



WATER FOR PEOPLE  
WORLD WATER CORPS®

NICARAGUA MONITORING REPORT  
2010

REPORT PREPARED BY:

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2010 NICARAGUA MONITORING TEAM

## I. Introduction

### **Brief description of Water for People Nicaragua Country Program**

The Water for People has been working in Nicaragua in alliance with a Nicaraguan not-for-profit organization, El Porvenir since 2008. The program in Nicaragua focuses in two geographic locations: the northern department of Jinotega, chosen for its high poverty levels and low water and sanitation coverage; and the department of León located in the foothills of the Segovia Mountains. The focus of the program in Nicaragua is in the following three areas: 1) construction and maintenance of community wells; 2) construction of pour-flush latrines; and 3) hygiene education.

Many communities in Nicaragua are fortunate to have access to hillside springs that can be tapped for reliable year-round water supplies. Springs are protected at the source and gravity is put to work to deliver water to homes and community taps. When springs are not available, community wells are built, but often at a higher cost.

The construction of ventilated improved pit latrines is a common sanitation solution in Nicaragua. Recently, El Porvenir shifted away from using wood-framed latrines to metal-framed structures. Although more costly, metal structures will last considerably longer and can easily be more moved to new latrine pits when necessary.

### **2010 Nicaragua World Water Corps® Monitoring Team and Assignment**

The monitoring team consisted of four volunteers with The World Water Corp® along with members of El Porvenir and community volunteers based in El Sauce. The monitoring team was tasked to monitor the condition of water and sanitation projects implemented over the last few years, capacity of community members in managing and maintaining the systems, and the efficacy of hygiene education programs. El Porvenir has been working in El Sauce since 1999 and Wiwili (in partnership with Water for People) since 2008.

The 2010 World Water Corp Nicaragua Monitoring Team consisted of the following volunteers:

Elaine Lai, EPA, team leader  
John Fawley, journeyman pipefitter  
Jill Green, retired teacher  
Bob Burnett, retired

### **Regions Visited by 2010 Monitoring Team**

The team divided into two groups for this assignment. One group (two World Water Corps volunteers and staff from El Porvenir) was based in the northern region in the municipality of Wiwili while the second group (two World Water Corps volunteers and community leaders/staff from El Sauce) was based in El Sauce. The regions visited by the Wiwili Team included: Las Vueltas, Jicote No 3, La Naranja, Jicote No 4, Yakalwacito,

Manchones, San Felipe and Corozal. The regions visited by the El Sauce Team included: Cenicera Oeste, San Agustin, Borditos Martinez, Salale, La Esperanza #2.

## II. Overview

### **Field protocol**

Four World Water Corps volunteers traveled to Nicaragua to work with staff from El Porvenir and community leaders/staff from El Sauce from February 25 to March 5, 2010. The World Water Corps team leader trained the monitoring team on field protocol during the first day to ensure consistency across the two groups once deployed to their respective geographic locations. The training focused on the use of GPS devices, ensuring consistent interpretation of survey questions and possible responses, sampling protocol, and data management.

Upon arrival at each community, where possible, the team attempted to first meet with community leaders to explain the objectives of the project and in many instances, enlist community leaders in accompanying the team to complete the community surveys. The support of El Porvenir and Community Leaders with the monitoring survey proved to be critical to the success of the project and the openness of community members to discuss their experience with the water / sanitation projects. The team then worked to complete three types of surveys in each community visited: 1) waterpoint survey, 2) public institution surveys, and 3) household survey.

**Waterpoint Survey.** The general objectives of the waterpoint survey were to characterize the waterpoint (defined as a manmade structure established to protect the source and/or facilitate the access and conveyance of water), determine the population served, assess the long term function of the system, and assess maintenance and management of the system.

**Public Institution Survey.** The general objectives of the public institution survey were to assess access and availability of water and sanitation to public institutions (schools and health clinics) in the communities visited, discern maintenance and care of the facilities, and assess sanitation practices and knowledge of users of sanitation facilities.

**Household Survey.** The general objectives of the household survey were to assess access, availability, management and maintenance of water and sanitation facilities and sanitation practices of households in the communities visited.

### **Sample size and randomization methodology**

Target sample sizes for the household surveys in each community were established by Water for People. While teams attempted to meet target sample sizes for the household surveys, due to time constraints, teams surveyed as many households as were possible with the time allotted for each community. Each team attempted to ensure broad geographic representation in the households surveyed. The general approach was to

survey a portion of households located close to the community center, a portion at a moderate distance away from the household center, and a number of households on the community fringe. Due to time constraints, households were generally within a 20 minute walk to the road. The households were either selected by team members or were selected by community members accompanying the team.

#### **Communities visited**

To enhance the efficiency of the monitoring assessment, the Water for People team divided into two separate teams to simultaneously survey two different geographic regions in Nicaragua over a three day period. The teams and assigned communities were as follows:

**Team Wiwili:** Las Vueltas, Jicote No 3, La Naranja, Jicote No 4, Yakalwacito, Manchones, San Felipe and Corozal.

**Team El Sauce:** Cenicera Oeste, San Agustin, Borditos Martinez, Salale, La Esperanza #2.

#### MAP OF LOCATION OF COMMUNITIES

### **III. Results by regions**

#### **Waterpoint Surveys**

The general objectives of the waterpoint survey for each community were to characterize the waterpoint, determine the population served, assess the long term function of the system, and assess maintenance and management of the system. Generally, either a community member or a member of the water committee in each community assisted in answering questions about waterpoints in each community.

#### **Availability**

**Availability of Improved Water System.** Improved water systems were present in all communities surveyed with the exception of San Felipe. It was reported that there are plans in place to initiate a Water for People project in San Felipe to develop and implement an improved water system. Currently, the community of San Felipe obtains its water from a protected spring.

**Characteristics of Improved Water System Present.** Generally, communities in the El Sauce region had access to either household taps (n=3; El Caracol, San Agustin, Bordito Martinez) or a rope pump well (n=2; Esperanza, Cenicera Oeste); one community had an electric pump well (Monte Grande Lapita). The majority of the communities in the Wiwili region generally did not have access to household taps; alternatively, the majority of communities were served by rope pump wells (n=4, Jicote #4, Boca del Coracol, La Naranja, Manchones). Las Vueltas was served by a gravity fed system which offered a mix of household and public taps. Overall, most systems observed were Water for People projects that were constructed in the last two years (2008-2010). Only three of the 12 observed improved water systems were not part of a Water for People Project: El Caracol (2004), Bordito Martinez (1997), and Esperanza (2008).

**Community Access.** The population that each improved water system serves is presented in Table 1 below. In general, the entire community had access to the improved water source with the exception of Las Vueltas (41 people did not have access), Manchones (8 people did not have access), and San Agustin (12 homes did not have access). It was not clear why these individuals were not able to access the improved water source. Of the water systems observed, all provided enough water every day of the year for the communities (this was unsure for San Agustin). The Water for People Assessment Teams tested water availability at each system that was observed to gauge whether the quantity of water (based on rate) from each system met minimum government standards for liters of water that can be pumped per minute. The monitoring team determined how much water was available per user of the system by measuring the time to fill a five gallon bucket to gauge rate of water flow. Of all working water systems observed, all water systems met minimum government standards of water availability. The waterpoint at Boca del Coracol was not working the day of the survey and the waterpoints at Monte Grande Lapita and Cenicera Oeste were not measured during the survey (reason not provided).

**Table 1. Population Size Using Improved Water System**

| Community           | Population Using Improved Water System |
|---------------------|--|
| Jicote #4           | 21                                     |
| Jicote#3            | 9                                      |
| Las Vueltas         | 78                                     |
| Boca del Corozal    | 30                                     |
| La Naranja          | 25                                     |
| San Felipe          | NA                                     |
| Manchones           | 30                                     |
| Monte Grande Lapita | 84                                     |
| El Caracol          | 287                                    |
| San Agustin         | 120                                    |
| Bordito Martinez    | 40                                     |
| Esperanza           | 20                                     |
| Cenicera Oeste      | 20                                     |

**System Function, Maintenance and Management.** The large majority (ten out of thirteen systems) had not been down for more than one day over the last month. This can be anticipated given how new most of the water systems were in the region. Only one system (Boca del Corozal) had been down more than one day over the last month. In eight of twelve surveyed communities, interviewees reported no problems with the water system. Three out of the twelve communities surveyed indicated some problems with the water system that needed attention – these problems were commonly associated with broken ropes associated with the rope pump wells. Community members in Monte Grande Lapita also indicated that water access and availability was

interrupted during electrical outages in the community due to the fact that their well was outfitted with an electric pump.

Establishment of user fees/tariffs for water use from the improved system was split evenly: five out of eleven communities surveyed had tariff systems in place while another five out of eleven communities had no fee system in place. Of the communities that have established user fees/tariffs, three communities indicated that 100% of the users paid the user fee, one community indicated that approximately 10% of the users did not pay the user fee, and one community was unsure about the percentage of users that complied with the user fee. (*See Table 2*) The communities (with the exception of one) were not able to present the assessment team with any records documenting the financial history associated with the user fee system. Monte Grande Lepita apparently did present records to the assessment team, however, the records were unclear for the communities which were successful in instituting a user fee system. It therefore remains unclear whether records are being maintained and are up to date, and whether a system is in place to track income and expenditures.

Across the board, all communities identified that the Water Committee/Board of the community manages the improved water system. All but one community identified the Water Committee/Board as the entity that maintains and repairs the water system. One community selected 'other' in response to the entity that maintains and repairs the system, but it was not clear what or who this entity was.

| Community Name      | Presence of User Fee System | If Yes, What is the User Fee (cordobas/household /month)? | Percentage of Users Paying User Fee |
|---------------------|-----------------------------|---|-------------------------------------|
| Jicote #4           | NA                          | NA  | NA                                  |
| Jicote#3            | No                          | NA  | NA                                  |
| LasVueltas          | No                          | NA  | NA                                  |
| Boca del Corozal    | Yes                         | 20  | 100%                                |
| La Naranja          | Yes                         | 20  | 100%                                |
| San Felipe          | NA                          | NA  | NA                                  |
| Manchones           | No                          | NA  | NA                                  |
| Monte Grande Lapita | Yes                         | 50  | 100%                                |
| El Caracol          | Yes                         | 10  | 90%                                 |
| San Agustin         | Don't Know                  | NA  | Don't Know                          |
| Bordito Martinez    | Yes                         | 10  | Don't Know                          |
| Esperanza           | No                          | NA  | NA                                  |
| Cenicera Oeste      | No                          | NA  | NA                                  |

**Table 2. Presence and Characteristics of User Fee System in Communities**

### Household Surveys

The general objective of the household surveys were to obtain a general sense of household level access to drinking water, access to sanitation facilities and habits and practices in the use of household sanitation facilities.

### Survey Characteristics

In general, the Monitoring Team strived to survey a representative number of households in each community, given established time constraints. Similarly, the monitoring team attempted to assure some level of geographic representation of households surveyed, by aiming to survey a number of households further from the road (however, was limited by time constraints). The number of households interviewed in each community is provided in *Table 3*. The majority of the respondents to the surveys were the female head of household (70%), while 22% of the respondents were the male head of household; to a lesser extent, a teenager in the household was the key respondent in approximately 6% of the surveys completed. There average number of household members in each household surveyed were 5.3 (mean, sd=2.3) and 5.0 (median) household members in each household surveyed. Household sizes ranged from 1-12 members for households surveyed.

**Table 3. Number of Household Surveys Completed**

| Name of Community | Number of Surveys Conducted |
|-------------------|-----------------------------|
| Boca del Corazol  | 2                           |
| Bordito Martinez  | 6                           |
| Caracol           | 8                           |
| Cenicera Oeste    | 4                           |
| Esperanza         | 1                           |
| Jicote #3         | 1                           |
| Jicote #4         | 3                           |
| Jicote#3          | 1                           |
| La Naranja        | 3                           |
| Las Vueltas       | 12                          |
| Manchones         | 14                          |
| Monte Grande      | 6                           |
| Salale            | 19                          |
| San Agustin       | 18                          |
| San Felipe        | 22                          |
| Yacalwacito       | 8                           |

**Access to Drinking Water**

**Distance Traveled to Access Water.** Overall, households surveyed did not have to travel far distances to access drinking water. Households traveled 101 meters (mean, sd=118m) or 50 meters (median). The range of distances traveled to access water was from 2 to 500meters. Households traveling furthest to access water were from San Felipe, Yacalwacito, Jicote #4, and Boca del Corazol. In each of these communities, one or more households traveled further than 300m to access water.

**Access and Availability of Improved Water Source.** An improved water source is defined as a source of water with a superstructure protecting the resource from any external elements or contamination. The majority (59%) of households surveyed collected drinking water from an improved water source, while 40% did not collect water from an improved source. Communities in which at least a portion of households did not collect water from an improved source are presented in *Table 4*. (percentage surveyed households for each community ***not*** collecting water from an improved source provided in parentheses):

**Table 4. Percentage of households not collecting water from an improved water source**

| <b>Community</b> | <b>Percentage households not collecting water from an improved source</b> |
|------------------|---|
| San Felipe       | 100%  |
| Boca del Corazol | 50%   |
| Manchones        | 71%   |
| Yacalwacito      | 100%  |
| San Agustin      | 33%   |
| Bordito Martinez | 33%   |
| Esperanza        | 100%  |
| La Naranja       | 33%   |

Households that were not collecting water from an improved source tended to collect it from hillside springs or creeks. For households that did have access to an improved water source, the large majority of water sources provided water every day of the year; only 13.2% of households surveyed indicated that the water source did not provide water every day of the year. Households in Las Vueltas (58.3% of all households surveyed in Las Vueltas) had the greatest number of problems accessing water every day of the year from the improved water source; however, this may be an artifact of the situation where 34% of did not have access to the water system rather than as indicative of management/maintenance issues.

**Presence of Management Systems.**

The ability for a community to maintain and sustain the function of their improved water system depends on the implementation of a management system which will allow the community to establish funding mechanisms to ensure that the system can be repaired, maintained and replaced over time. The presence of a fee system is indicative that some semblance of a management system may be in place to recover costs to maintain the long term health and functionality of the system. Of the communities surveyed with access to an improved water system, 59% of households surveyed did not pay any form of user fee, while 41% of those surveyed paid some sort of user fee. Communities with some form of user fee system in place include Boca del Corazol, La Naranja, Caracol, Monte Grande and Salale. Communities without a user fee system in place included Las Vueltas, San Felipe, Jicote #4, San Agustin, Manchones, Bordito, Cenicero, Jicote #3, Esperanza and Salale. It appears that 26% of surveyed households in Salale are not paying a fee while 74% of those surveyed are paying a fee. Fees paid by households surveyed ranged from 10 cordobas/month (La Naranja, Caracol, Salale); 20 cordobas/month (Boca del Corazol, La Naranja) to 50 cordobas/month (Salale); the majority of households in Salale paid fees only when maintenance needs arose. It seemed as if fee structures were relatively consistent within communities, with the exception of La Naranja and Salale. In La Naranja, one household paid 10 cordobas/month while another paid 20 cordobas/month. In Salale, 21% of households surveyed paid 10 cordobas/month while 79% paid fees only when maintenance needs arose.

### **Sanitation**

**Characterization of Facilities Present.** Sanitation facilities in households surveyed were for the large majority (94%), ventilated improved pit latrines, apparently implemented through efforts of El Porvenir over the last 2-3 years. Four households in Cenicera Oeste were improved pit latrines, while there were four total households surveyed (one household each in Jicote #4, Esperanza, San Felipe and Las Vueltas) that used traditional, unimproved latrines.

**Practice and Habits in Use of Sanitation Facilities.** All households surveyed with an improved sanitation system use the facilities for their intended use; everyone in the household uses the system (both adults and children) with the exception of one household in San Felipe, where only the adults use the facilities. Of those with improved sanitation facilities, 99% of the facilities were in functional conditions with only one household surveyed where the monitoring team could not access the sanitation facilities. The large majority of sanitation facilities observed were in good condition, with 96% of the facilities not exhibiting any urine or feces on the walls/floors/seat; the monitoring team only observed urine and/or feces on only 4% of the facilities observed. It appeared that nearly all of the households surveyed used the facilities, as there was not any feces observed within 3 meters of the house for all households surveyed except one. Signs of general handwashing practices and habits in households was generally good. For households with improved sanitation facilities, the monitoring team observed that in two thirds (67%) of all households, water was available within 3 meters of the sanitation facility, while a third (33%) did not have water available in close proximity of the sanitation facilities. Soap or some other cleansing agent (e.g. ashes) was available at 77% of households with improved sanitation facilities, while 23% of households did not have some form of hand cleansing agent available near the sanitation facility. The large majority of household members surveyed (97%) knew well when handwashing should be practiced, while 3% could not recite the times when handwashing was important.

### **Public Institution Surveys**

The general objective of the public institution surveys were to obtain a general sense of availability, access, usage, sanitation practices, maintenance and management of improved water systems and sanitation facilities at public institutions in communities surveyed. The team was not able to assess water quality during this visit due to lack of monitoring equipment available to conduct water quality analyses.

#### **Characterization of Public Institutions Surveyed**

Ten communities visited had public institutions that were surveyed by the monitoring team; Salale was the only community surveyed with both a clinic and educational institution. Nine schools and two health posts/clinics were surveyed in the communities visited. Of the nine schools surveyed, there were four primary schools, three nursery/preprimary/primary schools, one primary and secondary school and one where the type of school was unknown. Total number of students at the schools surveyed were known for seven of the nine schools. The range of student population ranged from 53 to 675 students (mean=170 students, sd

84.8; median=84 students). By far the largest school was found in Salale, which served 675 students at the Centro Escolar which was both a primary and secondary school.

### **Water Supply**

**Availability of Improved Water System.** Access to improved water systems were present at eight public institutions (out of the eleven total that were surveyed). The three public institutions surveyed in the communities of Yacalwacito, Manchones and San Felipe did not have access to an improved water system. While the health clinic in Salale did have access to an improved water system, the nurse at this clinic indicated that the water was polluted and was only used for washing. In the communities that did not have access to an improved water source, the water source was from an unprotected spring in San Felipe; it was not clear through the interviews what the source of water was for Yacalwacito and Manchones. In the communities that did have access to an improved water system, the improved water systems were rope pumps (n=5) and gravity fed systems with public taps (n=1); it was unclear what type of system was in place at the school in Las Vueltas. Most improved water systems were constructed within the last ten years, with the exception that the water system at the clinic in Salale was constructed in 1990. Only one improved water system (school in Las Vueltas) was part of a Water for People project. Interviewees indicated that there are plans for a Water for People project to implement improved water systems at the schools in La Naranja and San Felipe.

**Access to Use of Improved Water System.** The number of students/staff/patients using the improved water system ranged from 100-675 people (mean=298 people, sd=188.4; median=120). The primary and secondary school in Salale had the largest number of students/staff of all institutions surveyed (675 students/staff using the system). The number of other community members also using the water system that was not part of the public institution ranged from 3-100 (mean=36, sd=21.8; median=20). Again, the public institutions in Salale (clinic and primary/secondary school) had the highest use by community members not part of the public institution. Consistency of water availability from the improved water system was generally pretty good, with four of the seven systems having water availability every day over the last 30 days. The clinic in Salale did not have water available every day over the last 30 days, and consistency of water availability in Caracol and San Agustin was unknown. On the day of the visit, only one system (Clinic in Salale) did not have any water available. The improved water system was down for more than one day over the last month in three communities (Boca del Corazol, the clinic in Salale, and the school in Salale). These same institutions indicated that there are current problems with the improved water system that need attention. Only one water system did not experience any problems over the last month.

**Quantity of Water Available.** The monitoring team attempted to assess whether water supply availability of the improved water systems was sufficient to meet government established water supply availability standards. The monitoring team determined how much water was available per user of the system by measuring the time to fill a five gallon bucket to estimate rate of water flow, and divided this number by the number of users of the improved water system. The monitoring team was only able to measure water quantity in half of the public institutions surveyed that had an improved water point as a number of visits occurred on days where the school was closed. Of the public institutions surveyed, two out of three systems (schools in Salale and Boca del Corazol) had sufficient water flow

to meet government standards, but the health clinic in Salale did not have sufficient water quantity to meet government standards. It was reported by the monitoring team that the primary reason for inadequate water supply at this clinic was due to pollution of the water source.

#### **Maintenance and Management**

**Records.** None of the institutions interviewed had records that the monitoring team could view to assess account keeping

**Maintenance and Management.** The entity responsible for the management of the improved water systems visited varied across the board. Of the communities with improved water systems, management entities included: water committee (n=2), local government of the community (n=1) and school committee (n=2). Local maintenance and repairs on the improved water system would be conducted by the same entity identified as the management entity. Funds to maintain and operate the improved water system would come from the school committee (n=2), local government (n=1), water committee (n=1) and other (not identified). We did not have data to assess maintenance, management and record keeping practices in La Naranja, Caracol and San Agustin since the school was closed the day of the visit.

#### **Sanitation**

**Availability.** All public institutions in the communities visited had improved sanitation facilities with the exception of the school in La Esperanza, where students were still using traditional latrines. Of the improved sanitation facilities, 78% were ventilated, improved latrines, 11% were urine diversion latrines (skyloos) and 11% were general improved latrines. All improved sanitation facilities were built within the last two years with the exception of those in La Naranja, which were constructed in 2005.

**Use and Habits.** Sixty seven percent of public institutions with improved sanitation facilities had unisex latrines, while 33% had separate latrines for male and females. Overall, each public institution tended to have two separate latrines, either both unisex, or one for males and one for females. Three out of eight public institutions had a sufficient number of latrines to meet government standards of number of latrines relative to number of users, while a full half of the institutions did not have sufficient numbers of latrines to meet minimum government standards for availability. All latrines that were observed presented evidence of being used, in functional condition, and good cleanliness. Only one latrine observed had urine/feces (La Naranja) on the walls/floor. Few sanitation facilities observed had sufficient access to handwashing stations. Eighty percent of sanitation facilities observed did not have water within three meters of the latrines; only one facility had water within three meters of the latrines. Similar findings were observed for access to cleansing agents: sixty percent did not have cleansing agents within three meters of the latrines, and thirty percent did have cleansing agents within three meters of the latrines. The monitoring team assess knowledge of users of the sanitation facilities in identifying the correct times in which they should wash their hands. In most cases, the team worked with a teacher at the school to call over a group of students to answer the question “When do you wash your hands”? Sixty percent of the public institutions surveyed had users who could correctly list the situations after which handwashing was important.

## IV. Conclusions, Observations and Recommendations

A key, overarching observation was the critical role that El Porvenir plays as a key partner in the success of Water for People's water and sanitation efforts in Nicaragua. El Porvenir is a trusted presence in all the communities visited by the monitoring team. Water for People must continue to build upon the innovative efforts and relationship with El Porvenir in their continued work in Nicaragua.

### **Water**

**Access and Availability.** In general, Water for People's improved water system projects in Nicaragua resulted in good access to clean water by community members. However, areas of improvement include improving access to water from improved water systems in communities where over half of the community is not able to access water from the water projects (See Table 4). These communities are (percentage in parentheses indicate % of community not accessing water from improved water system): San Felipe (100%), Bocal del Corazol (50%), Manchones (71%), Yacalwacito (100%) and Esperanza (100%). In San Felipe, no improved water system exists yet, although it was indicated that plans were in place to initiate an improved water system there in the near future. However, the reasons were unclear in the other communities as to why some community members/households were unable to access water from the improved water system.

**Technology.** In general, the rope pumps appear to be an excellent technological solution in the communities visited. The electric pump well observed in Monte Grande Lapita may not be an effective solution in Nicaragua, simply given the prevalence of electrical outages (often daily) that occur in most communities in Nicaragua. As a result, households surveyed in Monte Grande Lapita did indicate the inability to access water from this waterpoint everyday of the year.

**Operations, Maintenance and Management.** A key recommendation for Water for People's program in Nicaragua will be increase knowledge, awareness and training on the importance and need for a fee system and management program. Most improved waterpoints did not generally experience any major issues given how new most of these systems were (often constructed over the last two years). However, as these systems age, it will prove increasingly critical that funds are available to maintain, repair and replace components of the system. While it is a positive and promising sign that around half of the communities have established some sort of fee system and approximately 41% of the households surveyed did report paying some sort of fee, the implementation of management systems need to be expanded, particularly in the region of El Sauce where currently none of the communities surveyed had an established fee system. Training will also need to address good record keeping as none of the communities surveyed could produce any sort of financial record for the community water system.

**Water Quality and Source Water Protection.** There will need to be an alternative water source to service the waterpoint used by the health clinic in Salale. The nurse has indicated that this source is polluted, and the water can only be used for very limited applications. Given the critical role that a clean water source will play in community health in Salale,

helping the community to find a clean, alternative source should be a priority. This may speak to a larger potential need of working to identify source water pollution issues in the communities where waterpoints are established. Most waterpoints have been established within the last two years and communities did not identify water pollution concerns during the monitoring assessment. However, general awareness and practices to ensure long term protection of the community water sources will be critical to ensure the long term availability of clean drinking water. This will be important particularly in areas where there is the presence of shallow groundwater (found close to the surface). The need will be to ensure protection from pollutant sources such as latrines, agricultural practices (pesticides, nutrients) and livestock (nutrients, bacteria). As the monitoring team did not monitor water quality during this assessment, no data exists to discern whether contamination is currently an issue.

### **Sanitation**

**Access and Availability.** In general, household access to improved sanitation facilities was observed to be ubiquitous but in dire conditions. The superstructure of latrines over 12 years old are generally in fairly bad shape. This is due in part to focused international humanitarian efforts to provide sanitation facilities to communities after the devastation caused from Hurricane Mitch in 1998. In general, the presence of improved sanitation systems in communities visited exceed 90%. Households were actively using these facilities for their intended use, and keeping their facilities clean. Another reason for the excellent observed condition of household sanitation facilities can be attributed to two of El Porvenir's very innovative programs, the sticker incentive program, and their weekly radio program. El Porvenir pays random visits to households where they inspect the condition of the latrines; latrines kept in excellent condition during this visit will receive an El Porvenir sticker; households that receive three of these stickers will be awarded a prize. Additionally, El Porvenir hosts a weekly radio program in Wiwilli that discusses water and sanitation issues. Both of these efforts are critical to enhancing community awareness, knowledge, and practices.

A recommended area of improvement is to increase the presence of improved sanitation facilities at public institutions to ensure that the government minimum standard of latrines available per student is met. Over half of the public institutions surveyed did not have sufficient numbers of latrines to meet minimum government standards. In particular, the schools in the communities of Boca del Corazol, Salale and La Esperanza need additional improved latrines. Each of these schools has a total of two latrines, while the user population is over one hundred (Boca del Corazol, La Esperanza) and over six hundred in the case of the school in Salale.

**Handwashing.** At the household level, most households demonstrated relatively good sanitation practices, as most households had an established handwashing station (water and cleansing agent) in close proximity to the latrines. However, handwashing practices could be improved greatly at public institutions, as 80% of the observed sanitation facilities at public institutions did not even have water available within three meters of the latrines.