

Water For People

World Water Corps®

Guatemala Monitoring Report

November 2010



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I. Introduction

Water For People is an international nongovernmental organization (NGO) headquartered in Denver, Colorado in the United States of America (USA). Its vision is a world where all people have access to safe drinking water and sanitation; a world where no one suffers or dies from a water or sanitation-related disease. Water For People has been active in Guatemala since 1994, supporting a range of small water and sanitation projects implemented by Guatemalan organizations, and with close cooperation with the association Agua para la Salud. Its program in Guatemala is known as Water For People—Guatemala.

Water For People—Guatemala is currently developing from being a small NGO supporting various individual projects, to a significant player in the water and sanitation sector in Guatemala, with a coherent strategic work program focused on increasing capacity and coverage in specific municipalities.

World Water Corps® Assignment

Water For People believes it is vitally important to monitor its projects in all the countries where it works each year so that it knows the operational status of projects and can intervene if a high level of projects are experiencing problems. Monitoring is Water For People's way of ensuring that its projects sustainable – offering communities potable water and hygienic sanitation facilities not only on the day a project is initiated but for many years to come.

The World Water Corps® (WWC) is the sector of Water For People that monitors the work efforts and implementation activities in the field. Volunteers with WWC observe and interview people on the ground concerning water and sanitation facilities and issues in their homes, schools and community. Through these activities and the information obtained, the WWC team of volunteers helps to assess the current situation and needs of the communities, providing Water For People with data that gives the organization critical important information about the operational status of its projects that will allow Water For People to grow, learn, and adjust strategies where programs are unsuccessful.

Water For People is transitioning the data collection methodology from paper surveys to a new monitoring system called FLOW (Field Lever Operations Watch). FLOW is Water For People's newly launched monitoring system using an application on Android based cell phones that allows collection of data through surveys, photos, and taking Global Positioning System (GPS) points directly through the phones. The data can then be submitted immediately to the Water For People Denver office, whenever the phones can access a Wi-Fi or cellular connection for rapid analysis and visualization (using Google Earth, etc). This allows the staff in Denver to get instant feedback on the activities happening in the field, and provide instructions or make changes based on the information submitted if necessary.

The WWC team collected GPS data at each location visited and conducted surveys to gather data for water points and sanitation technologies for schools, communities and households, in

order to monitor the existing water, sanitation, and hygiene conditions in the community. This assessment will be used to evaluate if the current projects developed by Water For People in Guatemala are working and running efficiently. The WWC team conducted this monitoring assignment in Guatemala from November 7 to November 12, 2010. The objectives were as follows:

- Collect community, school, and household-level data on existing water, sanitation, and hygiene conditions.
- Collect basic mapping information about the water points and sanitation facilities.

Area of Study

El Quiché



Water For People-Guatemala focuses its work in the department of Quiché, which has some of the highest indicators of poverty and lack of basic necessities. Eighty-five percent (84.6%) of the population of the Quiché Department lives below the poverty line and 16 percent falls below the extreme poverty line, according to the Survey of Conditions of Life 2000, which is one of the most reliable data sources in Guatemala.

Quiché is overwhelmingly rural, with 75.35 percent (493,919 people) living in rural areas. The remaining 24.65 percent (161,591 people) live in urban areas, for a total departmental population of 655,510 in an area of 8,378 square kilometers. Most of the population is indigenous (88.79 percent or 81,996 people), while the non-indigenous population is 11.21 percent (73,514 people). The infant mortality rate at the departmental level is 27.38/1,000.

As in most of the world, diarrhea is estimated to be grossly under-reported in Quiché since many families do not have access to government health care services in rural areas which would track these statistics, and most families treat diarrhea at home.

Most of the municipal centers in Quiché that have waste drainage systems, directly connect them to rivers or creeks, which continuously affects the towns located downstream. Sanitation coverage is low in small towns and the rural areas of Quiché. A large percentage of the people that possess improved latrines do not use them or do not manage them hygienically, which contributes to pollution of the environment and high rates of diarrheal illnesses. Guatemalans in Quiché drink water that is unfit for human consumption; water that has high bacteriological contamination or chemical and physical properties that greatly exceed government norms.

II. Project Overview

Methodology

Water For People-Guatemala has dedicated the majority of its funding towards schools in 2010, apart from the SWASH+ schools, thus the initial plan was to focus on schools during the majority of this monitoring assignment. Most of these schools are in communities where Water For People has not yet implemented community water point or household level improved water and sanitation facilities. Water For People has now broadened its jurisdiction beyond the community to be municipality based, thus the team received instructions while in the field to collect additional data at the community and household level in all communities visited, being cognizant of the fact that when the communities where the schools are located have not yet received projects yet are being surveyed, it can create a false expectation that programming will begin soon in the community. The team was able to collect community and household data when possible in these communities as the Water For People-Guatemala staff assessed if it was appropriate to do so in each community.

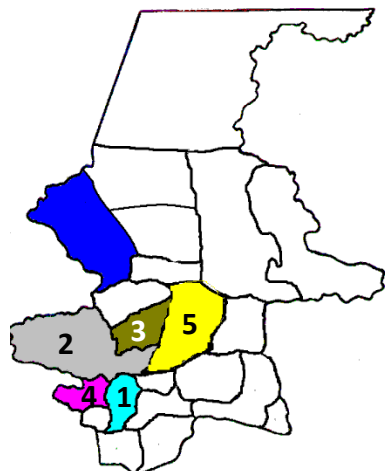
Surveys for school and household water points and sanitation technologies, as well as community water points were conducted in each community visited if possible. The number of households interviewed was determined based on 10% of the total number of households in each of the communities. Due to time constraints if teams visited a very large community the sample size was reduced.

Field process

During this monitoring assignment, the WWC volunteers were divided into two groups consisting of two engineer volunteers from the United States and two Water For People-Guatemala staff. The teams conducted surveys for each assigned community and public institution that they visited. Every day, each of the groups visited 1 to 2 communities depending on the travel distance from the Water For People-Guatemala office. In each community the volunteers were received by the Water Board (Consejo Comunitario de Desarrollo –COCODE) or another community representative knowledgeable about the projects implemented, who facilitated the interviews. When the WWC volunteers arrived at a site, they would have a briefing by the COCODE or representative and then the volunteers would begin to conduct the various surveys. For the community water point survey, usually the team had to drive or hike up to the town water point if it was accessible. The volunteers conducted the public institution school assessments on both water and sanitation facilities, and to finalize the visit, the volunteers surveyed 3-10 households in the community, based on the 10 percent criteria. However, in some communities, time constraints and long distances between each rural community prevented the teams from visiting ten percent of the households.

Communities Visited Within El Quiche

The World Water Corps monitoring assignment in Guatemala focused on five municipalities within Quiche Department:



1. Santa Cruz del Quiche
2. San Pedro Jocopilas
3. San Bartolome Jocotenango
4. San Antonio Ilotenango
5. San Andres Sajcabaja

The communities visited in each of the municipalities included:

1. Santa Cruz del Quiche

Community	Project	Beneficiaries
Pamesebal I	50 ecologic latrines	300 people benefited
Xesic IV	SWASH	120 students
Pixtup	SWASH	195 students

2. San Pedro Jocopilas

Community	Project	Beneficiaries
Villa Hermosa	SWASH	57 students
Santabal II	20 improved latrines	
Chitucur II	Water system: 28 connections	168 beneficiaries
Las Tunas	50 ecologic latrines	300 beneficiaries
Chocruz	SWASH	137 students

3. San Bartolome Jocotenango

Community	Project	Beneficiaries
Canoas	SWASH	102 students
Pacamonchaj	30 ecologic latrines	180 beneficiaries
Hacienda II	30 ecologic latrines	180 beneficiaries

4. San Antonio Ilotenango*

Community	Project	Beneficiaries
Patzala	560 water connections	3,360 beneficiaries
Xejip	450 water connections	2,700 beneficiaries

* This municipality was not included in the Android survey; therefore the survey was filled out as Nebaj

5. San Andres Sajcabaja

Community	Project	Beneficiaries
Platanar	SWASH	40 students
Limon	SWASH	40 students
Tonolajic	SWASH	90 students

III. Results

Water Supply

Household Survey Results

Out of the 108 households visited in the five municipalities, eighteen percent (18%) do not have access to improved sources of water, and collect the water from unprotected springs, unlined wells or from a neighboring house. Eighty one percent (82%) of the households interviewed have access to an improved water system, which consist mainly of gravity fed systems, except an eleven percent (11%) that uses some type of pump.

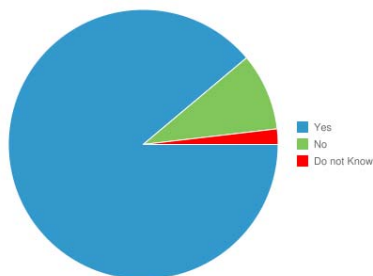


Figure 1. Do you collect drinking water from an improved water source?

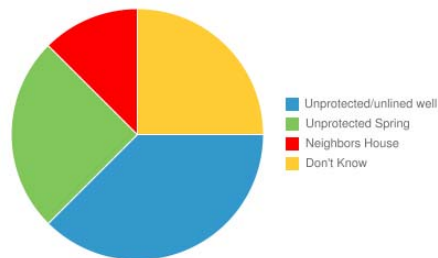


Figure 2. What is the type of unimproved water system?

Eighteen percent (18%) of the households interviewed travel more than 30 meters to gather water, which means they do not meet the minimum government standard.

Eleven percent (11%) of the 108 households interviewed do not treat the water before drinking it. The 89% remaining treat the water, with an eighty-seven percent (87%) boiling it and a thirteen percent (13%) using chlorine or filter.

Out of the 89 households that have improved water systems, 24% do not have water available every day of the year, mainly due to seasonal shortages, rationing, no power or broken parts in the supply system.

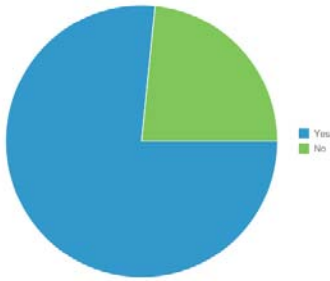


Figure 3. Does the improved source provide drinking water every day of the year?

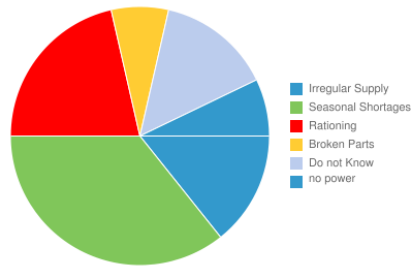


Figure 4. Why does not the system provide water every day?

Nineteen percent (19%) of the 89 households with improved water systems do not pay a tariff. The 81% remaining of households pay a tariff per month, semester or year around \$10-25 quetzales/month or \$50-100 quetzales/semester or year.

Community Water Point Survey Results

Out of the nine community water points surveyed, one water point (11%) does not have an improved water system and is taking water from an unprotected spring. Fifty percent (50%) of the eight remaining community water points use gravity fed systems and the other fifty percent (50%) electric pumps.

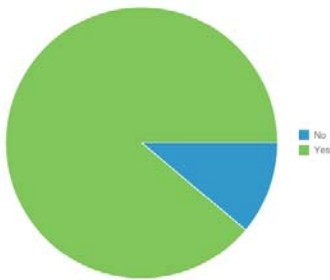


Figure 5. Is there an improved water system?

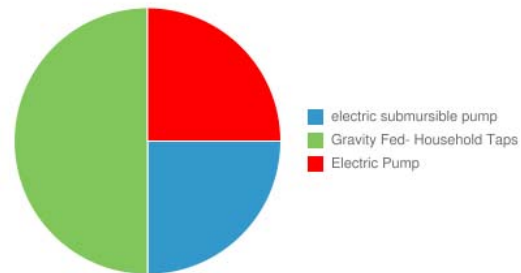


Figure 6. What is the type of the improve water system?

Out of the eight improved community water points, two water points (25%) do not provide access to all the community. Further, two of the eight improved community water points (25%) do not provide enough drinking water for the community every day of the year, due principally to broken parts in the system or lack of power.

Five out of the eight improved community water points visited (62%) have been down for more than one day in the previous 30 days to the interview. Additionally, two improved community water points visited (25%) had problems with the system at the time of the visit, such as broken pipes due to high rains and river overflow, and did not have water available. The other six

community water points had water available at the time of the visit, and the quantity met government minimum standards. Four improved community water points (50%) treat the water with chlorine.

Seventy five percent (75%) of the eight improved community water points charge a tariff to the users. Some users pay their tariff on a monthly basis (67%), while others pay their tariff by semester. The tariff they pay ranges from 5 quetzales to 25 quetzales per month. Most water committees (75%) have financial records on the tariff payments. However, it was not possible to determine if these records were updated, and there was not documentation available about expenses in the site of the interview. Thus, it was not possible for the team to assess if the financial/administrative management of the water systems were appropriate. The following figure illustrates the responsible party for performing local maintenance and repairs on the different improved water systems:

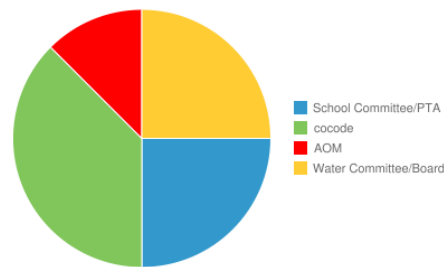


Figure 7. Who manages the improved water system?

Community Public Institution Survey Results

The nine public institutions surveyed were schools and 100% of them have an improved water system with the following types:

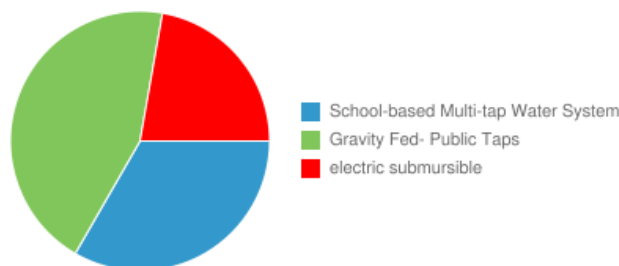


Figure 8. What is the type of the improved water system?

Only one school water point (11%) out of the nine surveyed does not provide drinking water every day of the year due to seasonal shortages. Four improved systems (45%) currently have problems such as faucets that do not work, damaged water tubes and valve leaks. On the day of the visit, one of the water systems (11%) did not have water available.



Figure 9. What is the operational status of the improved water system?

Four of the nine improved systems (45%) have been down for more than one day in the last 30 days, due to damage in the pipe system, vandalism or heavy rains.

Six out of the nine institutions surveyed treat their water. Out of those ones that treat their water, 50% use chlorination while the other 50% boil the water.

The COCODE and the school board are the two entities that manage the water systems. The COCODE is the one responsible of performing local maintenance and repairs on the improved water systems in 70% of the communities. Seventy eight percent (78%) of the institutions interviewed did not have separate water point financial records from the community. There were not financial records available in the place of visit, therefore, the team was not able to review and assess them.

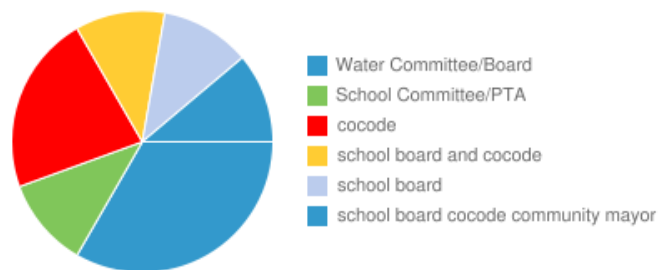


Figure 10. Who manages the improved water system?

Sanitation

Household Survey Results

Out of the 108 households surveyed, 38% do not have improved sanitation facilities. The 62% of the households with improved sanitation facilities have the following types:

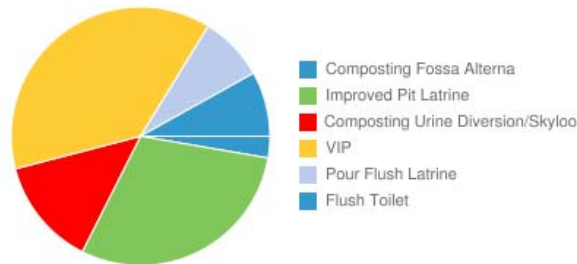


Figure 11. What type of improved sanitation does the household use?

Eleven percent (11%) of the households with improved systems do not use it. Eight percent (8%) of the improved sanitation facilities have technical problems or were full at the time of the visit.

Ninety six percent (96%) of the improved latrines were found clean at the time of inspection. In six percent (6%) of the households with improved systems, feces were found within three meters of the latrine.

Community Public Institution Survey Results

One hundred percent (100%) of the institutions interviewed were schools and had improved sanitation facilities. The types of improved facilities are illustrated in the following figure:

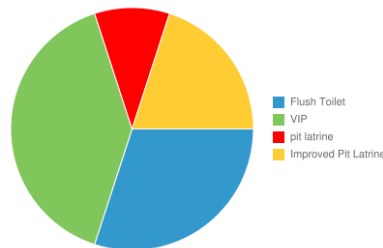


Figure 12. What type of improved sanitation does the institution use?

In 75% of the institutions visited the number of improved latrines does not meet minimum government standards for latrine pupil ratio. In all of the institutions surveyed (100%) there was evidence that the latrines were being used. In 88% of the institutions the improved sanitation

facilities were functional, and in 75% the latrines were clean when inspected. In none (0%) of the institutions surveyed human feces were found within three meters of the public institution.

Hygiene

Household Survey Results

In fifty four percent (54%) of the surveyed households that have improved sanitation systems there was not water available for hand washing within three meters of the latrine. And in thirty six percent (36%) there was not soap or other cleansing agent for hand washing available near the improved latrine.

The following figure illustrates the answers given by the people interviewed in the households when asked at what moments during the day they wash their hands with soap.

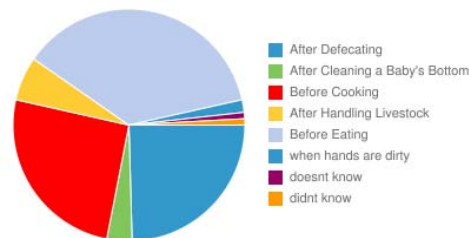


Figure 13. When do you wash your hands with soap?

Community Public Institution Survey Results

The kids from the schools were on vacation at the time of the visits. Thus, it was difficult to make accurate assessments for some of the questions because they were answered by people from the water committee, instead of getting the answers by viewing the kids perform their daily routines.

In 25% of the schools visited there was not water available for hand washing within three meters of the improved latrine, and there was not soap or other cleaning agent for hand washing near the latrine.

IV. Observations and Recommendations

Throughout the monitoring assignment, the WWC team of volunteers interacted with the people in each community, discussing the current situation of the water and/or sanitation faculties and their general or specific needs or wishes for future improvements. The team made several observations and had discussions amongst themselves and with the Water For People-

Guatemala staff regarding various conditions or improvements. The WWC team appreciates the opportunity to provide input into Water For People's program and processes, and has summarized these observations and offers the following recommendations outlined below.

Water Supply

1. In several households throughout the communities, it was observed that the drinking water was not collected directly from the tap on an as-needed-basis, but was first collected in a bucket ahead of time and left to sit. The people may not realize that the quality of the water could be impacted by leaving the water stagnant, where insects and mosquitoes can easily breed and develop.
2. Faucet valve handles—most faucet valve handles observed in the field were of the circular kind, which screw up or down to manipulate the water flow. Many of these types of valves seen in the households or schools were either broken or leaking. Water For People should consider using ¼ turn valve handles instead; these valves tend to be more rugged and less prone to leaking.
3. In some houses water stagnated on the floor around the house, where mosquitoes and insects were proliferating. When the water points are built, it is recommended to assess the drainage of overflow water, making sure it is discharged at an appropriate distance from the house.
4. It is not recommended to use PVC pipe in the cement where it comes out of the ground and immediately used as a faucet. Instead, it is recommended to use metal pipe. Any slight force on the PVC pipe can cause it to break and present a difficult problem to the community or homeowner to replace the pipe underground.
5. In several communities it was observed that water pressure was low at the school taps. Community members indicated that the method of collecting the water from the source was not ideal. Water For People should verify adequate collection facilities, such as tanks, are utilized to provide adequate water flow and pressure to the discharge locations.
6. In some houses visited, drinking water was not available, only water for irrigation. The water used for irrigation had a lot of sediment in it. Another thought is to consider the feasibility of treating this water so it can also be used for drinking purposes.
7. All of the Water For People water tanks visited, and mostly for schools, did not have an easy method to measure the water level in the tank except for opening the top lid. With very little extra cost, a valve and clear tube could be installed as a "sight glass" to view the water level in the tank.

Sanitation

1. In several instances, the latrines were located a significant distant from the house, or in areas not easily accessible from the house. Such a location can hinder the use of the latrine and the idea of always washing the hands after using the latrine.

2. In several households visited that had an ecological sanitation unit (or composting latrine), families were not using ash or any other proper agent to help control odors and dehydrate the feces. In many other cases, people were not consistently using ash every time they defecated into the chamber. Overall, more education is needed to reinforce the need to use ash, etc with these types of latrines.
3. It is suggested that Water For People look at different toilet options vs. the combo toilet design for urinating and defecating. The following observations were made:
 - It is very difficult for men to urinate into the designated urination chamber, which is located inside of the toilet, without splattering on the toilet seat and/or floor. This problem is especially true for children, and was personally experienced by one of the male WWC volunteers.
 - Many men interviewed also did not like using the designated urination chamber; if they did urinate inside the latrine, they preferred to bypass the urination chamber and to urinate into the defecation chamber.
4. In some instances, the team observed improved ventilated latrines with the ventilation tubes protected from rainwater with a cover (in the shape of hat). We recommend this type of protection to be used in all ventilated latrines.
5. Many, if not most, of the water flushable toilets did not have clean-out boxes. These are important because if the lines ever get plugged, clean-out boxes can help access the lines easily and safely.
6. For restrooms with flushable toilets (schools), it is recommended that Water For People install a water faucet close by to the restrooms for easier cleaning of the facilities, which might encourage more frequent cleanings. Also instructing the teachers or villagers to use a hose if available to rinse the restrooms down would be extremely helpful in maintaining the hygiene inside the facilities.
7. It was noted that many of the well built adobe latrines were better insulated against the cold winds vs. wood latrines; adobe is also a cheaper material for the villagers. In colder regions, this kind of material might be preferred and recommended, especially for children users.
8. Some school latrine sizes were very small even for children; household latrines were fine. Smaller construction can cut costs but perhaps the square footage for standard school latrines should be evaluated. The small space might impede cleanup and comfort during use.
9. In most of the school visits, it was observed that the latrines were unlocked and left open when school was not in session. This does not allow control over the use of the latrines. In many communities the teachers have the responsibility of cleaning the latrines. As the schools were on their two month vacation, the volunteers encountered many dirty latrines not fit for use. It is recommended that the latrines be locked when school is not in session or continue to have a designated community members to clean the latrines year round.

10. It was also observed at each school that the number of latrines provided for the students (especially for the girls) did not meet government standards, nor were the community representatives aware of these standards. For future projects, Water For People should consider providing government standard level of services for schools.

Hygiene

1. Overall, in most villages and/or schools visited, people in the communities are still unfamiliar with the concept of washing their hands after using the latrine or toilet. The people need more education to help change their hygiene lifestyles. About less than 10% of the people interviewed were able to give a satisfactory level answer when asked when the most appropriate moments in the day are to wash their hands.
2. Most schools lacked what the volunteers considered a sufficient amount or had NO hygiene posters of children washing hands, brushing teeth...etc. Posters are very inexpensive and very useful; each school should have a minimum of various hygiene posters (perhaps 10-15), posted everywhere, including inside the latrines.
3. School soap dispensers—only one school visited had a dedicated place for a soap dispenser. This idea is highly recommended for all schools.
4. No mirrors of any kind were ever noted at any of the schools. It is recommended to install metal (or something similar) mirrors at the faucet locations. This might encourage the children to look at themselves more and realize how clean or dirty they are—and promote better hygiene.



Other

1. After visiting several rural areas in Guatemala, the team was able to realize how little education communities have in overall garbage and trash disposal. It was very common to see trash in the floor and ground, around the schools, and along the roads. There were no signs of garbage cans around the towns or schools, and it seemed like a common custom for people to dispose of the garbage on the streets. This practice is not strictly related to water issues, however if communities would also have education on trash management, and proper garbage receptacles around the town, the overall quality of life of could greatly improve.

References

Water For People. *Water For People – Guatemala Country Strategy 2008-2011*. January 2008.

Appendix A WWC Volunteers

This monitoring assignment was conducted by a team of 4 engineers who traveled to Guatemala as WWC volunteers. This was the first assignment for all. Brief biographies for the volunteers are provided below.

Alan Bebchik - Alan is a native of Argentina, South America. He graduated from Florida University with a civil engineering degree. He has 3 years of engineering experience. Alan is currently working as a project manager, for a construction company in Miami, Florida where he oversees large projects. Alan enjoys traveling and has had the opportunity to travel around the world.

Paula Diaz - Paula is a native from Colombia, South America, where she obtained her undergraduate degree in environmental and sanitary engineering. After college, she worked as a consultant for the petrol and government sectors. Most recently, she graduated from the Johns Hopkins University with a master's degree in environmental policy and sciences. Concurrent with her graduate studies in the U.S., she has also held research positions at the U.S. Environmental Protection Agency.

Paul McNeill - Paul is a process (chemical) engineer for a chemical company called Nalco Company. The company is best recognized in the industry for its work with water treatment abilities and process improvements. Paul has 7 years of engineering experience, including some water engineering projects. In 2006, Paul did his own humanitarian projects, all funded by donations. Basically, he helped three villages in the remote mountains of Peru--South America, to design and construct a gravity flow water system and one public restroom for each village. At the time, the villages did not have running water, restrooms, or electricity.

Barika Poole - Barika is a water resources engineer at CDM, performing permitting, design and construction for stormwater and aquifer storage and recovery wells (ASR). She is a graduate of MIT where she obtained her bachelor's and master's degrees in Environmental Engineering. She has over 8 years of experience, and has been working on projects in Togo, Haiti and Kenya with Engineers Without Borders for the last several years. She is very active in several volunteer organizations and will be serving as the Florida Section of American Water Works Association Region III Water For People Chair in 2011.

Appendix B Monitoring Schedule

Cronograma de recorrido por grupos para monitoreo 7-13 noviembre, 2010																	
Grupo	No.	proy.	Comunidades	Domingo 7 de noviembre	Lunes 8	Martes 9	Miércoles 10	Jueves 11	Viernes 12	Sabado 13 de noviembre	RESPONSABLES DE AVISAR A CADA COMUNIDAD						
Todos	140101	S	Pameseбал I	Traslado de Voluntarios de Guatemala hacia Quiché	x						WFP						
	141702	SW	Canoas / 9:30			x						Victor Castro					
1	141703	S	Pacamanchaj/ 11:00			x						Victor Castro					
	141404	SW	Platanar/ 10:00				x					WFP					
	140905	SW	Villa Hermosa/9:00						x			WFP					
	140906	SW+S	Santabal II/ 11:00						x			WFP					
	140907	W	Chitucur II/ 9:00							x		WFP					
	140108	SW	Xesic IV/ 14:00							x		WFP					
	141709	MO	Hacienda II/9:30			x						Victor Castro					
	140110	S	Pixtup/14:00			x						WFP					
2	141411	SW	Limon/9:30					X				WFP					
	141412	SW	Tonolajic/11:00					X				WFP					
	140913	S	Las Tunas/9:30						x			WFP					
	140914	SW	Chocruz/ 14:00						x			WFP					
	140815	SW	Patzalá/9:00							x		Santos Martin					
	140816	SW	Xejip/11:00							x		Santos Martin					
REFERENCIAS <table border="1"> <tr> <td>S</td> <td>Sanearamiento comunitario</td> </tr> <tr> <td>SW</td> <td>Swash+</td> </tr> <tr> <td>W</td> <td>Acueducto comunitario</td> </tr> </table>												S	Sanearamiento comunitario	SW	Swash+	W	Acueducto comunitario
S	Sanearamiento comunitario																
SW	Swash+																
W	Acueducto comunitario																

Appendix C Guatemala Government Standards

Guatemala Water and Sanitation Government Regulations	
Rural Parameters	
Approved Water Technologies	Gravity fed system with public or household taps: Spring box Surface rivers and lakes collection Mechanically or manually drilled pump supply system Combined pump with gravity fed supply public or household taps Rainwater catchment tanks
Distance to Water Point (max)	= 30m (household tap) = 200m (public tap)
Quantity per person/day	= 15L (hand pump) = 30 – 60L (public tap) = 60 – 90L (inside the property) = 90 – 120L household in rural areas
Number of users per water point	= 1 family per household tap (avg. family size = 6 people) = 60 people or 5-10 families per public tap
Water Quality Measures	Fecal Coliform = 0 coliforms /100 ml
Approved Sanitation Technologies	Traditional Pit latrine Ventilated Improved Pit latrine (VIP) Sun collector latrine Ecological Composting latrine Hydraulic sealed latrine Hydraulic drag latrine Flush Toilet
Schools	Sanitation: 50 boys/latrine, 25 per urinal 25 girls/latrine 1 latrine for all faculty and staff Water: Two taps for the first 60 students and then for pre-primary and primary schools 1 more for each 20 additional students or for secondary schools 1 more for each 30 additional students.
Peri-Urban Parameters	
Approved Water Technologies	Gravity fed system with public or household taps: Spring box Surface rivers and lakes collection Mechanically or manually drilled pump supply system Combined pump with gravity fed supply, public or household taps Rainwater catchment tanks
Distance to Water Point (max)	= 30m (household tap) = 200m (public tap)
Quantity per person/day	= 15L (hand pump) = 30 – 60L (public tap) = 60 – 90L (inside the property)
Number of users per water point	=1 family per household tap (avg. family size = 6 people) = 60 people or 5-10 families per public tap
Water Quality Measures	Fecal Coliform = 0 coliforms /100 ml

Guatemala Water and Sanitation Government Regulations	
Peri-Urban Parameters	
Approved Sanitation Technologies	Traditional Pit latrine Ventilated Improved Pit latrine (VIP) Sun collector latrine Ecological Composting latrine Hydraulic sealed latrine Hydraulic drag latrine Flush Toilet
Schools	Sanitation: 50 boys/latrine, 25 per urinal