2015 Nicaragua Closeout Impact Report
A review of eight closed EWB-USA programs

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Acknowledgements

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Amayo
Bernardino Diaz Ochoa
El Coyol
El Papaturro
Jinotepe
La Conquista
La Prusia
Pueblo Nuevo

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### Acronyms

<table>
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<th>Acronym</th>
<th>Description</th>
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<tr>
<td>CIR</td>
<td>Closeout Impact Review</td>
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<tr>
<td>EWB-USA</td>
<td>Engineers Without Borders USA</td>
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<td>IA</td>
<td>Impact Analysis</td>
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<td>ICP</td>
<td>International Community Programs</td>
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<td>PMEL</td>
<td>Planning, Monitoring, Evaluation and Learning</td>
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<td>TAC</td>
<td>Technical Advisory Committee</td>
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<tr>
<td>ToC</td>
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Executive Summary

Closeout Impact Reviews (CIRs) provide a significant opportunity to learn about Engineers Without Borders USA’s (EWB-USA’s) impact in the lives of community partners. Information gathered through report reviews, field visits and interviews with stakeholders provide crucial feedback for EWB-USA to continue to improve the International Community Programs (ICP) project delivery model of community-driven development. The 2015 EWB-USA Nicaragua CIR was designed to assess changes over time in the lives of program partners and the extent to which EWB-USA has contributed to those changes through project implementations.

In September, 2015, seven team members, including four volunteers from EWB-USA membership, visited eight closed program sites in southern Nicaragua to assess 15 implemented projects. These projects were implemented between 2004 and 2014 by six different EWB-USA chapters. All six of the organization’s designated project types are represented in the sample of projects: water supply, sanitation, structures, civil works, energy and agriculture. Project sites with strong non-governmental organization (NGO) partners, municipal partners and no local partners were visited. Of the fifteen projects, two were considered technically non-functional as designed, one community-wide implementation of a solar system and one household-level point-of-use water filtration project. The technical status of the remaining projects ranged from moderately to completely functional as designed.

Beyond technical functionality, the CIR team also assessed the impact that the EWB-USA chapters have had in the communities through community meetings, focus groups and key informant interviews. The purpose of these methodologies is to encourage community members to describe what has changed in their lives as it relates to the implemented project and the extent to which the approach that EWB-USA took to develop the project with the community actually met their needs. The overarching change experienced by the majority of community partners interviewed was unanticipated. While EWB-USA does not typically include self-advocacy as a key focus of their program work, most of the partner communities which participated in this CIR experienced an increase in their capacity to advocate for their needs to their local government and NGOs after the EWB-USA team worked with them.

An example of the unanticipated impact EWB-USA chapters had on community self-advocacy is that the EWB-USA team might consider a latrine project a failure because the household no longer uses it, but the community members reported that the implementation of the first latrine contributed to their capacity to advocate to local authorities to provide sanitation services throughout the community. In the town of Amayo, 65 latrines were built in the years after the EWB-USA chapter left and the community members attributed securing that level of local engagement to what they learned from EWB-USA during the implementation of the initial 11 latrines.

Diverse perspectives were gained from the various stakeholders at each of the program site visits, but four main themes arose as key conclusions from this CIR: Community Capacity Building, Maximize Collaborative Partnerships, Maintenance Planning and Quality of Service.
Community Capacity Building: The CIR team found that the element of community capacity was the most important key to project sustainability; it was more significant than anything the EWB-USA chapter, the municipality or the local environment contributed to the project. Community capacity includes establishing financing mechanisms to fund maintenance, identifying roles and responsibilities of those who would oversee the projects and exhibiting the authority and technical knowledge to make decisions about the projects that would benefit the community. The problem with the approach of replicating a successful project to another community nearby is that it assumes the sustainability of the project relies on the technology. This CIR observed that the community’s capacity was the key factor to sustainability, not technology.

Maximize Collaborative Partnerships: From years of experience, EWB-USA has found that projects are most successful when there is a three-way partnership between the community, a local partner organization and EWB-USA. The CIR team learned a great deal about the significance of collaborative partnerships in successful community development programs. While EWB-USA requires a formal three-way partnership in all project development, it is equally important to recognize those additional stakeholders whose engagement, or lack thereof, will have an impact on the lasting change sought by the community.

Maintenance Planning: All of the communities with which EWB-USA partners are 100% responsible for the operations and maintenance of the implemented projects within the program. This policy requires that the EWB-USA chapter has provided any necessary technical training to keep the projects functional prior to closing out the program. It was clear in this CIR that long-term maintenance training was not always prioritized prior to program close-out, nor was it reinforced with printed resources in the local language and context to maximize comprehension by those tasked with maintenance responsibilities.

Quality of Service: EWB-USA’s fourth principle of development is quality. The organization has a well-established project process which is the basis of its quality control program. EWB-USA is committed to providing a high quality of service to its partners, beginning with confirmation of understanding the community’s goals and ending with ensuring that EWB-USA headquarters has all of the relevant program information required to study the impact of the chapter’s work well into the future. This CIR presented several opportunities to improve the quality through process improvements.

The CIR team developed actionable recommendations in each of the four conclusion themes discussed above. Detailed suggestions are outlined under each of the following recommendations at the end of this report:

- Improve EWB-USA assessment of community capacity in each phase of the project process.
- Strive to ensure collaborative partnerships with all stakeholders in the program.
- Provide effective and tested training on maintenance of the implemented projects within the program.
- Ensure a high quality of appropriate design and implementation.
- Provide professional-quality documentation of the projects from inception to close-out.
Introduction

EWB-USA began working in Nicaragua in 2004. Currently, there are 29 active programs throughout the country. With the opening of the organization’s first field office there, in-country staff provided the coordination and logistical support required to design a comprehensive CIR. Eight closed program sites in southern Nicaragua were included in the scope of this review, representing 40% of all closed Nicaraguan programs.

The purpose of this review was two-fold. First, the impact reviews serve to verify the information gathered and reported through chapter impact monitoring reports and also to analyze the extent to which the chapters and partners have influenced changes reported in those reports. Secondly, this was the first CIR conducted for EWB-USA. It provided a learning opportunity to test the approach to longer term impact assessment developed in the PMEL program. Above all, the principle aim of this CIR was to understand what type of impact EWB-USA chapters are having in the field, especially as it relates to long-term changes experienced by community partners. The intention was to identify areas for improvement to the International Community Programs (ICP) delivery model.

The CIR took place from mid-August to mid-October, 2015, with travel to Nicaragua occurring from September 1-10, 2015. The team spent the first full day in impact assessment training and six days conducting project site visits, with time in between for group meetings and report writing. A brief description of the projects reviewed is included below:

<table>
<thead>
<tr>
<th>Community</th>
<th>Project descriptions</th>
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<tbody>
<tr>
<td>Amayo</td>
<td>Latrine implementation, Potters for Peace point-of-use water filters</td>
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<tr>
<td>Bernardino Diaz Ochoa</td>
<td>Solar lighting, rainwater catchment systems and health clinic building</td>
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<tr>
<td>El Coyol</td>
<td>Solar lighting</td>
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<tr>
<td>El Papaturro</td>
<td>Solar lighting</td>
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<tr>
<td>Jinotepe</td>
<td>Water storage (drinking and irrigation), electrical system repair and roof repair</td>
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<tr>
<td>La Conquista</td>
<td>Pedestrian bridge</td>
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<tr>
<td>La Prusia</td>
<td>Roadway improvements</td>
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<tr>
<td>Pueblo Nuevo</td>
<td>Water distribution, health clinic building</td>
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The CIR team was comprised of EWB-USA staff and engaged volunteers from the EWB-USA professional membership. The volunteers were selected based on their roles within the organization and their level
of familiarity with the Planning, Monitoring, Evaluation and Learning (PMEL) philosophy and the Nicaraguan context. Volunteer team members included four women and three men, those who had experience in Nicaragua and those who did not, those who have served as PMEL Leads in their chapter and those who have not, members of the Board of Directors, Faculty Leadership Council, Application Review Committee, Technical Advisory Committee and who serve as Professional Mentors. None of the team members had any experience with the projects being reviewed as part of this CIR.
Approach, Purpose, Methodology and Limitations

Approach

EWB-USA plans to conduct a strategic number of Closeout Impact Reviews (CIRs) annually on a specified group of closed programs. They are designed to verify information gathered and reported through program impact monitoring reports by chapters. They also analyze the extent to which chapters and local partners have influenced changes observed at the community level. CIRs include 1) a review of selected program reports submitted by chapters as part of the EWB-USA project process and 2) field visits to the communities included in the scope of the review. Each CIR team is comprised of EWB-USA staff and a small group of trained volunteers.

Purpose

CIRs provide a significant opportunity to learn about EWB-USA’s impact in the lives of community partners. Information gathered through field visits and interviews with stakeholders provide crucial feedback for EWB-USA to continue to improve the International Community Programs (ICP) project delivery model of community-driven development. Specifically, the two main purposes of an impact review are:

1) Triangulation and verification of information gathered through chapter impact monitoring reports,

2) Exploration of the changes local partners and EWB-USA chapters have experienced as a result of the partnership in the community, and to what extent EWB-USA involvement influenced those changes.

Scope of this Closeout Impact Review

In 2015, EWB-USA’s first field office was opened in Nicaragua. This in-country presence provided key resources to coordinate the organization’s first CIR. Overall, there are 29 active EWB-USA programs in Nicaragua. The Impact Analysis Director and International Community Programs Manager reviewed closed program locations and project types to establish a feasible itinerary. Not all closed programs in Nicaragua were visited as part of this CIR.

The scope included closed program sites in the southern region of the country, totalling eight sites comprised of 15 different projects implemented by six different EWB-USA chapters. Despite the relatively small sample size of all of the organization’s closed programs, these community projects are representative of their work in the world. Each community visit was approximately three hours in length and included multiple methodologies for data collection. The team was able to review projects with the following diverse characteristics:

- All six project types were reviewed: water supply, sanitation, structures, civil works, energy and agriculture
- Community-level and household-level implementations were reviewed
- Project sites with strong NGO partners, municipal partners and no local partners were visited
- The completion date of the projects ranged from 2004 to 2014
The CIR also included extensive analysis of the program monitoring reports submitted by EWB-USA chapters related to each project. The CIR team reviewed the program context, program plan, relationships with partners and baseline information collected by chapters throughout their work with the communities.

**Dimensions of Change and Areas of Inquiry**

EWB-USA considers four Dimensions of Change in the organizational approach to impact assessment. This CIR focused on the following two in each community visited:

<table>
<thead>
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<th>Dimension of Change</th>
<th>Areas of Inquiry</th>
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| **Appropriateness and relevance of the community projects** | - Shifts in community capacity to:  
- source necessary materials locally  
- operate and maintain projects  
- sustain projects financially and technically  
- Shifts in levels of access to projects by all members of the community |
| **Changes recorded within the community** | - Changes in some or all of the following as appropriate:  
- Public Health  
- Environmental Health  
- Behavior  
- Access to Services  
- Technical Knowledge Related to Projects  
- Community Organization  
- Community Self-Advocacy |

The CIR team applied the following questions to each Dimension of Change, using the specific Areas of Inquiry as focal points to guide discussion:

1. What has actually changed, considering all relevant change experienced in the community: positive and negative, intended and unintended?
2. How have recorded changes affected the various stakeholders differently?
3. How significant are these changes to the different stakeholders?
4. To what extent are the recorded changes lasting?
5. How did EWB-USA’s program and project work contribute to the recorded changes?

**Methodologies**

An assortment of methods was used to collect information from stakeholders related to each project. At each site, the CIR team was divided into smaller groups to triangulate the information gathered through multiple techniques. Following is a brief description of the methodologies employed by the CIR team to gather stakeholder input. The team met at the end of each day to compare notes and ensure that a consistent understanding of the lessons from each site was documented.
Modified stories of change

Stories collected directly from project beneficiaries can powerfully demonstrate the impact of the work of EWB-USA and partner organizations. Stories of change are short descriptions of outcomes or impact, drawn from individual or collective experience. The beneficiary members of the partner community are the main target group for this tool. The CIR team employed this method through 1) interviews and note taking, 2) group discussions and 3) observations and informal discussions.

Community-wide meeting

At almost all sites, the CIR team was able to conduct an introductory community-wide meeting. This afforded the team the opportunity to clearly articulate the purpose of the visit and the goals of this impact review. Attendance ranged at each site from a few interested individuals to close to 100 people who were impacted by the project. This methodology allowed the team to observe general consensus of opinion where it existed among the groups within the community. It also helped to identify natural smaller groups to interview as focus groups.

Focus groups

Focus groups gather evidence from a small group of people, typically beneficiaries or other community members, through group discussion. Focus groups are very useful for enabling beneficiaries to tell their own story, and to speak openly and in detail about their experiences. The CIR team used focus group discussions at almost all sites. Focus groups usually stimulate rich responses that one might not get from individual interviews.

Individual interviews

In-depth interviews are used if there is a particular value in hearing individual experiences, especially if the aim is to explore motivations, attitudes, beliefs and/or perceived impact. Interviews allow for fuller exploration with an individual than is possible in focus groups. They also provide a private space for dialog. The CIR team used semi-structured interviews to guide the conversations towards the objectives of the impact review, but still allowed flexibility for unexpected information, nuances and opinions. At different sites, the team was able to conduct interviews with representatives from the mayor’s office, a community leader, key informants who used the project for work and technicians responsible for project maintenance.

Challenges and Limitations

As noted above, not all methodologies were used at each site. Key informants were not always available to participate in the impact review data collection, despite attempts to schedule their time in advance. Additionally, time spent at each site was limited by the availability of the community members. Not all stakeholders could be interviewed or participate in a focus group. The CIR team did not have enough members who were fluent in Spanish to assist in translation, limiting the number of smaller group or in-depth individual interviews that could be held at one time.
However, EWB-USA feels that the opinions and experiences shared with the CIR team at each site are generally representative of most of the population of each community. Communications at all sites provided sufficient information from a broad range of stakeholders.

Lastly, the findings in this report will be shared with the eight communities visited. If additional information is learned through that exercise, an appendix will be added to include additional viewpoints.

**Theory of Change**

EWB-USA’s Theory of Change (ToC) approach includes four key components.

- The acknowledgement that change does happen and the associated identification of that change in the field;
- A change pathway, or how the organization can influence the positive change they hope to see;
- A framework for assessing their impact on the planned or unplanned changes; and
- Learning from a reflection and putting that learning back into the ToC.

The change pathway describes how the organization’s efforts can lead to the Vision of Success. That vision is that *all members of partner communities enjoy an improved quality of life through being able to access, use and maintain technologies that are appropriate to their needs.* At each program site visited, the CIR team approached data and story collection with this vision in mind. Community members were encouraged to describe what has changed in their lives as it relates to the implemented project and the extent to which the approach that EWB-USA took to develop the project with the community met their needs.

The program-specific baseline situation in each community was unique, though commonalities did exist. The overarching goal in almost all communities was to identify a technology that would meet a community-specified need and would be affordable and appropriate for the community to sustain into the future. At the onset, each community relationship included a local partner, be it municipal or non-governmental, in addition to community leadership. Communities exhibited varying degrees of capacity to develop, implement and sustain the implemented projects when the chapters began their partnership. All of the implemented EWB-USA projects were intended to reach all members of the communities equally. A review of changes at each program site revealed varying degrees of success in achieving the community’s goals and in implementing sustainable projects.
Community Program Findings
(Detailed reports from each community are included in Appendix 5)

Amayo – program closed in 2011

Program status: The original program consisted of implementing 11 latrines (estimated complete in 2008) and 30 Potters for Peace water filters (estimated complete in 2007). It was reported that some of the initial latrines were destroyed by high winds, some survived and some destroyed latrines were rebuilt. The CIR team did observe three of the original latrines and their status ranged from unusable to being rebuilt and used by the community. Two of the original filters were observed and the community members reported that they still used them. It was not possible to locate all of the original implemented latrines and water filters. The implementing EWB-USA chapter also facilitated contacts with other NGOs and the mayor’s office, which resulted in 45 new latrines being built by the mayor’s office and 20 latrines by ADECO (a local NGO).

Actors and/or factors contributing to change:
Community of Amayo
EWB-USA chapter
Mayor’s office
ADECA

Description of change: The community members who were provided latrines through partnership with EWB-USA no longer use open defecation in the fields and river. In addition, the EWB-USA chapter’s contacts with other NGOs and the mayor’s office resulted in additional latrines and water wells. These changes decreased the amount of flies and contamination of the river, which was the community’s drinking and cooking water source. As a result of these changed behaviors, and the use of the water filters, the incident rate of diarrhea decreased. The latrine design did not allow for the latrines to be easily moved when the pit filled and the Potters for Peace water filters were only a stop-gap measure, however, they were appropriate and relevant to meeting the community’s water and sanitation needs. The community also reported that they gained the knowledge to rebuild the superstructure of the latrines from EWB-USA, which allowed them to rebuild them when they were damaged by winds.

Significance of change: The improvements in public health are very significant. The cases of diarrhea are reported to have decreased significantly and the community believes their general health has improved because of the latrines and clay pot filters provided by EWB-USA and others.

Change compared to expectations: The expectation was that the latrines and clay water filters would improve the health of the community, but the scale of implementation was limited by resources. The community prioritized where the facilities were installed to have the most significant impact in the health of the community.

It is not apparent that there was an expectation that the community would gain the capacity to advocate for themselves with the mayor’s office and other NGOs. However, this was a clear unexpected change that occurred after the EWB-USA chapter closed the program.
**Sustainability of changes:** The community members have cleaned, maintained, moved and replaced the latrines as needed. There is no indication that the community members would go back to open defecation. The community has also demonstrated their commitment to the sustainability of the changes within the community by forming a CAP (semi-governmental community organization) to help administer the access to water, water quality and sanitary situation within the community.

**Overall Summary and Analysis of Findings**

The Amayo community program of installing 11 latrines and providing 30 Potters for Peace clay filters has made a significant difference in the health of the Amayo community members, dramatically decreasing the incidents of diarrhea and improving the overall general health of the community. These changes were brought about by the elimination of open defecation and the ancillary vector borne diseases, and the ability of community members to cook and drink with clean water. While the changes in the health of the community were planned, the changes in the engagement of the mayor’s office and other NGOs significantly exceeded the expectations of the original project. The projects in this program can be categorized both appropriate and relevant and being sustained through community advocacy efforts to continually improve their clean water and sanitation situation.

**Bernardino Diaz Ochoa – program closed in 2012**

**Program status:** The projects examined include solar lighting at the church, rainwater catchment at the church, the health clinic building, and solar lighting at the health clinic (all projects estimated complete by 2007). The solar lighting at the church is not being used because grid electricity is being provided. The panels and charge controllers are present but unused (even as a backup) because the batteries are expired. The rainwater catchment system works, but is only sporadically used, as the tank is usually moved closer to the school to be filled with municipal water brought in a truck. The health clinic is there and being used regularly for health visits as well as community meetings, but it is in disrepair. The type of construction used for the clinic (straw bales) is unfamiliar to the community and is not maintained sufficiently. The solar lighting system at the clinic is in the same condition as that for the church.

**Actors and/or factors contributing to change:**
Community of Bernardino Diaz Ochoa
EWB-USA chapter
Mayor’s office
Electric utility

**Description of change:** The health clinic has meant access to regular medical care in the village for all residents, particularly children, pregnant women (although deliveries take place in a hospital), and very sick people. Prior to the implementation of the health clinic, the path to medical services was long and involved multiple modes of transportation. The Health Ministry sends a doctor once a month for general services, who also brings medicines to dispense. There is no charge for the services. A different organization comes about once a month to measure blood pressure, blood sugar, and heart conditions. They also bring medicines and provide their services at no charge. Sometimes there is also dental service. The clinic is also being used for some high school classes.
Initially, the solar and water systems were functional and useful. The solar system installed at the church allowed the community to be able to hold vigils in the evening and have music during the service. This was appropriate and relevant to the religious nature of the community and indicative of their priorities. The solar system has been obviated by the grid electricity. The rainwater catchment system is mostly not functioning simply because the community uses it to store trucked water from the municipality.

**Significance of change:** The construction of the clinic has provided a significant change in access to routine or preventative health care for all members of the community. The health-related improvements are particularly significant for children and pregnant women. Change in access to emergency care has been insignificant for everyone since the clinic does not serve emergencies. The change for the high school students who use the clinic for classes is moderately significant since there are other options available for meeting space if the clinic building were not accessible.

**Change compared to expectations:** The frequency of doctor visits to the community is as expected. The quality, longevity and need for maintenance of the clinic building do not meet the expectations of the community. The solar systems provided expected benefits, but replacing the batteries 5 times was not within the community’s expectations. Water filters were provided to the school early in the program and were a temporary contributor to improved health, but the community expected to know how to maintain and replace the filters when they no longer function and this was not included in the program.

**Sustainability of changes:** Any change related to the solar systems has been obviated by the introduction of grid electricity. The clinic building seems to be in disrepair, although the community is discussing what is needed to fix it and how to pay for it. They have the ability to pay for and effect small improvements. They seem to be able to fix and adapt water systems, so parts of the EWB-USA-implemented water system, having been repurposed, have new life as part of an alternative system. However, there is some growth of algae at the bottom of the tank, so maintenance is not happening as often as it should.

**Overall Summary and Analysis of Findings**

In general, the community has enjoyed improvements in public health. The drought has made the rainwater catchment system all but irrelevant, as the mayor’s office is trucking in clean water. The grid electricity has made the solar systems irrelevant. They might be repurposed, but as of now nothing is being done with them. There is no reason to believe that EWB-USA could have predicted either the drought or the arrival of grid electricity, however. The mayor’s office played a significant role in the changes by providing electricity to the town, and water during this recent drought. The community still says that EWB-USA helped put the community in a more recognized position with the mayor’s office.

**El Coyol – program closed in 2014**

**Program status:** Currently the solar panel (estimated complete in 2007), charge controller and battery are reportedly functional and the system has been maintained. However, when the community received grid electricity about a year ago, the system was moved by the community to serve a seminary that is
associated with the community’s priest. The CIR team did not go to the seminary to see the solar system in use at this new location, but the community representatives stated that the system is functional.

**Actors and/or factors contributing to change:**
Community of El Coyol
EWB-USA chapter

**Description of change:** Prior to EWB-USA involvement, no electricity was available in the community. The community met in the church and used candles, kerosene lamps and flashlights for illumination. While these means did provide some light, it was not sufficient for the community to read music or other written communications together. Kerosene lamps and candles also gave off by-products of combustion which the community breathed in. Flashlights also required non-reusable batteries as there was not power available to charge rechargeable batteries.

After installation of the solar system, the community was able to illuminate their meetings with compact fluorescent light bulbs (CFL). They were able to read music and have night time vigils as a result. The light generated by the solar system became a central point for community gatherings for church services and community meetings thereby bringing members of the community together, supporting the development of relationships and fostering camaraderie.

**Significance of change:** The community reports that the changes brought by the installation of the solar system were significant. It allowed them to use the building for church or other meetings and they typically did so for one hour on Thursday and Sunday nights as well as from 6 pm to 11 pm on Saturday. It was so significant that ten people from the community took turns sleeping overnight at the building to provide security for the solar system year round. In addition, the community was very glad that they no longer had to breathe the fumes from the kerosene lamps and candles.

**Change compared to expectations:** The community stated that they did not have any expectations for grid electricity being installed at the time of the program inception. In fact, they checked with the mayor’s office before embarking on the project with EWB-USA to confirm this fact. The solar system met their expectations in giving them light for night time gathering. They also understood and expected to pay for maintenance of the system, including maintaining and replacing the battery and established a system of special offerings at the church when they needed money to fund the maintenance.

Even though non-church members were not involved in the decision to install a solar system, there were no reported issues from these community members.

**Sustainability of changes:** The system ran for eight years until grid electricity came to the community. Their original battery lasted six years before needing replacement, which demonstrates a commitment to sustaining the system through regular maintenance. At that time, the community contributed C$3,500 to replace the battery. An individual within the community took on the job of maintaining the system and ten people within the community took turns sleeping at the building to prevent the theft of the system. The EWB-USA chapter left a maintenance manual that was in Spanish and trained the maintenance person on how to maintain the system. Once grid electricity came to the community, the
community and the priest agreed to move the solar system to a nearby seminary. The community reports that the solar system is still operating there.

**Overall Summary and Analysis of Findings**

The community of El Coyol was able to hold meetings and vigils in the evening as a result of getting a solar system. The seminary that received the solar system once grid electricity came to El Coyol also benefits from having better light; however the extent of the benefit was not assessed during this impact review. By installing the system and providing maintenance instructions in Spanish and instruction to the maintenance person, the EWB-USA chapter implemented a system that lasted eight years, only requiring the battery to be replaced once. While the changes expected were limited to the community, the undocumented changes that are likely occurring at the seminary were not expected. The community of El Coyol would like to work with EWB-USA on additional projects, and mentioned a priority for them would be a water project. They are in contact with EWB-USA Nicaragua staff to submit an application.

**El Papaturro – program closed in 2014**

**Program status:** This solar system project is no longer functioning for two reasons: theft of components (enabled by lack of security of the building) and arrival of grid electricity. It was installed in 2008 to provide lights and a radio in the church and lights in the school. Thefts began three months after installation, but the community replaced essential parts and the system functioned for lighting until grid electricity arrived in December 2014. Until the spring of 2015 when the last battery died, the system was used to recharge cell phones. Juana Solis, the community’s political director, now has the panel, controller and any other components in her house for safe-keeping. The grid electricity in the church and most of the school is no longer functioning either, due to theft of the wiring, bulbs and switches.

**Actors and/or factors contributing to change:**
EWB-USA chapter
Local contacts and advocates: Miguel Gonzalez and Deepa (last name unknown) from San Juan del Sur
Catholic priest
Municipality of San Juan del Sur

**Description of change:** Church members and the priest were able to forego candles and lanterns for safer, brighter lighting. They were able to have more church gatherings at night, and more people came to services (according to Sra. Solis, some came just to experience the electric lights). Solar power allowed the school to have celebrations and other meetings after sunset. The change especially impacted students and their families, people involved in community events and church attendees. At first, the community was very excited about the solar system. They assigned people to guard the installation. After the theft of one battery three months following installation, community members began to lose their enthusiasm for protecting the project. However, they did continue to collect funds needed to replace stolen parts and buy new batteries, which cost approximately $150 each.

Despite these successes, the solar system was not an appropriate technology for any of the stakeholders in this community given the high level of theft and their inability to take steps to ensure its safety. Given
the short amount of time spent in the community by the EWB-USA chapter, it would have been very difficult to know this at time of installation. It is notable that an almost identical system installed at the same time in a community fewer than five miles away had a completely different outcome.

**Significance of change:** Initially, change was very significant for the priest and church members. They were able to have celebrations and they had a radio for the children. We infer that the teacher finds the change to be very significant, since she has been able to prevent theft of the grid system in one room of the school. The daytime use of the school did not require lighting, so the change for school children and their families over the life of the project is unclear. It is worth noting that we were told that attendance at the impact review community meeting was very small because people were ashamed of what had happened to the solar and grid system. It was impossible for us to gauge the overall significance of the project during the time it was operating. At this time, it has no practical significance, but it may be serving as a caution to the community that they need to mobilize in order halt the thefts.

**Change compared to expectations:** The changes upon initial installation of the solar system were as expected at both the church and the school. The community had lighting for important events. The change in access to services continued even after installation of grid electricity, since the community used solar power to charge cell phones. The community did not plan for or expect the increased frequency of battery replacement. The fact the community members guarded the system in its first months indicates that the community expected there to be issues with theft. The community never had an expectation that there would be municipal power.

**Sustainability of changes:** It is important to acknowledge the community’s ability to sustain the system for almost six years in very difficult conditions. Money was collected for two new batteries and replacements were done correctly. Based on information from Sra. Solis and the lack of documentation in the 527 Closeout Report, sustainability of the system was compromised by insufficient attention of the chapter to maintenance routines and a lack of maintenance instructions. However, despite the efforts described above, we did not observe the will or resources to make this a sustainable project.

**Overall Summary and Analysis of Findings**

For six years, this project resulted in significant changes in access to services in a very poor community, particularly for its church members and schoolchildren. The significance of changes declined over time, as thefts increased operating costs and sapped community enthusiasm to maintain the changes. EWB-USA contributed essential technical skills and financing for this project, but failed to evaluate community capacity ahead of installation and did not provide sufficient guidance or maintenance training. The initial assumptions supporting "quick hit" implementations of replicated technology were invalid.

**Jinotepe Hogar de Ancianos – program closed in 2007**

**Program status:** This program included a reserve water system, roof repairs and electrical system repair and upgrade (estimated complete in 2006). The roof and electrical system work have since been supplanted by an expansion of the facility and are no longer a structural component of the Hogar. As of September 2015, the oldest 2,500 gallon tank and tower is not functioning. It is severely corroded and in
danger of collapse, and is a threat to the integrity of the rest of the system. In addition, the float valve has been replaced four times and is broken again, and there are a few small leaks in the piping. Despite these problems, the Hogar considers the project to have been a critical success factor in its current capacity to provide services to residents and neighbors.

**Actors and/or factors contributing to change:**
Hogar Board of Directors
Jesse Richardson (JFR) Foundation (NGO)
Hogar staff
EWB-USA chapter
Local companies and individuals
Visiting medical brigades

**Description of change:** Staff and management were very clear that without the electrical repairs, roof stabilization and water security, the facility was unsafe and would have been closed. Access to water provides improved health through better hygiene practices for the residents and increased services to the neighborhood residents. The management of the Hogar can fulfill its mission due to the reliable water supply. The simple, gravity-fed technology used here is appropriate to the situation and skills available at the Hogar and highly relevant to its needs. It is also apparent that the success of the project resulted in more self-advocacy on the part of the Hogar in planning for the future. One staff person commented that the Hogar feels more connected to the neighboring community, an outgrowth of their expansion into outpatient services.

**Significance of change:** For management, residents, and staff, changes in public health and access to services due to the project are very significant. For example, the manager of the facility stated that the Hogar would not exist now if it were not for the water supply project. The head of the pharmacy said that the EWB-USA water supply project contributed 100 percent to the forward-thinking changes that the Hogar is now experiencing. The change in technical knowledge for the nurse in charge of maintenance is very significant: he has learned new skills and is knowledgeable about how to keep the system running, even without sufficient funds for the major repairs needed. For the management and JFR Foundation, change in this area is moderately significant. They may now be better able to imagine technical improvements. However, they do not seem aware of the specific threats to the viability of the Hogar from a deteriorating water system, and have not begun funding the significant repairs needed.

**Change compared to expectations:** Staff members were clear that the inadequate water supply, unsafe roof, unsafe electrical system and overcrowding problems had threatened the existence of the facility and that they considered the project a great success in avoiding a closure. The Hogar management expected and planned to be able to maintain the projects. However, there is no evidence that EWB-USA provided a written maintenance plan, estimated budget, or instructions on repairing the float valve.

**Sustainability of changes:** From 2007 until now, the project has been sustained. Staff was able to do maintenance and repair work, and materials and maintenance supplies are available locally. Minimal repairs have been carried out competently. The float valve has been replaced four times; it has been
removed and staff now relies on visual sighting to determine when to deactivate tank filling. Materials and expertise are available locally for plumbing repairs or repairs to the towers that are beyond the capacity of Hogar staff. Looking forward, however, this success will not be sustainable without additional financial resources and attention to preventive maintenance and major repairs to prevent the system from failing.

Overall Summary and Analysis of Findings

This program resulted in very significant changes in public health and access to services for its residents, caregivers and neighbors. For the management, Board of Directors and supporting NGO, it set the stage for a successful expansion and a larger presence in the community. The technical skills and financial contributions of EWB-USA played a critical role in these changes. Although the energy and confidence generated by the program’s success to date is heartening, the lack of financial resources and planning for maintenance and repair of the water system is a threat to its long term sustainability.

La Conquista – project completed in 2014

Program status: The pedestrian bridge project within this program is fully functional and provides a reliable and safe river crossing for pedestrians, motorcycles and horses at all times of the year.

Actors and/or factors contributing to change:
Communities of Santa Elena, El Nance and El Panama
Municipality of La Conquista
EWB-USA chapter
Bridges to Prosperity
Nica Impact
The Ministerio Peniel

Description of change: During the rainy season, when the river waters ran at high velocity and elevation, crossing the river was dangerous and sometimes impossible. People described crossing the river using ropes or fallen trees which, on a few occasions, resulted in injury or death. Access to health care, schools and other economic opportunities were inhibited. All stakeholders, including the women, men, school children and elderly of the communities of La Conquista, Santa Elena, El Nance and El Panama, as well as La Conquista Municipality employees have experienced improved access to goods, services and health care facilities. The residents spoke of an increased peace of mind, knowing their loved ones were not in danger and the municipality noted improvement in communication and their ability to provide services to those communities on the far side of the river crossing.

Changes were also experienced by the young men living the Ministerio Peniel who volunteered their time and labor to complete construction of the bridge. These men were provided the opportunity to perform constructive work that benefited the local community, develop a sense of responsibility and perhaps gain a few vocational skills they will be able to use in the future.
**Significance of change:** The change due to the bridge one year after completion is very significant for all individuals and stakeholder groups that must cross the Las Trancas River at the location of the new bridge.

**Change compared to expectations:** It is clear that all groups expected the construction of a pedestrian bridge that would provide safe, reliable crossing of the river at all times of the year. At the time of this impact review, it appears the changes experienced by the stakeholders are as planned and expected.

**Sustainability of changes:** The rains experienced since completion of the bridge have been very low in comparison with the years previous to the bridge construction, so required use of the bridge has been less than expected. Lower than average stream flow and minimal bridge use has resulted in very little wear and tear on the bridge. While the community has demonstrated their ability to paint the steel and make minor repairs to damaged fencing, major repairs have not been needed and it is unknown whether the community has the capacity to finance or source all types of materials and labor needed for repair or maintenance. Focus group discussions did indicate that community residents did understand the maintenance requirements and how to get it done, though not where to get the cable.

**Overall Summary and Analysis of Findings**

This program resulted in very significant changes in safe and reliable access to health, school and market services for residents in affected communities. For the municipality, it provided greater opportunities to service the constituent communities. The mayor indicated that knowledgeable people in the municipality can perform minor repairs, but that replication of the project would not be possible in other areas where a similar bridge is needed because they do not know where to get the bridge cable. Assuming the bridge components have a long life span and proper maintenance and repair occurs, the changes experienced by the stakeholders will likely be very lasting.

**La Prusia — program closed in 2015**

**Program status:** Repair the Path of La Prusia, a stabilization paving project at one intersection along the main road (estimated complete in 2010), is functioning as designed and is keeping that particular area of the roadway passable for all modes of transportation during and after heavy rain events. There are other portions of the roadway, outside of the project scope, that still experience damage and cause transportation disruptions.

**Actors and/or factors contributing to change:**
Community of La Prusia
Casas de La Esperanza
EWB-USA chapter
Municipal Department of Public Works
The Department and Director of Public Works in the municipality of Granada
Moto-taxi drivers
Description of change: Prior to construction, the rainwater runoff from the side road would flow down into the intersection where flooding would occur and erosion would cause wide channels to develop. The flooding and severe erosion made the roadway impassable for pedestrians, bicycles, motorcycles, moto-taxis and vehicles. Children would sometimes miss school and ill individuals would need to be carried to locations accessible by taxi. Moto-taxi drivers reported that they would experience a loss of approximately 300 cordobas per day that the road was not in service. If the damage was minor, repairs would be made by the community – pitching in on labor and materials. If damage was severe, the community was forced to wait many days until the municipality could come with heavy machinery to do the repair. The municipality expected the community to pay for the fuel to operate the equipment.

The final project consisted of “paving” the intersection with mortared cobblestone and ensuring the roadway’s cross-slope directed the flow of water into the adjacent river. In the few years since construction was completed, this particular intersection has not yet eroded and has been a safe, reliable traverse point. Moto-taxi drivers have reported feeling safer crossing this intersection, even when flooded, knowing that the roadway below is paved. The flooding that does occasionally occur is still dangerous to cross for pedestrians, but typically lasts for shorter durations. The raised curbs, built to direct the flow of water, have provided residents seating while waiting for public transportation. In addition, the children are able to use the area to play games. Unfortunately, erosion and flooding problems still exist along the main road and cause transportation disruptions. However, it was noted by the community leaders that damage in other areas have minimized since roadway runoff at this particular intersection is now directed into the river instead of further down the roadway.

The initial NGO partner is no longer able to support the community, necessitating a search for a new NGO partnership. Additionally, the community is in the process of applying to EWB-USA for a new water project. Both of these efforts demonstrate an improvement in organization and self-advocacy.

Significance of change: The changes in access to services and behavior experienced by the community due to the intersection improvements have been only moderately significant due to the fact that other portions of their main road and side roads still experience damage that causes transportation disruptions. Community self-advocacy and organization seems to have changed significantly as is seen in the leadership’s efforts towards collecting funds from the residents, seeking partnership with a new local NGO and applying for a new project with EWB-USA.

Change compared to expectations: The community stated an expectation that the cobblestone pavement would extend further up the side road, but they also understand that EWB-USA budget constraints prevented this from happening. The community expected the implementation to come sooner than the time it took construction to begin after the initial assessment trip. They also expressed an understanding that damage to the main roadway would still occur in locations beyond the site of the project improvements and that they would be responsible for repairs since the municipality is generally unresponsive in that regard.

Sustainability of changes: Should future repairs be needed, the community leadership has stated that they have established a fund for materials and that they have the skills needed to perform the necessary
repairs. Community members contribute to this fund per their financial ability. The community has noted that there is currently around $2000 in this fund. To the extent that this fund is managed effectively, the changes brought on by the project should be lasting.

**Overall Summary and Analysis of Findings**

This program resulted in moderately significant changes in safe and reliable access to health, school and market services for residents in La Prusia. The municipal involvement in the project was minimal, but impactful as they made the decision on the final location. The community has the knowledge to extend the paving up the side road, which would significantly improve the erosion and flooding problems at this intersection. Residents expressed an interest in continuing the partnership with EWB-USA and are in contact with EWB-USA Nicaragua staff to submit an application.

**Pueblo Nuevo – program closed in 2012**

*Program status:* When there is enough rain, about 150 out of 350 people in the community are now getting water from a hand-dug well, which is pumped up into a storage tank (estimated complete in 2010). The water is not chlorinated, as the original intent was to use it to feed the bio-sand filters provided by the Newton-SJdS Sister City Program. It is distributed to three different districts, using rationing methods if necessary. When the doctors and/or nurses are visiting, the clinic (estimated complete in 2012) is a place where medical consults can be conducted with privacy. Unfortunately, this is only happening about once every other month.

*Actors and/or factors contributing to change:*
Community of Pueblo Nuevo  
Water and Health committees  
EWB-USA chapter  
Mayor’s office  
Newton-SJdS Sister City Program

*Description of change:* For the 150 being served by the water distribution system, they now have access to relatively clean water, essentially unrestricted during times of plenty and rationed when necessary. The women no longer have to carry water 5-6 times a day from the river, with the associated detrimental effects to time budget and health. The men who previously carried water can spend more of their time tending to crops. Children who used to help carry water in the morning could be late for school, so the rate of tardiness has decreased. The EWB-USA chapter helped the community form the water committee, which also resulted in the formation of the three distinct districts. The community feels that they are more efficient as a result, and more organized with respect to responding to water-related issues, such as collecting fees to pay for maintenance items related to the water system.

The entire community can make use of the clinic as a meeting space and, on the occasions when doctors visit the community, it can be used for private medical consults. Even if minimally used, the community has developed a sense of pride for having a health clinic. The water catchment system at the clinic is working, though some maintenance is not happening, particularly cleaning the first flush. They also feel
more empowered to present their case for more medical visits to the Ministry of Health, although this advocacy does not seem to be getting many results.

**Significance of change:** The change in community organization seems very significant. The significance of the clinic building is not clear because it only rarely gets used for its stated purpose, as a health clinic. When doctor visits occur, they are better than before the clinic was built because of the additional privacy that it affords. The changes in access to water are very significant for the community.

**Change compared to expectations:** The improvements in water access and community space were expected. The community seemed to be expecting more visits from doctors and this seems not to be happening. The increase in community organization or efficiency was not articulated at the outset as an expectation, and hence has emerged as an unexpected positive benefit.

**Sustainability of changes:** The change in community organization is likely sustainable, so long as there is some functioning water system that needs to be rationed. The water system itself is in danger of becoming both financially and technically unsustainable. The potential withdrawal of support from the mayor’s office, coupled with the difficulties the community would have raising their own funds if the drought continues, threaten the system’s sustainability. The technical sustainability is related primarily to the drought – if there is no water, then the system does not work and systems that are not used tend to fall into disrepair and get abandoned. The clinic is holding up well and is being maintained.

**Overall Summary and Analysis of Findings**

Projects implemented through this program have been sustained by the community, or by their advocacy to the mayor’s office. There seems to be a strong commitment on the part of the water and health committees to continue to maintain and operate the water system and clinic. It is unclear how feasible this will be without continued assistance from the mayor’s office and the Ministry of Health in the form of health professional visits, but the technical knowledge to maintain the facilities exists within the community.
Conclusions and Recommendations

At EWB-USA, successful development projects are those which meet the community’s expressed needs in a lasting way. This review of fifteen projects in eight closed programs demonstrates the nuances of the term “successful.” Many of the projects reviewed are still technically functional and being maintained by the community years after implementation, albeit in somewhat compromised conditions. The two projects reported as non-functional were a solar system that was prone to theft and disassembled and stored by the community leader, and household water filters, some of which are still in use but in different locations. Few of the remaining projects are in the same condition they were in when first implemented, but they have been maintained and the communities do feel responsibility for them. Some have been repurposed to meet a new need in the community, while others have simply been repaired a number of times due to anticipated degradation from use.

A consistent, but unanticipated, change observed by the CIR team was the impact that EWB-USA’s involvement in the projects had on community self-advocacy with local government and NGOs to continue to address their needs after EWB-USA closed their role in the partnership. Many community members reported that prior to EWB-USA’s participation in the project, local partners were nonresponsive to the community’s requests for assistance. The CIR team repeatedly heard stories of positive change that EWB-USA had contributed to by implementing projects that attracted the attention of local actors. While this has not historically been a focus of EWB-USA’s work, it is the type of unanticipated change that impact reviews aim to uncover so that the organization can learn about the broad reach of project implementation.

Each community presented a unique case for review which varied widely in project type, number of community members engaged, level of partnership with local government and capacity of the leadership to continue to advocate for change in their community. At the conclusion of the CIR, the team reviewed all community findings from each site and notes from each team member in order to identify commonalities that could lead to actionable recommendations for EWB-USA’s ICP delivery model. The team used the following research questions as guidance in their review of the findings:

1. To what extent are ICP programs achieving and influencing planned changes?
2. Where is the ICP model failing to influence the communities’ planned changes; and why?
3. Are there any general negative and or unexpected changes that have resulted from implementation of the program model? If so what are they and why did they happen?
4. Overall, how would you describe EWB-USA’s contribution to these unexpected changes?
5. What can the program and EWB-USA learn from these findings and analysis?
6. How should the international community program model adapt?

Diverse perspectives were gained from the program site visits, but four main themes arose as key conclusions from this CIR: Community Capacity Building, Maximize Collaborative Partnerships, Maintenance Planning and Quality of Service. These themes are described below with accompanying recommendations for EWB-USA. The organization is conducting a review of the recommendations and
intends to develop an action plan to address those which will provide the most strategic improvements to the ICP project delivery model.

**Community Capacity Building**

The CIR team found that the element of community capacity was the most important key to project sustainability more than anything the EWB-USA chapter, the municipality or the local environment contributed to the project. Community capacity includes establishing financing mechanisms to fund maintenance, identifying roles and responsibilities of those who would oversee the projects and exhibiting the authority and technical knowledge to make decisions about the projects that would benefit the community. Where the community demonstrated that they have the capacity to organize and advocate for themselves, the projects were being maintained, financed and improved upon over time. In some cases, the community leadership decided to repurpose the project components for a new need within the community. This is considered a success because the overarching goal for EWB-USA is to respond directly to the needs of the community partners. When those needs change, the community should have the capacity to revisit the project and make it work for them rather than let it deteriorate as a failed attempt at development. If the community does not take action on a project that is no longer meeting their needs because they are waiting to hear what EWB-USA wants them to do with it, that is considered a failure. EWB-USA community partners own the implemented projects and must have the capacity to make autonomous decisions about their use into the future.

**CIR team recommendation**

*Improve EWB-USA assessment of community capacity in each phase of the project process.*

- Increase the number and role of in-country staff to facilitate a better initial community capacity assessment prior to approval of the program
- Modify New Program Application to allow communities to better demonstrate their capacity
- Improve pre-assessment trip guidance to emphasize community capacity assessment
- Encourage the inclusion of informal leaders when chapters meet with community members to assess capacity, e.g. local religious leaders, business people and entrepreneurs
- Require evidence that the community has the capacity to own and operate the system prior to approval to implement
- Provide additional resources to assist chapters in community capacity assessment prior to program close-out

**Maximize Collaborative Partnerships**

From years of experience, EWB-USA has found that projects are most successful when there is a three-way partnership between the community, a local partner organization and EWB-USA. Each partner has specific skills and expertise which contribute to a more sustainable project over the long-term. The program site visits on this CIR afforded the team to review a variety of partnership levels between stakeholders. In most cases, the community leadership and a locally-based NGO were effective partners
with the EWB-USA chapter to propel the projects forward to implementation. The involvement of a local municipality ranged from nonexistent to key decision-maker, with associated positive results on lasting change where the municipality was more involved. Unexpected stakeholders also served in key partnerships which had an impact on the sustainability of the project. Alternatively, some community members were not engaged at all with the project implemented in their town. The CIR team learned a great deal about the significance of collaborative partnerships in successful community development programs. While EWB-USA requires a formal three-way partnership in all project development, it is equally important to recognize those additional stakeholders whose engagement, or lack thereof, will have an impact on the lasting change sought by the community.

**CIR team recommendation**

*Strive to ensure collaborative partnerships with all stakeholders in the program.*

- Provide additional emphasis for chapters to engage local municipalities in programs
- Encourage involvement of all local community organizations in project development, even if their focus seems unrelated to the project
- Involve all residents in project development to ensure that diverse perspectives are accounted for in project planning
- Guide chapters to meet with many types of community leaders, beyond those required by the formal agreements, e.g. religious leaders, school or health clinic leadership
- Increase efforts to facilitate community advocacy where it is learned that projects without local governmental support will fail to meet the community’s needs in the long term
- Direct chapters to speak openly and honestly with communities about the possibility of the local partner leaving and what that could mean for the project; who they would turn to for support
- Do not approve project replication in a community without established partnerships

**Maintenance Planning**

All of the communities with which EWB-USA partners are 100% responsible for the operations and maintenance of the implemented projects within the program. This policy requires that the EWB-USA chapter has provided any necessary technical training to keep the projects functional prior to closing out the program. Visiting program sites years after the completion of implemented projects yielded valuable opportunities to learn about how well-prepared community partners are to assume responsibility for maintenance and operations of their projects. The CIR team did not observe hard copies of maintenance manuals in the communities, though some mentioned receiving them from the chapter initially. Most interviewees referenced a verbal training done with the chapter, but some reported no maintenance training at all. Presumably, most of the EWB-USA chapters include a discussion with their community partners about required maintenance on the projects. However, it seems clear that this discussion was not always prioritized prior to program close-out, nor was it reinforced with printed resources in the local context to maximize comprehension by those tasked with maintenance responsibilities.
CIR team recommendation

Provide effective and tested training on maintenance of the implemented projects within the program.

- Request that the communities provide examples of performing maintenance on similar projects in the past during the New Program Application phase
- Chapters must disclose to the community all maintenance requirements associated with all alternatives studied prior to the community selecting the alternative
- Provide guidance for chapters on planning for maintenance prior to implementation
- Professional mentors and faculty advisors should prioritize and contribute substantially to the development of comprehensive maintenance plans, based on their experience
- Require a discussion of testing procedures for functionality to be included in the implementation presentation
- Assign Standing Content Committees to develop standard maintenance plans for each project type, requiring the chapter to modify it for their project and append it to the post-implementation report
- Provide guidance to chapters on how to ensure community comprehension on operations and maintenance

Quality of Service

EWB-USA’s fourth principle of development is quality. The organization has a well-established project process which is the basis of its quality control program. This consists of a) regular reporting, b) review by an EWB-USA PE, c) review of all planned implementation activities by a technical advisory committee and d) confirmation from the partner community that they have the capacity to operate and maintain the project. This project process has evolved since 2002 and the variation in the quality of implemented projects reviewed as part of this CIR demonstrated the importance of some of the improvements in the process. The quality of EWB-USA chapter work is not only assessed in the implementation of a project, but also in the development of construction documents and reporting on the impact the project is having in the community. EWB-USA is committed to providing a high quality of service to its partners, beginning with confirmation of understanding the community’s goals and ending with ensuring that EWB-USA headquarters has all of the relevant program information to study the impact of the chapter’s work well into the future.

CIR team recommendations

Ensure a high quality of appropriate design and implementation.

- Ensure that chapters involve local craftsmen and skilled laborers from the local community/region from project design through implementation
- Chapters should meet with local experts who have installed similar systems
- Require mock-up/practice builds for implementation approval
• Develop a checklist for review to provide consistency in review between EWB-USA PEs and Technical Advisory Committees
• Provide pictures and evidence of technical issues to all Technical Advisory Committees to share learning from the field

*Provide professional-quality documentation of the projects from inception to close-out.*

• Provide more opportunity for the community explain their intended dimension of change in the New Program Application
• Establish community expectations in early program documentation
• Guide chapters to document the project for an unknown audience more than five years after implementation
• Improve close-out process for future reviews and organizational learning, including:
  o names and positions of community partners knowledgeable about the projects
  o a statement of expectations from the community about maintenance and operations
  o a list of relationships the community intends to maintain to sustain the projects
Lessons for Future Impact Reviews

The principle aim of this CIR was to understand what type of impact EWB-USA chapters are having in the field, especially as it relates to long-term changes experienced by community partners. As the first CIR that EWB-USA had undertaken, it provided a learning opportunity to test the approach to longer term impact assessment in order to ensure that the methodologies are appropriate for use in measuring the ICP delivery model. Following is a summary of lessons learned that will be put into action on future CIRs.

Maximize advance team preparation

Provide sufficient project documentation to allow for a full review of the initial situation in the community, program baseline goals and community expectations, issues that came up during project development and anything of note during and after implementation. Note where this does not exist in archived records. Reports provided for this review were the initial and final community reports. Clarity could have been gained with some interim project development reports as well.

Additional information gained by the in-country staff pre-trip community visits is very beneficial in preparing the community as well as the CIR team for what to expect at the site.

Conduct pre-trip conference calls to introduce team members to each other. Prior to this call, send individual photos and backgrounds to the team to familiarize members with each other.

Develop project review task leads

Assign each person on the CIR team the responsibility for select projects before they travel so that they can be intimately familiar with that project and be the subject matter expert on the project for the rest of the team. This same person would then also be the lead in conducting a debrief at the end of the day of the visit to that site and preparing the final community findings report for those same projects. Other team members would be expected to complete basic reading on all of the projects, but the lead would be responsible for identifying who the key informants were for the interviews, how to divide up the CIR team in the community and what information was essential to complete the review. It would also be useful to identify team tasks and assign those to people, i.e. photographer, technical data collection, etc.

Daily debrief sessions

Include time at the end of the day to review projects seen that day to share immediate thoughts and things not captured in notes. These group meetings should include the in-country staff as well in order to gain their perspective as key contacts with community partners. Plan for time each day to complete the community findings reports for each project reviewed while the information is still fresh in mind.

Include dedicated technical review

It would be beneficial for EWB-USA PE and TAC reviewers if the CIR included a more detailed technical review of the project functionality as well. This could include examination of materials, construction
techniques and/or technical reasons for lack of functionality. If we are not learning enough about the impact on the communities in which we are working, our efforts will not be appropriate or sustainable. Conversely, it will not matter how well we know our partners if we do not build high quality and durable engineering systems. Technical review of past projects should be included in an impact study.
List of Appendices

Appendix 1 – Terms of Reference for Impact Review
Appendix 2 – Impact Review itinerary
Appendix 3 – Projects map
Appendix 4 – List of secondary data reviewed
Appendix 5 – Detailed Field Notes – All Communities
Appendix 1: Impact Reviews Terms of Reference

ENGINEERS WITHOUT BORDERS-USA IMPACT REVIEWS
Terms of reference

1.0 INTRODUCTION

Since 2013, EWB-USA has been making a concerted effort to assess the impact of our programs. To this end, and also to link EWB-USA’s planning efforts to our assessment of impact more explicitly, the organization has developed a Theory of Change and organizational change pathway which will, in time, inform all program development efforts. The change pathway also forms our overall impact assessment framework.

EWB-USA believes that impact assessment is essential both for accountability to our donors and to our partner communities on the ground, as well as for organizational learning. We are constantly striving to understand how we can improve our programs and projects and to better meet the goals of the people we serve.

Strategies for assessing impact within the organization are emerging and being tested, but currently there are three complementary strategies (all of which are described in more detail in the EWB-USA Planning, Monitoring, Evaluation and Learning (PMEL) Program Description, which is available on our website: www.ewb-usa.org).

- **Impact Monitoring** processes are built into the program planning and evaluation reports (the 900 series). These are carried out by chapter members with review from EWB-USA Headquarters (HQ) Project Management (PM) staff. They are completed after each community site visit that the chapter makes, regardless of the scope of that trip, i.e. assessment or implementation. Information gathered and analyzed in these processes focusses on expected medium and long term changes at the community level and on the extent to which our efforts have contributed to these changes. In addition, they explore unexpected and unintended changes that have been brought about by specific interventions.

- **Impact Reviews** take place on an annual basis. They are designed to check and verify information gathered and reported through impact monitoring, but they go a step further and analyze the extent to which chapters and partners have influenced changes recorded in impact monitoring reports and other changes observed at the community level. There are two types of impact reviews in our PMEL Program. The first type is an Interim Impact Review. These will be carried out by EWB-USA HQ staff and include review of the reports that chapters submit while the program is still active. The second type is a Closeout Impact Review. These will be conducted by EWB-USA HQ staff and a group of trained volunteers after the chapter has closed out their involvement in the program. These Closeout Impact Reviews will include field visits and rely on the development of in-country staff programs to be conducted.

- **Impact Assessments** build on both of these processes. They are designed to take place a minimum of five years after the completion of a program and to interrogate and
reflect upon our whole impact pathway with the intent of being able to refresh our Theory of Change. This exercise will be carried out intermittently and will be conducted by an external consultant evaluator. Completion of impact assessments will require funding outside of our typical operating budget.

2.0 ORGANIZATIONAL CONTEXT

Our Mission is to support community-driven development programs worldwide by collaborating with local partners to design and implement sustainable engineering projects while creating transformative experiences and responsible leaders.

Our organizational Vision is a world in which the communities we serve have the capacity to sustainably meet their basic human needs, and that our members have enriched global perspectives through the innovative professional educational opportunities that the EWB-USA program provides.

EWB-USA is currently working on 389 community-driven development programs in 47 countries around the world. Our HQ staff administers the work of over 300 active chapters comprised of over 13,800 members participating in our mission and vision. Collectively, we are driven by our organizational Principles of Development to meet the expressed needs of our community partners.

1. All EWB-USA projects are engineering related.
2. All EWB-USA programs are community based.
3. EWB-USA chapters develop a partnership with a community that lasts at least five years.
4. EWB-USA chapters are required to comply with the established project process to ensure high quality.
5. EWB-USA chapters shall hold paramount the health, safety and welfare of the public in all aspects of their work.
6. EWB-USA chapters shall perform services only in their areas of expertise.
7. EWB-USA chapters partner with communities to implement proven technologies that are appropriate for the community.
8. EWB-USA chapters partner with communities to implement infrastructure technologies that are sustainable by the community.
9. EWB-USA chapters will have an in-country partner organization that assists with the non-engineering aspects of the program.
10. Education is an important part of the EWB-USA approach to development work.

The projects our chapters implement through their program work in the field are guided by our organizational Theory of Change and impact pathway. This is illustrated in the graphic on the next page.
EWB-USA CHANGE PATHWAY

**Support and strengthen chapters**
- EWB-USA HQ will...
- EWB-USA Chapters then...
- Which results in...
- Leading to...
- Contributing to...

**Provide funds to chapters**
- Support and strengthen chapters
- Provide funds to chapters
- Provide education to chapters

**Provide education to chapters**
- Support and strengthen chapters
- Provide funds to chapters
- Provide education to chapters

**Which results in...**
- ...strong collaboration with partner agencies and local community government
- ...participatory and inclusive approaches in planning with community
- ...appropriate designs developed and installed

**Leading to...**
- ...partners engaged in support/follow-up
- ...increased access to services for all of the community
- ...new perspectives and insight in the community
- ...improved health, livelihoods, access to services, education, environment
- ...self-advocating communities
- ...community having viable plans for sustainability

**Contributing to...**
- Making this vision a reality

All members of the community enjoy improved quality of life through being able to access, use and maintain technologies that are appropriate to their needs.
3.0 PURPOSE OF IMPACT REVIEWS

As stated above, the impact reviews have two main purposes:

1. To triangulate and verify information gathered and analyzed through regular impact monitoring reports.
2. To explore the changes local partners and chapters have experienced as a result of EWB-USA efforts and consider to what extent we have influenced changes at the community level.

The results of these reviews will be used for accountability to donors and to communities themselves. They will also be used for internal learning by EWB-USA HQ staff and chapter members.

4.0 IMPACT REVIEW SCOPE AND SCALE

The impact reviews will typically take place after a chapter is approved to close out their involvement in an active program (through the approval of a 527 – Program Closeout Report). The scope of the review will depend on the size of the program itself, the size and capacity of the review team and available funding for conducting the review. It is anticipated that the review will make use of appropriate sampling where necessary. Decisions on these factors will be made after a thorough review of the relevant chapter reports and on a case-by-case basis.

The impact review will focus, as appropriate to the particular program, on the following Dimensions of Change and Areas of Inquiry:

<table>
<thead>
<tr>
<th>Dimension of Change</th>
<th>Areas of Inquiry</th>
</tr>
</thead>
</table>
| Chapter capacity to support and guide community partners | • Chapter capacity to plan, budget, deliver, monitor and evaluate projects  
• Technical capacity to train community partners on operation and maintenance of the implemented projects within the program  
• Ability to communicate effectively with community partners |
| Partners working relationships in the community   | • Partners’ presence and reputation in the community  
• Partners’ capacity to work with and support communities to articulate priorities and access new services  
• Partners’ capacity to build community capacity to operate, maintain and sustain projects  
• Working relations between partners and chapter |
| Appropriateness and relevance of the community projects | • Shifts in community capacity to:  
- source necessary materials locally  
- operate and maintain projects  
- sustain projects financially and technically  
• Shifts in levels of access to projects by all members of |
| Changes recorded within the community | • Changes in some or all of the following as appropriate:  
- Public Health  
- Environmental Health  
- Behavior  
- Access to Services  
- Technical Knowledge Related to Projects  
- Community Organization  
- Community Self-Advocacy |

4.1 Impact Review Key Questions

The general list of questions which will apply to each Dimension of Change (using the specific Areas of Inquiry as probes) is as follows:

6. What has actually changed? *This question is designed to get the reviewers to consider all relevant change experienced in the community, positive and negative, intended and unintended.*

7. For whom? *This question is designed to explore how recorded changes have affected the various stakeholders differently. For example, how were girls affected? People with disabilities? Marginalized groups? etc.)*

8. How significant are these changes to the different stakeholders?

9. To what extent are the recorded changes lasting?

10. How did EWB-USA’s program and project work contribute to the recorded changes? *This question is designed to explore what other actors and factors might have contributed to the recorded changes.*

4.2 Information Sources and Methodologies

The impact reviews will rely heavily on the Program Plan and Baseline Study (document 901) and Program Impact Monitoring Reports (document 901B) which provide detail of the program context, program plan, relationship with partners, impact baseline information collected at the outset of the program and regularly updated status on monitoring changes in the community.

Throughout the impact review process, it is expected that there will be high levels of consultation with all stakeholders in the program partner community population. Individual teams of reviewers will make final decisions about the methodologies that they will use to collect and analyze information. These methodologies are likely to include some or all of the following:

- Secondary data analysis
- Partner self-assessment processes
- Semi-structured interviews
- Focus group discussions

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¹ Resources for further study on the importance of assessing impact are listed in Further Reading.
5.0 IMPACT REVIEW PROCESS AND DELIVERABLES

Each impact review will be organized to categorically assess our organizational impact. The categories of programs reviewed will be strategically determined by EWB-USA HQ staff on a case-by-case basis. Programs to be reviewed will likely be grouped by project type, geographic region or a donor-prescribed scope. It is anticipated that regardless of the category of the programs in review, the following process and deliverables will be produced.

5.1 Impact Review Process

Each impact review will consist of the following phases, with agreed timelines:

- Setting up and planning the review
- Training the review team and piloting methodologies
- Field visit to collect data
- Analysis of the data
- Report writing
- Presentation of results

5.2 Impact Review Deliverables

Deliverables will include:

- A full Impact Review Report, approximately 20 pages in length, of publishable quality,
- Executive Summary, approximately 4 pages in length, which is a stand-alone document that can be communicated to a wider audience, and
- Potential workshops, meetings or other media to share findings with donors, partners and other interested stakeholders (this will be discussed and agreed upon on a case-by-case basis).

6.0 IMPACT REVIEW RESOURCES

6.1 Management and Logistics

Interim Impact Reviews and Closeout Impact Reviews will be coordinated by a member of the EWB-USA HQ Impact Analysis staff. This department is in development and will include a Director, an Analyst and a Coordinator. More will be determined about the administration of each review when the positions exist within the organization. It is anticipated that a member of this department and/or the Projects department who has been trained in impact assessment will participate in each Impact Review to ensure consistency of data collection and analysis to facilitate organizational learning.

Impact Review teams will be comprised of a representative from the EWB-USA HQ staff, volunteers from the EWB-USA membership and representatives from
the partner communities with programs being reviewed. It is also anticipated that the planned position of EWB-USA in-country staff will be involved in a significant way with trip coordination and follow-up work in the community. The teams will be restricted to no more than five travellers so as not to overwhelm the community and to limit the budget. The volunteers will pay a fee to participate in a Closeout Impact Review to cover the administrative costs and in-country support. The amount of this fee is to be determined. Additionally, members of the Impact Review Team will be required to pay for their travel expenses and acquire appropriate travel insurance and sign organizational travel waivers.

6.2 Required Skills and Experience

The review teams will likely consist of:

- EWB-USA HQ staff – to be determined by the development of the EWB-USA Impact Analysis department and to be specifically trained in impact assessment methodology.
- Three volunteers who have been specifically trained in impact assessment methodology. They should have the following core skills:
  - Understanding of the fundamentals of the EWB-USA model of community-driven development
  - Current EWB-USA member
  - Minimum of two years of active experience with EWB-USA project work
  - Minimum of two years of post-bachelor degree work experience in the engineering discipline of the programs to be reviewed
  - Experience working and/or living overseas, including trips with EWB-USA
  - Team player who is willing and able to take responsibility when asked
  - Strong and proven analytical skills
  - Ability to write clear and concise reports
  - Capacity to communicate across language and cultural barriers
  - Sensitivity and respect for local culture and history
  - Ability to work well with diverse groups and facilitate meetings
- A representative from the local community who can support with logistics, translations and cultural sensitivities. Until the EWB-USA in-country staff program is fully implemented, local partners in the region of study will be engaged to assist with the impact reviews.

6.3 Budget of Time Estimate

<table>
<thead>
<tr>
<th>Job Description</th>
<th>Tasks Involved</th>
<th>Estimate of Time Required</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Setting up and planning the review</td>
<td>Decisions about location, sample size, timing</td>
<td>Up to 5 days</td>
<td>EWB-USA HQ staff</td>
</tr>
<tr>
<td></td>
<td>Selection and recruitment of volunteers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Decisions about</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step</td>
<td>Activity</td>
<td>Details</td>
<td>Duration</td>
</tr>
<tr>
<td>------</td>
<td>-----------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>1.</td>
<td>Methodologies and type of reports</td>
<td>Development of forms, guidelines and reporting formats</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Developing a training plan for the volunteers</td>
<td></td>
</tr>
</tbody>
</table>
| 2.   | Training of review team and piloting methodologies | Pre reading for volunteers before training  
1st meeting: Taking volunteers through the process and practicing using methodologies  
Volunteers to pilot methodologies locally and provide feedback  
2nd meeting: Feedback, revision of methodologies or report formats, logistics, etc. | 2-3 days | EWB-USA HQ staff and impact review team volunteers |
| 3.   | Analysis of program-related reports and secondary data | Review existing reports related to programs which are part of the impact review  
Review of secondary data, including additional reading on impact assessments as provided by EWB-USA HQ | 2-3 days | EWB-USA HQ staff and impact review team volunteers |
| 4.   | Field visit                             | Conduct reviews per the EWB-USA-prescribed methodologies of data collection | This will depend on the scope of the impact review. Expected to be 7-14 days. | EWB-USA HQ staff representative, impact review team volunteers and local, in-country support |
| 5.   | Analysis of collected impact review data | Compiling data gathered in the field and analyzing the results          | Not less than 5 days | Impact review team volunteers            |
| 6.   | Report writing and/or documentation     | Documentation of impact                                                 | Not less than 5 days | Impact review team volunteers,            |
other media prep | review data and conclusions | days | EWB-USA HQ staff to provide final review
--- | --- | --- | ---
7. | Presentation of results - Meetings and other forums to share feedback | This will depend on the purpose of the impact review. | Depends on purpose of review | EWB-USA HQ staff

### 7.0 FURTHER READING

The following reading list provides further materials and guidance on planning, M&E and impact assessment.

  (Last accessed: September, 2013)

- **Impact Assessment: Understanding and assessing our contributions to change**, O'Flynn, M., INTRAC (M&E Paper 7)  
  (Last accessed: September, 2013)

- **A Guide to Assessing our Contributions to Change**, Timlin A., Roberts A., and Zeese W., ACT Development  
  (Last accessed: September, 2013)

- **Toolkits: A practical guide to planning, monitoring, evaluation and impact assessment**, Gosling L., and Edwards M., Save the Children  
  (Last accessed: September, 2013)
## Appendix 2: Impact Review Itinerary

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wednesday, September 2</td>
<td>All day training</td>
</tr>
<tr>
<td>Thursday, September 3</td>
<td>Jinotepe program visit (3 projects)</td>
</tr>
<tr>
<td>Friday, September 4</td>
<td>Amayo and La Conquista programs (3 projects total)</td>
</tr>
<tr>
<td>Saturday, September 5</td>
<td>Pueblo Nuevo project visit (2 projects)</td>
</tr>
<tr>
<td>Sunday, September 6</td>
<td>Work day in San Juan del Sur</td>
</tr>
<tr>
<td>Monday, September 7</td>
<td>Bernardino, El Coyol and Papaturro project visits (5 projects total)</td>
</tr>
<tr>
<td>Tuesday, September 8</td>
<td>La Prusia project visit (1 project)</td>
</tr>
<tr>
<td>Wednesday, September 9</td>
<td>Report writing and wrap-up meeting at Laguna de Apoyo</td>
</tr>
</tbody>
</table>
Appendix 3: Projects Map – Southern Nicaragua
**Appendix 4: Secondary Data Reviewed**

<table>
<thead>
<tr>
<th>Community</th>
<th>Document Type</th>
<th>Document Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jinotepe</td>
<td>501B</td>
<td>Project application</td>
</tr>
<tr>
<td>Bernardino Diaz Ochoa</td>
<td>507B</td>
<td>Pre-assessment trip</td>
</tr>
<tr>
<td>Amayo</td>
<td>507E</td>
<td>Post-implementation</td>
</tr>
<tr>
<td>Amayo</td>
<td>527</td>
<td>Closeout</td>
</tr>
<tr>
<td>Amayo</td>
<td>527</td>
<td>527 PE review</td>
</tr>
<tr>
<td>Amayo</td>
<td>527</td>
<td>Community letter</td>
</tr>
<tr>
<td>Papaturro-El Coyol</td>
<td>525</td>
<td>Pre-implementation</td>
</tr>
<tr>
<td>Papaturro-El Coyol</td>
<td>527</td>
<td>Closeout</td>
</tr>
<tr>
<td>Papaturro-El Coyol</td>
<td>527</td>
<td>527 PE review</td>
</tr>
<tr>
<td>La Conquista</td>
<td>526</td>
<td>Post-implementation</td>
</tr>
<tr>
<td>La Conquista</td>
<td>901B</td>
<td>Program impact monitoring</td>
</tr>
<tr>
<td>La Prusia</td>
<td>527</td>
<td>Closeout</td>
</tr>
<tr>
<td>La Prusia</td>
<td>901B</td>
<td>Program impact monitoring</td>
</tr>
<tr>
<td>La Prusia</td>
<td>905</td>
<td>Logical framework</td>
</tr>
<tr>
<td>Pueblo Nuevo Sur</td>
<td>527</td>
<td>Closeout</td>
</tr>
</tbody>
</table>
Appendix 5: Detailed Field Notes – All Communities

Amayo

Project status

The project consisted of building 11 latrines. They were built using local building practices and the design of a local community member, using materials that were bought locally. Construction was carried out by a combination of community members and EWB-USA chapter members. It was reported that some of the initial latrines were destroyed by high winds, some survived and some destroyed latrines were rebuilt. However, it was not possible to quantify the exact numbers because the community members we talked with did not know where all of the original latrines were installed. We did observe three of the original latrines; all three were lacking structures and seemed unusable.

The project also included supplying 30 Potters for Peace water filters to some of the families in the community (recipients were selected by the community). Once again the community members we talked with did not know what community members had received the original filters. We did observe two of the original filters within community member’s homes and the community members reported that they still used them.

The EWB-USA chapter also facilitated contacts with other NGOs and the mayor’s office which resulted in 45 new latrines being built by the mayor’s office and 20 latrines by ADECO (NGO) after the EWB-USA chapter closed the project. In addition, 4 wells were built by FISE a governmental organization.

Actors and/or factors contributing to change

The EWB-USA chapter assessed the needs of the community and provided appropriate and relevant facilities to meet those needs. The community was also a key factor as they prioritized and selected the families in the community who received the initial latrines and water filters. In doing so, the community helped to improve water quality by selecting community members closest to the river for latrine installations.

Through their actions and outreach to the mayor’s office and ADECA, they also turned these groups into actors and factors in the continued development of additional latrines and the installation of water wells after the EWB-USA chapter’s program closed.

Description of change

The community members who were provided latrines could now take care of their sanitary needs with privacy, more safety and free from flies. They no longer used open defecation in the fields and river, which also decreased the amount of flies and contamination of the river which was their drinking and cooking water source. As a result of these changed behaviors, and the use of the water filters, the incident rate of diarrhea decreased.

The community also gained from EWB-USA the knowledge to rebuild the superstructure of the latrine, which allowed them to rebuild them when they were damaged by winds.
In addition, the EWB-USA chapter’s contacts with other NGOs and the mayor’s office resulted in further changes in the community in the form of additional latrines and water wells. These changes continued the benefits that were realized by the limited latrine installations and Potters for Peace water filters that the EWB-USA chapter provided in their program within the community.

Both the latrine and water filters were appropriate projects to meet the community’s needs in terms of sanitation and clean water. While one could argue that the latrine design did not allow for the latrines to be easily moved when the pit the filled, or that the Potters for Peace water filters were only a stop gap measure, they were appropriate and relevant to meeting the community’s needs.

Significance of change

The significance of the change is apparent in not only the fact that the latrines are still being used, but in the fact that the community now has latrines installed at most if not all of the community homes. The community members treat them as valuable assets by assuring that they are cleaned and know how to dig new pits and move the latrine structure when the existing pit fills.

Similarly, with the Potters for Peace clays pots - They continued to be used to filter drinking and cooking water even though they no longer get their water from the river. They were taught how to clean the clay filters and do so in order to maintain them. A few of the clay pots have broken over the years and have not been replaced due to not being able to afford the cost of a new filter. The need to replace them however is somewhat mitigated by the fact that they now get their water from an enclosed hand dug water well and can boil water if they have a concern about water quality.

The improvements in public health are also very significant. The cases of diarrhea have decrease significantly and the community believes their general health has improved because of the latrine and clay pot filters provided by EWB-USA and others after the EWB-USA program closed. The amount of insects within the community has also dramatically decreased.

Change compared to expectations

The expectation of the EWB-USA program was that the latrines and clay water filters would improve the health of the community. While the projects were limited in scope (11 latrines and 30 clay filters) for a community of approximately 230 people living in 55 homes, through the community prioritization the facilities were installed where they could make the most significant change in the health of the community.

It is not apparent that the EWB-USA chapter expected that their presence in the community and their advocacy with the mayor’s office and other NGOs would result in the changes that occurred after the chapter closed the program. In some ways the projects initiated by these organizations continued and furthered the benefits achieved during the original EWB-USA program.

Sustainability of changes

The community members, even though their resources are limited, seem dedicated to cleaning, maintaining, moving and replacing the latrines as needed using whatever materials they have on hand. There was no indication that the community members would go back to open defecation.
The community has also demonstrated their commitment to the sustainability of the changes within the community by forming a CAP (semi-governmental community organization) to help administer the access to water, water quality and sanitary situation within the community.

**Bernardino Diaz Ochoa**

**Project status**

The projects examined include solar lighting at the church, rainwater catchment at the church, the health clinic building, and solar lighting at the health clinic. The solar lighting at the church is not being used because grid electricity is being provided. The panels and charge controllers are present but unused (even as a backup) because the batteries are expired. The rainwater catchment system works, but is only sporadically used, as the tank is usually moved closer to the school to be filled with municipal water brought in a truck. The health clinic is there and being used regularly for health visits as well as community meetings, but it is in disrepair. The solar lighting system at the clinic is in the same condition as that for the church.

**Actors and/or factors contributing to change**

EWB-USA, the community of Bernardino Diaz Ochoa, the electric utility, the mayor’s office

**Description of change**

The health clinic has meant access to regular medical care in the village for all residents, particularly children, pregnant women (although deliveries take place in a hospital), and very sick people. Before, they had to walk 5k to Baston, and then get on to Rivas (appears to be the preferred location) or SJDS. The mud could be 2’ deep on the road, and once to the main road, they had to wait and pay for a bus or flag down a car. The Health Ministry sends a doctor once a month for general services. She brings medicines to dispense. There is no charge for the services. The main illnesses treated are diarrhea, fever, influenza, and cough. A different organization comes about once a month to measure blood pressure, blood sugar, and heart conditions. They also bring medicines and provide their services at no charge. Women said ~4 people are served by this, but it did not seem a sure answer (possibly people don’t publicize their visits). Sometimes there is also dental service, one room in the clinic does have a battered dental chair. The type of construction used for the clinic (straw bales) seems to be inappropriate because it is not being maintained sufficiently. The stucco is peeling in many places. The clinic is also being used for some high school classes.

Initially, the solar and water systems were functional and useful. The solar system installed at the church allowed the community to be able to hold vigils in the evening and have music during the worship service. This was appropriate and relevant to the religious nature of the community and indicative of their priorities. The solar system has been obviated by the grid electricity. Since they had to replace the batteries 5 times, it is clear that something was wrong with the installation, or the usage, or the replacements, as this is a much greater frequency than should have been expected. The charge controllers purchased by EWB-USA were of very low quality, and might have done a poor job regulating charge to the batteries, thereby contributing to their shorter life spans. The rainwater catchment system is mostly not functioning simply because its tank is put to better use storing water from the nearby municipality. There is some growth of algae at the bottom of the tank, so maintenance is not happening as often as it should.
Significance of change

The construction of the clinic has provided a significant change in access to routine or preventative health care for all members of the community. The health-related improvements are particularly significant for children and pregnant women. Change in access to emergency care has been insignificant for everyone since the clinic does not serve emergencies.

The change for the high school students who use the clinic for classes is moderately significant since there are other options available for meeting space if the clinic building were not accessible.

Change compared to expectations

The frequency of doctor visits are as planned; the quality, longevity and need for maintenance of the clinic building does not meet the expectations of the community. The solar systems provided expected benefits, but replacing the batteries five times would not have been within the community’s expectations. The water filters were a temporary contributor to improved health, but having no clear understanding of their maintenance or replacement is not what the community expected.

Sustainability of change

Any change related to the solar system has been obviated by the introduction of grid electricity. The clinic building seems to be in disrepair, although the community is discussing what is needed to fix it and how to pay for it. They have the ability to pay for and effect small improvements. They seem to be able to fix and adapt water systems, so parts of the EWB-USA supplied water system, despite having been repurposed, have new life as part of an alternative system.

Conclusions and recommendation

– The educational portion of this program seems to have been falling far short of what was needed. Maybe that is better with contemporary EWB-USA projects.
– The chapter seemed to be experimenting with novel building practices not supported by community experience (straw bales). Furthermore, the community does not believe that the construction was of high quality.
– The chapter built a rainwater catchment system for the church, but this could only have been thought of as a partial solution to the water problem. It is not clear how much the chapter thought about, or talked to the community about, larger scale water solutions, including the digging of local wells, which they seem to be doing on their own.
– Overall, the chapter seems to have been engaged in piecemeal, scattered projects with little thought towards a community-wide plan that would work long into the future.
– The process of collecting fees by way of the offering at church seems to be working well, although it is not clear what role EWB-USA had in establishing this norm.
– The planned improvements in health did indeed occur, although the filters seem only to have been a short-term solution, since no chapter guidance was provided on replacements.

Narrative summary

Monday, September 07, 2015
We started with a large meeting, in the health clinic, of the EWB-USA team and community members. Community representatives included Jose Marcos Rayo (the community leader), Marcos Rayo Delgadillo,
Griseldo Costellon, Judith Costellon (a teacher), Juan Carlos Cerda, Melva Rao Castellon, and Maria Adela Rayo. The meeting began with the community reciting their recollection of the history of their projects.

Miguel Gonzalez was the person who facilitated the contact between the EWB-USA chapter and the community of Bernardino. He had friends in the community, and the chapter was staying at his house in San Juan del Sur. During the chapter’s assessment trip, they learned that community members were suffering from diarrhea, vomiting, and stomach pains, presumably from water-borne illness. It was difficult to take them to the city to seek treatment.

The first projects they were interested in were electricity for the church, a water catchment system for the church and school, and a health clinic. The community had expressed interest in electricity for the entire village, but the EWB-USA chapter told them that was too expensive so they narrowed the scope to the church. During the first EWB-USA implementation, they installed a solar system and water catchment at the church. Sometime after this, a village well was built, not by EWB-USA. The water tank for the catchment system would occasionally be moved back and forth between the church and the well depending on which was able to supply water.

Two to three years later, the EWB-USA chapter returned and built the health clinic, including a solar lighting system. The chapter spoke with the Ministry of Health to arrange monthly medical visits from a doctor from San Juan del Sur. Before the clinic was built, a doctor would only come irregularly, and other times they would have to transport sick people using a hammock to the main road and wait for a car to come by.

During this same trip, the chapter brought clay pot filters and distributed them to all of the houses. Some combination of the change in water supply and filters caused the incidence of diarrhea to go down, although all of the filters have since expired. The initial water from the filters was tested by the Ministry of Health and found to be safe. The community doesn’t know where to get replacement filters, although they know the EWB-USA team purchased them in Nicaragua. Apparently the team did not tell them where the filters were purchased. Two years ago, the Newton sister city program brought sand filters for 16 of the 32 families. In some of the houses, these filters are still working.

Because of the drought, the well and catchment systems cannot provide enough water, and the mayor’s office is currently bringing water by truck. Houses along the road leave buckets outside, and the truck fills them as it passes. The rest of the water goes into the central tank, and other residents bring buckets to that tank to fill them. The truck brings about 18,000 litres once or twice a week for free, but the community feels it is still not enough water for their needs. They are hoping to get attached to a nearby water project that would connect to municipal water from San Juan del Sur.

The situation before the EWB-USA visits was that health was poor, especially for the children, the church had no electricity and was being lit by candles, and there was no road. The expectations from the EWB-USA projects, once suitably scoped, were for electricity at the church and water at the school and church. They did not expect to be able to extend the electric system themselves.

Just two years ago, grid electricity came (unexpectedly) to the community. Before the EWB-USA projects were built, no one in the community knew how to work with water or electric systems. They still rely on an electrician from the mayor’s office. The community helped install the solar system, so they learned a bit about solar, but they don’t have the right tools to work with it properly.

With regard to maintenance, the community has replaced the solar system batteries 5 times. They started connecting a cell phone battery charger, and they charged 5 cordobas so they could use the money to replace batteries. They bought the batteries at workshops in Rivas, at a cost of 2500 cordobas.
They used the cell phone charging revenue, plus an extra collection from the church. They specifically asked for replacement batteries that were appropriate for solar systems at the local markets. The EWB-USA team had left only verbal instructions about maintenance, including that the community was supposed to top off the battery acid, and clean corroded battery terminals. The community got acid in Rivas.

Because of the lighting in the church, the community was able to meet more often, particularly for late-night church services (vigils). They had been worried about fire in the church because of the candles, but there were no actual incidents. Because of the water and health clinic, this community became a magnet for meetings, classes, and health services held at the clinic. They want to improve the building because the walls are not safe for seismic conditions, and they are currently in disrepair. The improvements because of the water system include children no longer having to skip class to go to houses to ask for water during the school day. The community can also have water for festivities. Also because of the water, it was easier for the women to do housework because the water was closer and cleaner. They could spend more time with the children and the community.

Other improvements have happened outside of EWB-USA. The community built a water tower and installed a second tank on top of it. Another organization provided the rope pump currently installed at the well. The tank had previously been attached to the water at a private home but the community didn’t want to bother those people any more. The community dug the well themselves. They are considering replacing the rope pump with an electric pump. They have been able to pay for replacement pipes, faucets, elbows, etc. themselves.

The village now has grid electricity. The electricity at the school is subsidized by the government. The bill for the church and clinic are paid communally, by way of the offertory at church, and each house pays for its own. The bills for the church and clinic are each 42 cordobas per month. Occasionally the church does not collect enough. There are two houses that are not attached to the grid. For payment, a man comes out from the municipality on one day and gives bills, and returns the next day to collect the fees.

The panels and charge controllers are still in the village but are not being used. The batteries are dead. They might end up using the solar system as a backup to the grid – the electricity fails 2-3 times a month for as much as 2 days at a time. Another option is to support the two houses that do not have grid electricity.

**El Coyol**

**Project status**

Currently the solar panel, charge controller and battery are reportedly functional and the system has been maintained. However, the system was moved by the community to serve a seminary that is associated with the community’s priest when the community received grid electricity about a year ago. The Impact Review team did not go to the seminary to see the solar system in use at this new location.

**Actors and/or factors contributing to change**

The community heard that the EWB-USA chapter was in Bernardino Diaz Ochoa installing a solar system and asked the chapter to visit the El Coyol community to see if they could install a solar system within their community as well. This was the primary factor in a solar system being installed in El Coyol. A secondary factor was the fact that EWB-USA was espousing a “Quick Hit” program philosophy of duplicating successful projects. Another auxiliary factor was the community’s commitment to
maintaining and protecting (from theft) the solar system installation, and their commitment to paying for the maintenance.

Description of change

Prior to EWB-USA involvement, no electricity was available in the community. The community met in the church and used candles, kerosene lamps and flashlights for illumination. While these means did provide some light, it was not sufficient for the community to read music or other written communications together. Kerosene lamps and candles also gave off by-products of combustion which the community breathed in. Flashlights also required non-reusable batteries as there was not power available to charge rechargeable batteries.

After installation of the solar system, the community was able to illuminate their meetings with compact florescent light bulbs (CFL). They were able to read music and have night time vigils as a result. The light generated by the solar system became a central point for community gatherings for church services and community meetings thereby bringing members of the community together, supporting the development of relationships and fostering camaraderie.

Significance of change

The community reports that the changes brought by the installation of the solar system were significant. It allowed them to use the building for church or other meetings and typically did so for 1 hour on Thursday and Sunday nights as well as from 6 pm to 11 pm on Saturday. It was so significant in fact that 10 people from the community took turns sleeping overnight at the building with the solar system year round. In addition, the community was very glad that they no longer had to breathe the fumes from the kerosene lamps and candles.

Change compared to expectations

The community stated that they did not have any expectations for grid electricity being installed anytime soon. In fact, they checked with the mayor’s office before embarking on the project with EWB-USA to confirm this fact. The solar system met their expectations in giving them light for night time gathering. They also understood and expected to pay for maintenance of the system, including maintaining and replacing the battery and established a system of special offerings at the church when they needed money to fund the maintenance.

Even though non-church members were not involved in the decision to install a solar system, there were not reported issues from these folks.

Sustainability of change

The system ran for 8 years until grid electricity came to their community. Their original battery lasted 6 years before needing replacement, which demonstrates a commitment to sustaining the system through regular maintenance. At that time the community contributed C$3,500 to replace the battery. An individual within the community took on the job of maintaining the system and 10 people within the community took turns sleeping at the building with the solar system to prevent the theft of the system.

The EWB-USA chapter left a maintenance manual that was in Spanish and trained the maintenance person on how to maintain the system.
Once grid electricity came to the community, the community and the priest together agreed to move the solar system to a nearby seminary. The community reports that the solar system is still operating at the seminary.

**El Papaturro**

**Community Members Present at the Meeting with EWB-USA Team:**

Juana Solis – Community leader, secretary of political party
Carlos Castellon and Pedro Claber, residents
Juana’s daughter

**Project status**

This project is no longer functioning for two reasons: theft of components (enabled by lack of security of the building) and arrival of grid electricity. It was installed in 2008 to provide lights and a radio in the church and lights in the school. Thefts began three months after installation, but the community replaced essential parts, and the system functioned for lighting until grid electricity arrived in December 2014. Until the spring of 2015, when the last battery died, the system was used to recharge cell phones.

Juana Solis, the community’s political director, now has the panel, controller and any other components in her house for safe-keeping. The grid electricity in the church and most of the school is no longer functioning either, due to theft of the wiring, bulbs and switches. The community has decided that before electricity is reinstalled, they need to reinforce the surrounding fencing, fix the church roof and replace the missing windows.

**Background:**

- Building now used as a church was originally the community school.
- 2000: the Newton-San Juan del Sur Sister City program built a new school on the same grounds. The Catholic church asked to hold church services in the old school, and some community meetings were also held in the building (the EWB-USA chapter described it as a community center).
- 2008: EWB-USA chapter investigated follow-on projects from work in Bernardino Diaz Ochoa.
- Spring 2009: Solar system was installed, with 3 batteries, charge controller, inverter, and wiring and light bulbs in the church and school. EWB-USA installed wiring for 4 light bulbs in the school.
- System Setup: It is not clear that the 3 batteries were connected in parallel. What seems more likely is that one was the primary battery, one was a backup, and one was shuttled back-and-forth between the church and the school, running lights at the school and being charged at the church. Given that they were moving a battery back and forth, it seems likely they were charging two batteries in parallel with different potentials. This would have had a deleterious effect on the battery condition and likely contributed to the shortened life.
- Thefts: within 1 year, one battery was stolen. The other batteries lasted 1 ½ year, and the community twice bought batteries, each of which lasted 1 ½ years. Wiring and the inverter were also stolen, and replaced at least once. There is zero security at the site, and windows and doors are missing and seem likely to have been stolen. The community asked the chapter for
help with building a fence to protect the church and school compound, but the chapter explained that they did not have the money, and in any case, EWB-USA would never have approved this expenditure as it did not require engineering, but only funding.

- Grid electricity was installed in the school and church in December 2014, with associated switch and junction boxes and fixtures. At the end of August 2015, the switch and wiring in the church, and in the school (except for one room) were stolen. The electric company will reinstall these components at no charge.

**Actors and/or Factors Contributing to Current Status**

- The EWB-USA chapter provided the technical and financial resources to install the solar system and lights in the school and church.
- Local contacts and advocates: Miguel Gonzalez and Deepa (last name unknown) from San Juan del Sur were familiar with the EWB-USA work in Bernardino Diaz Ochoa, and knew about the need in Papaturro for electricity. They helped connect Papaturro with EWB-USA and provided some coordination.
- The Catholic priest was an important actor in energizing the local church community to use the old school for services and to seek improved lighting there.
- The EWB-USA work in nearby Bernardino Diaz Ochoa provided a model for the installation in Papaturro. The impetus for ‘quick hits’ and expansion of EWB-USA projects, without sufficient time to investigate community capacity in Papaturro, was a factor in the installation of an unsustainable project.
- Deep poverty and a lack of solidarity were likely factors in the thefts that began soon after installation and gradually sapped the will of the community to keep the system from being vandalized. At the same time, the community did have the will and resources to replace stolen parts and invest in new batteries. Based on a two-hour meeting with fewer than six community members, we were unable to make sense of conditions in the community that contributed to the neglect of the solar system and the church building and the theft of both solar and grid components.
- The municipality of San Juan del Sur brought grid electricity to the town in December 2014.

**Description of change**

Stakeholders include members of the Catholic church and their priest who comes once a month for services, school children and teachers, and families in the community.

Church members and the priest were able to forego candles and lanterns for safer, brighter lighting. They were able to have more church gatherings at night, and more people came to services (according to Sra. Solis, some came just to experience the electric lights).

Solar power allowed the school to have celebrations after sunset (e.g., for Mothers’ Day and national holidays) and for other meetings. The change impacted especially students and their families, people involved in community events, and church attendees.

At first, the community was very excited about the solar system. Being aware of the potential for theft, they assigned people to guard the installation. Sra. Solis reported that after the theft of one battery three months following installation, community members began to lose their enthusiasm for the vigilance needed to protect it. However, they did continue to collect funds needed to replace stolen parts and buy new batteries. Batteries cost approximately $150 each.
Despite these successes, the solar system was not an appropriate technology for any of the stakeholders in this community given the high level of theft and their inability to take steps to ensure its safety. Given the short amount of time spent in the community by the EWB-USA chapter, it would have been very difficult to know this at time of installation. It is notable that an almost identical system installed at the same time in a community fewer than five miles away had a completely different outcome.

Significance of change

Change was very significant for the Catholic priest and church members, who felt that the lighting should be in the church as a sign that God was lighting their paths. They were able to have celebrations and they had a radio for the children. We infer that the teacher finds the change to be very significant, since she has been able to prevent theft of the grid system in one room of the school and locks the light bulbs in her desk for safekeeping. Students and their families and other community members using the school likely experienced a very significant initial change based on community-wide enthusiasm for this project. The primary daytime use of the school did not require lighting, so the change for school children and their families over the life of the project is unclear.

We were told that attendance at the community meeting was very small because people were ashamed of what had happened to the solar and grid system. It was impossible for us to gauge the overall significance of the project during the time it was operating. At this time, it has no practical significance, but it may be serving as a caution to the community that they need to mobilize in order halt the thefts.

Change compared to expectations

The changes upon initial installation of the solar system were as expected at both the church and the school. The community had lighting for important events, and it seems likely that initially there was a boost in community organization and solidarity. The change in access to services continued even after installation of grid electricity, since the community used solar power to charge cell phones.

The community did not plan for or expect the higher costs of system operation: They understood they would have to replace the batteries every four years, but each battery lasted less than two years.

The fact the community members guarded the system in its first months indicates that the community expected there to be issues with theft. Perhaps they did not expect the tenacity of the thieves or that the community would lose its enthusiasm for constant guarding of the system.

The community had no idea that the grid would arrive when it did; in fact, they never had an expectation that there would be municipal power.

Sustainability of change

It is important to acknowledge the community’s ability to sustain the system for almost six years in very difficult conditions, albeit in a compromised state:

- Although there was no provision for collecting advance fees for parts and repairs, money was collected as needed, including $150 each for two new batteries.
- The community did know where to get parts, and was able to replace the components correctly.
- Sra. Solis performed the maintenance tasks that were verbally given to her:
  - Kept liquid levels topped off in the battery.
Cleaned the panel every other day (this seems excessive).

Based on information from Sra. Solis and the complete lack of documentation in the 527 Closeout Report, sustainability of the system was compromised by insufficient attention of the chapter to maintenance routines and a lack of maintenance instructions:

- The only maintenance manual provided was for the controller and in English.
- Maintenance instructions were only verbal.
- The setup presented complications: batteries had to be moved between the church and the school, and charging batteries in parallel with differing energy potentials shortens their useful life. At the very least, the community should have been provided with detailed instructions on how to maximize battery life.
- Once the electric grid was installed, this project’s sustainability became even more tenuous. In addition to paying electric bills, the community had to collect funds to replace the battery and other parts as well as deal with security issues. When the community realized that parts were being stolen, they decided to keep the remaining components of the system safe at Sra. Solis’ house. They wanted to keep it safe until EWB-USA told them what to do with the system, which does not demonstrate a sense of ownership of the system.

Finally, we ask what might have happened if the electric grid had not been installed in Papaturro. Would the community have come together to address the thefts, costs and lack of security for their only source of electric lights? Despite the efforts described above, we did not see the will or resources to make this a sustainable project.

**Jinotepe Hogar de Anciancos**

**Participants in the discussion with the EWB-USA team, September 3, 2015:**

- Ismael Carrasco – maintenance man and nurse
- Samantha Lacayo – Representative of the Jesse F Richardson (JFR) Foundation
- Alma Sanchez – President of the Hogar’s Board of Directors since 2009

**Project status and Actors and/or Factors Contributing to Change**

Begun in 2006 and completed in 2007, this project includes a reserve water system, roof repairs and electrical system repair and upgrade. The roof and electrical system work, although critical at the time of project implementation, have been supplanted by an expansion of the facility and are no longer a structural component of the Hogar. This impact review focuses on the water system and is based on a tour of the facility and visual inspection of the water system, a meeting with staff and management and informal conversations with a few residents, and review of EWB-USA chapter reports.

The City of Jinotepe provides municipal water at no charge to the Hogar, but supply is frequently interrupted due to power cuts and insufficient water supply. In 2006-07, city water was generally unavailable anywhere from five hours a day to most of the day, and shutoffs might last up to four days. In 2015, daily water supply seems to be more reliable, but it is still possible to be without water for 2-4 days at a time, particularly in the dry summer season (which has increased in length and severity over the past two years).

The water-related goal of the EWB-USA project was to increase the Hogar’s reserve water supply from 2,500 to 10,000 gallons in order to meet its water needs during times without city water. The system
includes three elevated water tanks with interconnections, a float valve to control filling from the city system, and a feed to the Hogar’s internal plumbing system. City water is fed through the reserve tanks so that they are constantly full in case of a water shutoff. There is sufficient reserve water to cover two days of normal operation; if a shutoff continues longer than this, the Hogar pays for the fuel for a truck at a nearby Fire Station to fill its tanks.

As of September 2015, the oldest 2,500 gallon tank and tower (built prior to EWB-USA’s work) is not functioning. It is severely corroded and in danger of collapse, and is a threat to the integrity of the rest of the system. In addition, the float valve has been replaced four times and is broken again, and there are a few small leaks in the piping.

Despite these problems, the Hogar considers the project to have been a critical success factor in its current status: it has significantly upgraded its inpatient and outpatient facilities and has grown from 14 to 42 beds. Many actors and factors contributed to this change:

- EWB-USA contributed technical knowledge to identify, design and build the reserve water system. EWB-USA also contributed significantly by repairing the wiring and roof.
- The Hogar Board of Directors and the Jesse Richardson (JFR) Foundation have provided the vision of an improved, expanded Hogar to serve more residents and to provide meals and health care to the local neighborhood. They also are capitalizing on the improved facility and its more consistent water supply to expand into areas such as a pharmacy and physical therapy that may generate additional income.
- Hogar staff have shown great determination to maintain a high-quality, viable operation. They have coped with difficult situations in order to care for residents and keep the facility clean, and a nurse has taken on maintenance and repair duties to keep the water system functioning.
- Local companies and individuals contribute funds to keep the Hogar running; families of residents and the national government contribute small amounts.
- Additional public health services for residents and neighbors have contributed to the Hogar becoming a center for health in the neighborhood. For example, visiting medical brigades have served up to 200 clients during a one-week visit.
- However, sufficient planning for sustainability has not been done and is an important factor contributing to the system’s precarious status. This factor is discussed in detail in the section below on Sustainability of Change.

**Description of change**

The over-arching, immediate result of the EWB-USA project was the ability of the Hogar to continue functioning and to expand. Staff and management were very clear that without the electrical repairs, roof stabilization and water security, the facility was unsafe and would have been closed. Longer term, the overall change has been that water is no longer a constraining factor in its services. Instead of a daily bucket brigade by the Fire Department during water shutoffs, the Hogar has water all the time. The simple, gravity-fed technology used here is appropriate to the situation and skills available at the Hogar and highly relevant to its needs.

The impact on its many stakeholders has been dramatic:

- Residents: better health through improved hygiene and hydration. They get baths every day (before, it might be two days between baths), and their clothing and linens are changed regularly. The facility is cleaner and residents show pride in being there.
• Caregivers and staff: able to provide better care with less effort and to take pride in their work, their facility and its expanding place in the neighborhood. There is an increase in technical knowledge due to fact that this solution to the water shortage hadn’t previously occurred to the stakeholders and there is a basic understanding of how the system functions. Although Ismael Carrasco, the nurse in charge of maintaining the system, is not technically trained, he has gained technical skills and has a clear understanding of inspection, maintenance and repairs needed.

• Management, Directors and Foundation: Confidence in the ability of the Hogar to fulfil its mission, an ability to look forward to expanding their services, potentially, an increased awareness of technical and water issues that may help in finding solutions to other problems.

• Brigades of health care providers: able to use the facility more effectively and serve more residents because of the consistent supply of water.

• Neighborhood residents: better health through more access to meals and health care provided by visiting brigades. A greater sense of community with the Hogar.

In addition to the obvious dimensions of change addressed in this project – public health, access to services, and technical knowledge – we note an unforeseen change in other dimensions. It is apparent that the success of the project resulted in more self-advocacy on the part of the Hogar in planning for the future. One staff person commented that the Hogar feels more connected to the neighboring community, an outgrowth of their expansion into outpatient services.

Significance of change

• For management, residents, and staff, changes in public health and access to services due to the project are very significant. As noted earlier, the facility was at risk of closing before EWB-USA partnered with them to upgrade the electrical system, repair the roof, and expand the reserve water system. For example, the manager of the facility stated that the Hogar would not exist now if it were not for the water supply project, because the facility was not sustainable when it relied upon firefighters to provide water. The head of the pharmacy said that the EWB-USA water supply project contributed 100% to the forward-thinking changes that the Hogar is now experiencing.
  o The facility increased capacity from 14 to 42 beds and expanded its outpatient services in large part because there was sufficient water to maintain a healthy, clean facility, tiles were not falling through the roof, and the electrical system was no longer causing fires and potentially deadly electrical shocks. The expansion of the facility may allow them to improve finances by providing outpatient service, but it is unknown if this will generate the funds needed to maintain the water supply facilities or if management will prioritize the maintenance and repairs before the system fails.
  o For residents and caregivers, the very significant change in public health and access to services was based on the critical importance of water in maintaining personal hygiene, a healthy diet and clean surroundings.

• The change in technical knowledge varies between stakeholders:
  o For Ismael Carrasco, the nurse in charge of maintenance, the change is very significant: he has learned new skills and is the one person knowledgeable about how to keep the system running, even without sufficient funds for the major repairs needed. As a result, he plays a critical role in the viability of the Hogar.
For the management and JFR Foundation, change in this area is moderately significant. The facility director mentioned that they would not have thought of the solution proposed and built by the EWB-USA chapter. They participated in an important technical change in their facility and now may be better able to imagine other technical improvements. However, they do not seem aware of the specific threats to the viability of the Hogar from a deteriorating water system, and have not routinized maintenance or begun funding the significant repairs needed.

- For neighborhood residents with access to services at the Hogar, changes are significant, but it is impossible to judge their level. For a frail elder or other resident with no other access to health care or a good meal, the change is certainly very significant. For neighbors living with caring families and/or with access to other health services, the change would moderately significant or perhaps even insignificant.

Change compared to baseline plans and expectations.

During its assessment trip, the EWB-USA chapter identified four problems at the Hogar. Three of them - inadequate/inefficient water reserve, unsafe roof, and unsafe electrical system – were successfully addressed in the implementation phase, which allowed the Hogar to expand, thereby addressing the fourth problem – general overcrowding - identified during the assessment. Chapter reports note the high degree of mutual respect and very open communication and collaborative decision-making among all project partners, so we have no reason to think that Hogar staff and management did not fully agree with the assessment or the implementation plan. We did not discuss specific expectations for change during our visit, but staff were clear that the problems noted above had threatened the existence of the facility and that they considered the program a great success.

We do know from our meeting that the chapter communicated to Ismael Carrasco the following maintenance needs:
- Inspect the pipes and float valve every six months.
- Paint the tank and supports once a year to prevent corrosion.
- To repair the supports, use round piping rather than angle iron.

We therefore assume that the Hogar expected and planned to be able to maintain the project. However, there is no evidence that EWB-USA provided a written maintenance plan, estimated budget, or instructions on repairing the float valve, which has been the most problematic part of the system.

In addition, the Hogar probably did not plan or expect that budget constraints would limit funds for maintenance and repair. It is making back payments for social security contributions for its staff (neglected during a previous administration), which in addition to a large accompanying fine, is requiring all funds not committed to basic operations. This undoubtedly limits funds available to maintain and repair the water system.

Mr. Carrasco also noted that there was a three-four year gap in maintenance after project completion, and after that he made repairs only as needed. From this, we assume that he did not expect much maintenance would be needed soon after completion and did not understand the need for preventive maintenance to prevent tank failure.
Students from the local university participated in the project and the chapter noted in 2007 that they would likely be a source of future help. It is reasonable to assume that the Hogar expected to have an ongoing relationship with them, but this was not mentioned during our visit.

Sustainability of change

Sustainability of this project can be looked at from the time of project completion until now and from now looking forward.

From 2007 until now, the project has been sustained, albeit with significant problems:

- Staff was identified and able to do maintenance and repair work, and materials and maintenance supplies are available locally.
- Minimal repairs have been carried out competently, and we have no information that the system has failed since its completion. The float valve has been replaced four times; given the generally problematic history of float valves, it is not unreasonable that Mr. Carrasco would have removed it and is now relying on visual sighting to determine when to deactivate tank filling.
- Materials and expertise are available locally for plumbing repairs or repairs to the towers that are beyond the capacity of Hogar staff.
- The success of the EWB-USA program has sustained the Hogar’s impact on public health and access to services and has enabled it to raise its visibility to potential funders and users of its outpatient for-pay services. When absolutely necessary in order to continue to provide high-quality care to its residents and neighbors, the Hogar has found funds needed to keep the water system operating.

Looking forward, however, this success will not be sustainable without additional financial resources and attention to preventive maintenance and major repairs to prevent the system from failing.

- The two operational tanks have stands that are not being painted on a regular basis and it is only a matter of time before corrosion will cause them to fail.
- While the technical knowledge exists to maintain the system (replace parts, tubing, etc.), the Hogar is not able to afford the necessary maintenance (painting) that has caused one of the towers to fail due to corrosion. They also do not have the money to replace the tower that has failed, and therefore are operating at a reduced capacity. It was not clear from our meetings if the lack of preventive maintenance is due to not understanding its long-term importance, a shortage of funds for all but essential repairs, or a combination of these factors.
- Changes in technical knowledge are likely to last as long as Ismael Carrasco works at the Hogar. It does not appear that a written description of routine maintenance or repairs exists or that anyone else has been trained or would be able to provide the minimal maintenance and repairs that Mr. Carrasco does, much less understand and troubleshoot system operation. There is a plan of tasks necessary to bring the third tank on line, but no sense of the cost or how soon work might begin.
- Funding for the Hogar is very tight, especially with the additional financial burden of making up past social security payments. Operating funds from the government and the JFR Foundation are very limited, and the Board member at our meeting talked about raising operating funds by going to local businesses and begging. The newly installed pharmacy and additional space to provide physical therapy and other services to the public for a fee is a promising plan to ensure
additional funding, but we cannot determine how successful these efforts will be or how high a priority will be put on repair of the water system.

La Conquista

Project status

The pedestrian bridge project within this program is fully functional and provides a reliable and safe river crossing for pedestrians, motorcycles and horses at all times of the year.

Actors and/or factors contributing to change

EWB-USA contributed to the changes by coordinating with the stakeholders, performing some elements of design, financing the materials, organizing the labor needed for construction and by some level of maintenance training.

Bridges to Prosperity contributed by providing a large portion of the main bridge design and by providing the main cabling for the structure.

The Municipality of La Conquista contributed by providing and financing some materials, transportation of all materials and by supplying a trained mason to the job site.

The communities of Santa Elena, El Nance and El Panama contributed by providing manual labor, storing materials and performing maintenance, although the extent of these contributions is unknown.

Nica Impact was the Community Contact and contributed by assisting in communication between the groups.

The Ministerio Peniel, a religious organization that provides housing and life skills training to troubled young men, contributed by sending boys to participate in general construction.

Description of change

Prior to construction of the pedestrian bridge, individuals wishing to cross the Las Trancas River had to do so by traversing directly through the water or by using large stones in the waterway. During the rainy season, when the river waters ran at high velocity and elevation, crossing the river was dangerous and sometimes impossible. Stories were collected describing how people would cross the river using ropes or fallen trees which, on a few occasions, resulted in injury or death. Children often arrived to school wet after crossing the river during high water and dangerous water conditions resulted in inability to access health care, schools and other economic opportunities.

All stakeholders, including the women, men, school children and elderly of the communities of La Conquista, Santa Elena, El Nance and El Panama, as well as La Conquista Municipality employees have experienced improved access to goods, services and health care facilities. People no longer need to engage in risky behavior to traverse the river during high water flows. The residents spoke of an increased peace of mind, knowing their loved ones were not in danger and the municipality noted improvement in communication and their ability to provide services to those communities on the far side of the river crossing.
Changes were also experienced by the young men living the Ministerio Peniel who volunteered their time and labor to complete construction of the bridge. These men were provided the opportunity to perform constructive work that benefited the local community, develop a sense of responsibility and perhaps gain a few vocational skills they will be able to use in the future.

The bridge project was highly relevant and has appropriately addressed Santa Elena’s, El Nance’s, El Panama’s and La Conquista’s daily need for safe transportation and access to services.

Significance of change

The change due to the bridge one year after completion is very significant for all individuals and stakeholder groups that must cross the Las Trancas River at the location of the new bridge.

Change compared to expectations

After reading the EWB-USA chapter’s 526 and 901B documents and participating in stakeholder focus groups, all groups expected the construction of a pedestrian bridge that would provide safe, reliable crossing of the river at all times of the year. At the time of this impact review, it appears the changes experienced by the stakeholders are as planned and expected.

Sustainability of change

This impact review was conducted 15 months after the completion of the bridge and the community is currently experiencing its second rainy season. This year’s rains have been very low in comparison with the years previous to the bridge construction, so required use of the bridge has been less than expected. Lower than average stream flow and minimal bridge use has resulted in very little wear and tear on the bridge. While the community has demonstrated their ability to paint the steel and make minor repairs to damaged fencing, major repairs have not been needed and it is unknown whether the community has the capacity to finance or source all types of materials and labor needed for repair or maintenance. Focus group discussions did indicate that community residents did understand the maintenance requirements, where to get most materials and how to get it done.

Lasting changes depend upon the ability of the project to continue to function as designed. Assuming the bridge components have a long life span and proper maintenance and repair occurs, the changes experienced by the stakeholders will likely be very lasting.

La Prusia

Project status

The Repair the Path of La Prusia, a stabilization/paving project at one intersection along the main road, is functioning as designed and is keeping that particular area of the roadway passable for all modes of transportation during and after heavy rain events. There are other portions of the roadway that still experience significant damage and cause transportation disruptions.

Actors and/or factors contributing to change

EWB-USA contributed by working with all the stakeholders involved, providing a portion of the design and financing the materials for implementation. The EWB-USA team also arranged a maintenance
agreement with the municipality’s Department of Public Works. The chapter’s paperwork indicates that the final construction was carried out in a location different from what was indicated in the 525 Report. It is unknown how much the new location impacted the final design details or cost of the project.

The community leaders of La Prusia provided input on the final location and design of repair. It is unclear whether the community participated in the construction.

Casas de La Esperanza, the partnering NGO located in La Prusia, organized community meetings and provided EWB-USA with community information and feedback.

The Department and Director of Public Works in the municipality of Granada provided some materials (sand and stone) and input on the final location and design of the project. The municipality provided the final decision on where to locate the constructed project and added additional design details during implementation such as drainage curbs to direct runoff and stepped water outlet to reduce water velocity and scour.

Moto-taxi drivers often contributed to minor repairs of the main roadway by donating rocks, dirt and small financial donations.

Description of change

The stabilization/paving project is located along the main roadway through the village of La Prussia where a smaller, dirt road joins at a 3-way, T-shaped intersection. A small river runs roughly parallel and adjacent to the main roadway and carries away the rainwater runoff from the nearby roads.

Prior to construction of the project, the rainwater runoff from the side road would flow down into the intersection where flooding would occur and erosion would cause wide channels to develop. The flooding and severe erosion made the roadway impassable for pedestrians, bicycles, motorcycles, moto-taxis and vehicles. To avoid the area, commuters would need to traverse a long detour through private land. It was noted by the community that children would also sometimes miss school and ill individuals would need to be carried to locations accessible by taxi. Moto-taxi drivers reported that they would experience a loss of approximately 300 cordobas per day that the road was not in service. If the damage was minor, repairs would be made by the community – pitching in on labor and materials. If damage was severe, the community was forced to wait many days until the municipality could come with heavy machinery to do the repair. At these times, the municipality expected the community to pay for the fuel necessary to operate the equipment.

The final project consisted of “paving” the intersection with mortared cobblestone and ensuring the roadway’s cross-slope directed the flow of water into the adjacent river. In the few years since construction was completed, this particular intersection has not yet eroded and has been a safe, reliable traverse point. Moto-taxi drivers have reported feeling safer crossing this intersection, even when flooded, knowing that the roadway below is paved. The flooding that does occasionally occur is still dangerous to cross for pedestrians, but typically lasts for shorter durations. The raised curbs, built to direct the flow of water, have provided residents seating while waiting for public transportation. In addition, the children are able to use the area to play games. Unfortunately, erosion and flooding problems still exist along the main road, which cause transportation disruptions. It was noted by the community leaders that damage in other areas have minimized since roadway runoff at this particular intersection is now directed into the river instead of further down the roadway.
Should future repairs be needed, the community cooperative leadership has stated that they have established a fund for materials and that they have the skills needed to perform the necessary repairs. Community members contribute to this fund per their financial ability. The community has noted that there is currently around $2000 in this fund and they are in the process of applying to EWB-USA for a water project, demonstrating an improvement in organization and self-advocacy.

**Significance of change**

The changes in access to services and behavior experienced by the community due to the intersection improvements have been only moderately significant due to the fact that other portions of their main road and side roads still experience damage that causes transportation disruptions.

Community self-advocacy and organization seems to have changed significantly as is seen in the leadership’s efforts towards collecting funds from the residents, partnering with a local NGO and applying for a new project with EWB-USA.

**Change compared to expectations**

The community seems to have expected the cobblestone pavement to have been extended further up the side road, but they also understand that EWB-USA budget constraints prevented this from happening. The community expected the implementation to come sooner than the 1 ½ years it took after the initial assessment trip. They also expressed an understanding that damage to the main roadway would still occur in locations beyond the site of the project improvements and that they would be responsible for repairs since the municipality is generally unresponsive in that regard.

**Sustainability of change**

As long as the community is able to finance and perform the repairs, the improvement in access to services changes resulting from this intersection upgrade should be lasting. If the leadership continues to collects funds from the residents and this money is used to make tangible, lasting changes for the entire community, this will hopefully lead to continued self-advocacy and organization.

**Pueblo Nuevo**

**Actors and/or factors contributing to change**

Community, health committee, water committee, EWB-USA, mayor’s office, Newton-SJdS Sister City Program, Ministry of Health

**Description of change**

When there is enough rain, about 150 out of 350 people in the community are now getting water from a hand-dug well, which is pumped up into a storage tank. It is distributed to three different districts, using rationing methods if necessary. The women who are experiencing these benefits no longer have to carry water 5-6 times a day from the river, with the associated detrimental effects to time budget and health. The women can spend more of their time doing other household chores. The men also used to help carry water, and as a result of the water system they can spend more of their time tending to crops. Children used to help carry water in the morning, and this could make them late for school, so the rate of tardiness has decreased. The EWB-USA team helped the community form the water
committee, which also resulted in the formation of the 3 distinct districts. The community feels that they are more efficient as a result, and more organized with respect to responding to water-related issues, such as collecting fees to pay for maintenance items related to the water system.

The entire community can make use of the clinic as a meeting space, and on the occasions when doctors visit the community, it can be used for medical consults. These occur at a lower frequency than they had been led to believe by the government. Nevertheless, the community has developed a sense of pride for having a health clinic in the first place. The water catchment system at the clinic is working. Some maintenance is not happening, particularly cleaning the first flush.

Public health: When the doctors and/or nurses are visiting, the clinic is a place where medical consults can be conducted with privacy and shelter. Unfortunately, this is only happening about once every other month. Emergencies require a call to a doctor or travel by bus to a clinic or hospital. The clinic building is not stocked with medical supplies. No one in the village was trained in any form of health care.

Access to services: The community has somewhat improved access to health services, as described above. For the 150 being served by the water distribution system, they have access to relatively clean water, essentially unrestricted during times of plenty and rationed when necessary. The water is not chlorinated, as the original intent was to use it to feed the bio-sand filters provided by the Newton-SjdS Sister City Program.

Community organization: The community feels more organized and more efficient with the three water districts as well as the water committee ensuring fair payment for maintenance items. They also feel more empowered to present their case for more medical visits to the Ministry of Health, although this advocacy doesn’t seem to be getting many results.

Significance and sustainability of change

The change in community organization seems very significant and likely sustainable, so long as there is some functioning water system that needs to be rationed. The clinic building is holding up well, and will continue to serve as a meeting space for the foreseeable future, although it is not clear how significant this is to the community, because it only rarely gets used for its stated purpose, as a health clinic. When doctor visits occur, they are better than before the clinic was built because of the additional privacy that it affords. The water system itself is in danger of becoming both financially and technically unsustainable. In the former case, it is the potential withdrawal of support from the mayor’s office, coupled with the difficulties the community would have raising their own funds if the drought continues. The technical sustainability is related primarily to the drought – if there is no water, then the system doesn’t work, and systems that are not used tend to fall into disrepair and get abandoned.

Change compared to expectations

The improvements in water access and community space were expected. The community seemed to be expecting more visits from doctors, in order to use the building as a bona fide clinic, and this seems not to be happening. The increase in community organization or efficiency was not articulated at the outset as an expectation, and hence has emerged as an unexpected positive benefit.
Narrative Summary

Saturday, September 05, 2015

We started with a large meeting, in the health clinic, of the EWB-USA team and community members. Included in the community members were members of the health committee (all female) and the water committee (some male, some female). EWB-USA Nicaragua staff introduced the team and described our mission. He included an explanation that we were not there scouting or soliciting additional projects, and that any community interested in starting projects should feel free to contact him to begin that process. The community leader started by explaining that the EWB-USA chapter who had been there before had clear with the community that they were not coming back. The community was therefore surprised to receive a visit from EWB-USA, and they had no expectations of future projects, but were hoping for some help to improve the existing projects.

Our first question was to ask them their understanding of the history of their projects and their involvement with EWB-USA. Their response was as follows. At one time, the community was dispersed geographically, and decided to form a more concentrated settlement in order to facilitate the delivery of electricity and water. The mayor helped them get the land to make their current settlement. There was a guy named Jorge Sanchez from the mayor’s office who made the first contact with EWB-USA. A team from the EWB-USA chapter happened to be doing work in a nearby community, Jorge was aware of them, and he established the link with this community. The community of Pueblo Nuevo had need of a water project, and the chapter indicated they wanted to do a water project, so it was a good fit.

The mayor’s office paid for the existing well to be constructed. It is hand-dug, at 6m depth. This depth was chosen because that was how far they could get before their budget ran out. The EWB-USA team had contributed some ideas about the appropriate hole diameter, and they did water quality tests on the resulting water. The well was constructed during the dry season; the depth at the time was sufficient to find water. In the last two years, however, there has been a drought, and the well has not been providing water. The EWB-USA team helped with the pump, including electricity to the pump, the water tank, float valve, and control circuitry. Most of the technical work was performed by a technician from the mayor’s office.

The water flows to individual homes, by way of a distribution system whose construction was financed by the mayor’s office. Initially, the water was distributed freely, but since there are shortages, it is now rationed, with the system divided into three sectors. Each day, only one sector is served water, and they are allowed a maximum of 4000L of water. Each sector is about 19 homes. Thus, the water quantity being delivered while rationing is in effect is 4000L / 19 homes / 3 days = 70L per home per day averaged over the cycle.

There are about 350 people total in the settlement; of these, 150 are served by the water system. The rest have to carry water in buckets, either by hand or with a horse, from springs or from the river. This is what everyone was doing before the water system was installed, which encompassed about 3 years.

We then asked what the expectations of the community were with regard to how life would change because of the water system. We asked for separate responses from the women and men. The women replied that there was relief after the well was drilled. Previously, they had to carry water 5-6 times a day, with one bucket on the head and one over the shoulder. This was dangerous and bad for their health. It was also very tiring, because once completed, they had to stand in front of the fire and cook,
and do other household chores, for hours. Thus, their workload was less with the water system. Additionally, the water quality from the well water was better than what they were getting before.

At this point, a woman described an organization that had provided bio sand filters for most of the houses. It turned out to be the Newton, Massachusetts sister city program. Many of these filters are still in use, although anyone who moved into the community after the initial dispersal has no filter. They notice that there is something in the water (perhaps calcium) that clogs the filters, and it is also noticeable when they boil the water. It is a white substance. In any event, no one has diarrhea anymore, and it had been prevalent before. The timing of the introduction of the filters coincides with the water system, so it is not clear which is a bigger contributor to the improved health. The EWB-USA chapter advised the community not to chlorinate the water in the tank, so that they would not kill the organisms in the water necessary for the bio sand filters to work.

The men reported an improvement in time management. They could now spend time working the fields instead of carrying water. They had contributed to the water hauling before, primarily through the use of horses. Another benefit was that now children could get to school on time, rather than being late because of their water carrying duties. The men commented that they are worried because the natural springs seem to be running dry, and perhaps the same will happen to the river.

With regard to maintenance, there is a water committee. When the EWB-USA chapter was here, they helped to organize the committee. The terms of the committee members are annual, and they are elected at a big community meeting. There has been no regular maintenance on the water system for 7 years. The original pump broke after 3 months, and was replaced with a second pump left by the chapter, by a technician from the mayor’s office. The old pump would continue running even when the well was dry, which might be why it broke. The new one has a limit switch. No one in the community knows how to work with electricity, so they have relied on help from the mayor’s office. The second pump lasted until just a month or so ago, and the mayor’s office again sent a technician to replace it, this time with the newer style pump provided by the mayor.

The community does not believe that the support from the mayor’s office will continue; some think the installation of the most recent pump may be the last such event. The mayor’s office did not say explicitly that they will not continue to help the community, but they said to be prepared for such an eventuality by collecting money in a reserve. The community thinks a new pump would cost around 58,000 cordobas. The community’s plan is to collect extra from each family after the harvest – perhaps 200 cordobas, which should return a total of 10,000 cordobas in a year. The problem these last years has been that the water has been so low, and the crops have suffered, so there hasn’t been any excess to sell.

The water committee charges residents a fee to pay for the electricity to run the pump. The funds collected are not enough to pay for small repairs. Someone has to go to Rivas to pay the electric bill, and the cost of this trip includes bus fare and food. If something breaks in a sector, the families in only that sector are responsible for its replacement. If a break occurs on the main line, then the water committee charges extra to everyone to cover the replacement costs. They have to go to Rivas to get replacement parts. The entire distribution system is underground, made from PVC.

The community believes that the project has contributed to community organization because they now have the three sectors. Also, more families are moving closer, and the community can provide services more efficiently. There were no reported negative impacts from the project. Some people are reported
to complain that there is not enough water in certain sectors, but they don’t understand that the well is dry.

The Newton/SJDS sister city program provided about 50 biosand water filters shortly before the arrival of the EWB-USA team. Of those, 6 are still in operation. There is a direct connection between willingness to do routine maintenance and functionality of the filters. Given the current water shortage, it seems to be difficult to justify spending sparse water cleaning the filters. There are some families who were not originally given filters who might want them, but there is no process for re-purposing unused filters within the community.