2017 Nicaragua Closeout Impact Report

A review of two closed and three active EWB-USA programs

Prepared for EWB-USA Impact Analysis

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Contents

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EWB-USA would like to acknowledge the work of the 2017 Nicaragua Impact Review (IR) team members:

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Collado
La Pintada
Managua
San Claudio
Venecia

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Acronyms

CIR	Closeout Impact Review
EWB-USA	Engineers Without Borders USA
IA	Impact Analysis
ICP	International Community Programs
PMEL	Planning, Monitoring, Evaluation and Learning
TAC	Technical Advisory Committee
ToC	Theory of Change
ToR	Terms of Reference

Executive Summary

Impact Reviews (IRs) provide an 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 2017 EWB-USA Nicaragua IR assessed 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 April, 2017, seven team members, including four volunteers from EWB-USA membership, visited three active and two closed program sites in southern Nicaragua to assess 9 implemented projects. These projects were implemented between 2006 and 2016 by five 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, and energy. Project sites with strong non-governmental organization (NGO) partners, municipal partners and no local partners were visited. Of the nine projects, two were considered technically non-functional as designed, one unused community-wide implementation of a solar system and one community-wide chlorination system. The technical status of the remaining projects ranged from moderately to completely functional as designed.

Beyond technical functionality, the IR 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 building community engagement as a key focus of their program work, most of the partner communities which participated in this IR experienced an increase in the level of community engagement to meet their collective needs after the EWB-USA team worked with them. Some communities reported that although they always had community meetings and workdays in the past, they were poorly attended until the chapter worked with the entire community on finding solutions to reported challenges. Others reported that the meeting structure to design and implement a water system was then employed to tackle community trash clean up efforts independent of the chapter's involvement.

Diverse perspectives were gained from the various stakeholders at each of the program site visits, but three main themes arose as key conclusions from this IR: Communication between chapters and communities, Assessment of community priorities/chapter abilities, and Resources beyond engineering.

Communication between chapters and communities: One recurring theme in the IR team's findings was the presence or absence of direct communication between the community and either the chapter or the local partner. Historically, and because of logistical challenges working in remote regions, EWB-USA chapters have relied heavily on communication with local partners who had more reliable access to

phones or computers than community members did. This impact review presented multiple examples of the insufficiency of a connection with a local partner and not directly with the community. More frequent and/or substantial communication was proven to provide better support to communities while also reducing the ambiguity of project status. It also had the potential to ensure the sustainability of implemented projects and ensure that all parties understood next steps in the project development. In cases where the community had regular communication with the EWB-USA chapter, the projects were maintained and still functional as designed. In one clear example of a lack of communication with either the chapter or the local partner, the community was currently not using the project at all and the infrastructure was in storage.

Assessment of community priorities/chapter abilities: The program scope should be defined by the community and be determined after a thorough review of their priority projects. In cases where the skillset of the chapter is not a good fit for the requested assistance, EWB-USA chapters must communicate openly with community leadership to determine another project focus. At some sites, it was clear that the scope of the initial community priority was larger than a chapter could feasibly implement. It was not clear, however, that the chapter clearly communicated plans to reduce the scope with the community. The community must always be the decision makers in project development. It is important to manage expectations throughout the program partnership to ensure that community-expressed needs are met and that partners are not left with a sense that projects are incomplete.

Resources beyond engineering: EWB-USA understands very well that engineering is not the sole solution to meeting community-expressed development needs. We aim to work with communities and local partners who have the capacity to complement the implemented infrastructure with program-sustaining elements like ongoing training, maintenance protocols, and financial systems for operations. In some cases, these associated components to the project technology are not in place and the project has failed to meet the community's needs. Additional non-engineering approaches to complement the program would make the projects more sustainable and potentially have greater impact. Such approaches would include but not be limited to business planning consulting, health consulting, and environmental consulting. As an example, reports of changes in climate affected the two water-related projects in the central and southern part of the country: in Managua, reduced rainfall has lessened the flooding, and in La Pintada, drying up of other wells has brought users from outside the community as customers of the community water system. The EWB-USA chapters did include periphery project components in some of the reviewed programs and were successful in improving the long-term use of the infrastructure. Inclusion of non-engineering aspects of project development in the design could impact the sustainability of the projects.

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

- *Improve quality and frequency of communications between chapters and community members.*
- *Improve alignment of community's proposed scope and chapter skillset.*
- *Increase chapter capacity to include non-engineering resources in project implementation.*

Introduction

EWB-USA began working in Nicaragua in 2004. Currently, there are 32 active programs throughout the country. In-country staff at EWB-USA's field office provided the coordination and logistical support required to design a comprehensive Impact Review (IR). Three active and two closed program sites in Nicaragua were included in the scope of this review, representing 9% of all active and 15% of all closed Nicaraguan programs.

The impact reviews serve to verify the information gathered and reported through chapter impact monitoring reports and to analyze the extent to which the chapters and partners have influenced changes reported in those reports. The principal aim of this IR 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 IR took place from April 24-28, 2017, with travel to Nicaragua occurring from April 22-30, 2017. The team spent the first full day in impact assessment training and five 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:

Community	Project descriptions
Collado (closed)	Solar power at community building
La Pintada (active)	School building addition, water project – well and pump installation, chlorination system
Managua (closed)	School courtyard drainage
San Claudio (active)	Bridge, school – latrines, water tower, handwashing station
Venecia (active)	Water treatment – chlorinator, household flow meters

The IR 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. 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, and who serve as Professional Mentors. None of the team members had any experience with the projects being reviewed as part of this IR.

Approach, Purpose, Methodology and Limitations

Approach

EWB-USA plans to conduct a strategic number of Impact Reviews (IRs) annually on a specified group of 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. IRs 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 IR team is comprised of EWB-USA staff and a small group of trained volunteers.

Purpose

IRs 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 Impact Review

Overall, there are 32 active EWB-USA programs in Nicaragua. The Impact Analysis Director and Nicaragua Country 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 IR.

The scope included active and closed program sites, totalling five sites comprised of 9 different projects implemented by six different EWB-USA chapters. These community projects are representative of EWB-USA's work in the world. The team reviewed projects with the following diverse characteristics:

- Five project types were reviewed: water supply, sanitation, structures, civil works, and energy
- Community-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 2007-2016

The IR also included extensive analysis of the available program monitoring reports submitted by EWB-USA chapters related to each project. The IR 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 IR focused on the following two in each community visited:

Dimension of Change	Areas of Inquiry
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 IR 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 IR 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 IR 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 IR team employed this method through 1) interviews and note taking, 2) group discussions and 3) observations and informal discussions.

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 IR 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 IR 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.

Secondary Data Analysis

Each impact review includes a thorough review of the program reports related to each project. These include the initial program application and subsequent project applications from the communities, in addition to program monitoring reports submitted by the partnering EWB-USA chapter throughout the design development phases. These reports provide a snapshot in time of program status and any issues arising that should be addressed with the EWB-USA chapter to right the course of the program before implementation.

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 IR 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 IR 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 five 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 IR 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

Collado

Program status: Community leaders reported that EWB-USA implemented the solar panel system at the community building. EWB-USA has no record of having installed this system, although an EWB-USA chapter did report that the community had interest in having solar power prior to their assessment trip to the community. The one-panel system was installed in 2009 and operated for three years until shortly before the electric grid arrived. As of 2017, the panel and batteries are stored in the community building and are in good condition; the controller was stolen just prior to the implementation of the grid electricity.

***Actors and/or factors contributing to change*:**
Community of Collado
Mayor of San Juan del Sur (SJDS)
EWB-USA
Other NGOs operating in Collado

Description of change: Schoolchildren did not spend time and energy carrying water the 25 meters from the well to the school up the hill, because the solar power was used for 15 minutes a day to power the pump that filled the water tank at the school. This change allowed them more time at school to study and a better quality of water, since it was pumped directly to the tank rather than carried by hand in buckets. Community members could charge their cell phones without going to SJDS. This was described as an important benefit that allowed them to be in touch with people outside the community and to have better access to services and goods outside Collado. Even families living some distance from the community center could charge their phones more conveniently than before. Community members living near the center of Collado could socialize and relax by watching TV programs at the community building and occasionally utilizing lights at the church across the road.

Significance of change: Schoolchildren: initially, the change was very significant, with access to more school time, less manual work collecting water, and cleaner water provided by the system. However, this change was not sustainable. After two years of operation, the pumps for the well provided first by the Mayor and then by another NGO failed. Although there is now electricity from the grid, without a pump schoolchildren are once again hauling water from the well up to the school.

Community members with cellphones: the solar panel was installed just as cell phones became common in this part of Nicaragua; as a result,this change was very significant through greater access to family and friends and time-saving access to services and products outside Collado. For example, they could phone someone already in San Juan del Sur to ask that medicines be brought back.

Community members with access to TV programs and movies at the community building: change was quite significant. As one community leader said, “Imagine being able to watch TV for the first time in this isolated community.” This communal activity was not sustained when people were able to get electricity

at their homes. The community building did not appear to have electricity at the time of the IR visit, so any shared TV would take place in individual homes or the church.

Change compared to expectations: Community members: Electricity was their first priority submitted to the Mayor, but there was no record or discussion of specific expectations at the time of project implementation.

Schoolchildren, teachers and parents: no information provided, and the IR team was not able to meet with them during this visit.

Sustainability of changes: For community members: access to cell phones is likely to continue for those able to purchase electricity from the grid or for anyone with a private solar panel. Access to communal TV watching and evening church services continues only in homes or if the church has a generator or access to the electric grid.

For schoolchildren: change from solar panel was not sustainable without a working pump. Now, pumped water to the school is unsustainable without a working pump and a source of power.

Technical status and observations: The solar power system has not been functional since 2012-13, since the theft of the controller and arrival of the electric grid. Although no maintenance was demonstrated, the community leader trained to do basic work clearly remembered the cleaning and maintenance process provided verbally to him by EWB-USA.

Overall Summary and Analysis of Findings

For the three years of its functionality, the solar power project in Collado provided a very important change for community members with cell phones by improving their access to the outside world; for community members living close to the community building, being able to relax together and enjoy a TV program was reportedly also an important change. The project provided very significant changes for schoolchildren, increasing their time in school, access to cleaner water and eliminating the hard work of carrying water uphill in buckets. According to the community, the EWB-USA program contributed greatly to these changes by providing all components of the system and installing it with help from the community. The community had prioritized access to electricity, and this project was appropriate and relevant to those expressed needs. While electricity delivered to individual homes has made cell phone usage and entertainment more convenient to families able to pay for this service, household access eliminates the social time spent watching TV programs together and socializing communally in this way. Additionally, the lack of water pump maintenance means that a consistent supply of clean water pumped to the school is even more remote.

La Pintada

Program status: The program was completed during the May 15, 2015 EWB-USA chapter's implementation trip.

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

Community of La Pintada
EWB-USA
Latin American Community Development (NGO)

Description of change: The EWB-USA chapter implemented two general improvements - a 2013 school addition and water supply/treatment improvements. The 2015 water improvements included drilling a well, adding a pump, constructing a well house (for security) including a dual chlorination system, and decommissioning an existing open well. The major stakeholder was the community of La Pintada. The two projects were very relevant and appropriate for their circumstances and priorities. There were overcrowding issues at the school and they were without clean, in-community water for an extended period of time.

Significance of change: The changes were very significant and the community was thankful to EWB-USA and expressed pride in their participation in the improvements. The improvements were sustainable but one of the chlorinators' connections started to leak. The community members were technically trained and had the applicable knowledge to run the water through one side of the system. Instead of repairing the seal, the community voted to use a filter, expressing that the chlorination systems did not seem to add much value. The water committee and the homes we interviewed all agreed on how substantial both improvements were for their quality of life.

Change compared to expectations: The changes were very consistent with the planned improvements. The advance work by the community, e.g. locating and filling bottles for the well house, demonstrated the advanced planning for the improvements.

Sustainability of changes: This IR team observed the school addition and it appears to be well constructed and maintained. The water system is also functioning very well with only minor delivery pipe repairs (not an EWB-USA system) needed. However, the chlorine system suffered a leak and the community elected to replace it with a filter. EWB-USA views this decision as a demonstration of the community's sense of ownership and capacity to manage the system. The continued supply of power for the pump may cause a problem in that it is now being powered "off the grid," i.e. no current financial charges are incurred for pump electricity. If it goes on the grid, the costs could have a measurable impact to the community. Additionally, the increase in users outside of the community is seen as a financial benefit, but this could pose a long-term threat to the water supply.

Technical status and observations: All EWB-USA installed systems are functioning as designed and, other than the pipe repairs (not installed by EWB-USA) and the chlorine system leak, there have been no maintenance issues.

Overall Summary and Analysis of Findings

The impacts to the school improvements were significant and include the following benefits:

- Classrooms are less crowded, facilitating a better learning environment for students
- More teachers are hired, creating better teacher/student ratios

- Students from nearby communities now attending the school instead of traveling farther away and missing days due to distance

The impacts to the community of the EWB-USA water improvements were significant with the following noted benefits:

- Stronger collaboration on community-wide projects
- Community meets monthly for water but now also have a forum to discuss other community needs
- The open well has been closed, which was a safety issue
- Water fees are lower than with the previous shared system – reduced from C$154/month to C$54 (however, with the connection to the grid, the fees will likely rise again to some extent)
- No problems with fee collection now
- There is pride in participation of community projects, e.g. ten people/day supporting EWB-USA
- Whole community participated in collecting and filling bottles for well house construction
- Water is more accessible and being used for animals and plants
- The system also serves other nearby communities

The community leaders and the homes that we visited all confirmed that the improvements changed their lives and were a resounding success.

Managua

Program status: The courtyard improvement project has reduced the amount of water collecting on the courtyard. However, the full drainage project was never installed as designed and never functioned as expected.

To solve the core problem of the two-foot differential elevation between the street and the courtyard, the planned design included raising the courtyard elevation by eight inches, detention vaults and a bypass pipe to carry street water under the sidewalk in front of the school.

The project as installed only re-paved the courtyard, raising it by a few inches. Some water – typically about five inches – still collects, particularly in its lowest corner, where parents made a hole through the front wall in order to drain collected water to the gutter outside. Elsewhere on the property, parents made other changes: they created a walled ditch to keep muddy water from flooding an upper courtyard, thereby reducing the amount of mud coming to the front courtyard, put concrete blocks on a dirt passageway, and built up the sidewalk in front of the school for safe passage.

Lack of full functionality is due to insufficient height of paving, lack of drains and the bypass pipe, and flow of street water into the courtyard through the hole created after the paving was completed.

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

EWB-USA Chapter
Spanish NGO

Fe y Alegria school system
School staff and parents
Local craftsmen
A contributing factor to reduced flooding is the general decrease of rainfall, attributed by the school principal to climate change.

Description of change: Schoolchildren: No longer walking through or playing in up to one foot of muddy water.

School staff: now able to have children use the courtyard more regularly for recess and to release the children from school on time.

Parents: Somewhat fewer parents keeping their children home from school on rainy days.

Significance of change: Moderately significant: flooding is reduced from an average of eight to five inches concentrated in one corner of the courtyard, and other related projects have reduced the mud coming into the courtyard and provide safer passage inside and outside the school.

Change compared to expectations: The school principal expected that the flooding problem would be solved. In fact, it contributed only to "a little less" flooding.

The EWB-USA chapter anticipated that the project would reduce the amount of mosquito-borne illness. This did not occur, since water is still present and trees overhanging the property still create havens for mosquitoes.

Sustainability of changes: These changes will last until the concrete courtyard deteriorates or the level of the street is raised. Neither of these is anticipated in the short term.

Technical status and observations: The repaved courtyard is in good condition, and students sweep it regularly to remove dirt, leaves and trash. The hole in the front wall was clogged with leaves and dirt. The janitor has been instructed to clean it out, but this is difficult to keep up with in the season of leaf fall. No system failure is foreseen. The technical review group of the IR team noted that a grate over the hole in the wall would keep out large leaves, although it would make it more difficult to clean mud from the hole.

Overall Summary and Analysis of Findings

The project resulted in somewhat less flooding and a moderate change for parents, staff and schoolchildren from the risks of playing in or crossing through flooded areas. The EWB-USA program contributed essential planning and funds to these changes. Initial assumptions about the project as designed were likely valid, but the installed project did not meet project expectations. Related changes that impacted the project were created by the parents and staff, who built up the sidewalk in front of the school, created a hole in the front wall to let water drain to the street, and built a walled ditch to reduce the amount of mud coming from an upper courtyard.

San Claudio

Program status: At the time of the site visit, the handwashing station, the water tower and the pilot program latrines were all working and functional. The original scope of the project, a bridge, has not been implemented and the plans are at a standstill. There are plans for implementing latrines in five phases on a household level.

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

Michael Cipoletti
Teachers
EWB-USA Chapter
Parents and children
Local Municipality

Description of change: The school community described changes in access to services, public health, environmental health, behavior, self-advocacy, and community organization. They cited improved access to water at the school through the handwashing station. The children no longer need to carry heavy water bottles to and from school. There were reports of changes in stomach issues and hygiene. It was unclear to the extent, but the parents/grandparents felt that the children were in a cleaner and healthier environment. There is reportedly less open defecation by children and any adults at the school, and therefore fewer disease factors in the environment. A secondary change reported is greater involvement of the community in efforts to pick up trash.There has been an increase of washing hands after using the latrine both at the school and in the home. Women reported needing to do less laundry, since their children were washing their hands rather than wiping them on their school uniforms. The IR team noted, however, that there was no soap at the time of visit. The school community feels an increase in pride in the school for the nice facilities. Another source of pride are the flowers they are able to grow with the convenience of the hand washing station for watering. The community members and school staff understand the new latrines and how to operate them. It is reported that there is greater participation in the environmental committee in the community, which was attributed to the increase in community unity that resulted from the implementation of these projects. The community is planning on creating a garden for the school which now can be done since they have a reliable source of water at the school.

Significance of change: The seemingly most significant change for the community is the shift in access to services. Many of the other changes are consequence of this change. As a result of the access to water, there is an increase in pride which is evident and expressed multiple times by those we interviewed. The burden of carrying water and cleaning materials to and from school each day is alleviated. which has an effect on a daily basis. The increase in hygiene has transferred to the home where it was reported that behavior is changing. More time will be needed to determine the consequences of the increase in community organization. Because changes in public health are not easily quantified, their significance cannot be determined.

Change compared to expectations: What was expected for the implemented projects was an improvement in health. Parents reported that there were fewer stomach problems after the implementation of these projects. There were many changes that were surprises such as less laundry, increase in pride, being able to grow flowers, hygienic hand washing practices in the home and children not making the choice of having to choose how to use their limited amounts of water between drinking, washing hands and watering plants.

Sustainability of changes: There was no soap used in the hand washing process during the site visit, so the sustainability of the improvements to health is in question. Also, the facilities are only used in the morning at the school and locked up to prevent theft.

The increase in ability to self-advocate and community unity are most likely to continue but are subject to future community dynamics.

An obstacle to the sustainability of the project is the maintenance requirement of procuring chlorine tablets. At the time of the visit, they had enough supply for the next couple of months. The local municipality provided the initial supply of tablets as a one-time gift. Those interviewed indicated there was no plan set in place as to how to replenish the stock of tablets. This will need to be addressed for the system to work to its full capacity.

Technical status and observations: All implementations were technically running with no problems reported. There is regular cleaning and operation reported. However, the compost has not been used because they did not have the volume of material required at the suggested 6 month mark. Whether this feature will be used is yet to be determined (though there is reported interest and value perceived in the compost). There was training on operation and the chapter left pamphlets. No reported guidelines or plans for future repairs if necessary. No reported plan for when the chlorine tablets run out.

There are reported plans for a further implementation of more latrines for individual families. The latrines at the school are considered part of a pilot program. The plans for implementation will be in five stages.

Overall Summary and Analysis of Findings

The initial project of the program, the bridge, is not being addressed. However, there are other implementations (handwashing station, corresponding well, tank and latrines) that are reported to have created positive changes along with plans for further implementation of latrines on the household level. EWB-USA contributed to the changes through technical implementation and operations training. The primary expectations for the implemented projects was an improvement in health and it is reported that this was met. Verification of the extent of this change is not possible due to the lack of thorough collection of health data at the onset of the project, the limited time of the project and the inability of the IR team to interview more members of the community. The unanticipated changes were positive and talked about passionately by the members of the community. Overall, the original community priority is still yet to be addressed, but all the implemented projects have created a positive change in

the daily lives of those with access to the implementations. There is concern for sustainability with no plan to replace the chlorine tablets.

Venecia

Program status: The program in Venecia is currently active, but the functionality of the project is debatable. The primary project implemented was the installation of a chlorinator in an existing water system; an elevated structure was also constructed to better position the tank and chlorinator to feed the community. A subsequent proposed project includes the installation of household flow meters to better monitor water usage and alternatively implement a per usage water charge. Note that there is a secondary water source proposed by the municipality, separate from the system with which EWB-USA had worked.

At the time of impact review, the chlorinator was not in use as this part of the water system was not operating correctly; the community had been without water for some time and had been working to fix the system. It seems that, though sustainable water supply from the current system was a concern voiced by the community, the lack of functionality of the system is due to damage of the piping and possibly by tampering from the community (in an attempt to secure continued water source).

It was unclear the exact reason for the system currently not functioning; however, a root cause of community tampering is due to their concern of not having a secure/continued water source. The system cannot naturally overcome a "critical point" in the system (due to elevation changes/pressure requirements) and the community, when water is available, has manually altered the piping to ensure maximum distribution/gathering. It seems a pump was also installed by the community, separate from the project, and this may have affected the current system.

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

Community of Venecia Water Committee
EWB-USA Chapter

Description of change: The primary stakeholder is the community. It seems changes are relatively minimal based on the lack of security of water system; the initial need prioritized by the community was to have a secure water source and this need has yet to be met. Changes seen by the community from implementation of the chlorinator are negligible since the chlorinator is not in use. The community now spends more time on maintaining the system, thereby spending less time farming/working. The community is also facing potential disputes due to water usage and payment, though it is difficult to determine if there is an increase of this risk directly attributable to the work implemented by EWB-USA.

Significance of change: Changes seen by the community are not significant.

Change compared to expectations: As discussed during implementation review, initial community expectations were unclear; though it seems likely that they were not met as water sourcing is not yet secure and the critical point has yet to be addressed.

Sustainability of changes: Until the "critical point" is overcome, the existing system will not be sustainable for the community. The implementation of the chlorinator may be sustainable if the community can secure continued funding for chlorine tablets and continue maintenance of the system, though training materials were not formerly supplied and sustainability of maintenance knowledge will be verbal from community member to community member. Note that community already has not kept up with chlorinator maintenance and this reflects likely failure of system long term.

Technical status and observations: Project is technically not being used since the water system was down at the time of visit. To ensure technical sustainability of project, the "critical point" must be overcome and alternative projects are secondary to this and likely will not have meaningful impact.

As mentioned previously, the community has implemented its own kind of maintenance on the system (switching valves, installing pump etc.) in order to secure water, though they were not maintaining the chlorinator as it was not in use at the time of visit.

Overall Summary and Analysis of Findings

It seems the primary concern of the community was not met, i.e. they still do not have a secure, sustainable water source. Until the critical point is overcome, use of the chlorinator is not sustainable or useful, nor does it provide added value to the community. The community seemingly manipulated the existing system to provide ample water, when available, though this re-route bypasses the chlorinator and also is not a reliable source due to system outages and lack of source water. Proposed installation of household flow meters does not add value to the program. Overall, maintenance of the system could be undertaken by the community, but EWB-USA did not provide formal training and/or maintenance materials to the community, so longevity of the system is questionable.

There also seems to be ambiguity as to roles and responsibilities with the project/program; the community, EWB-USA, municipality and NGO do not seem to have clear roles and this also attributes to the lack of sustainability of the project.

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 nine projects in three active and two closed programs demonstrates the nuances of the term "successful." Many of the projects reviewed are technically functional and being maintained by the community years after implementation, albeit it in somewhat compromised conditions. Some of the projects reviewed have been maintained by the community leadership and some were non-functional or their use abandoned at the time of the IR visit. In four of the five community's visited, the leadership in the community had taken ownership of the projects to the extent that they had modified them or were using them differently, which we see as one type of success.

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 IR, 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 three main themes arose as key conclusions from this IR: Communication Between Chapters and Communities, Assessment of Community Priorities/Chapter Abilities, and Resources Beyond Engineering. 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.

Communication Between Chapters and Communities

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. One recurring theme in the IR team's findings was the presence or absence of direct communication between the community and either the chapter or the local partner. Historically, and because of logistical challenges working in remote regions, EWB-USA chapters have relied heavily on communication with local partners who had more reliable access to phones or computers than community members did. This impact review presented multiple

examples of the insufficiency of a connection with a local partner and not directly with the community. More frequent and/or substantial communication was proven to provide better support to communities while also reducing the ambiguity of project status. It also had the potential to ensure the sustainability of implemented projects and ensure that all parties understood next steps in the project development. In cases where the community had regular communication with the EWB-USA chapter, the projects were maintained and still functional as designed. In one clear example of a lack of communication with either the chapter or the local partner, the community was currently not using the project at all and the infrastructure was in storage.

IR team recommendation

Improve quality and frequency of communications between chapters and community members.

- Provide a current glossary/definitions/instructions document relating to possible communication methods for chapters (college and professional) and communities, e.g. email, WhatsApp, conference calls, Google Drive etc. Chapters are most frequently using email and phone calls, but community members are communicating in many new ways.
- Provide teams with recommended guidelines on frequency of communication.
- Provide teams with suggestions on what milestones they should be collecting community feedback during the design of the project to ensure that the community is driving the project development in an informed way.

Assessment of Community Priorities/Chapter Abilities

The program scope should be defined by the community and be determined after a thorough review of their priority projects. In cases where the skillset of the chapter is not a good fit for the requested assistance, EWB-USA chapters must communicate openly with community leadership to determine another project focus. At some sites, it was clear that the scope of the initial community priority was larger than a chapter could feasibly implement. It was not clear, however, that the chapter clearly communicated plans to reduce the scope with the community. The community must always be the decision makers in the project development. It is important to manage expectations throughout the entire program partnership to ensure that community-expressed needs are being met and that our partners are not left with a sense that projects are incomplete.

IR team recommendation

Improve alignment of community's proposed scope and chapter skillset.

- Measure success by how well the implemented infrastructure aligns with the community's defined priorities, not simply how well the projects are functioning technically.
- Develop tools for in-country staff to use in confirming the proposed scope of the program during the community application phase.

- Include thorough skills assessment at the chapter adoption phase to ensure that their skills align with the community's expressed needs.
- Facilitate a smoother process for chapters to request to transfer the program to another chapter, or request partnership with another chapter, to implement the community's proposed scope.
- Provide guidance to project teams on clear communication about changes in scope. Reductions in scope are acceptable with clear documentation of discussions with community partners about the change.

Resources Beyond Engineering

EWB-USA understands very well that engineering is not the sole solution to meeting community-expressed development needs. We aim to work with communities and local partners who have the capacity to complement the implemented infrastructure with program-sustaining elements like ongoing training, maintenance protocols, and financial systems for operations. In some cases, these associated components to the project technology are not in place and the project has failed to meet the community's needs. Additional non-engineering approaches to complement the program would make the projects more sustainable and potentially have greater impact. Such approaches would include but not be limited to business planning consulting, health consulting, and environmental consulting. As an example, reports of changes in climate affected the two water-related projects in the central and southern part of the country: in Managua, reduced rainfall has lessened the flooding, and in La Pintada, drying up of other wells has brought users from outside the community as customers of the community water system. The EWB-USA chapters did include periphery project components in some of the reviewed programs and were successful in improving the long-term use of the infrastructure. Inclusion of non-engineering aspects of project development in the design could impact the sustainability of the projects.

IR team recommendation

Increase chapter capacity to include non-engineering resources in project implementation.

- Partner with organizations who have expertise in public health or business development and provide applicable trainings that are associated with the implemented technical project.
- Provide scope assessment training and guidance on maintenance training for implemented projects.
- Develop expertise in climate change prediction and impacts in order to better support chapter/community projects. Guide chapters to provide support to communities and local partners in water planning and future management.
- Improve reporting project results to communities and local governments in a way that increases their capacity to self-advocate within their governing structure.
- Add optional sections to the project documentation for consideration of non-engineering approaches that may complement the program.

Lessons for Future Impact Reviews

The principal aim of this IR 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. This trip also 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 IRs.

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.
- Provide additional information on the current situation through pre-trip community visits to prepare the community as well as the IR team for what to expect at the site.
- Provide clear instruction on how to complete the review forms provided for use during the trip and document development.
- Require review of previous EWB-USA IR reports.
- Clearly establish the timeline for document review, production and publishing.
- Provide more detail for those IR team members not leading the day so they can contribute to the review in an informed way.

Data gathering in the field

- Break out into household interview teams as soon as possible to avoid duplication of stories from households present at the community focus group discussions.
- Provide more training on the methodologies, techniques, and specific questions to use during the community visits.
- Pack a lunch for flexibility in the schedule. This could allow for more time in the community for household interviews. However, the team would need to remain sensitive to eating lunch in front of host community members.
- Do not plan to visit more than one community in a day for impact review.
- Look intentionally for patterns of success factors to identify areas for future program improvements. For example, if *communication between chapters and communities* or *following the communities' priorities* begins to present as commonalities between projects reviewed, flag these in a systematic way to provide clear guidance for the ICP program team to focus resources for improvement.

List of Appendices

Appendix 1: Impact Review Itinerary

Date	Activity
Sunday, April 23	All day training
Monday, April 24	Venecia program visit (2 projects)
Tuesday, April 25	San Claudio program visit (3 projects total)
Wednesday, April 26	Managua program visit (1 projects)
Thursday, April 27	La Pintada program visit (2 projects)
Friday, April 28	Collado program visit (1 projects total)
Saturday, April 29	Report writing and wrap-up meeting

Appendix 2: Programs Map – Nicaragua

Appendix 3: Secondary Data Reviewed

Community	Document Type	Document Description
La Pintada	501	New Program Application
La Pintada	525	Pre-implementation
La Pintada	525	Pre-implementation
La Pintada	526	Post-implementation
La Pintada	Community Education Plan	Community Education Plan
Managua	501	New Program Application
Managua	507D (525)	Pre-implementation
Managua	527	Closeout
San Claudio	501	New Program Application
San Claudio	501B	New Project within an Existing Program
San Claudio	502	Chapter Program Application
San Claudio	522	Post-assessment
San Claudio	901B	Program impact monitoring
San Claudio	901	Program Plan and Baseline Study
San Claudio	902	Project Partnership Agreement
San Claudio	Community Statement of Intent	Initial community agreement
Venecia	501	New Program Application
Venecia	501	New Program Application
Venecia	501B	New Project within an Existing Program
Venecia	525	Pre-implementation
Venecia	526	Post-implementation
Venecia	905	Logframe
Venecia	903	Implementation Agreement
Venecia	MOU	Agreement prior to 902/903
Venecia	524 PE comments	PE comments on review of draft design
Venecia	901B	Program Impact Monitoring
Collado	501	New Program Application
Collado	521	Pre-assessment
Collado	521 PE notes	PE comments on review of trip report
Collado	522	Post-assessment
Collado	522 PE notes	PE comments on review of trip report

