the water purifier is available to everyone, only one of the four schools give access to the public to use the water purifier. The biggest issue for doing this is because the schools worry that parts of the water purifier will be stolen.

There was a 16% decrease of diseases transmitted by water in the Chinantón community. Absences at schools fell 72% in La Chincua and 33% in La Puerta. There was an increase in students passing their grade level: 17% in La Puerta and 28% in Chicua II.

In terms of money savings, a potential savings of Q140,400 will occur by eliminating diarrhea in the communities of San Andrés. In addition, the San Lucas School would save Q3,000 per year if they use the purification unit and stop buying bottled water.

## **Recommendations**

- Investigate how to increase the consumption of purified water by community members.
- Get information and data before the installation of the water purifier in new communities.
- Continue to work with the mayor or local government to support collaboration of all water projects.
- Install purifiers in places accessible for students and members of the communities.
- Replicate the experiences of other communities' water purifier facilities.
- Put on the front of each box cover a number or email to contact in order to service unit or to ask questions about maintenance. If the local communities have a "service" phone number or email in a prominent location, the unit will not be disconnected if there is a concern.
- Consider installing units at the system's main pipe instead of one point at the end so increased usage of the purified water occurs.
- Consider installing a second unit in communities since the schools or health clinics is a long distance from the community members' homes.

## Appendix A – Individual Survey

# CLEAN WATER FOR THE WORLD

## Water Purification Impact Survey

### Internal Use Only

Water Promoter Name: / Name of Survey Administrator \_\_\_\_\_ Date \_\_\_\_\_

Water Purification Unit Inventory #\_\_\_\_\_ Survey #\_\_\_\_\_

Pre Installation Survey \_\_\_\_\_ Post Installation Survey \_\_\_\_\_

### Who is taking the Survey: Information Section

Instructions: Ask the following questions to the person you are interviewing. Tell them this survey is to verify if the water purification unit actually improves people's lives. Their answers are confidential and their participation in answering the survey is voluntary. They can stop answering questions any time if they want to.

Name of Community where the survey was taken \_\_\_\_\_ Name of Country \_\_\_\_\_

(Circle one) **SEX:** Male Female    **AGE:** 11-14    15-18    19-29    30-39    40-49    50+

Number of children living in the same house \_\_\_\_\_

### Water Sources Questions

Instructions: ask the person you are interviewing the following questions:

#### 1. Where do you currently get your drinking water? (circle all that apply)

Piped Water in House

Tube well/Borehole

Protected Spring

Bottled Water

Other

Piped Water in Yard/plot

Protected Dug Well

Unprotected Spring

Cart with Small Tank

Public Tap/Standpipe

Surface Water (river/lake/pond)

Rainwater Collection

#### 2. How many minutes does it take to get water?

Water is in house    less than 10 minutes    10-20    21-30    31- 40    41- 50    51 or more    I don't know

#### 3. How many times a day does your family get water from sources out of your house?

Water is at my house    1    2    3    4    5    6+

#### 4. Who usually goes to get the water?

Adult Woman

Adult Man

Female Child

(Under 15 years)

Male Child

(Under 15 years)

5. What do you usually do to make sure the water is safe to drink?

- |                           |                             |
|---------------------------|-----------------------------|
| Boil it                   | Let it stand and settle     |
| Add bleach or chorine     | UV light Filter - White Box |
| Strain it through a cloth | Other                       |
| Solar Disinfection Filter | Nothing                     |

**6. What is the Name of your Filter?**

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**IMPACT QUESTIONS**

**7. Please write the name of each person living in your home with you. How many times have you and others living with you members gotten sick (diarrhea) in the last six months? How many days did you and others living with you miss work or school because of being sick (diarrhea) in the last six months?**

House Member's Name:	Number of times diarrhea					Number of days missed from work or school				
	0	1	2	3	4+	0	1	2	3	4+
Your name:										
House Member 1:										
House Member 2:										
House Member 3:										
House Member 4:										
House Member 5:										
House Member 6:										
House Member 7:										
House Member 8:										

**8. How much money do you spend to help your child get better if they get diarrhea? \$\_\_\_\_\_**

**FREQUENCY OF USE**

**9. Do you use water from the filter every time you drink?**

Every Time      Most of the Time      Sometimes      Once in While      Never

**10. What do you need to drink purified water every time? \_\_\_\_\_**

**Information about the person participating in the survey**

This information is OPTIONAL. We will use this information to do future surveys with the same people to see if the system is working.

**11. What is your name? \_\_\_\_\_ Cell Phone: \_\_\_\_\_**

Email Address: \_\_\_\_\_

What is your home address? \_\_\_\_\_

What is the name of your neighborhood? \_\_\_\_\_

What is the name of your city? \_\_\_\_\_

# THANK YOU!

## What to do when you are finished with the survey

Return the survey to: Janet Ray, Evaluator, Clean Water for the World  
1550 Hubbard, Detroit, MI 29209 + 313 320-4850 + [janetray@mission-lift.com](mailto:janetray@mission-lift.com)

## Appendix B – School Survey

### Evaluación de Nivel Escolar: Impacto de Agua Purificadora De Luz UV

#### School Evaluation Interview Form

*Instrucciones para los educadores de salud: el objetivo de esta evaluación es evaluar el impacto del purificador de agua en la salud y éxito escolar de los estudiantes, ya como medir otros impactos que podría tener en las vidas de los estudiantes. Le Queremos ayudar a tener una escuela exitosa. La evaluación deberá ser llenado por el/la director(a) de la escuela con el educador de agua. Esta encuesta es voluntario y los resultados va ser compartidos con CARITAS y el organización Clean Water for the World.*

*Instructions for health educators: the purpose of this evaluation is to assess the impact of the water purifier on students' health and success in school, along with any other impacts it may be having. We want to help you have a successful school. The evaluation should be completed by the school's principal with the health educator assistance. The survey is voluntary and the results will be shared with CARITAS and the non-profit organization, Clean Water for the World.*

1. Nombre de la escuela (Name of School): \_\_\_\_\_
2. Nombre de la comunidad (Name of the community): \_\_\_\_\_
3. Departamento (Department): \_\_\_\_\_
4. Fecha de visita (Date of visit): \_\_\_\_\_
5. Fecha de instalación del purificador de agua (Date water purifier was installed): \_\_\_\_\_
6. ¿El purificador de agua está funcionando? (Is the water purifier working?)  Yes  
 No
7. Si se contestó no, ¿por qué? (If no, why not?) \_\_\_\_\_
8. ¿Qué voltaje tiene el enchufe? (What is the voltage from the outlet?)  
\_\_\_\_\_
9. Número de alumnos asisten la escuela (Number of students attending the school): \_\_\_\_\_
10. ¿El purificador del agua ha produsido algún cambio para su escuela? (Has the water purifier made any difference for your school?)  sí (yes)  no (no)  
¿Si se contestó sí, como se lo nota? (If so, how can you tell?)  
\_\_\_\_\_
11. ¿Cuáles son índices que se puede sugerir para medir el impacto del purificador de agua en la mejora de las vidas de los niños? (What ways do you suggest measuring if the water purifier is improving children's lives?)  
\_\_\_\_\_

12. ¿Se ha notado un incremento de asistencia desde que el purificador se instaló?  
(Have you noticed an increase in attendance since the water purifier was installed?)  
\_\_\_\_sí (yes) \_\_\_\_no (no) Explica porque:

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13. ¿Sabe cuales estudiantes llevan el agua purificada a su casa? (Do you know which students take the purified water to their home?) \_\_\_\_sí (yes) \_\_\_\_no (no)
14. ¿Puede escribir los nombres en una lista por aula? (Can you write their names on a list by classroom?) \_\_\_\_sí (yes) \_\_\_\_no (no)
15. ¿Usted piensa que la asistencia de los alumnos ha mejorado? (Do you think their attendance has improved?) \_\_\_\_sí (yes) \_\_\_\_no (no)
16. ¿Después la instalación del purificador, piensa usted han mejorado las notas calificaciones de los estudiantes? (After the water purifier was installed, do you think their grades have improved?) \_\_\_\_sí (yes) \_\_\_\_no (no)
17. ¿Tienen una nota promedio para la escuela? (Do you have average grades for the school?)  
\_\_\_\_sí (yes) \_\_\_\_no (no)
18. ¿Podemos revisar las notas calificaciones de cada estudiante del primer grado antes de la instalación del purificador? Podemos revisar las notas calificaciones de los misma estudiantes están en un grado más alto después la instalación del purificador? (Can we review student's grades in the first grade the year before the water purifier was installed? Can we see the same students' grades when they are in a higher grade after the water purifier has been installed for one year?)  
\_\_\_\_sí (yes) \_\_\_\_no (no)

## Appendix C – Water Unit Information

WATER PURIFIER MONITORING – GUATEMALA 2015				
Location/ Inventory Number	Voltage	Condition of Unit	Evaluation Team Response	Support Needed by CWW
Caritas - Chinanton (S/N 12-0026-N)	At principal office - 112 at water unit - 108	Installed outside a school. Paper Filter, UV Light, and quartz tube clean. A second unit was installed at the other side of the community to encourage use and cut the walking distance.	Conducted focus group, survey, interview with school principal and health clinic assistant nurse and mayor. See impact report.	None for unit. Well maintained. Consider installing unit at the system main pipe instead of one point at the end so increased use occurs.
Caritas - Chicua II (S/N 12-0034)	At principal office - 106 at water unit - 112	Unit installed in school kitchen and used for students' snacks. The previous water committee used a ticket system to allow community members to get water from the school kitchen since they were afraid of robbers entering the school. This policy will be reviewed. Water committee of 8 members have 2 year commissions. The unit was making a sound and the committee thought the UV light was burnt. The ballast number was more than 100. Light was burnt on the bottom with some filaments loose in the light.	Evaluation Team watched the water committee review the paper filter and change the light and quartz team to help empower them. Evaluation team helped guide the water committee with resetting the ballast.	See above
Caritas - La Puerta Chinque (S/N 12-0024-N)	At water source - 118	Unit installed in school kitchen. School principal is maintenance person. He was comfortable changing paper filters but Caritas staff trained the principal on how to check and change quartz tube and UV Light. Principal is open to have parents take water from school kitchen.	Evaluation team coached Caritas staff to train the principal.	Consider installing second unit in community since school is a long distance from the community members' homes.
Caritas - Warehouse	N/A	Inventory of Supplies: 0 units, 6 UV Lights, 70 Paper Filters, 6 Quartz Tubes. Supply Boxes 09-0011, 10-0017, 11-0022 unopened.	Took Inventory of supplies on site.	Coordinate with Global Partner: Running Water partners, In for shipping of possible 25 units.
San Lucas Toliman - Clinic (S/N 09-0021)	N/A	Unit found in the hallway, not connected nor being used. The unit was unconnected in 2012 because the water tasted funny. The Rotary Club International installed a Sun Spring dual filter system of .02 micro size on the clinic roof that includes wind turbine and solar panels. The city water is pumped up to the roof by an electrical pump and stored in a tuft tank. The entire clinic tubing was connected to the roof unit. A tube is also sourced to the street fence to provide water to the community. Clinic personnel shared that steel container has a "secret of the owner" and did not know what was in the canister phase.	CWW unit was removed from clinic with the supply box that contained 12 paper filters, 2 UV lights and 2 quartz tubes.	Put on box front cover a number or email to contact to service unit. If the local communities have a "Service" phone number or Email to call in a prominent location, the unit will not be disconnected if there is a concern.

ODIM - San Juan Laguna (S/N 09-0021)	At clinic - 121	This nonprofit is supported by the United Methodist Church in Dallas, Ron Willheim, and executive Director Jeff Hasel.	The rescued unit for the San Lucas Toliman clinic was installed at the San Juan Health Clinic with the intention to pipe water to the outside wall of the dental clinic for community use. 3 clinic workers were trained along with Jeff (executive director) for maintenance. Pedro, the clinic administrator, will be the lead maintenance person. The solenoid did not work and was stuck in the open position. Thus, currently the water flows even when there is no electricity.	ODIM has interest in installing other units in their clinic in San Pedro Laguna and into community pipe of complete community coverage. The faulty solenoid needs repair ASAP. A delegation in North Carolina is going to Guatemala in early June.
San Lucas Toliman - School (S/N 10-0023)	At water source - 120	Unit was found in school office unconnected and not being used for at least 2 years. Principal Patricia (new and different principal since the first initial installation) was very receptive for us to reinstall it. School spends Q3,000 per year on bottled water for the schools' students and teachers.	Trained Miguel and Salvador who are the new maintenance personnel at the school. System was installed on the outside wall of the school courtyard. Principal Patricia took pre and post installation water samples. Team educated her on how to interpret the samples. After 4 days of incubation, pre plates showed 13 red colonies. Post plate had 0 change. Principal will share with parents and teachers. Heather, the long term volunteer coordinator, will work with Juan Carlos, who is the parish administrator to stop buying bottled water for the 1,600 US volunteer delegations who visit the mission.	New idea for all purifiers: put on the front cover of every box a phone number or email to contact to service the unit and answer maintenance questions.
San Lucas Toliman - IMAP (S/N 14-003)	At water source - 111	Paper filter was dark green. New international volunteer, Neal, from Ireland, changes the paper filter every 3 weeks. He has never changed or knew how to clean the quartz tube. The replacement supplies were locked in the office, so it is uncertain the number of paper filters, UV lights and quartz tube were on site. Did pre and post water samples and educated IMAP on how to interpret the E coli plates. Miriam (Canadian and English Speaker) and Roni are interested in being promoting CWW purifier throughout Guatemala if CWW can help with outreach costs.	Team trained Neal who said he would train a local Guatemalan. A new UV light, tube and paper filter were installed. Team gave 15 more paper filters to IMAP.	CWW needs to send at least 26 paper filters per year since they are getting raw water from Lake Atitlan and need to replace paper filter every 2 weeks.