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POST-PROJECT ASSESSMENT OF PIT LATRINES IN RURAL PANAMA

Jacob B. Midkiff
Michigan Technological University

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By

Jacob B. Midkiff

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Department of Civil and Environmental Engineering

Report Advisor: *Dr. David Watkins*

Committee Member: *Dr. Brian Barkdoll*

Committee Member: *Dr. Craig Waddell*

Department Chair: *Dr. David Hand*

Table of Contents

List of Figures

List of Tables

List of Acronyms

AEA	American Evaluation Association
APCD	Assistant Peace Corps Country Director
CEHDP	Community Environmental Development Plan
CHC	Community Health Clubs
CLTS	Community-Led Total Sanitation
COS	Close of Service
EH	Environmental Health
FITU	Focus In Train Up
GDP	Gross Domestic Product
GINI	a measure of income inequality
HAMA	la Herramienta de Analizar el Manejo del Aqueducto
HWF	Hand Washing Free
IDAAN	Instituto de Aqueductos y Alcantarillados Nacionales
IHHS	Individual Household Hardware Subsidy
IST	In-service Training
MGD	Millennium Development Goal
MINSA	Ministerio de Salud
MR&E	Monitoring, Reporting, and Evaluation
NGO	Non-governmental Organization
OD	Open Defecation
ODF	Open Defecation Free
PACA	Participatory Analysis for Community Action
PCPP	Peace Corps Partnership Program
PCV	Peace Corps Volunteer
PHAST	Participatory Hygiene and Sanitation Transformation
PI	Post Indicator
PST	Pre-service Training

SI	Sector Indicator
TSSM	Total Sanitation/Sanitation Marketing
UN	United Nations
WASH	Water, Sanitation, and Hygiene
WasteSTAR	Waste Systems Technical Assistance Report
WaterSTAR	Water Systems Technical Assistance Report
WHO	World Health Organization
WSP	Water and Sanitation Project

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Abstract

In Panama, one of the Environmental Health (EH) Sector's primary goals is to improve the health of rural Panamanians by helping them to adopt behaviors and practices that improve access to and use of sanitation systems. In complying with this goal, the EH sector has used participatory development models to improve hygiene and increase access to latrines through volunteer managed latrine construction projects. Unfortunately, there is little understanding of the long term sustainability of these interventions after the volunteers have completed their service. With the Peace Corps adapting their Monitoring, Reporting, and Evaluation procedures, it is appropriate to evaluate the sustainability of sanitation interventions offering recommendations for the adaptions of the EH training program, project management, and evaluation procedures.

Recognizing the need for evaluation of past latrine projects, the author performed a post project assessment of 19 pit latrine projects using participatory analysis methodologies. First, the author reviewed volunteers' perspectives of pit latrine projects in a survey. Then, for comparison, the author performed a survey of latrine projects using a benchmarking scoring system to rate solid waste management, drainage, latrine siting, latrine condition, and hygiene.

It was observed that the Sanitation WASH matrix created by the author was an effective tool for evaluating the efficacy of sanitation interventions. Overall more than 75%, of latrines constructed were in use. However, there were some areas where improvements could be made for both latrine construction and health and hygiene. The latrines scored poorly on the indicators related to the privacy structure and seat covers. Interestingly those are the two items least likely to be included in project subsidies. Furthermore, scores for hygiene-related indicators were low; particularly those related to hand washing and cleanliness of the kitchen, indicating potential for improvement in hygiene education.

Based on these outcomes, the EH sector should consider including subsidies and standardized designs for privacy structures and seat covers for latrines. In addition, the universal adoption of contracts and/or deposits for project beneficiaries is expected to improve the completion of latrines. In order to address the low scores in the health and hygiene indicators, the EH sector should adapt volunteer training, in addition to standardizing health and hygiene intervention procedures. In doing so, the sector should mimic the Community Health Club model that has shown success in improving health and hygiene indicators, as well as use a training session plan format similar to those in the Water Committee Seminar manual. Finally, the sector should have an experienced volunteer dedicated to program oversight and post-project monitoring and evaluation.

1 Introduction

1.1 Introduction

In 1990 the United Nations developed the Millennium Development Goals (MDG's) to be a wide ranging blueprint for improving the lives of the world's poorest populations by the year 2015. Goal 7.C of the MDG's is a call to reduce by half the portion of the population without access to water and sanitation by 2015 (United Nations). While the latest data indicates that the goal has been achieved for water, as of 2010 nearly 2.5 billon people still lacked access to an improved source of sanitation, and it appears that the goal will not be reached by 2015 (World Health Organization (WHO) and Unicef 2012).

Additionally, regional or even country specific scores tend to leave out an important aspect of the access to sanitation. The difficulty in reaching the sanitation goal lies mostly among rural populations, as an estimated 53% of rural populations still lack access to proper sanitation. The disparity in access between urban and rural populations is high worldwide. Therefore, while a country may report having a high level of sanitation coverage, smaller rural populations within that country may have extremely low access to sanitation. For example, in Panama the country-wide access to sanitation was 68%, but the Comarca Ngobe-Bugle, a rural indigenous reservation, reported 51% of the population without access to proper sanitation (Electoral Tribunal, 2010).

UNICEF estimates that 4000 to 6000 children a day die from diseases associated with poor access to water, sanitation, and hygiene (Moe & Rheingans, 2006). Additionally, the WHO reports that infectious and parasitic diseases account for 10% of the worldwide disease burden and that at any time half of urban populations of Africa, Asia, and Latin America have a disease associated with water, sanitation, and hygiene (Mara et.al., 2010). There is a strong link between poverty and poor sanitation. A study of access to improved sanitation in 35 countries in sub-Saharan Africa found that over 90% of the urban wealthy had access to improved sanitation, while the rural poor only had 15% access. A more direct comparison of urban poor to rural poor finds that access is 42 and 15%, respectively, highlighting the disparity between access to sanitation in urban and rural settings. Of those without sanitation, 32% also do not have access to potable water (WHO & Unicef, 2012). Among rural populations, improved sanitation is usually provided by some form of pit latrines or composting latrines. Even after improved sanitation is provided for a community, sometimes those technologies are slow to be adopted, or the projects are never put into use. (Robinson, 2006; Harvey, 2011)

While for the purposes of the MDG's the UN calls sanitation improvement only latrines, in reality it includes several other factors. Any attempt at improving sanitation should include hand washing andgrey water and solid waste disposal, in addition to latrines (Robinson, 2006; Kal & Chambers, 2008). Many times behavior change interventions such as hand washing can be difficult to get adopted. Additionally, many studies have found that even if desired practices are initially adopted, they tend to fall out of practice once the intervention programs have ended in the communities (Whaley & Webster, 2011).

1.2 Objectives

The Environmental Health Sector of Peace Corps Panama uses a participatory development model to implement pit latrine projects in Panama. Community participation and involvement are used in conjunction not only to complete projects, but also to build capacity within the communities where the projects are implemented. Volunteers are trained in ways to educate community members on proper hygiene, project management and construction skills, among other skills. However, little standardization of project implementation and training methodologies has been mandated in the form of reporting tools and training documents. Nevertheless, using this methodology the Peace Corps Panama is contributing to improved access to sanitation and health for Panama's rural and indigenous populations.

While the immediate impacts of these interventions are reported, very little information exists on the long term performance of the projects. Therefore, this report has the following objectives:

1) To present the results of a post-project evaluation of pit latrine projects constructed by the EH sector of Peace Corps Panama;
2) To offer recommendations for improved training, standardized project implementation, and post-project reporting based on those results;
3) To create an easy to use and effective evaluation tool to gauge the success of sanitation interventions;

This report is meant to be a practical guide for Peace Corps Panama's EH sector in a continued effort to adapt the sanitation portion of the sector's work. In addition it evaluates the progress of Panama's EH program in adapting to the Peace Corps Monitoring, Reporting, and Evaluation initiative. In doing so, the author has developed tools new that can be used to evaluate the efficacy and sustainability of the sanitation program.

1.3 Organization

Chapter 2 presents relevant literature on participatory approaches to sanitation intervention, as well as a review of monitoring and evaluation case studies and their outcomes. Additionally, a review of the Peace Corps approach to monitoring, reporting, and evaluation strategy is presented. The chapter goes on to discuss relevant details about Panama, provide a local picture of sanitation, and evaluate Peace Corps' role in sanitation projects and their monitoring and evaluation.

Chapter 3 discusses the methodologies used in data collection for this report. Included is a discussion of the questionnaire distributed to past volunteers, as well as a detailed description of the survey used to evaluate the sanitation scores of households.
Chapter 4 presents the results of both the volunteer questionnaire and the latrine surveys for the 19 communities surveyed. Additionally, analysis and comparisons of the data are presented.
Chapter 5 presents the conclusions and recommendations developed during this evaluation.

2 Background

2.1 Participatory Sanitation Intervention Strategies

Historically, sanitation interventions in the developing world have been based around subsidies from NGO's or government agencies and top-down project implementation. However, as is evidenced by the lagging progress in meeting the MDG for sanitation, those interventions have often yielded poor results (WHO and UNICEF, 2012). In recent years the focus on subsidy based, top-down sanitation interventions has begun to be phased out and replaced with low-cost participatory based sanitation interventions, with varying levels of success. In particular, two participatory methodologies have begun to show signs of success and are gaining widespread adoption in developing communities around the world. These are Community-led Total Sanitation (CLTS) and Community Health Clubs (CHC), which have many thematic similarities but somewhat different methodologies.

The CLTS model focuses on the use of participatory development tools and a shame-based triggering event in order to motivate communities to end open defecation. In doing so, it focuses on holistic sanitation behavior change rather than constructing latrines. The model is based on the theory that ensuring that a community is 100 percent free of open defecation is the key to improving community health. In order to meet that goal, the model uses the procedures described in Table 1.

Table 1: Procedures for CLTS interventions

Pre-triggering	Communities are visited and selected for interventions based on factors such as current community practices, physical environment, social and cultural concerns, and program and policy presence. It is recommended that this take anywhere from ½ day to 1 week.
Triggering	Triggering is a one day activity in the community where by facilitators use participatory tools to ignite change. First, there is a transect walk of defecation areas, followed by a mapping activity to identify problem areas. Both before and after the activities the facilitator is expected to create a sense of shame using grotesque terms for feces, smell, the disease pathways, and other participatory development tools. The hope is that this motivates the community to implement change internally.
Post-triggering	After the triggering event, facilitators are to support the community and keep momentum going. This is done by encouraging and identifying leaders, providing education and information, facilitating access to materials, setting goals, organizing monitoring and evaluation, and other needed activities. This should lead to an Open Defecation Free (ODF) community in 3 – 6 months.

In practical terms, the Community Health Club (CHC) interventions follow a relatively simple procedure. Initially, a health professional enters the community and explains the health clubs and what members will be required to do in order to successfully obtain and maintain membership. The actual health and hygiene trainings are typically administered by the health professional and consist of participatory trainings developed by the WHO in their Participatory Hygiene and Sanitation Transformation (PHAST) manual (WHO, 1998). Typically, in conjunction with health and hygiene trainings, the CHC interventions foster community organization and empowerment through the forming of executive committees. The goal is that after gaining a better understanding health and hygiene, the community will be able to self-identify potential areas of improvement. Having formed the clubs and an executive committee, the community should be able, with some help from the trainers, to develop and implement strategies for improving the health and sanitation of the community (Waterkeyn & Craincross, 2005).

There are some common themes between the CLTS and CHC methodologies. First, both methods focus on the ideas of ending open defecation rather than latrine construction, of participatory methods to spur action, and facilitation rather than teaching. Both use participatory training sessions to create a demand for sanitation improvements in the community. Both models promote community ownership of the projects by creating either health clubs (CHC) or executive committees (CLTS) that help to guide the communities through the transformations. In both cases, the group facilitating the intervention provides organizational and educational support to the communities, but the transformation itself should be controlled by the community members. Therefore, if communities are lacking strong potential leaders who can organize and guide the population to buy into the process, it will be difficult for a hands-off intervention to succeed. The success of these interventions is highly dependent on the facilitator's training, skill level, and motivation. A poor facilitator can sink an intervention. Additionally, the models are more successful in small rural settings than in urban settings with larger populations, perhaps because sanitation solutions in high population areas tend to be more complicated and costly. Another potential reason is that small rural social structures are more susceptible to the shame-based interventions or a common unity that comes from the forming of health clubs. Finally, it has been found that as some projects age and post project assessments are done, if emphasis is not placed on post project follow-up, then the motivation to make a change tends to wane and there is a regression to previous more undesirable behavior (Oko-Williams, 2011). Neither method promotes a standardized top-down design but rather a flexibility allowing community members to choose locally appropriate, sustainable, low-cost latrine designs.

While there are many similarities between the two methodologies, there are also some key differences that need highlighting. First, CLTS promotes a "shaming" methodology that includes vulgar language and forcing community members to feel uncomfortable about their sanitation habits. The theory is that this shame will create a drive in the community to improve, and a system of organization and peer pressure will guide the changes. Conversely, the CHC model forms clubs that are then educated about health and hygiene. The idea is that these trainings will create a "common unity" or peer pressure in the community to address sanitation issues on their own. Both methodologies strive for the same result but, the use of shaming in CLTS is a key difference in approach.

Another difference in the two methodologies is their goals. CLTS aims to end open defecation but focuses less on other health and hygiene practices. On the other hand, CHC focuses on general health and hygiene trainings that include eliminating open defecation, but the focus is more on health and hygiene as a whole rather than on the disposal methods of human waste.

A final difference in the two methods is the quantity of time spent and number of meetings held in each community. CLTS includes three meetings with the community in order to "trigger" a change. In some locations follow-up is done to keep the momentum going and provide additional technical and organizational support, but the actual triggering event is short and intensive. The CHC model often includes around 20 independent visits to communities for formal health and hygiene trainings where community members must present their cards to be signed as proof of attendance. While the meetings are shorter and less diverse than the CLTS triggering events, it represents a longer term commitment to the community and may offer more time to build mutual confidence between community members and trainers.

As the models have gained wider use, some adaptations have become common. In some locations, they have been used in conjunction with a sanitation marketing campaign in order to create a local market for latrine hardware to meet the demand created by the CLTS intervention (Whaley & Webster, 2011). Another common adaption is that instead of allowing the community members to build any kind of latrine they like, the facilitator provides some guidance in the form of different technology choices or designs (Chambers, 2009). Some projects have even combined CLTS with a subsidy or hardware to implement a total sanitation improvement, while helping the lowest income beneficiaries to meet the cost of an improved latrine (Pattanayak et. al., 2009).

2.2 Monitoring and Evaluation of Participatory Sanitation Interventions

Both the CLTS and the CHC models are relatively recent developments in sanitation, and there is a limited amount of available post-project evaluation of their performance. However, a few studies have assessed some of the benefits and deficiencies of the two models. Something can also be determined about appropriate methodologies and parameters for evaluation.

Two studies in particular are useful in developing evaluations of Peace Corps Sanitation projects. In 2005-2006 a study was implemented to evaluate the efficacy of a program in India that combined social marketing, community-led total sanitation, and subsidies (Pattanayak, 2009). The purpose of the study was to evaluate which factors, if any, motivated project participants to construct latrines. The second was implemented in 2010 by Whaley and Webster, who completed a review of CHC and CLTS projects in Zimbabwe in an effort to compare the effectiveness of the different methodologies. The objectives of the study were to complete:

- A comparison between approaches of select indicators of sanitation and hygiene status.
- An analysis of the motivation for change by project beneficiaries.
- An analysis of factors influencing the effectiveness and sustainability of the approaches.

In both cases the project implementers initially formed focus groups to help develop a survey to evaluate the project. Those focus groups and semi-structured interviews were used to develop the surveys used to perform the evaluations. In the case of the CLTS study, the groups indicated that there should be more than just a presentation of basic health information, with a focus on education and communication about the need for a strong, sustained, widely accepted

commitment to improve sanitation. Additionally, the implementers identified two keys to the potential success of the project: the support of district administrators, public health engineers, and NGO's; and the training of government civil engineers in social engineering. In the survey, questions were asked to evaluate the perceived overall cleanliness of the villages, the most important improvement for community members (roads, water, or sanitation), how latrines affect women's privacy and safety, and whether the government or private individuals should be responsible for paying for latrines (Pattanayak, 2009). In the study by Whaley and Webster (2010), the survey evaluated whether the household practiced open defecation, cat-type defecation (digging a hole and burying), or used a latrine. If the household had a latrine, the investigator evaluated several characteristics of the latrines such as usage, cleanliness, covering practices, and general maintenance. In order to evaluate hygiene, the investigators observed the presence of a hand washing station and looked for the presence of soap or ash for use in hand washing.

The evaluation of the CLTS project in India was conducted immediately before and after the implementation in order to understand how successful the methods were in decreasing open defecation in the communities. The evaluation was completed in 1086 households, including 534 which participated in the intervention and a control group of 552 which did not. The survey was conducted by 30 trained college graduates who were fluent in the local language. The interviews were conducted with the primary care giver of the household, typically the mother, and the initial questions were set up to extract the desires and motivations of community members

The Whaley and Webster (2010) study was performed in communities in three different districts of the country, covering 10 communities and 233 households. One-hundred of the households surveyed participated in a community health club, 103 households had been involved in a Community Led Total Sanitation intervention, and 30 households had been involved in both types of interventions. The survey was conducted over 7 weeks during 2010. The interventions had begun in all of the communities in 2008 or 2009, allowing for a minimum of a year between initial intervention and evaluation. The evaluation team consisted of two people: a researcher and a translator. The observations were conducted during unannounced, informal visits to the households to get a more accurate view of daily practices.

The studies provided some important outcomes that can help to identify some potentially valuable information for the designs of a similar study in Panama.

- There was a 29% increase in latrine usage after the intervention with no statistical increase in the control group. Approximately 1/3 of the motivation for constructing a latrine was receiving a subsidy and that 2/3 of the motivation was based on the shame and peer pressure that the CLTS intervention created (Pattanayak, 2009).

- The comparison study found that both methods were effective in reducing open defecation (OD), with 95% of CHC participants and 86% of CLTS participants not practicing OD (Whaley & Webster, 2011).

- Education in itself may not be enough to bring about behavior change. However, where CHCs were used, more improvement in health and hygiene behavior was observed than with CLTS (Whaley & Webster, 2011).

- Affecting and sustaining change depends in part on the number of face-to-face interactions an approach provides. While on average CLTS offers three of these interactions, the health clubs consist of 20 sessions (Whaley & Webster, 2011).

- While CHCs effectively promote hand washing, CLTS largely failed to do so (Whaley & Webster, 2011).

2.3 Monitoring and Evaluation

2.3.1 Focus In Train Up (FITU)

The Peace Corps completed a Comprehensive Agency Assessment in 2010 (Peace Corps). Since that time the agency has been implementing strategic recommendations from that report. Additionally, the agency has developed a new strategy called "Focus In/Train Up" (FITU) that is designed to facilitate the work of staff at post around the world. The strategy is developed in order to best meet the demands of the sectors and countries Peace Corps works in, while focusing on the effective training of potential generalist volunteers (applicants that may not have a background that is applicable to the sector's work). The FITU strategy asks questions in the following five core areas:

- Training: What can we effectively train generalist Volunteers to do?
- Excellence: What can generalist Volunteers do best?
- Impact and Effectiveness: Concentrating on evidence-based activities, how can we maximize and measure our impact?
- Demand: What are the strategic development priorities of our host countries and partners?
- Synergy: How can we enhance synergy with development efforts and leaders?

The last three of the five core questions (Impact and Effectiveness, Demand, and Synergy) point towards the adaptation of a monitoring and evaluation plan that meets host country needs with standardized, easily measureable reporting metrics. The need for a monitoring and evaluation plan is apparent in the new monitoring and evaluation strategy described in the following section.

2.3.2 Peace Corps MR&E Strategy

The American Evaluation Association (AEA) is the organization for professionals who perform program evaluation, personnel evaluation, technology, and many other forms of evaluation. The AEA provides guidelines or standards of practice for any monitoring and evaluation studies. The Peace Corps' monitoring and evaluation program is in compliance with those guidelines. The AEA has five guiding principles for evaluations; systematic inquiry, competence, integrity and honesty, respect for people, and responsibility for general and public welfare (American Evaluation Association (AEA), 2004).

Based on the 2010 Agency Assessment outcomes, the new FITU strategy, and an increased focus on Peace Corps' partnerships, the agency has focused on developing a comprehensive Monitoring, Reporting, and Evaluation strategy. The stated goal of Peace Corps is to develop a MRE system that, as part of the FITU approach for programming and training, should result in the following:

- Promoting learning—how to improve Peace Corps work and expected results;
- Collecting evidence of value of Peace Corps interventions, i.e., what difference does the work of PCVs make;
- Establishing accountability—to Peace Corps, its partners, its partnerships, and the American people

The strategy is organized to roll out in a logical sequence to overhaul and create a comprehensive MR&E method. Previous to this roll out, Peace Corps Headquarters did not have a cohesive and comprehensive MR&E approach. Many of the changes, such as the new frameworks, sector tools, and reporting formats will directly affect volunteers in country and how they work in their sites. Additionally, there are more macro level adaptions, such as development of targets and baselines, performance evaluations, and impact assessments, that affect the direction of the project and staff but have less of an effect on the day to day work of the volunteers. For the purposes of this report, it is relevant to focus on those changes that will directly affect the work of the volunteers in site, and therefore these changes will be discussed in greater detail.

The initial phase of the initiative is to adapt or develop project frameworks that adhere to the FITU ideology. For the EH sector in Panama the framework is already completed and will be discussed in detail in a later section. The newly developed project frameworks are to have the following content (Peace Corps OPATS, 2013):

- Purpose – The purpose is a broad statement on the large scale and long term goal of the Sector.
- Goals- The stated goals are more specific and should relate directly to the purpose of the framework.
- Objectives- The objectives are very specific statements of purpose with a measureable component. Project objectives articulate the most significant, attributable outcome or outcomes that will result from Volunteer and partner activities, and will contribute to achievement of project goals. The objectives are to follow the SMART guidelines; Significant, Measureable, Achievable, Relevant, and Time-bound.
- Activity Statements – Activities are tasks that volunteers will complete in the field in order to meet the stated objectives. Peace Corps notes that activities should be trainable, as most Volunteers will need to be trained in order to complete them successfully.
- Targets and Indicators – Peace Corps has both output (measure of activities) and outcome (changes that result from activities) indicators. It is important that the indicators have a unit of measure and state the change that will

be measured. Data sheets are developed for indicators with more detailed information on the indicator. The indicators will align with the objectives by fulfilling those targets. In addition, as a part of the new initiative Peace Corps has begun to develop Standard Indicators (SI's) at Headquarters that post level staff will choose from to include in their project frameworks. These SI's will ensure that all posts of the same sector will be reporting on standard indicators and will allow for a better understanding and comparisons of same sector performance and compliance. In addition, indicators can be developed at the post level (PI's) for indicators that are not covered by the SI's

In Panama the EH project framework has been completed, and many of the tools that the sector was previously using to train volunteers and guide them during their service dovetail well with the water and sanitation related SI's. With minimal adaptation, and the addition of reporting spreadsheets, the EH sector in Panama will be in line with the new guidelines. The post, in conjunction with headquarters, will also be developing baselines and targets for achievement of the sector goals. The new initiative requires some changes in reporting as well. A new Volunteer Reporting File will be implemented to allow for reporting on the new project frameworks and the SI's. There will also be a focus on data management at the post level and an increase in the reporting and feedback to volunteers, counterparts, and posts. The long term success of the new interventions will have to be evaluated. Additionally, the projects themselves will need to be evaluated to see if they are meeting their benchmarks and long term goals. The Peace Corps needs to develop more guidance for process and performance evaluations. However, some performance is done through program and project reviews, or for partnership agreements.

2.4 Geography and Culture

Figure 1: Map of Western Panama. The balloons represent the sites reviewed for this report (Google Maps)

Panama is a small tropical isthmus that connects Central America to South America. The country is 75,420 sq. km, in size with 2,490 km of coastline with the Caribbean Sea to the north and the Pacific Ocean to the South. Panama shares a western border with Costa Rica and an eastern border with Columbia. The interior of the country is largely comprised of steep rugged mountains and desiccated upland plains, while the coastal regions are comprised of plains and rolling hills. Panama's climate is hot, humid, and cloudy, with a pronounced rainy season from May to December and a short dry season from January to April (Library of Congress, 2010).

The population of Panama is 3,405,813, of which 1,713,070, or 50%, live in the province of Panama where the capital, Panama City, is located (Tribunal Electoral, 2010). Seventy-five percent of Panamanians are urban dwellers, with 25% of the population living in rural surroundings. Panama is also ethnically diverse, with 70% Latino, 14% Afro-Antillean, 10% white, and 6% indigenous (Library of Congress, 2010). Geopolitically the country is divided into 9 provinces and 3 indigenous comarcas (reservations). The provinces from east to west are: Darien, Panama, Colon, Cocle, Herrera, Los Santos, Veraguas, Chiriqui, and Bocas Del Toro. The Comarcas are Embara Woonan in eastern Panama; Kuna-Yala, which is comprised of hundreds of small islands along the northeastern coast; and Ngobe-Bugle in Panama's western highlands.

Panama is a constitutional democracy divided into three branches: the executive, the judicial, and the legislative branch. The executive branch is made up of the president, the vice president and the cabinet. The president is elected to a single 5-year term and appoints the cabinet. The legislative branch is made up of 71 members of the National Assembly who are also elected to 5-year terms. The judicial branch is made up of a 9 justice supreme court who are appointed to 10-year terms by the president (Library of Congress, 2010).

Panama is defined by the World Bank as a middle income country, and the economy has been booming over the last 8 years, with GDP expanding at an average rate of over 8 %. This is made even more impressive by the fact that this expansion has occurred during a large scale recession in the global economy. These impressive growth rates are expected to continue and possibly even increase for the foreseeable future due to the completion of large scale projects such as the Panama Canal expansion. These economic windfalls have helped to reduce poverty levels to 27% in 2012 from 48.5% in 2002. Likewise extreme poverty rates have fallen from 21% to 11% over that same time period (World Bank, 2013).

While economic growth has helped to reduce poverty in Panama, the economic disparity remains high with a Gini index of 51.9 in 2010 (Central Intelligence Agency (CIA), 2013). A Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality. Panama has the 16th highest index of the 136 countries with available data. Much of that disparity can be attributed to the rural poor. As of 2011, 50% of rural Panamanians were living in poverty, compared with 15% of the urban population. Furthermore, 27% of rural Panamanians were living in extreme poverty, compared to 3% of their urban counterparts. The center of wealth for the country is Panama City, where most of the urban population lives, and as would be expected, this is the province with the lowest incidence of poverty at 16%. The poorest areas of the country are the three indigenous reservations, with 89% poverty and 68% extreme poverty. The

poorest province of all is the Comarca Ngobe-Bugle in Panama's western highlands, where 91% of the population lives in poverty and 70% lives in extreme poverty (Dieguez and Alvarado, 2012).

The Panamanian government defines the poverty level by evaluating what the costs are for basic needs. They define basic needs as not only food, but also, clothing, transportation, utilities, and telephone. The cost of living is estimated to be lower in rural areas, and therefore, the poverty line is lower, with those who earn less than $52.88 monthly defined as living in extreme poverty and those earning less than $97.64 monthly considered below the poverty line. Comparatively, in urban Panama, the extreme poverty and poverty lines are $62.94 and $131.37 per month, respectively (Dieguez and Alvarado, 2012). Those values do not include support provided by Panama's welfare system. The "Red de Oportunidades" (net of opportunities) gives conditional monthly aid to people living in extreme poverty. While the funds are given to the head of household, they are conditionally tied to health, children's educational performance, pre/post-natal care, and vaccines. The amount of funds available to a family is dependent on income and family size (MIDES, 2013).

The Indigenous Comarcas

There first of the three indigenous comarcas in Panama, the Kuna-Yala was founded in 1925, and the Embera-Wounaan and Ngobe-Bugle were founded much later, in 1997. The Kuna have a long history of strong organization and have lived in a semi-autonomous fashion for much of the time since their revolution in 1925. The Ngobe-Bugle and Embera-Wounaan comaracas were established at the same time in 1997. The comarcas are set up to function semi-autonomously from the Panamanian government and have somewhat more freedom than the other provinces of Panama. Within the comarcas, land is communal with some exceptions. Land that was titled within the boundaries of the comarcas prior to their founding are grandfathered in, and the government has the right to the use and extraction of natural resources. Additionally, the tribes are allowed to govern internally by traditional forms and can create internal regulation or norms, but they must adhere to Panamanian law and may not override it (Whickstrom, 2003).

The first Spanish encounter with the Ngobe was by Ferdinand Columbus in 1502, and contact continued with missionaries and conquistadors throughout the Spanish occupation of Panama. However, the area of Panama where the Ngobe lived was lightly settled, and contact was somewhat limited. The historical territory of the Ngobe covered much of central and western Panama, occupying the modern day provinces of Veraguas, Chiriqui, and Bocas del Toro (Jessome, 2008). Over time, the territory of the Ngobe has been reduced to a smaller area that was designated by the Panamanian government as a Comarca (reservation) in 1997 (Wickstrom, 2003). While many Ngobe live outside of the Comarca, specifically in Chriqui, Veraguas, and Bocas del Toro, the majority of the population is within the Comarca. There are currently 156,747 Ngobe living in the 2500 square mile Comarca Ngobe Bugle (Electoral Tribunal, 2010), which straddles the continental divide in Panamas western highlands (Jessome, 2008).

The Ngobe live in rural settings, mostly in the highlands of western Panama. The region is mountainous and rugged with little infrastructure development. The majority of the comarca is without roads and electricity, and has scarce access to running water. The Ngobe live in familial compounds, or casarios, that are often separated from one another

by a minimum of a quarter-mile. While many of these groups are lumped together to form a community, often around a school and/or other government posts, they are often unfamiliar and resistant to social organization above the casarios level (Jessome, 2008).

The Ngobe typically live in small huts with dirt floors and walls made of wood, bamboo, or open to the elements. Roofs of more traditional homes are constructed of palm fronds or grass mats, but many Ngobe now use metal roofing instead. In communities with more outside influence and road access, concrete block houses with metal roofs are becoming common.

Figure 2: typical Ngobe casario (Photo by Author)

Ngobe women wear distinctive homemade dresses called a Naguas that are ankle length, baggy, often with an exaggerated collar, and short sleeves. The Naguas are typically very brightly colored and have distinctive detailing along the neck, waist, and hems that look much like the teeth of a cross-cut saw. While the Ngobe are proud of the dresses, the colors and detailing do not appear to have any historical significance, and the Naguas themselves were introduced by missionaries. The males do not have a distinctive dress and wear typical western clothing. Both the men and women often carry handmade bags, or chacaras, that are crocheted out of natural plant fibers or nylon. The chacaras have similar detailing to the Naguas.

Most Ngobe are bi-lingual in Spanish and their native tongue, Ngobere. Ngobere is most often used in the home among friends and family. All interactions with the outside world are done in Spanish, as very few Panamanians not of Ngobe decent understand the language. There are still some Ngobe who do not speak Spanish, but they are typically older women, living in the more remote communities in the Comarca.

The vast majority of Ngobe are subsistence farmers that will sell any surplus in town. Typical crops are name, otoe, yucca, rice, corn, legumes, bananas, plantains, fruits, and palm fruits. The Ngobe raise some animals, and it is common to see chickens and pigs in a family compound. Cattle are less common, and their ownership is often a sign of

wealth. In order to make money, many men of working age leave the comarca to work as migrant laborers in the vegetable fields in the mountains near Boquete and Volcan or the coffee plantations there and in Costa Rica.

2.5 Sanitation in Panama

Even though Panama is defined by the World Bank (2013) as a high middle income country, with a booming economy and falling poverty, the country's rural and indigenous populations still live in poverty and extreme poverty. Along with a reduction in poverty, Panama has also been realizing a reduction in those without access to basic water and sanitation services. The access to improved sanitation has increased from 58% to 68% from 1990 to 2005, while the percentage of the population that defecated in the open has decreased from 12% to 5% over that same period of time (Electoral Tribunal, 2010). However, the economic inequalities between urban and rural populations mimic themselves in access to basic sanitation. The latest information from the WHO indicates that 75% of the urban population has access to improved sanitation, with 11% access to shared facilities, 13% with access to unimproved facilities, and only 1% practicing open defecation. Comparatively, rural populations only have 51% access to improved sanitation, with 5% access to shared facilities, 28% access to unimproved facilities, and 16% open defecation (WHO and Unicef, 2012). Again mimicking the economics performance, the sanitation coverage is highest in the wealthiest provinces of Panama and the Asuero Peninsula, all with above 90% improved sanitation coverage and less than 3% open defecation. The Comarca Ngobe-Bugle, however, has 33% access to improved sanitation, 8% access to shared facilities, and 59% open defecation, second only to the Comarca Kuna-Yala with 94 percent open defecation (Electoral Tribunal, 2010).

The Panamanian government has no national policy on water and sanitation, with a large number of stakeholders intervening in the sector with no coordination (World Bank, 2006). Water and sanitation for large population areas in Panama are covered by the national utility IDAAN (Insitituto de Aqueductos y Alcantarillados Nacionales), while rural water and sanitation improvements for populations below 1500 people are by law under the jurisdiction of the Ministerio de Salud (MINSA). However, in practice, the division of duties is less transparent and the sharing of responsibility has led to confusion and dereliction of responsibility. While MINSA is legally responsible for overseeing water and sanitation in the rural sector, they do not have a clear strategy or streamlined organization for implementing and managing water and sanitation projects (World Bank, 2006; Suzuki, 2010). In the author's experience, while most of the regional staff were well intentioned and competent, their hands were tied by several factors. First, the office was grossly understaffed, with only three employees overseeing water and sanitation project implementation and follow-up support for the entire province. Second, the project selection and funding were controlled by regional political representatives and not by ministry staff. Because of this, communities could not directly request a project from the ministry, but rather from a political representative, who, in the author's experience, were less likely to base decisions on need rather than on political concerns.

2.6 Peace Corps Panama – Environmental Health

2.6.1 Sector Overview

The Environmental Health (EH) Sector is one of four sectors currently active in Peace Corps Panama. Worldwide, Environmental Health programs work with a diverse range of topics such as hygiene, water, and sanitation, HIV/Aids, maternal health, and indoor air quality. In Panama, however, the sector focuses on hygiene, water, and sanitation and identifies as a water and sanitation sector. The EH sector in Panama has the following three essential competencies (Peace Corps, 2013):

1) Promote health and hygiene practices
2) Manage water systems
3) Manage sanitation systems

Each sector in Peace Corps Panama partners with a sector of the Panamanian government. The EH sector partners with MINSA (the ministry of health). Despite being hindered by a lack of oversight for water and sanitation in Panama, leading to a sub-optimal collaboration between MINSA and the EH sector in many regions of the country, it is a relationship that the EH sector nurtures on a regional and national level with varying levels of success (Suzuki, 2010).

The EH sector endeavors to place volunteers in the areas of the country where the need is the highest. In Panama, those areas with the greatest need tend to be small rural communities with poor access to infrastructure. In addition to a rural focus, the EH sector tends to place volunteers in two of the country's three indigenous reservations, which are the poorest and least developed areas of the country (World Bank, 2006; Ministerio de Economia y Finanzas, 2003). These volunteers often live in locations that are very difficult to access. Many have to hike or travel by boat for several hours from the nearest roads to access their sites. Additionally, many of the sites have no electricity or phone service, and poor water and sanitation.

The nature of the sites in which EH sector has chosen to work has largely controlled the types of projects that volunteers implement. Gravity-fed water systems are relatively robust and require low levels of maintenance and no electricity (Jordan, 1980). Most of the water systems constructed and managed in rural Panama are of this type. For similar reasons, sanitation interventions are typically limited to those that do not require electricity or running water, such as pit or composting latrines (Mihelcic et. al., 2009).

2.6.2 Sector Framework

The EH sector in Panama uses an operational framework to guide the work of sanitation projects. The framework has been adjusted since all of the projects reviewed for this report were implemented, but the adjustments are not significant enough that they would change the way projects are implemented. In its current iteration the framework endeavors to tie the purpose and objectives of the EH projects to specific measurable indicators. This latest version was created in order to adapt to the new MRE initiative by Peace Corps. The framework is divided into two goals focused on water and sanitation, respectively. The framework states that the overall purpose of the EH project is that:

- Panamanians living in marginalized rural communities will improve their health

In order to meet that purpose, two goals were identified, one for water and one for sanitation. The sanitation goal states that:

- Rural community members will adopt behaviors and practices that improve access to and use of sanitation systems.

Two objectives are then stated, to meet the sanitation goal.

- Objective 2.1- By September 2017, 5,000 community members will adopt at least two waste-borne disease prevention methods.
- Objective 2.2- By September 2017, 7,500 community members will benefit from rehabilitated or constructed sanitation systems.

Each objective has a series of activities to be performed by volunteers in order to meet the objective.

- Activities for objective 2.1- Each year, 50 volunteers and community counterparts will educate 2,000 community members in methods to decrease waste-borne disease transmission at the household, community, and watershed level through:
    - Identifying potential community promoters,
    - Providing informal education,
    - Offering presentations on waste-borne disease for community members, and
    - Organizing hands-on activities or field trips for community members to learn about waste-borne disease

- Activities for objective 2.2 – Each year 15 volunteers and their community counterparts will improve the access to rehabilitated sanitation systems or construct new systems (household and community latrine projects, or grey water soak pits) for 1500 community members through:
    - Leadership development workshops focused on sanitation systems projects,
    - Organizing, planning, and design of sanitation systems projects,
    - Project construction and implementation, and
    - Capacity building with respect to operation and maintenance of sanitation systems.

In order to evaluate whether the activities are being completed successfully, there are a series of output indicators with specific numerical targets that can be easily measured and reported on. Each of those indicators requires a tool that can be used to collect the data that is being reported. Some of those tools have been developed previously and are currently in use, while others need adaptation or still need to be developed. The following section details the specific reporting tools that the EH sector has in place. Some of those tools can be used to report on the specific indicators. Others may not be useful as reporting tools but are critical to volunteers during the process of the project.

2.6.3 EH Volunteer Service Timeline

Although, the actual timing of specific events in a volunteers' service can vary greatly depending on any number of factors, it is useful for the purposes of this report to have a general idea of when during their service most volunteers will be completing different activities outlined in the project framework. Figure 3 is a general timeline of the EH volunteer timeline in Panama; including pre-service training, community analysis, in-service training, and project planning in year 1, and project implementation in year 2. From the author's experience and discussions with others in the EH Panama community, there are two common variants to the timeline. The first would be for it to take longer for a volunteer to complete the community analysis and design phase of the project, pushing project funding and implementation to later in a volunteer's service or possibly to a follow-up volunteer. Additionally, follow-up volunteers may have a condensed community analysis and project design phase moving funding and implementation into the first year of service.

Figure 3: Typical Volunteer Service Timeline

When volunteers first arrive in country, they enter a 9 week Pre-service Training program (PST). During PST, volunteers live with host families in a training community meant to approximate living situations in Panama. The EH training curriculum is split evenly between language training and technical training. The technical training covers general participatory development methodologies, general Peace Corps tools, as well as basic hygiene, sanitation, and water topics both general and specific to Panama. The training includes a one-week visit to a current volunteers' site and a one-week visit to the site in which the volunteer will be serving. Volunteers should leave with a firm understanding of the EH project framework and be fully prepared to complete the community analysis and Community Environmental Health Development Plan (CEHDP). In PST, the volunteers are exposed to more technical topics related aqueduct and latrine projects. However, typically this is a cursory review, and more specific aspects of project planning and implementation are reserved for later trainings.

During the first three to four months in site, volunteers should be working to integrate into the community as well as collecting relevant demographic and community characteristic information for future use. During this time period the volunteers typically do a lot of home visits to explain their presence in the community and the work they will be completing during their two years. Additionally, these home visits are when general observation and informal surveying

are used to complete the community analysis questionnaire. Volunteers often conduct meetings with community members in order to collect information from groups using the Participatory Analysis for Community Action (PACA) tools as well.

All of the information the volunteers collect during this community integration period should be compiled and used to produce the CEHDP, allowing volunteers to enter In Service Training (IST) with a well-developed plan for projects in their sites.

Volunteers are asked to come out of their sites around the three to four month mark in order to attend a four day In-Service Training (IST). During IST volunteers are given much more detailed information on project planning, design, funding and implementation. IST has also historically been an opportunity for volunteers to present of their community analysis, as well as the submission deadline for the CEHDP. For volunteers, IST is a good marker for transitioning from community integration to project planning. While in practice, transitions tend to fade slowly rather than transitioning abruptly pre- and post- IST. IST is meant to provide volunteers with the technical tools that will allow them to complete successful projects.

Typically between IST and the one-year mark, volunteers work with community members on project planning and apply for project funding. Based on the outcomes from the CEHDP needs assessment, the volunteer and community will begin a WasteSTAR or WaterSTAR report. The WasteSTAR report will guide the volunteer through project trainings, budgeting, timelines, and construction. For sanitation project planning and design, the volunteer uses the latrine manual as a guide for planning hygiene training sessions, calculating materials quantities, and designing latrines. The completion of the WasteSTAR report will guide volunteers to a point at which they are prepared to apply for funding. Typically, because of large budgets relative to most Peace Corps projects, EH volunteers apply for funding through the Peace Corps Partnership Program (PCPP). The PCPP allows people to donate to a volunteer's project tax free. For reference, a single pit latrine usually costs approximately $70 in PCPP provided funding and the average number of latrines built for projects reviewed herein was 33, indicating a typical funding request of about $2,300. Because each individual PCPP request relies on individual donations, the timeline for raising the necessary funds can be somewhat variable depending on the size of the budget and amount of donations.

Timelines for project implementation can be highly variable due to several factors. However, it is rare that volunteers would be able to begin project implementation prior to the one-year mark, and it is probably unwise to begin a project after one and a half years in site. The length of time from projects receiving funding until project completion is largely controlled by the size of the project, transportation, weather, and the type of latrines being constructed.

If a volunteer completes a project through a PCPP grant, they are required to submit a PCPP closeout report at the Close of Service (COS) conference, which is usually held about two months prior to a volunteer's COS. There are currently no other defined requirements for project closeouts. The recommendations section will discuss a plan for a project closeout report for sanitation projects that can be disseminated to follow-up volunteers, agencies, and community members, as well as used as a reporting tool.

Volunteers attend a COS conference approximately two months prior to leaving the country. At this conference, volunteers discuss exit strategies, resumé building, and close of service procedures, and they submit many close out

documents. In addition, in the final week before leaving country volunteers return to the office to complete close out documentation, medical evaluations, and administrative closeout.

2.6.4 EH Panama Sector Sanitation Tools

The EH sector in Panama uses several different tools to select, plan, implement, monitor, evaluate, and report on water and sanitation projects. Some of those tools have been developed by Peace Corps Headquarters and are used all over the world, while others have been developed in Panama at the post level. Those tools developed by Headquarters are generally well developed and have been relatively widely adopted by volunteers. Conversely, some of the tools and reports that have been developed at the post level are still being adapted and have yet to gain widespread adoption. The following section will discuss the EH Panama tools relevant to sanitation projects and their respective stages in development and adoption.

2.6.4.1 Community Analysis and PACA Tools

When EH Volunteers in Panama first arrive in their sites, they are asked to perform a community analysis. The EH sector provides a questionnaire that helps to collect information on the demographics of the community, the organizational structure of the community, as well as the general overview of current conditions of water, sanitation, and hygiene. This survey is usually completed by a series of informal interviews during home visits. The questionnaire was developed at the post level in Panama.

Another set of tools that volunteers have at their disposal for community analysis is the Participatory Analysis for Community Action (PACA) Tools. This set of tools was developed by Peace Corps Headquarters and is meant to help a volunteer and community members better understand their community. There are four different PACA Tools: the community map, the seasonal calendar, the daily activities schedule, and the needs assessment. These tools are presented in a training manual and are meant to be used as hands on activities that community members can complete with the guidance of the volunteer (Peace Corps, Undated).

EH volunteers typically use the community analysis and PACA tools in conjunction during their first few months in site in order to gain an understanding of the community their needs in preparation for developing a work plan. These tools have long been adopted as a standard of practice by EH volunteers in Panama and are nearly universal in use. Although, neither of these tools can be used directly to report on indicators in the project framework, they provide critical baseline data that can be used in further reporting. Furthermore, these tools are integral in planning projects that will later contribute to the project goals.

2.6.4.2 Community Environmental Health Development Plan (CEHDP)

The Community Environmental Health Development Plan (CEHDP) is a report that the EH sector has developed in the last few years with the goal of helping the volunteer translate the community analysis and needs assessment into a clear project plan. The report guideline asks the volunteer to present the community analysis in a formal, professional way, in Spanish. In addition to the basic community analysis information, volunteers are asked to give a brief discussion of institutions and programs working in their community, as well as potential partnership opportunities. Then, the volunteer is asked to discuss the communities' needs that were assessed using the community analysis tools. Finally, the volunteer should present a strategic plan for proposed work going forward. This plan will help volunteers transition to WasteSTAR and WaterSTAR reporting and/or the next phase of the project (Peace Corps Panama, 2011).

While the guidance document for the CEHDP is well developed, the adoption of the report as a standard has been slow. Ideally the report should be completed in conjunction with the community analysis and submitted during In Service Training (IST) so that volunteers can leave IST ready to begin in depth project planning. This report does not collect any information that can be directly reported in the project framework, but it is critical in preparing successful projects.

2.6.4.3 Panama Water, Sanitation, and Hygiene (WASH) Matrix

The WASH matrix is a participatory analysis tool that can be used to evaluate the overall performance of communities in the areas in which the EH sector works. There are a total of 78 indicators included in the matrix, and the tool has three different sections- one to evaluate the household level indicators, another for community-wide indicators, and a third section to evaluate water committees. The matrix is then divided into specific water, sanitation, and hygiene indicators. Each indicator then has three possible descriptions of conditions for that indicator. Each description corresponds to a numerical score of 1, 2, or 3, with 3 being the highest positive score and 1 being the lowest (Peace Corps Panama, Undated).

This matrix could be extremely useful to volunteers in a couple of ways. It can be used during community analysis to identify specific areas for improvement in the community. It can also be used as a post-project evaluation tool to measure the improvements the communities have made due the intervention. Many of the indicators collect information that can be used to report directly back to the target numbers in the EH project framework.

The WASH matrix, however, is not widely used by volunteers as either a pre- or post- project assessment tool. Because of the number of indicators included in the matrix, the tool is not practical for use in the field. It would not be practical for a volunteer to visit every household in their community with a list of 78 questions and expect to get quality feedback; additionally, the time expenditure would be substantial. Furthermore, many of the indicators, such as nutrition or dental hygiene, while useful, are somewhat tangential to the core goals of the EH project in Panama.

The Herramienta para analizar el manejo de acueductos (HAMA) analysis developed by Ryu Suzuki (2010) extracted 10 of the most relevant indicators for aqueduct systems from the matrix and created an evaluation tool that could be

used by volunteers and community members to evaluate aqueduct systems. While the WASH matrix as a whole is not widely used among EH volunteers, the HAMA analysis has been widely adopted and used to evaluate water systems in Panama. In addition, it can be used to report directly on the numerical goals in the project framework. The author has endeavored in this study to create a similar tool to be used for sanitation called the Sanitation WASH (Appendix E). The methodologies and outcomes of this effort are detailed in sections 3 and 4, respectively.

2.6.4.4 WasteSTAR and WaterSTAR

The WasteSTAR and WaterSTAR are reports that EH volunteers use to plan projects in sanitation and water, respectively. The guidance document for the WasteSTAR report is presented in Appendix B. These reports are meant to be a guide from project conception through to the application for funding, and the reports have several useful purposes. First, they can be used by volunteers as a guide for project planning and to ensure that all proper preparations have all been met. The reports can also be used by office staff and potential funding groups to ensure that due diligence has been met in project planning. They can also be used as a professional document to provide to host country agencies and community members to provide information about the project. A detailed discussion of the WaterSTAR report would not be relevant to the objectives of this report.

The WasteSTAR report requires that volunteers complete the following sections (see guidance document details in Appendix B):

- Sanitation WASH Matrix (adapted by the author and discussed in sections 3 and 4)
- Hygiene education and community capacity development plan
- Community map showing houses, current latrine coverage, and water sources
- Initial latrine designs and justification for choosing that design
- Materials survey
- Household contract/deposit
- Transportation logistics
- Work group logistics
- Recommendations
- Photos

The WasteSTAR guidance document was developed by the author in 2011 as a response to the new FITU initiatives, and it has slowly gained limited adoption among volunteers implementing latrine projects. The EH staff had begun requiring that all volunteers complete the WasteSTAR report prior to sanitation project approval by the APCD. However, due to some leadership transitions and limited compliance by volunteers, adoption has been slow. This reporting format will benefit from widespread adoption and some adaptions that will come as the Sanitation WASH matrix is universally adopted. Additionally, as more of these reports are completed, the collective knowledge of the EH sector should improve the reports and help to standardize the approach to sanitation projects. The report itself cannot

be included directly in the project framework, but it is critical in the planning, budgeting, and implementation of successful sanitation projects.

2.6.4.5 Manuals

For latrine project implementation, the EH sector in Panama uses the “Maunal para la latrina abornara y latrina de hueco”. The manual, written in Spanish, was developed with the intention of being used as a guide for latrine construction for community members. It is also currently the only guidance document for volunteers on latrine project implementation. This manual currently includes information on proper hygiene, latrine location, latrine construction, and maintenance.

The pre-construction portion of the manual consists of two sections. First, is a section of common waste borne disease transmission pathways. The pathways are presented in the form of diagrams that detail the different pathways that human waste can become ingested. The disease vectors are followed by a discussion on how latrines can help to eliminate some of the pathways for transmission.

The manual then presents different latrine types and criteria for choosing one over the others. Next, the manual gives some basic guidance on organizing a latrine project. As with the discussion of disease vectors, this information is meant for community members and is not detailed enough for volunteers to use as a guidance tool. The manual then goes on to detail latrine specifics. There are two separate sections; one for pit latrines and one for composting latrines. The manual presents the quantity of materials needed, a step-by-step construction procedure, construction details, and photos**.** Additionally, there is a step-by-step use and maintenance guide primarily for composting latrines. However, the majority of the maintenance practices are appropriate for both types of latrines and should perhaps be presented as such.

While being a useful document, there are some minor areas where the latrine manual could be adapted in order to be more useful for volunteers. The pre-project section could be expanded to provide more detailed information and organized in a way that details more precisely how those topics could be presented as training sessions. Additionally, some of the materials quantities and specifications are no longer accurate for the types of latrines volunteers are constructing. The same can be said for the construction procedures.

Many of the numerical indicators outlined in the project framework are tied to community members being trained on the topics covered in the latrine manual. However, in order to extract that information more readily, the manual should be adapted somewhat. Also, the project framework now calls for the inclusion of drainage and soak pit interventions. This manual would be an appropriate place to add details for those interventions.

2.6.5 Post Project Assessment and Site Closeout

Volunteers provide post project information to the Peace Corps in several different ways. Some are quantitative reporting tools that volunteers are required to fill out, some are more qualitative requests for information, and others are

accounting tools. The author used some, but not all, of these reporting tools in order to collect baseline data on the projects surveyed for this report.

The first way that volunteers report project information is through the volunteer reporting file (VRF). This is a reporting form that all PCV's are required to fill out on a quarterly basis and is submitted to Washington D.C. The VRF is generally divided into two sections: a section where qualitative data is reported, and a section for volunteer narratives. Qualitative data is reported based on the objectives in Environmental Health Project Framework. For sanitation projects these indicators collect information on hygiene training, construction methodologies trainings, and infrastructure interventions. This data is typically reported in number of people trained or affected by the intervention. It is sometimes reported in the number of infrastructure interventions (i.e. number of latrines constructed). The numbers reported are used to evaluate project success based on 5 years goals presented in the EH project framework.

For the purposes of this project no information was available for use from VRF's. While the VRF is a useful reporting tool to evaluate project success a couple of problems prevent it from providing information to volunteers in the field. First, the reporting timeline is quarterly and not tied to the project itself. Therefore, the data does not give a good view of the project as a whole but rather is a snapshot of the portion of the project completed in that specific quarter. Secondly, the VRF data is not currently disseminated to the volunteers in any format after being reported.

The Peace Corps Partnership Program (PCPP) is the main way in which volunteers fund large-scale projects, providing a tax free mechanism for individuals or groups to donate to a specific Peace Corps project. When a project is funded through a PCPP grant, the volunteer is required to complete a package of forms to formally closeout the project after its completion. The Small Grants Completion Report is primarily a tool for assuring project expenditures were correct and reporting the allocation of project funds. In another section volunteers are asked to provide demographic information on the project beneficiaries. Additionally, volunteers are required to write a few narratives about the project. This is usually where project specifics such as number of latrines constructed, project implementation procedures, and perceptions of project success are reported. However, the Small Grants Completion Report is used for many different types of projects, and the narrative prompts are consequently relatively general and do not always require the volunteer to report the information needed in this study.

The third way that Peace Corps collects project information is through the site closeout form. This form is filled out by the volunteers at their close of service conference. The form is meant to collect general information on the site to inform the Peace Corps Panama staff of changes in the site during the volunteer's two years of service. This includes access information to the site, contact information for community leaders, descriptions of projects completed by the volunteer, recommendations to future volunteers, and other general information. While this form is useful, it is not project specific, and the questions are general enough that relevant information will be left out because the volunteer was not prompted to provide it. The author did not receive these forms during the survey.

While much of the pertinent information related to site closeout is collected by the Peace Corps and/or volunteers, it is reported in a way that does not make it particularly useful for post-project evaluations or for future volunteers in those sites. While many of the project specific numbers are reported in the VRF, the numbers are difficult to tie to specific project timelines and are not disseminated to volunteers after being reported. Both the PCPP closeout and site

closeout forms offer volunteers the opportunity to report much of the relevant information, but unfortunately they remain too general to require that information be reported and also suffer from a lack of active dissemination to volunteers. It could be beneficial for the EH sector to require a project closeout form specifically tailored to project type in order to collect detailed post project data. In addition to improving the quality of reporting, this information could, if actively passed back to the volunteers, be a great help on the ground.

3 Methodology

3.1 Data Collection Methodology

The data collection methodology was developed to evaluate the physical condition of the latrine project as well as the adoption of proper hygiene and sanitation practices in the community. The author primarily used observation and informal conversations with community members to extract the answers to the questions in the Sanitation WASH matrix created by the author for this study and presented in Appendix E.

Because of the scope of the study, it was not possible for the author to develop a strong comfort level with the project beneficiaries. Therefore, the author often relied on the relationships of others (either community leaders or Peace Corps Volunteers living in the area) to interact with community members. A great deal of effort was put into not showing up alone and unknown, making community members uncomfortable.

Published data indicates that direct questioning provides inaccurate data and that the process should be participatory. Because of the scope of the project and human resources available to complete the survey, it could not be completely participatory as described in Suzuki (2009). The author often used observation and relied on other peoples' relationships (community leaders and volunteers) to ask questions informally. Care was taken not to write down information in front of the community members, and the author endeavored to record the information discretely after leaving the house.

Ideally the author would have collected direct data on the incidence of diarrhea in the communities. However, obtaining direct data proved to be impossible as the local health clinics do not keep a record of diarrhea incidence. Even if records were kept, the communities where these projects were implemented are extremely rural. Typically, the closest health clinic is several hours of hiking away and provides health services for multiple communities. There would be no way to separate those people who had visited health clinics from households included in Peace Corps latrine projects from those who were not. Another option considered was to track student absences at school due to illness, but spotty record keeping and the problem of multiple communities attending the same school eliminated that possibility as well.

3.2 Benchmarking

In order to evaluate the sustainability of the latrine interventions, a quantifiable scoring system needed to be developed in order to compare the sanitation systems in an objective way. The scoring system is developed specifically for

evaluating sanitation interventions by Peace Corps in rural Panama, but it is general enough that it could be used to evaluate any pit latrine project. The inherent difficulty with a study of this type is that the only collectable information is qualitative, and a system needs to be developed in order to analyze the data in a quantitative way (Mukherji & Van Wijk, 2000). The author developed a scoring system by adapting questions from the WASH matrix for water and sanitation used by Peace Corps Panama. The scoring system is not unlike those used in the studies by Suzuki (2009), McConville (2006), and the MPA guidebook (Mukherji & Van Wijk, 2000).

Each indicator is set up on a scale of 1 to 3, with 1 being the lowest possible score, or poorest, overall score and 3 being the highest, or best, overall score. Each score has a corresponding description which details what qualities the indicator should meet in order to receive that score. This scoring system works well for hard to evaluate indicators such as some evaluated for this study (clean kitchen, solid waste, latrine use).

One of the benefits of a benchmarking tool is that its simplicity allows for it to be used by community members as well as experts. This is beneficial because community members can evaluate their own communities and easily see actionable areas for improvement. In addition, this type of tool will be useful for volunteers to do a pre/post assessment comparison of future sanitation interventions. Used for pre/post assessment, this tool should provide valuable information about the success of specific portions of the interventions and allow for the improvement and continued measureable evaluation of the project. The tool endeavors to extract information on the topics in Table 2 (Mukjerji & Van Wijk, 2000).

Table 2: The indicators evaluated for this study.

Indicators	
Solid Waste	Privacy Structure
Standing Water	Depth of Hole
Distance to Structures	Clean Kitchen Area
Distance to Water Source	Hand Washing
Covered hole	Latrine Use

This scoring guide is meant to help someone evaluate the condition of the sanitation infrastructure of their community. It is therefore intentionally general and does not provide nor ask the user to provide overly detailed information. It does however, provide the user with easily understandable descriptions that will enable proper evaluation of the system and identification of areas for improvement. The tool can also be used to develop community goals for improvement by using a description of what the system will look like when that goal is met (Mukjerji & Van Wijk, 2000; Suzuki, 2009).

The ultimate goal of a household would be to score a total of 30 points, or a “3” for each of the 10 indicators. However, the purpose of this Sanitation WASH Matrix is to give community members an idea of areas where they are performing well, as well as areas where there is room for improvement. In addition, the descriptions in the indicators help those who receive low scores to understand the differences between their score and the higher scores allowing community members to set specific goals for improvement.

3.3 Indicators

3.3.1 Solid Waste

The Solid Waste indicator was developed to record how the project beneficiaries were disposing of solid waste in their homes. The presence of improperly disposed solid waste can be a source of pests and flies, leading to an increase in disease transmission on the household level (Mihelicic et. al., 2009). In the majority of the surveyed latrine projects, the volunteers indicated that trainings were given to community members regarding the proper disposal of solid waste. The purpose of Peace Corps trainings in these communities is to limit the disease vectors that are a detriment to public health. In the author's experience, it is common for residents of rural Panama to use solid waste such as plastic bags to start cooking fires. In addition, it is not uncommon to see solid waste disposed of in a rather haphazard manner by throwing cans, plastic, and other waste around the peripheries of the house site. While most of these communities are extremely remote and do not have access to solid waste pickup or engineered landfills, it should be possible to separate those things that can safely be burned from those that cannot, and dispose of the non-combustibles in small pit a safe distance from the house. The solid waste scoring guidelines are given in Table 3.

Table 3: Solid waste scoring guidelines.

Score	Description
1	*Solid waste is left out and not disposed of appropriately (burn plastic while cooking)*
2	*All solid waste is burned or occasionally delivered to a nearby dump site if available*
3	*Solid waste is buried and/ or burned their appropriately (take to dump site if available)*

3.3.2 Standing Water

The standing water indicator is meant to measure how well potential problem areas around the home are drained. The presence of pooled water or mud in close proximity to the home creates a potential breeding ground for mosquitos and other pests that are primary routes of disease transmission (Mihelcic et. al., 2009). The most common problem areas appear to be the drainage areas for the tap stand, the area around the dishwashing station, and the ground below the eaves of the homes. If these areas are poorly drained, water can pool, creating unsanitary conditions that will aid in disease transmission. The standing water scoring guidelines are given in Table 4.

Table 4: Standing water scoring guidelines

Score	Description
1	*Frequent standing water and mud, mosquito larvae are present*
2	*Some drainage, but some standing water*
3	*No standing water and there is good drainage around the house*

3.3.3 Distance to Structures

The distance to structures indicator helps to ensure that the latrines constructed during the project are located an acceptable distance from any other structure. If the latrines are too close to homes they can create many problems including odor, increased presence of flies and other bugs, and lack of privacy. The latrines also need to be close enough to the homes to ensure usage. If they are too far away from the home, the inconvenience leads to limited usage. The distance to structures guidelines are given in Table 5.

Table 5: Distance to structures scoring guidelines

Score	Description
1	*Within 10 feet of house*
2	*15 to 30 feet from house*
3	*30 to 50 feet from a house*

3.3.4 Distance to Water Source

The distance to water source indicator is meant to ensure that the latrines constructed during the project are located an acceptable distance from any water source. If a pit latrine is located too close and/or up-gradient of a water source, there is a high potential for seepage of effluent to contaminate the water source, leading to an increased incidence of disease. The distance to water source scoring guidelines are given in Table 6.

Table 6: Distance to water source scoring guideline

Score	Description
1	*Within 30 feet of water source*
2	*30 to 50 feet from water source*
3	*More than 50 feet from water source*

3.3.5 Covered Hole

This indicator is meant to observe whether the hole to the pit is consistently covered. An uncovered pit latrine hole leads to increased odor and flies. Flies are a common route of disease transmission. Most of the pit latrine projects implemented by Peace Corps Panama include a concrete seat structure integrated into the pad. However, while volunteers typically recommend constantly covering the holes to reduce odor and flies, it is uncommon for them to provide materials or specific recommendations for construction of covers. The covered hole scoring guidelines are given in Table 7.

Table 7: Covered hole scoring guidelines

Score	Description
1	*Latrine has no top and is left uncovered*
2	*Latrine has a top, but is uncovered*
3	*Latrine has a top, and is covered*

3.3.6 Privacy Structure

The privacy structure indicator is meant to evaluate the roof, walls and door of the constructed latrines. The privacy structure is an important part of the latrine for several reasons. The roof keeps water drained away from the pit, helping to keep the pit from filling with water, and allows use during inclement weather. The walls and door structures are meant to keep livestock, pests, and children out of the latrines. They also provide privacy to the latrine user. Peace Corps Panama usually provides zinc roofing for the projects, but the materials for the walls are typically expected to be provided as part of the community contribution. Typically, limited guidance is provided by the volunteers related to the proper construction of the privacy structures. The privacy structure scoring guidelines are given in Table 8.

Table 8: Privacy structure scoring guidelines

Score	Description
1	*Latrine does not have a door, walls, or roof that is well built.*
2	*Latrine has a decent enclosure that is well built, but still allows access by animals*
3	*Latrine has a door, walls, and a roof that are well enclosed, provide privacy, and are safe from the entry of animals*

3.3.7 Depth of Pit

This indicator is meant to evaluate the remaining life of the latrine, as well as ensure that the latrine was constructed above the water table. It is important that the pit for the latrine is above the water table for several reasons. If the latrine

is full of water there will be an increase in odor and flies, and in extreme situations, the effluent could even overtop the latrine and flow out onto the ground surface, creating a serious health risk. In addition, if the latrine is below the water table, the contaminants in the latrine will be highly mobile, greatly increasing the risk of seepage and contamination of water sources. Peace Corps Panama's pit latrine design recommends that the pits be between 2 and 3 meters deep when newly constructed, in order to ensure a useful life. Once the useful depth is below 1 meter, the latrine structure should be properly covered and moved over a new pit. The depth of pit scoring guidelines are given in Table 9.

Table 9: Depth of pit scoring guidelines

Score	Description
1	*Latrine pit is below water table, fills up during rain, overflows, or is nearly full*
2	*Latrine pit is above the water table and does not fill up when it rains, but is nearing full.*
3	*Latrine pit has appropriate and proper depth, does not fill with water during rain, and has a useful depth of at least 5 feet*

3.3.8 Sanitary Kitchen Area

This indicator is meant to help evaluate the sanitary practices in the cooking and dishwashing areas of the home. Unsanitary conditions during food preparation can transmit disease in many ways. Animals and their feces can be transmitted into food or water if present in the cooking area. Improper washing of eating and cooking implements can also allow for the transmission of disease. Furthermore, leaving the kitchen area untidy with food or other waste left out for extended periods can attract flies and other unwanted pests (Mihelcic et. al., 2009). Peace Corps Panama often includes trainings on the proper cleaning of the cooking and cleaning stations and regularly emphasizes the importance of using soap as a part of latrine projects. The sanitary kitchen area guidelines are given in Table 10.

Table 10: Sanitary kitchen area scoring guidelines

Score	Description
1	*Floors and surfaces are not kept clean. Insects are often visible.*
2	*Floors and surfaces are sometimes clean. Only water is used to clean.*
3	*Floors and surfaces are clean. Bleach, soap, or lime is used.*

3.3.9 Hand Washing

This indicator is meant to evaluate the access to proper mechanisms for hand washing. The diligent washing of hands is an important step in eliminating disease transmission. Without the ready and consistent access of potable water and soap, it is difficult for community members to properly wash their hands (Mihelcic et. al., 2009). In this analysis, the author looked for the obvious access to running potable water and soap at each house. The hand washing scoring guidelines are given in Table 11.

Table 11: Hand washing scoring guidelines

Score	Description
1	*No water or soap is visible*
2	*Water is available and visible but soap is not*
3	*Soap and water are readily available*

3.3.10 Latrine Usage

This indicator is meant to judge whether a latrine was completed and/or is in use by the household. While all of the homes visited during this study were reported as having a latrine as a part of a Peace Corps Project, this indicator was meant to locate those latrines and deduce if they were still functioning. The latrine usage scoring guidelines are given in Table 12.

Table 12: Latrine usage scoring guidelines

Score	Description
1	*There is no latrine, or it is clearly not being used for its intended purpose*
2	*There is a latrine. It seems to be used.*
3	*Latrine is clean, clearly in use, and soap and water are available for hand washing.*

3.4 Volunteer Survey

A survey was submitted to each volunteer who completed the projects evaluated for this report. The survey was meant to collect information on how each volunteer organized and implemented their project. The objective was to evaluate how the variance of methodologies in project implementation may affect the long term success of the project. When these projects were implemented the EH sector did not provide any formal, documented procedure for project implementation and planning. In addition, there was no post project reporting of procedures. There was therefore no way to know the specifics of implementation at each site without contacting the volunteer who had completed the work. It should be noted that over the last two years the author has worked with the EH sector to develop a WasteSTAR reporting format (discussed in the background section) that helps with standardization of project implementation and post project reporting.

In addition to the survey questions (Appendix F) the author requested that the volunteers provide, if available, a list of project beneficiaries, the final number of latrines constructed, the name(s) of a community counterpart to help guide the author around the site, and public transport and/or hiking directions to the site. The author also included in the request for information a description of the post-project assessment and the goals of the assessment.

3.5 Assessment

3.5.1 Post project reporting: Volunteer surveys

The first step the author took after developing the idea for this assessment was to contact the Peace Corps Panama office to see what, if any, information was retained about past latrine projects. It was indicated that the main source of information would be the PCPP closeout report. The report is principally documentation of project expenditures, with a section for project narratives. Based on the documentation provided, it appears that the format of the PCPP closeout report has changed several times over the course of the last 6 years. The PCPP grants are also used for many different types of projects across all sectors of the Peace Corps, and therefore the narrative prompts are rather general. Because of the general nature of the narrative prompts, not all of the responses provided the author with useful information to complete the assessment. However, the narratives section was the primary source of useful information provided by the Peace Corps for the authors' purposes.

The author was provided PCPP closesout reports for 21 pit latrine projects. Typically, the author was able to extract the name of the volunteer, the name of the site, the number of latrines constructed, and the project completion data. Depending on the detail provided in the report, there was sometimes information on topics such as required training sessions, perceived project success, and PCPP/community provided materials. Table 13 shows the information extracted from the PCPP closeout reports, with the actual number of latrines inspected for comparison.

Table 13: PCPP Closeout provided information.

PCPP Closeout Provided Information					
Site	**Volunteer Name**	**Site Name**	**Reported Latrines Constructed**	**Project Completion Date**	**Latrines Reviewed by Author**
Bajo Cerro Name 1	Y	N	79	Sept. 2011	70
Cerro Ceniza	Y	Y	85	Oct. 2011	75
Bajo Cerro Name 2	Y	Y	44	July 2012	41
Vallecito	Y	Y	51	July 2010	45
Cerro Banco	Y	Y	56	June 2012	43
Candela	Y	Y	52	Aug. 2012	43
Salitre	Y	Y	Not Reported	Oct. 2010	43
Quebrada Cana	Y	Y	19	Aug. 2009	14
Limon	Y	Y	20	Not Reported	15
Lajero	Y	Y	22	May 2012	18
Rio Santiago	Y	Y	30	Aug. 2010	16
Alto Rey	Y	Y	45	July 2009	24
Bajo Mosquito	Y	Y	Not Reported	Oct. 2011	23
Sabina Huso	Y	Y	40	Sept.2010	25
Quebrada Macho	Y	Y	Not Reported	Aug. 2012	24
Casicon	Y	Y	37	Dec. 2011	32
Cerro Piedra	Y	Y	33	April 2012	33
Cerro Tula	Y	N	58	May 2008	39
Bajo Membrillo	Y	Y	Not Reported	Aug. 2010	10
Quebrada Pabon*	Y	Y	20	Sept. 2010	0
Alto Algarrabo*	Y	Y	Not Reported	July 2009	0

*Not inspected by the author, but information was initially provided.

3.5.2 Assessment procedure

The author spent 3 years living amongst the Ngobe people, which accounted for all but 2 of the projects surveyed, and therefore had developed a strong understanding of cultural norms and how to behave appropriately, as well as some comfort with the indigenous language. This allowed the author to develop a culturally appropriate assessment procedure that would be minimally intrusive and followed Ngobe social norms.

Typically, the author would exhaust all available channels to contact the community and announce the site visit and its purpose in advance of traveling to the site. This, when successful, manifested itself in one of two ways. If a volunteer was currently in or nearby the site, the author contacted them and asked that they help to coordinate with community leaders and inform community members of the visit. If no volunteer was currently near the site, the author made every effort to contact the counterpart of the volunteer who implemented the project in order to coordinate a time for the visit. If neither of the options worked out, the author would schedule a visit to the site with the sole purpose of contacting community leaders with knowledge of the project in order to set up a time when the leaders were able guide the author to each of the latrines constructed during the project.

Even if a volunteer was present in the site, every effort was made to find a local guide with knowledge of the project and good rapport with the beneficiaries. The physical footprint of many projects was quite large. Most of the projects surveyed were in a largely undeveloped, mountainous, region of the Comarca Ngobe-Bugle. In fact, it was typical for different parts of the project to be separated by many miles and connected by an intricate system of footpaths. It would have been impossible to locate all of the latrines in the project without an intimate knowledge of the community members and house locations. It was not uncommon for volunteers living in the sites to be unaware of some of the families included in the projects. In a few cases, where the projects included several different communities, the author had to use more than one guide in order to locate all of the latrines.

While nearly all Ngobe speak Spanish, it often makes them more comfortable if formal greetings and some basic conversation are done in Ngobere. Additionally, the counterparts were always native speakers, important on the rare occasion that translation was needed. The counterparts were educated about the purpose of the home inspections and the overall purpose of the project prior to the visits. At each household, the author introduced himself and stated the purpose of the visits and requested permission to perform the survey, in accordance with the procedure approved by the Michigan Technological University Institutional Review Board. The author made a concerted effort to allow the counterpart to take the lead initially in order to make the family comfortable with the authors' presence and help them gain a thorough understanding of the purpose of the visit. Often, in an effort to make the participant more comfortable, some time would initially be dedicated to small talk on non-related topics. In fact, it is common in rural Panama for any visitor to be offered food or a cup of coffee, and it would be culturally insensitive to refuse the gift and to abruptly attempt to perform a survey of the home. Therefore, the amount of time spent at each individual household varied greatly depending on whether or not people were present and whether food was offered. Most of the indicators could be scored through observation during other conversation and while food or coffee was being prepared.

It should be noted that a large percentage of the Ngobe work as migrant workers outside of the Comarca and are therefore away from home for extended periods of time. Some homes inspected during the project were unoccupied at the time of inspection. In those homes it was not possible to collect data on some indicators (solid waste disposal, clean kitchen, and hand washing). However, typically when families are away a neighbor is tasked with looking after the home, and it is culturally acceptable to gain permission to perform the inspection from neighbors or appropriate community members. Omitting the time for coffee and small talk, a typical inspection took 5 to 10 minutes.

While the amount of time needed to complete a single inspection was relatively short, it was not uncommon for homes to be separated by as much as 45 minutes of rigorous hiking. In addition, most of the communities were not accessible by public transportation, sometimes requiring several additional hours of hiking. Because of the large footprint of the projects and the remote nature of the communities, the author spent anywhere from 1 to 4 days in each site. It should also be noted that some latrines were so far from the rest of those included in the project as to make inspection impractical. Additionally, the author was largely dependent on the knowledge of the local guide or volunteer in the site to help judge the practicality of including a particular latrine in the inspection.

4 Results and Discussion

Information was collected on the project from volunteers in the form of a survey with open-ended questions about the project and practical questions about accessing the sites and community contacts. Information was collected from the community members in the form of the Sanitation WASH matrix to evaluate the overall sanitary health of the community.

4.1 Volunteer Survey Results

Volunteers responded to the questionnaire and also generally provided logistical information such as directions to their site, potential guides/project counterparts, names of project participants, and total number of latrines constructed. Some information was provided by community members if the volunteers did not respond to the survey. Table 14 provides a breakdown of the information provided to the author by the volunteers who implemented the projects.

Table 14: information submitted by volunteers about each site

Volunteer Response					
Site	**Sector**	**Survey Response**	**List of Beneficiaries**	**Directions to Site**	**Community Contact Provided**
Bajo Cerro Name 1	EH	Y	N	Y	Y,PCV
Cerro Ceniza	EH	Y	Y	Y	PCV
Bajo Cerro Name 2	EH	N	N	Y	Y,PCV
Vallecito	EH	N	Y	Y	PCV
Cerro Banco	EH	Y	Y	Y	PCV
Candela	EH/CED	Y*	Y*	Y*	Y*,PCV
Salitre	EH	Y	N	Y	PCV
Quebrada Cana	SAS	N	Y	Y	Y
Limon	EH	Y	Y	Y	PCV
Lajero	EH	Y	Y	Y	Y,PCV
Rio Santiago	EH	N	Y	Y	PCV
Alto Rey	EH	N	N	N	N
Bajo Mosquito	EH	Y	Y	Y	Y
Sabina Huso	CEC	Y	N	Y	Y
Quebrada Macho	EH	Y	Y	Y	PCV
Casicon	SAS	N	N	Y	PCV
Cerro Piedra	EH	Y*	Y*	Y*	Y*
Cerro Tula	EH	Y	N	Y	Y
Bajo Membrillo	SAS	Y	Y	Y	Y

*The author implemented, or helped implement, these projects

PCV= There is currently a Peace Corps Volunteer at or near the site who acted as a guide.

4.1.1 Training Sessions

The latrine manual that is provided to trainees in the Environmental Health sector includes general information pertaining to health and hygiene, proper siting of the latrine, and construction schematics and procedures. While the latrine manual is not specific on how the information should be disseminated to community members, it has become common practice for volunteers to present the information in a series of training sessions for those community members who wish to participate in a latrine project. The health and hygiene trainings consist of highly visual participatory trainings. The latrine manual uses a common participatory method called the F-diagram used to show disease vectors (Appendix G). Rather than attempting to educate on a more abstract theme like bacteria the f-diagram allows community members to understand the pathways in which disease are transmitted. The education on disease vectors rather than bacteria is typical for hygiene education in communities with low education levels (Whaley and Webster, 2011, Pattanayak, et. al., 2009). Of the 19 projects surveyed for this study, 14 volunteers provided details about their meeting formats. Twelve of the volunteers held a training session on proper hygiene practices, typically including hand washing, disease vectors, and proper household practices to avoid disease transmission. All of the volunteers who responded to the question indicated that they held a meeting about acceptable locations for their latrines and/or project organization. These meetings typically outlined acceptable locations for pit latrines, taking into account water sources, gradients, and locations of structures. Organizational components of the meetings generally covered topics such as work groups, work days, deadlines, and materials deliveries. Additionally, all of the respondents reported having conducted a construction meeting. Construction meetings were usually participatory demonstrations of the process of constructing a latrine. Some of the respondents reported holding additional meetings on topics such as project management, water treatment, project wrap-up, latrine maintenance, and additional organization. Table 15 shows a breakdown of training sessions provided by volunteers at each site.

Table 15: Required training session held for latrine projects

Site	Health Meeting	Location /Organizational	Construction Meeting	Other
Bajo Cerro Name 1	X	X	X	Project Management
Cerro Ceniza	X	X	X	
Bajo Cerro Name 2	X	X	X	
Vallecito	No Data	No Data	No Data	
Cerro Banco	X	X	X	Post Project
Candela	X	X	X	
Salitre		X	X	
Quebrada Cana	X	X	X	
Limon	X	X	X	
Lajero	X	X	X	
Rio Santiago	X	X	X	
Alto Rey	X	X	X	Project Management
Bajo Mosquito	X	X	X	
Sabina Huso	X	X	X	Project Management
Quebrada Macho	X	X	X	Maintenance
Casicon		X		
Cerro Piedra	X	X	X	
Cerro Tula	X		X	Water Treatment
Bajo Membrillo	X	X	X	Additional Organizational

4.1.2 Materials Provided

The EH sector in Panama has a standard design and materials list for pit latrines but does not specify which materials should be purchased with outside funding and which materials should be contributed by the community (either locally sourced or in the form of cash contribution). Therefore, there is some variation in the materials community members are required to provide and those provided by the volunteer.

The components of a pit latrine can logically be divided into four parts: the pad, the seat, the privacy structure, and the roof. In all of the sites reviewed, the Peace Corps volunteer provided the cement, re-bar, and tie wire for the pad. The sand and gravel for the pad and seat are typically locally sourced if readily available. Sand and gravel were locally

sourced for 8 of the 19 sites (no data was available for 3 sites). The concrete seats that are attached to the top of the pad were either constructed on site using a mold, or else pre-fabricated seats were purchased. Fourteen of the 19 sites used a mold to construct the seats. One project purchased some and constructed some on site. The privacy structures were either made of locally sourced materials or else constructed from a specific design using milled wood. Sixteen of the 19 projects were constructed used completely locally sourced materials. Of the remaining three, two paid a sawyer to mill the wall materials from locally available trees, and one purchased framing materials and locally sourced the wall materials. For 16 of the 19 sites, two sheets of zinc roofing were purchased for the latrines. In two of the sites, no roofing materials were purchased. In Quebrada Macho, project participants could choose to contribute $10 and receive two sheets of zinc roofing or construct the roof using local materials. Table 16 has a breakdown of the materials provided for each project.

Table 16: Materials provided by project funds and community contributions.

Materials					
Site	**Cement, Re-Bar,**	**Sand/Gravel**	**Privacy Structure**	**Roofing**	**Seat**
Bajo Cerro Name 1	VP	VP/LS (where possible)	LS	VP	MOLD
Cerro Ceniza	VP	LS	LS	VP	MOLD
Bajo Cerro Name 2	VP	LS	LS	VP	PRE-FAB
Vallecito	VP	VP	VP*	VP	MOLD
Cerro Banco	VP	VP	LS	VP	PRE-FAB
Candela	VP	VP	LS	VP	MOLD/PRE-FAB
Salitre	VP	LS	LS	VP	MOLD
Quebrada Cana	VP	No Data	LS	LS	MOLD
Limon	VP	VP	LS	VP	MOLD
Lajero	VP	VP	LS	VP	PRE-FAB
Rio Santiago	VP	LS	VP**	VP	MOLD
Alto Rey	VP	No Data	LS	VP	MOLD
Bajo Mosquito	VP	LS	VP*	VP	MOLD
Sabina Huso	VP	LS	LS	VP	MOLD
Quebrada Macho	VP	VP	LS	VP***	MOLD
Casicon	VP	No Data	LS	VP	MOLD
Cerro Piedra	VP	VP	LS	VP	PRE-FAB
Cerro Tula	VP	VP	LS	LS	MOLD
Bajo Membrillo	VP	LS	LS	VP	MOLD

VP- Volunteer provided, or those materials provided by project funding
LS- Locally Sourced
MOLD- Seats were constructed on site using a mold
PRE-FAB- Seats were purchased pre-fabricated from the hardware store
*A sawyer was paid with project funds to mill wall materials
**framing materials were purchased with project funds and wall materials were locally sourced.
***A $10 beneficiary contribution was required towards roofing, or materials were locally sourced

4.1.3 Project Organization

The Environmental Health project in Panama has not historically provided any formal guidance on how latrine projects should be managed and how the communities should be organized. However, during training current volunteers typically discussed their experiences and shared best practices. Interestingly, even without documented procedures, the projects surveyed still seemed to report a relatively standardized methodology for project organization and management.

Most of the volunteers surveyed organized the project into separate communities, or sectors within communities, and installed community or sector leaders for each corresponding area. This is an intuitive step as many communities in rural Panama are largely dispersed and identify more with geographical proximity or family groups than as a community. For the purpose of this report, a community can be defined by the area in which a single Peace Corps volunteer was assigned to work, or chose to work, for the purpose of a specific project. Additionally, it is common for latrine projects to include more than one community or sector, sometimes stretching as far as 4 hours of hiking from the volunteer's site. This often limits a volunteer's ability to be on site for all steps of the latrine project. Because of the large footprint of most projects, it would be logistically impossible for one volunteer to disseminate information about project timelines and work dates to each individual household. The solution for most volunteers is to designate a sector or community leader for sub-sections of the project. The author observed that the sectors were typically selected with input from the communities and mimicked lines of historical collaboration or geographical proximity

Most of the volunteers either selected or requested the members of each sub-section to select a sector leader for each project area. Typically, a strong leader with good standing in the community was selected. The sector leaders were typically responsible for many tasks. Primarily, they acted as a point of contact for volunteers in their sector of the project. Ideally, a good sector leader acted as a representative of the volunteer in all aspects of the project. The volunteers could then communicate project deadlines, delivery dates, meeting times, and other project information to the leader who would then disseminate that information to the beneficiaries in their region, thereby eliminating the need for the volunteer to visit each home several times. In addition, many volunteers relied on the sector leaders to verify that beneficiaries had met deadlines and to act a technical expert. Some volunteers even relied upon sector leaders to organize work groups and work days, effectively allowing that sector to complete the project autonomously from the volunteer. As expected, volunteers reported varying levels of competence among sector leaders. Good sector leaders allowed the volunteer to play a much smaller role in the project, while less competent, less dedicated, or absent ones led to volunteers filling the role.

Most communities divided into work groups and collaborated to ease the workload. Some groups were much more organized than others and worked together to complete each step in the process. However, in smaller or less organized projects, families functioned semi-autonomously. Even within the more organized sectors, a family would occasionally choose to complete the work independently and not collaborate with others. The author observed that levels of collaboration varied greatly between projects, between sectors of projects, and sometimes within a sector

itself. This could be based on historical practices or any number of outside influences. The variance implies that the volunteers' interventions and preferences had little to do with beneficiaries' willingness to collaborate.

Most volunteers reported having well laid out timelines. However, it appears that some volunteers were less able than others to adhere to them. Typically, volunteers created benchmark deadlines by which time certain tasks had to be completed in order to remain in the project and/or receive the next set of materials. A common practice was to verify the pit was excavated before the counterpart could receive the materials for the pad, and then the pad needed to be completed in order to receive roofing materials. One volunteer imposed a fine for not completing certain steps in a timely manner. As previously discussed, many volunteers used contracts and deposits to ensure that the latrines were completed in a timely manner. Several volunteers mentioned that they wished they had been clearer about timelines and been more rigid about complying with them.

4.1.4 Deposit/Contract

While not a requirement of latrine projects historically, some volunteers have required community members to sign a contract agreeing to comply with project deadlines and latrine completion. Other volunteers have taken it a step further and required project participants to provide a deposit that was refundable upon the timely completion of the latrine. Of the projects surveyed, 7 required that project participants sign a contract, indicating that they would complete the project in a timely manner. Eight projects were completed without a contract, and no data was available for 4 sites. Three of the sites surveyed required project participants to submit a $5 deposit, and 12 sites did not require a deposit. Two of the sites requiring a deposit also required a nonrefundable contribution of $10 towards materials costs. One of the sites surveyed required both a contract and a deposit. Six projects did not include either a contract or deposit. Table 17 provides a breakdown of which projects included deposits and contracts.

Table 17: Contracts and deposits required by projects

Deposit/Contract			
Site	**Contract**	**Deposit**	**Other**
Bajo Cerro Name 1	N	None	
Cerro Ceniza	Y	None	
Bajo Cerro Name 2	N	None	
Vallecito	No Data	No Data	
Cerro Banco	Y	None	
Candela	N	None	
Salitre	N	None	
Quebrada Cana	No Data	No Data	
Limon	Y	None	
Lajero	Y	$5	
Rio Santiago	Y	None	
Alto Rey	No Data	No Data	
Bajo Mosquito	N*	$5	$10, non-refundable
Sabina Huso	Y	None	
Quebrada Macho	N	$5	$10, for roofing
Casicon	No Data	No Data	
Cerro Piedra	N	None	
Cerro Tula	N	None	
Bajo Membrillo	Y	None	

*An application was required for community members interested in the project

4.1.5 Project Evaluation

Volunteers were asked how successful they felt the project had been, and if they would change anything about the project if they were to do it again. All of the fourteen volunteers who responded to the question indicated that they felt that the project was at least moderately successful, and most indicated that they viewed the project as being very successful. However, most volunteers indicated that they would change something about their approach to the project if they were to do it again. Many of the respondents reported similar areas for improvement, bringing to light a few trends worth mentioning as potential sector changes.

First, several volunteers indicated regret in not having project participants provide a deposit or sign a contract in order to be included in the project. The reasoning was that beneficiaries had a tendency to delay or failed to complete the privacy structure for the latrine. As previously stated, projects are typically organized in steps so that beneficiaries had to complete one part of the project in order to receive the next set of materials and remain in the project. However, once the roofing materials are received, there is no more leverage to ensure that deadlines are met, and often this leads to delays or unfinished latrines. The deposits and contracts provide the volunteers and community leaders with leverage to see the project to completion. No volunteers who reported having contracts or deposits indicated any regrets in having included them.

Second, several volunteers reported that they would have liked to have had more community involvement in the project management and budgeting portion of the project. It can be common for volunteers to exclude project participants from planning portions of the project such as calculating materials quantities, visiting the hardware stores for price quotes, developing a project timeline, and soliciting funds. While it may be impractical to include the entire community in all of these steps, including sector leaders in this process and allowing them to disseminate information to other community members produced more community ownership of the project and a higher likelihood that the community will take on a project on its own.

Several volunteers indicated that if they were to repeat the project they would have been less flexible with deadlines and less hesitant to make exceptions when deadlines were missed. While most survey respondents reported having firm deadlines for different stages of the project, many also reported allowing several exceptions when steps were not completed. Many of those volunteers expressed a hesitance to remove community members from the project. However, in hindsight, many felt that the latrines that were the least successful were those at the locations where exceptions and extensions were granted.

4.2 Site evaluations

This section provides a summary of the data collected using the Sanitation WASH indicators developed for this project. The data collection was performed between November of 2012 and April of 2013.

4.2.1 Solid Waste

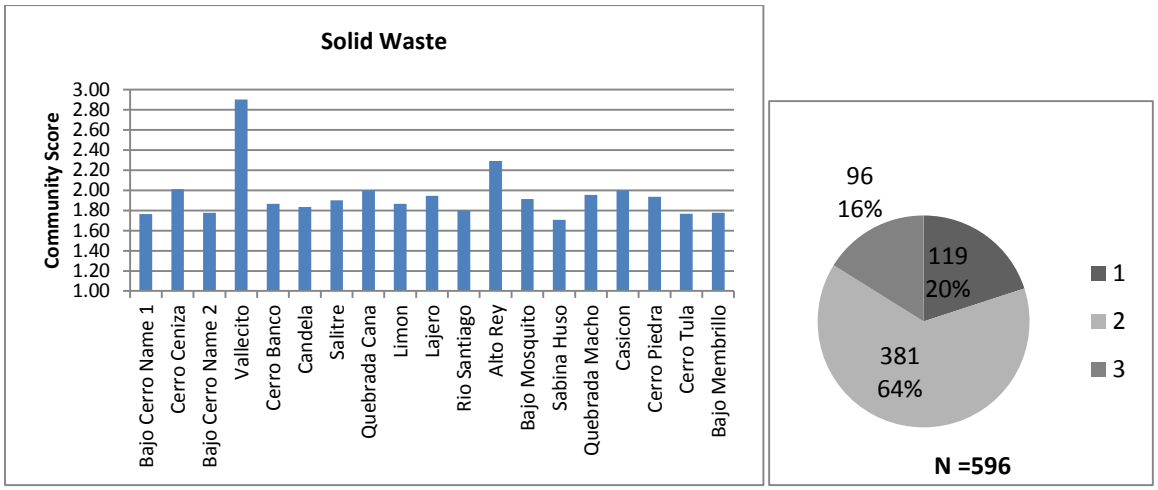

Figure 4: Solid Waste Indicator Scoring: The bar graph displays average community scores for this indicator while the pie chart displays the number of households receiving each score.

The household solid waste disposal indicator evaluated the presence of a waste pit, burning practices, and general cleanliness of the grounds. Approximately 2/3 of the households received a score of "2," indicating that all solid waste is burned or occasionally delivered to a nearby dump site, if available. Because of the rural nature of the Environmental Health project, none of the sites visited had access to municipal solid waste pickup or to an engineered landfill. In addition, the majority of the communities are widely dispersed family compounds connected by poorly developed foot paths. The lack of infrastructure and population dispersion makes centralized waste collection impractical. The observed best practice was the separation of waste into three categories: organics, combustibles, and non-combustibles. The organics can be composed or disposed of in an area away from the home for natural decomposition. The combustibles are burned, and the non-combustibles are disposed of in a small waste pit a safe distance from the house. Figure 5A shows a waste pit at a typical home site that would receive a "2" or "3" depending on other practices. Figure 5B shows poor solid waste management methods with waste strewn about, which received a score of "1".

(A)

(B)

Figures: Typical waste disposal practices the author encountered during data collection: (A) A solid waste disposal pit, (B) Household typical of a score of "1".

4.2.2 Standing Water

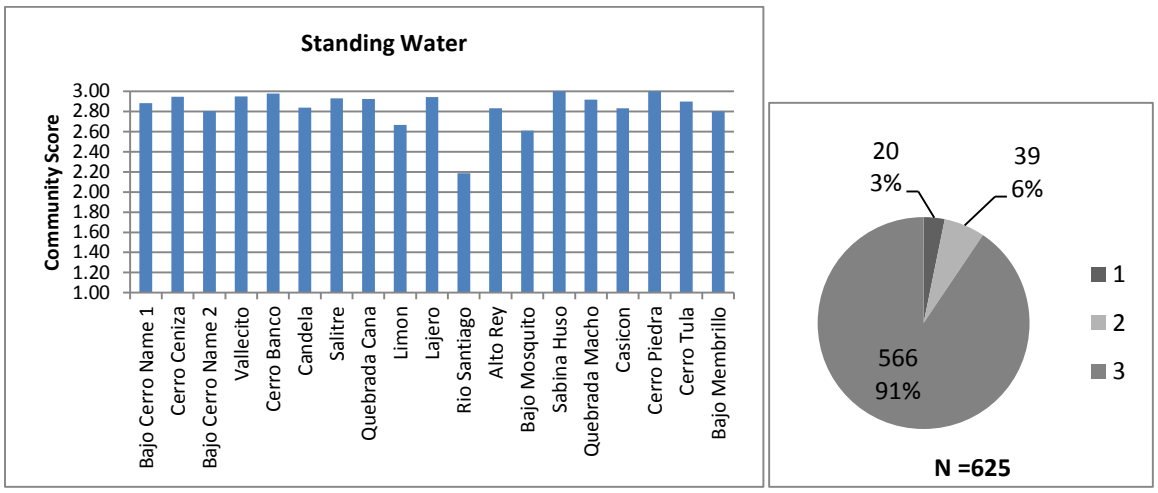

Figure 6: Standing Water Indicator Scoring: The bar graph displays average community scores for this indicator while the pie chart displays the number of households receiving each score.

The standing water indicator evaluates the household's management of grey water and rainfall runoff. The typical household evaluated had three areas of potential standing water problems. The first was the area around the spigot connected to the aqueduct and its drainage area. The second is the dish washing station, which usually consists of a table constructed of "1" to 2" diameter sticks. The grey water is often allowed to collect in a pool below the table. The third area is under the eaves of rooflines. Typical construction consists of metal or palm roofing with no gutters, allowing water to collect below the eave. Nearly all of the homes surveyed received a high score for this indicator, meaning that no pooled water or mud was observed. However, all data collection was done during the dry season, and very little rainfall was occurring. The rainy and dry seasons are very pronounced in Panama, and lower scores would be expected during the rainy season. Also, most of the projects assessed were in a mountainous region of Panama

with high gradients for rapid runoff. It could be expected that this indicator would score lower in a different environment or season. Figure shows typical views of the areas around spigots.

(A) (B) (C)

Figure 7: Typical spigot connection to an aqueduct and wash area: (A), (B), and (C) are typical of washing area

4.2.3 Distance to Structures

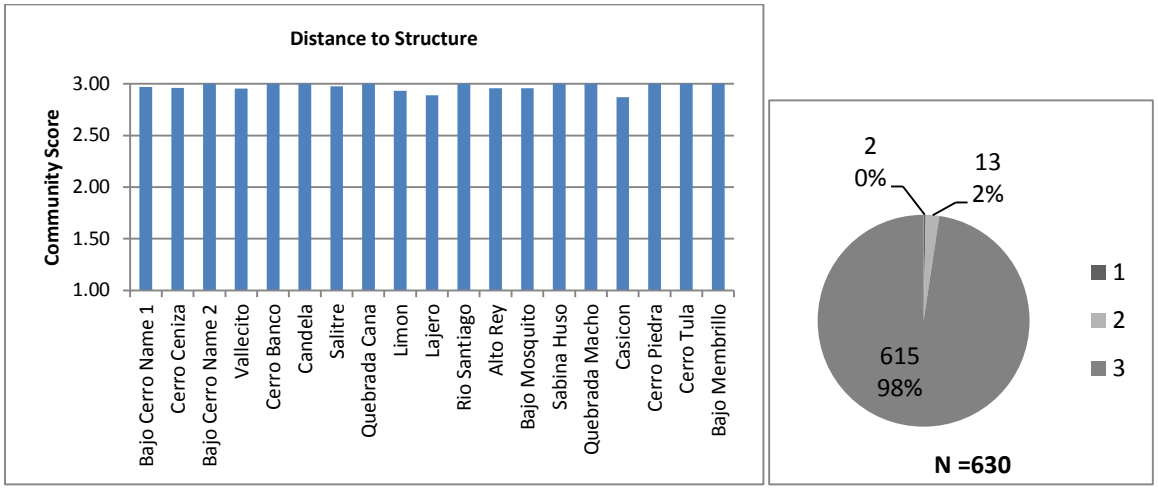

Figure 8: Distance to Structures Indicator Scoring: The bar graph displays average community scores for this indicator while the pie chart displays the number of households receiving each score.

This indicator measures the distance of the latrine to the closest structures. Nearly every latrine visited scored a “3,” indicating it was 30’ to 50’ from any structure. There are two reasons in particular for the relatively high score of this indicator. The Peace Corps latrine construction procedure typically dictates that the location of the latrine be approved before the pit is excavated, and the populations of the communities surveyed are widely dispersed, allowing for many appropriate sites for latrine placement.

4.2.4 Distance to Water Source

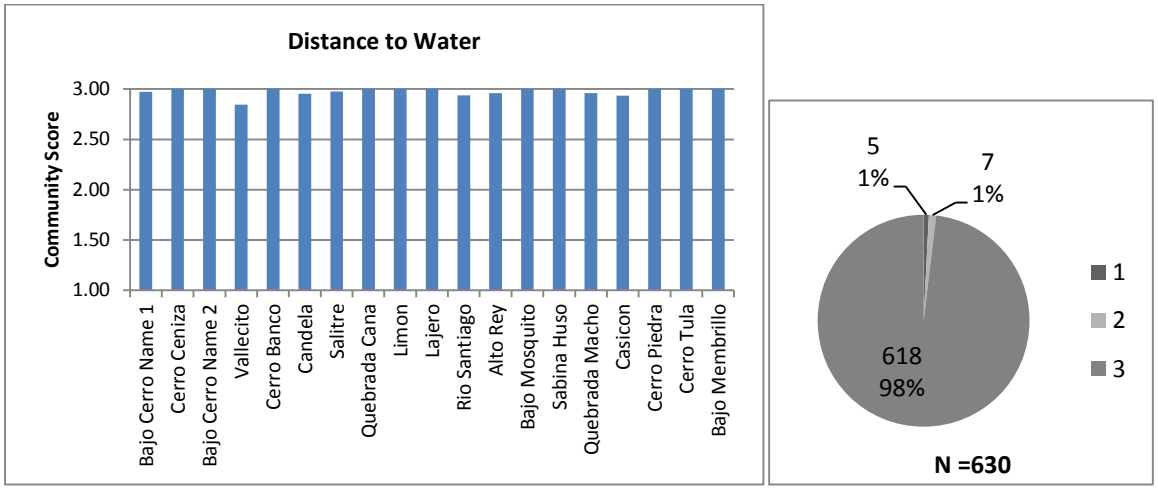

Figure 9: Distance to Water Source Indicator Scoring: The bar graph displays average community scores for this indicator while the pie chart displays the number of households receiving each score.

This indicator measures the distance of the latrine to the closest water source. Nearly every latrine visited scored a "3" for being more than 50' from any water source. Much like the distance to structures indicator, there are two reasons in particular for the relatively high score of this indicator. The Peace Corps latrine construction procedure typically dictates that the location of the latrine be approved before the pit is excavated, and the populations of the communities surveyed are widely dispersed allowing for many appropriate sites for latrine placement.

4.2.5 Covered Hole

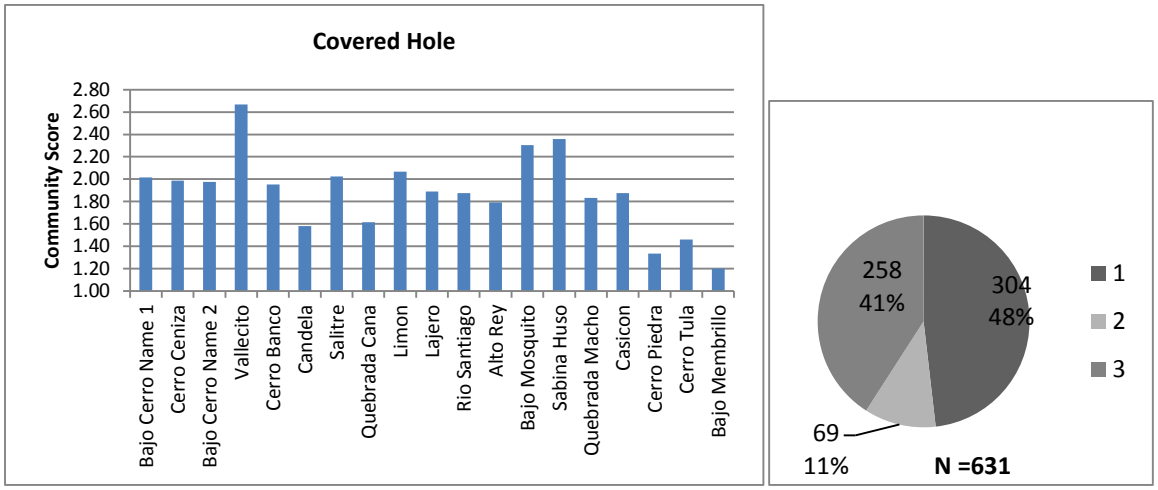

Figure 10: Covered Hole Indicator Scoring: The bar graph displays average community scores for this indicator while the pie chart displays the number of households receiving each score.

This indicator is meant to judge if the hole is properly covered. The purpose of the cover is to help in the reduction of odor, and consequently the number of flies in the latrine. Most of the latrines implemented these projects did not include ventilation in the form of a PVC pipe extending from below the pad to above the roof. The justification for this has been the added cost of the PVC and the fact that, historically, the latrines have been largely open to the air leaving little need for ventilation. Additionally, unless the latrine is specially designed, vent pipes typically puncture the roof causing leaks and reducing the effective life of the roof. However, many community members expressed concern about reducing latrine odor. Historically, Peace Corps volunteers have recommended adding ash from cooking fires or dried organics to reduce smell, in addition to the consistent use of a cover.

For this indicator the distribution of the scores indicated that if a cover was present, the hole was usually properly covered; however, nearly 50 percent of the latrines surveyed had no cover at all. Peace Corps does not provide materials for cover construction, or prefabricated toilet seats. Lids for 5 gallon buckets, or 2" X 12" scraps with handles were commonly observed as covers. Some of the latrines scored a 1 because the concrete seat structure was broken or never installed, and many of those latrines were abandoned or not in use. The EH sector does not provide a design or subsidy for a cover, meaning that the community members are required to find and pay for them on their own. Additionally, many of the covers are not attached to the seat, making it likely that children or unaware people will leave it off after use. The highest score was 2.57, in Vallecito, Cocle and the lowest score was 1.20, in Bajo Membrillo, Comarca Ngobe-Bugle. Figures 11A, 11B, and 11C are indicative of scores "1","2", and "3," respectively.

(A) (B) (C)

Figure 11: Typical photo of latrine covering methods: (A) A score of "1",(B) A Score of "2", (C) A Score of "3".

4.2.6 Privacy Structure

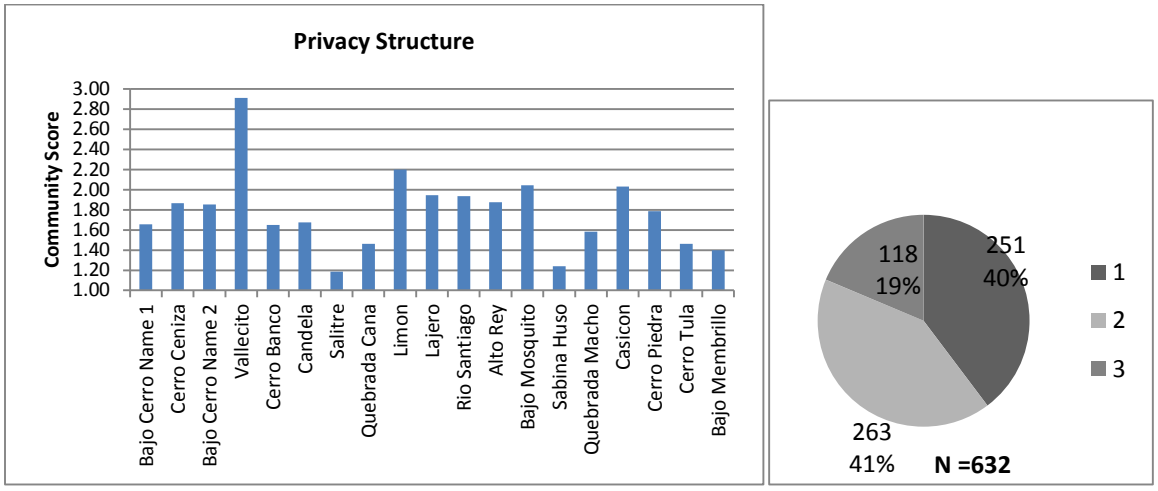

Figure 12: Privacy Structure Indicator Scoring: The bar graph displays average community scores for this indicator while the pie chart displays the number of households receiving each score.

The privacy structures are evaluated on their ability to protect the privacy of the user, the ability to direct drainage away from the pit, and the effectiveness of preventing access of unwanted animals and pests. The highest scoring community was Vallecito in Cocle, where the volunteer provided a design for the structures and funding for a sawyer to mill wall materials. The lowest scoring community was Sabina Huso, a community high in the mountains that is often exposed to high winds which blew down most of the structures. Only 18 percent of the latrines received a score of “3”, leaving 82 percent of the latrines in the lower categories. Peace Corps Panama does not typically provide funding for materials or direction in the construction of privacy structures. It is, however, common for metal roofing to be provided by the project. Most latrines scoring a “1” had either no housing structure or a structure that provided little or no privacy or protection from rain. A score of “2” typically had a metal or natural materials roof that effectively directed drainage away from the pit and a wall that provided some privacy. A latrine that scored a “2” would not typically have a door, and they did not prevent the entry of animals and pests. Typically, walls were constructed of palm fronds, fabric, plastic, or other locally sourced or repurposed materials. A latrine that scored a “3” had a roof (typically metal) that effectively directed water away from the pit, walls, and a door. A latrine that scored a “3” prevented the entry of animals or pests. Common construction materials included bamboo, roughhewn 2” X 12” boards, or metal roofing.

(A)

(B)

(C)

Figure 13: Typical view of privacy structure: (A) A score of "1", (B) A score of "2", (C) A score of "3".

4.2.7 Depth of Pit

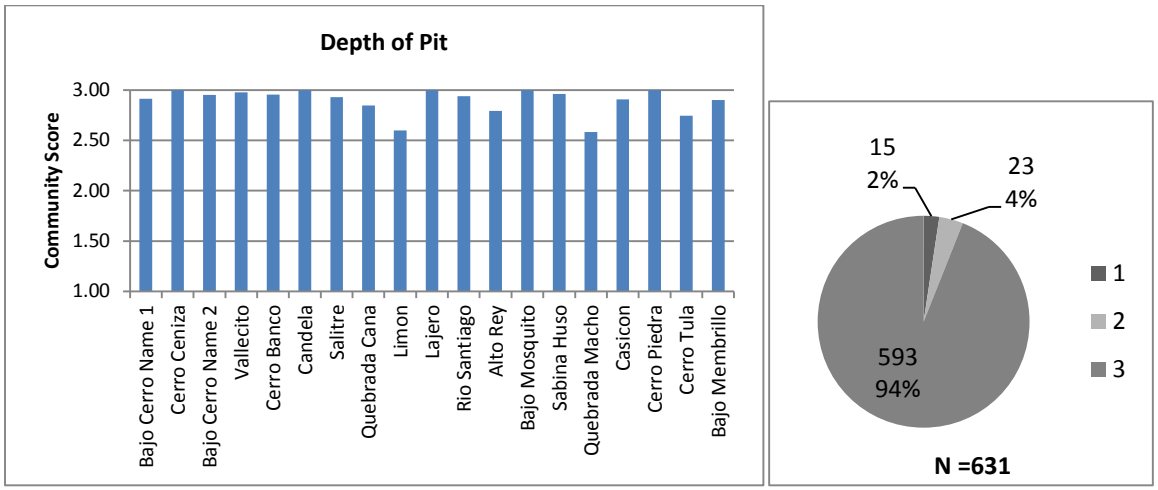

Figure 14: Depth of Hole Indicator Scoring: The bar graph displays average community scores for this indicator while the pie chart displays the number of households receiving each score.

Pit latrine excavations for Peace Corps projects typically consist of a 1 meter by 1 meter square hole excavated to a depth of 2 to 3 meters. However, if the depth does not perforate the water table, there is no reason why excavations cannot exceed 3 meters. Holes are excavated by hand using shovels and pick-axes with waste materials removed via a bucket and rope system. The majority of the latrines evaluated during this survey were excavated in fat clays which appear to hold up well after excavation as no beneficiaries reported problems with pit walls caving in.

This indicator is meant to measure the remaining usable depth of the latrine in conjunction with potential penetration of the water table or poor drainage. Nearly all the latrines were still within their design life, and the water table in nearly all of the sites was not encountered. Those that were filled with water appeared to be isolated post-rain drainage problems. All of the latrines that scored low were near to filling and not full of water. A latrine scoring a "1" would be full of water and may even overflow during a raining event. A latrine scoring a "2" did not have any water in the latrine but was nearing full (less than 5 feet), indicating that it was near the end of the design life. A score of "3" was given to

those latrines that did not have standing water and still had at least 5 feet of useable space below the base of the pad. Nearly 95 percent of the latrines measured received the highest possible score. This is to be expected because all of the latrines are still within their design lives, and volunteers inspected each pit location to ensure that the water table would not be encountered.

4.2.8 Sanitary Kitchen Area

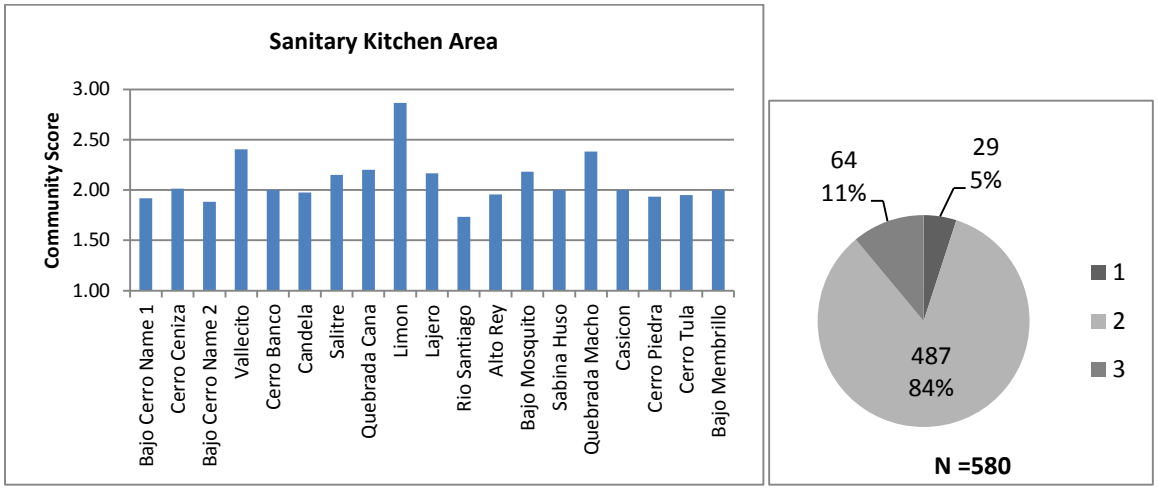

Figure 15: Sanitary Kitchen Area Indicator Scoring: The bar graph displays average community scores for this indicator while the pie chart displays the number of households receiving each score.

This indicator is used to assess the general sanitation practices in the kitchen area by judging general cleanliness, food storage, presence of animals, and soap for dish washing. Most households in rural Panama keep their cooking area in a separate hut from the main living area (or outside in the dry season) and include a nearby table for dishwashing. A score of "1" was indicative of poor general sanitation and would often include some or all of the following: no dish soap or water for washing, poor food storage, dirty dishes, the presence of flies and animals, solid waste, and mud under the dish washing area. A score of "2" was the most common and usually indicated that only dish washing was missing. A score of "3" met the following conditions: visible dish soap and water for washing, good food storage, no dirty dishes, no flies or animals, no solid waste, and a well-drained dish washing area.

(A) (B)

Figure 16: Typical view of Kitchen Areas: (A) A score of "2", (B) A score of "1".

4.2.9 Hand Washing

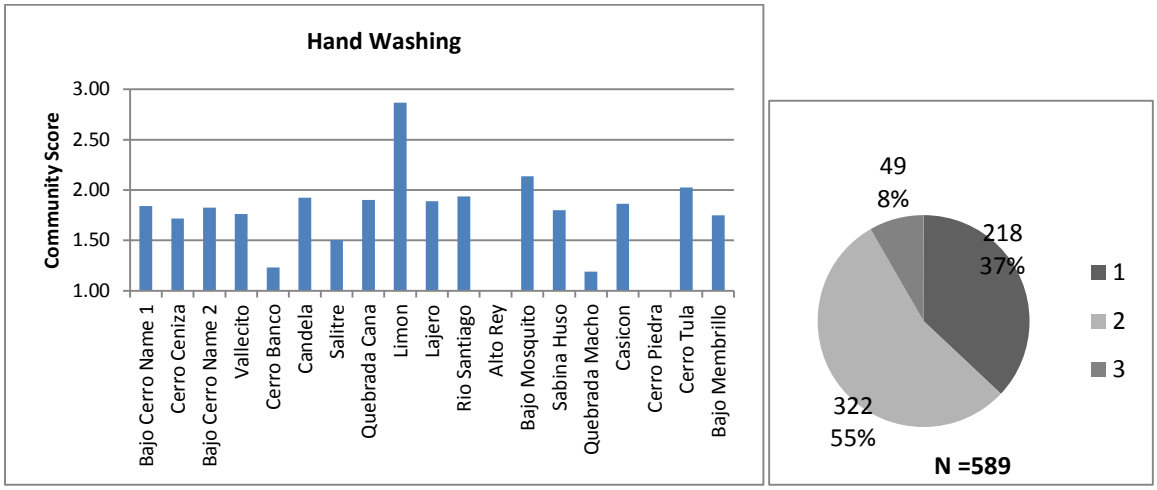

Figure 17: Hand Washing Indicator Scoring: The bar graph displays average community scores for this indicator while the pie chart displays the number of households receiving each score.

This indicator is meant to assess if the members of the household are washing their hands and is evaluated by the observed presence of soap and water. If the household received a score of "1," neither soap nor potable water was observed. If the household received a score of "2," one of the two was missing (typically soap). A score of "3" was reserved for those households where both soap and potable water were observed. Only 8 percent of households received a score of "3". This was nearly always because soap was not observed. Many families reported that hand soap was not affordable or readily available in local stores. However, in the authors experience this was not true as soap was observed to be readily available at most stores for a low cost. Additionally, the Panamanian food subsidy system allows for families to purchase soap with their monthly allowance. These observations point to a lack of value in using soap rather than an inability to obtain it. It should also be noted that many of the aqueducts flow only intermittently due to variations in seasonal and daily supply and demand. Therefore, there could be a potential over reporting of "2"s because access to water was only occasional, making those scores effectively "1".

4.2.10 Latrine Use

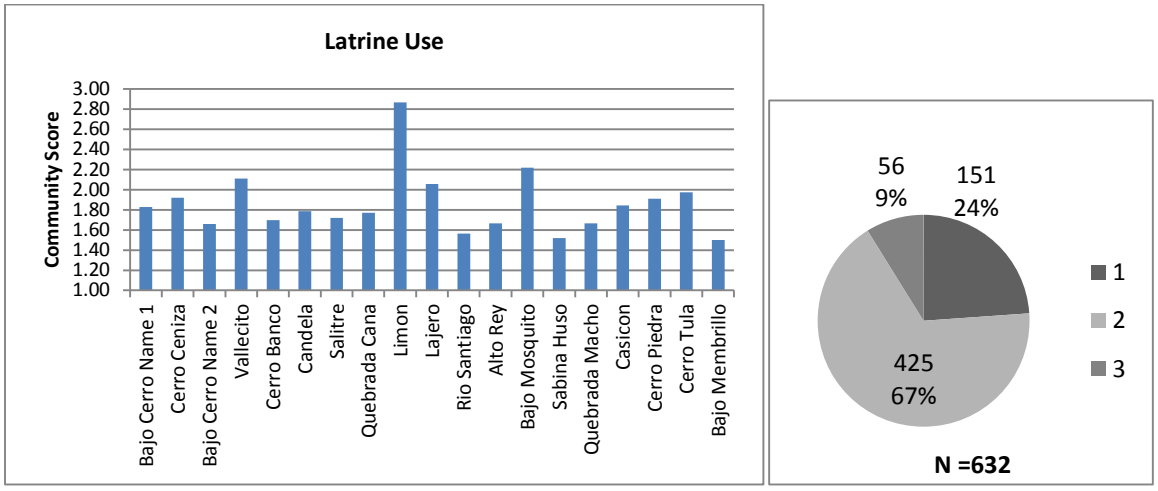

Figure 18: Latrine Use Indicator Scoring: The bar graph displays average community scores for this indicator while the pie chart displays the number of households receiving each score.

This indicator was meant to evaluate whether or not the latrine was being used and, if so, the effectiveness of use. A score of "1" indicated that a latrine was not currently in use. Many of these had never been completed and were never put to use. The others had fallen out of use usually from a family moving away or abandoning the house site. A score of "2" indicated that the latrine was in use, but that it was not being used in a completely sanitary manner. This was often due to the community members not having access to soap and water to wash their hands after use, but was also sometimes due to poor maintenance or leaving the top uncovered. A score of "3" was received by those latrines that were clearly in use and used in the proper fashion.

It should be noted that this indicator simply evaluates whether a latrine is being used or not, but not if all of the people living in the compound are using it. While the author did not collect data on the number of people using each latrine most volunteers estimate household size to be approximately 7. There may be some variability in usage based on sex or age of family members. For example very young children are probably less likely to use a latrine consistently than adults. Also, women may be more likely to use a latrine more regularly than men due to an increased need for privacy.

(A)

(B)

(C)

Figure 19: Typical Latrine Usage: (A) A score of "1", (B) A score of "2", (C) A score of "3"

4.2.11 Community Score

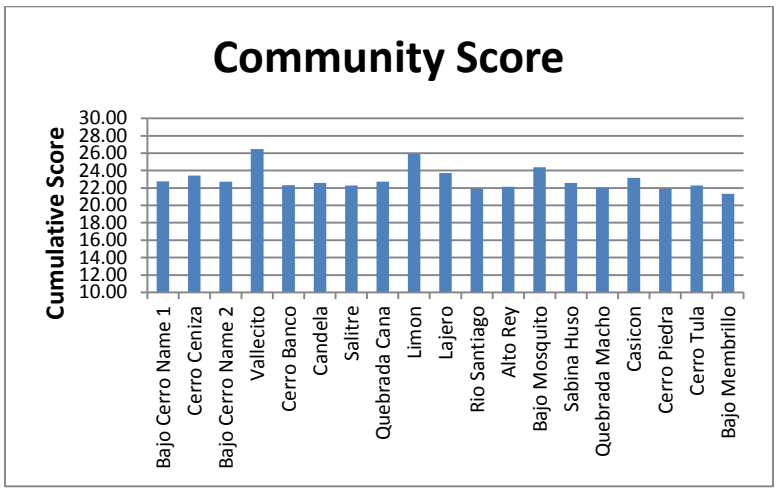

Figure 20: Community Score

The community score represents a summation of the average scores for each indicator and is meant to provide a general assessment of the overall sanitation performance of the community. The highest possible score is a 30, and the lowest possible score is a 10. The average score of all of the communities is 22.98, with a high score of 26.49 and a low of 21.33. The scores had a standard deviation of 1.34. While many communities show room for improvement, many are near the same level of sanitation performance after the implementation of a latrine project. It would have been interesting to compare this score to an evaluation done prior to project implementation. This could be a valuable reporting indicator for future volunteers.

4.2.12 Access to Potable Water In the Home

This indicator signifies the presence of a spigot in the home. All of the potable water for the communities surveyed is provided via gravity-fed aqueduct systems using springs or small creeks as water sources. The survey only counted the presence of a spigot and did not determine if water was available in the aqueduct year round. In these types of systems in Panama, it is common for the sources to have limited or no flow in the dry season, meaning that some communities only have access to potable water for part of the year. Therefore, while the following table showed access to water, it probably overstates in practical terms the amount of people with year round access.

Table 18: Access to Potable Water

Household Access to Potable Water			
	% Access	**Number With Access**	**Number Without Access**
Bajo Cerro Name 1	80	56	14
Cero Ceniza	68	51	24
Bajo Cerro Name 2	72	31	11
Vallecito	31	14	31
Cerro Banco	28	12	31
Candela	91	39	4
Salitre	37	16	27
Quebrada Cana	50	7	7
Limon	100	15	0
Lajero	67	12	6
Rio Santiago	94	15	1
Alto Rey	0	0	24
Bajo Mosquito	78	18	5
Sabina Huso	100	25	0
Quebrada Macho	25	6	18
Casicon	75	24	8
Cerro Piedra	0	0	33
Cerro Tula	100	39	0
Bajo Membrillo	70	7	3

4.2.13 Previous Usage of Pit Latrines

The respondents were asked if they had previously used a pit latrine in the home prior to the latrine provided by the Peace Corps project. In cases where there was no respondent, the investigator looked for evidence of an old or abandoned latrine structure. Typically, families constructed the new latrines in the same general area of an old latrine if one existed. Only 21 percent of the households visited had previously used a pit latrine. Table 19 shows the percentage of homes with a previous latrine, the number of homes with previous latrines, and the number of homes without a previous latrine.

Table 19: number of project participants that used a pit latrine prior to the Peace Corps Project

Previous Pit Latrine			
	% With Previous Latrine	**Number With Previous Latrine**	**Number Without Previous Latrine**
Bajo Cerro Name 1	5.7	4	66
Cero Ceniza	12	9	66
Bajo Cerro Name 2	4.9	2	39
Vallecito	53.7	24	21
Cerro Banco	2.3	1	42
Candela	18.6	8	35
Salitre	4.7	2	41
Quebrada Cana	13.3	2	13
Limon	13.3	2	13
Lajero	33.3	6	12
Rio Santiago	18.8	3	13
Alto Rey	0	0	24
Bajo Mosquito	4.3	1	22
Sabina Huso	4	1	24
Quebrada Macho	8.3	2	22
Casicon	3.1	1	31
Cerro Piedra	0	0	33
Cerro Tula	17.9	7	34
Bajo Membrillo	0	0	10
Total Avg.	21	150	561

4.2.14 Cultural Effects

Notably, the two highest scoring of the 19 sites reviewed were Latino sites, as shown in Figure 21. It would have been interesting to evaluate enough Latino sites to confirm that they would consistently score higher than the Ngobe sites for latrine projects. Unfortunately, those were the only sites for which the author was provided information. Nonetheless, due to the separation of the scores it is still valuable to speculate on the reasons for the high scores. A few reasons seem to jump out. First, even though they live in very similar circumstances, Latinos have a very different cultural identity than Ngobes. Latinos tend to identify with their Spanish roots and because of that tend to adopt a more "westernized" lifestyle. They are therefore typically more comfortable with ideas and practices that volunteers implement. They also tended to be more likely to have previously used a latrine than the Ngobe houses surveyed. Also, while still often living in poverty, Latinos tend to have higher incomes than Ngobe with the Comarca Ngobe-Bugle having over 98% poverty and Colce having closer to 80% poverty in its rural north (Ministerio de Economia y Finanzas, 2003). That could make the difference in latrine affordability.

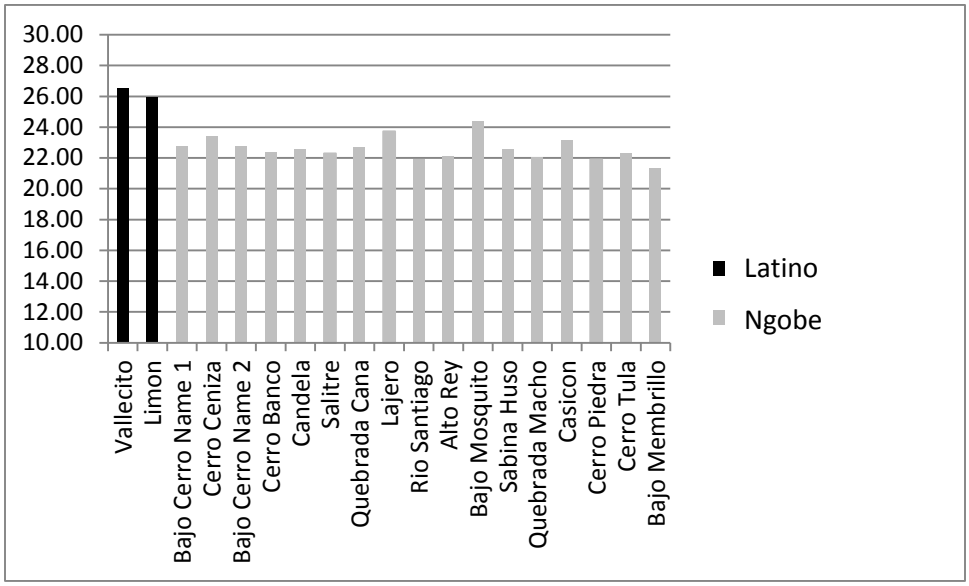

Figure 21: Cultural Effects

4.2.15 Subsidies and Contracts

Many volunteers have used some method to motivate community members to complete privacy structures in a timely and appropriate manner. As noted in the volunteer survey responses all of those using contracts or deposits felt that they were helpful in the successful completion of the project. In addition, many volunteers who did not use contracts or deposits indicated that they would use them if they were to do the project again. Interestingly, the scores for privacy structures were not necessarily higher for those projects that used contracts and deposits, with two of the lowest three scoring projects having used contracts. However a large portion (5 of the 8 highest scoring projects) did use a deposit or contract. Despite the high number of variables affecting these projects, it is still likely that contracts and deposits provide a positive impact on projects, and there is no evidence to indicate that they have a negative effect on projects.

The highest scoring community for the privacy structure indicator was Vallecito in Cocle. It scored nearly a full point higher than the next closest community. In Vallecito, the volunteer provided a subsidy to harvest wood to construct the privacy structures. Additionally, a standardized design was used for the structures. Because no other volunteers subsidized the structures, it is difficult to confirm subsidies will improve scores for this indicator. It does, however, seem intuitive that subsidies would help the completion of the structures. Figure 22 shows the breakdown of scores for communities with subsidies, deposits, and contracts.

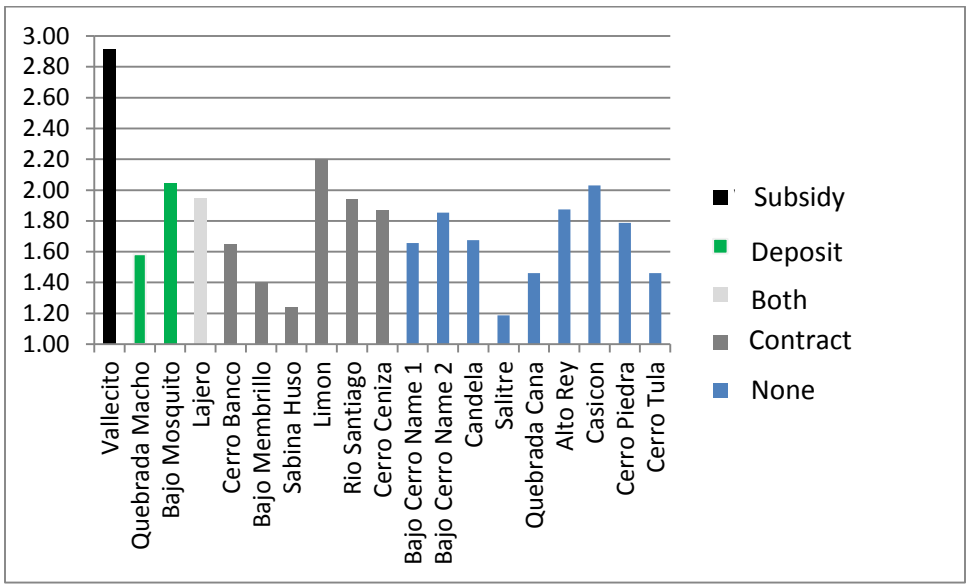

Figure 22: Subsidies and contracts effect on privacy structures

4.3 Conclusions

In the judgment of the author the sanitation WASH tool was an effective evaluator of the relative effectiveness of sanitation interventions. However, some of the individual indicators proved to be somewhat more complicated to evaluate than others, leaving more of the analysis than ideal up to judgment. During this study the review was performed by a single investigator, meaning any bias would be uniform. However, there is potential that with more than one investigator some individual judgment bias could occur.

In general the projects scored relatively high on those indicators related to latrine construction, with the exception of the privacy structure and covered hole. Distance from structures, distance from water, and depth of hole all had over 90 percent of households receiving the highest score. It is somewhat intuitive that with the Peace Corps approach to projects, these indicators would score so highly, as they are easy to control with training sessions and inspections of latrine sites and hole excavations. Additionally, both the Comarca and rural Cocle are mountainous farming communities having widely dispersed housing and low water tables with plenty of acceptable locations for pit latrines. Two indicators related to latrine infrastructure and implementation scored somewhat lower. Only 18 percent of households received the highest score for the completion of the privacy structure, with 42 percent receiving a score of

2, and 39 percent receiving a 1, the lowest possible score. The other infrastructure indicator that received lower scores were covered holes, with only 50 percent of households having a method for covering the hole and only 40 percent having the hole covered at the time of the inspection. Interestingly, these are the two areas of construction and implementation where the EH program does not offer a standardized design and/ or subsidy.

Those indicators related to health and hygiene were the lowest scoring indicators. Only 8 percent of beneficiaries were observed to wash hands with soap and water. Only 11 percent of households achieved the highest score for a sanitary kitchen area. Sixteen percent of households received the highest score for solid waste disposal. Also, only 9 percent of households received the highest score for latrine usage. This indicates that while over 75 percent of people are using their latrines, only 9 percent maintain them properly and are set up to wash their hands with soap and water after use. The exception in the health and hygiene questions was the standing water indicator, with over 90 percent of households receiving the highest score. However, as previously indicated, the majority of the survey was performed during the dry season. It could be expected that this indicator would score lower during the rainy season.

The methodology for health and hygiene training is somewhat inconsistent, and the procedures for training sessions are not presented in the most intuitively usable format. Volunteers do receive training on appropriate health and hygiene practices, but the lesson plans for those training sessions are typically provided by a volunteer who has been selected to help with Pre-Service Training. Therefore, the method in which volunteers are trained and the content of that training can vary greatly from year to year. Many useful resources for health and hygiene trainings are made available to volunteers during training and throughout their service, but the primary resource for the trainings prior to latrine project implementation is the latrine manual. These resources do not provide a detailed health and hygiene training plan. Volunteers are currently free to develop any methodology and scope they deem suitable for their sites. Additionally, most of resources made available are not formatted as a lesson plan that would ensure uniformed implementation of health and hygiene trainings across the sector. Having said that, volunteers who have completed latrine projects tended to have implemented the projects in similar ways, and common themes could be extracted from their recommendations for positive changes to the project. Some caution should be taken as the health and hygiene indicators were rather low scoring, potentially indicating that the sector could benefit from adaptations in methodology. Most volunteers reported having implemented three mandatory meetings prior to project implementation. Those meetings typically included one meeting on health and hygiene, one meeting on locating the latrines and project organization, and one training session on the construction of latrines. It should also be noted that the most common recommendations from PCV's were for the adoption of a contracts/deposits system and an increased involvement of the community in projects.

Upon developing the idea for this investigation, the author anticipated having access to a large database of project-specific information from the Peace Corps. However, project monitoring, reporting, evaluation and retention of useable project information was found lacking for latrine projects. Little practical information is currently retained related to past project outcomes, and information that is available is spotty and difficult to access due to the format in which the data is reported. The author was able to contact the volunteers who had completed projects in each site, and in most cases those volunteers were able to provide the necessary information (contacts, beneficiaries, access, project details). It

would be beneficial for the EH sector to retain that data in a database for collective use and evaluation within the project. It should be noted that Peace Corps recognizes the gap in monitoring, reporting, and evaluation, and has taken on a large overhaul of the system worldwide. The projects reviewed in this report were completed prior to many of the advances that Peace Corps Panama has made in the last few years towards project standardization and improved reporting. It will be educational to review the projects that are currently being implemented using the WasteSTAR, CEHDP, Sanitation WASH Index, and Project Closeout reports.

5 Going Forward

The following are recommendations based on the conclusions of this study. The section presents recommendations for training and planning project implementation and monitoring, evaluation and follow-up. It should be noted that the majority of the latrines reviewed were located in the Comarca Ngobe-Bugle and as such the following recommendations are applicable to that culture and may not be wholly applicable among other groups.

5.1 Training and Planning

Overall, the Environmental Health Sector is doing an excellent job in preparing their volunteers for the technical challenges they will face during their service. Over 75% of the latrines constructed by volunteers are still in use. Additionally, from the authors' active involvement with the implementation of many latrine projects during his time as sanitation coordinator, it is obvious that volunteers gain a strong understanding of sanitation projects and how to implement them during training. With a few adaptions based on low scores for certain indicators reviewed herein, the recommendations of volunteers working on latrine projects, and published methodologies, the sector can do an even better job of improving the health of rural Panamanians.

In order to allow for the effective evaluation of latrine projects and other health and hygiene interventions, the technical training sessions should be standardized for both pre-service training and in-service training. The focus of the content in those technical training sessions should be on appropriate health and hygiene topics. Specifically, the sessions should include practice in mimicking the same sessions that the volunteers will be asked to present to their communities. Having a well-constructed, standardized set of resource documents should make this process intuitive, and all effort should be made to train using the manuals and resources as a key. The sector has been adapting to this course over the last 2 years (2011-2012) and is completing the transition. It will be useful to see how this manifests itself in the long term performance of latrine projects.

Based on the low scores in the health and hygiene indicators for the projects reviewed, the sector could benefit from some adaption of, and increased focus on, health and hygiene trainings. While many resources exist for health and hygiene training, there is little standardization of the sector's approach to health and hygiene training sessions for latrine projects. Based on the outcomes of the investigation, the specific training topics that should be addressed are hand washing (specifically the use of soap), solid waste management, latrine maintenance, and general household cleanliness. These topics should be added along with maintaining training sessions on disease vectors and the importance of latrine usage, as these sessions seem to have had some success given the large percentage of the latrines surveyed in use.

The community health club (CHC) model has shown good results in the adaption of proper health and hygiene behavior in many locations around the world. Furthermore, the methodology is a natural fit for the Peace Corps' participatory development philosophy. Using each aforementioned topic as an independent training session, the volunteer would create a contract and health club membership card that included an agreement for each club member to attend every session and a location for the volunteer to sign off verifying the attendance of each training session.

The training session resources should be formatted in a way that someone with relatively limited expertise can facilitate the session successfully. The document should include a step-by-step procedure for implementing the session, an

expected time for completion of the session, any resources needed for the session, and a guide to constructing any visual aids the session may require. There is some precedent for this type of document in the Environmental Health Sector in Panama in the form of the Water Committee Seminar Manual (Peace Corps Panama Environmental Health Sector, 2010). In the manual, training sessions are structured as ready-to-use session plans and have been very successful both for volunteers and for igniting the desired behavior change in communities. A good source of pre-prepared training sessions is the WHO PHAST manual (WHO, 1998). These sessions are set up in a similar way to the water committee manual and could be easily adapted to Panama.

The latrine manual should be updated so that the design matches the current design for pit latrines being used in the field. Additionally, the training sessions for the health clubs discussed should replace all of the existing health and hygiene information. As the new project framework includes grey water interventions, the manual should also include a soak pit design and address grey water strategies.

The continued adoption, streamlining, and standardization of the project planning and implementation reports will improve the quality of the sanitation project. The CEHDP is critical for community analysis and project selection. The requirement that it is completed by all volunteers should be maintained and enforced. Similarly, the WasteSTAR report is critical to the continued improvement of sanitation projects in Panama. The reports will help to standardize the product, ensure that volunteers are selecting and planning appropriate projects for their communities, and aid in the monitoring evaluation and reporting of projects. The integration of the Sanitation WASH index created for this study can help to assess pre project appropriateness and post project evaluation. Over time, as projects are completed using these new reporting formats, the guidelines and methodology for the reports should adapt appropriately to improve the project. It is also critical that volunteers are exposed to these reporting formats during training and understand their critical place in the volunteer timeline in country. Increased exposure will also help improve volunteers understanding of their use during project planning and implementation.

5.2 Project Implementation

The construction and implementation of pit latrines in Panama is largely successful. Nearly all of the latrines constructed were located in acceptable areas with adequately deep holes. Additionally, those parts of the latrines that were subsidized were universally completed to the standards outlined in the manual. There were, however, two areas where latrines tended to fall short during inspection. A large number of latrines did not have adequate privacy structures, and often the holes were not covered during the inspection. Additionally, those projects that included a design and some sort of subsidy for a privacy structure had the highest usage and overall community scores, while those projects that did not include roofing materials or walls had among the lowest usage scores. This information, along with published data indicating that subsidies increase the success of CLTS projects, similar to Peace Corps projects, indicates that it could be beneficial to include the privacy structures and seat covers in project funding, or at least provide a standardized design to be used for all projects. Some argument can be made that providing total funding for all parts of the latrine eliminates the community ownership of the projects and consequently their sustainability. That is a legitimate concern. One potential solution is what the volunteer in Vallecito did by creating a standardized design and paying a local sawyer out of project funds to cut the wall materials from locally sources

materials. This seems to be a rather elegant solution. Another potential way to improve the scores for both privacy structures and seat covers is to require a contract or deposit for latrine projects. When the project comes to the privacy structure, the volunteer no longer holds any leverage over beneficiaries to motivate them to complete the latrine, but if a deposit or contract can be withheld until completion, there is incentive to complete the latrine. All of the volunteers that reported using contracts or deposits reported being glad they had done so.

5.3 Monitoring, Evaluation, and Follow-up

While many of the tools are in place to facilitate the successful selection, planning, implementation, close out and follow-up for sanitation projects, there is some room to improve a few of them and standardize the use of some others. In addition, there is a lack of effective pre- and post-project data collection to ensure the continuity of projects and smooth transition between volunteers during the 5-year project cycle.

The Peace Corps has taken on an overhaul of its monitoring, reporting, and evaluation program. In compliance with this initiative, Peace Corps Panama has developed a new project framework with a specific purpose, goals, objectives, activity statements, targets, and indicators. These specific, measurable parameters need tools for volunteers to use in collecting project specific data. The Sanitation WASH index developed for this report can be used to collect health and hygiene and latrine information to report on many of the indicators. However, to function better, the EH program will need to be able to collect and maintain data on the performance of interventions after volunteers have left the site. In order to collect this information, the EH project can do two things. First, a project closeout report should be developed for sanitation projects. The report should collect all of the information requested in the volunteer surveys and be maintained in a database that is easily accessible to potential follow-up volunteers and office staff, and be available for future data collection trips. Second, because one of the objectives calls for the evaluation of latrines 6 months after the completion of the project, it would be valuable for the program to have a sanitation coordinator extension position that performs the following tasks:

- The coordinator will manage the database of the sanitation projects in Panama. In addition, the volunteer will perform continued post-project assessment of latrine projects. The new project framework requires that data collection be performed 6 months after the completion of latrine projects which is a task well suited to this coordinator role.

- The coordinator will manage old projects and oversee new ones, allowing for improved transition of information between volunteers entering and leaving country.

- The coordinator will act as a technical advisor for sanitation projects by reviewing WasteSTAR reports, facilitating trainings, and aiding in project implementation. Additionally, having one point of contact for all sanitation projects should help to standardize project planning, implementation, follow-up, and reporting

- While completing the post-project reviews, the coordinator may identify the need for some follow-up action such as health and hygiene reinforcement training or maintenance and upkeep of latrines. The coordinator will be able to provide those services as needed.

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7 Appendices

Appendix A CEHDP Guidance Document

Peace Corps Panama Environmental Health Project

Community Environmental Health Development Plan (CEHDP)

CEHDP Process

The CEHDP is intended to help you identify your best added value to help the community meet its needs, and to help you identify resources and people who you can work with. It is intended to focus on the project goals, but to look at things with a wider lens in the information gathering stage. The Plan has three objectives:

1) To provide a framework within which you will make important contacts with community members, work partners, and both local institutions and institutions that work with your community, with whom you may develop a working relationship. It is important that you seek out a wide variety of individuals and understand their roles in your first three months.
2) To further define the areas in which you will work, that is the place where the truly felt community needs (these may be different from those that were discussed in your APCD's site preparation visits or from those that matched the personality, skills and interests of the Volunteer you are replacing better than they match yours) intersect with your skills and Peace Corps goals and objectives.
3) To improve communication on goals and Volunteer planned activities between you, your work partner(s), and your institutional representative(s), and to better establish you as a professional in the community and with the organizations with which you will work.

The Plan is a process in which you better understand the community and they better understand your role, and in which together you develop sound baseline information and a map for your work. We also believe that this process will decrease the time it takes you to discover and make contacts in the area where you will make the greatest contribution with your community.

The CEHDP process includes:

1) Interviews of institutions relevant to the Volunteer's primary work assignment and secondary work interests
2) Informal interviews of community members
3) Focus groups with target group representatives
4) Analysis of information with work partner(s) and institutional representative(s)
5) The presentation at the first in-service training (Reconnect Conference)
6) The written CEHDP, to be shared with Peace Corps, and its contents shared in the most appropriate way with your host institution and work partners

Remember that community analysis begins and continues with *Proyecto Amistad*: lots of talking with community members and participating in any and all community member activities. Also remember that if community members are involved from the beginning in discovering and/or expressing their needs/interests, it is highly probable that they become more involved in the process and encourage change rather than inhibit it. Those individuals involved in the process can learn a great deal through the process.

Use of the Plan

There are three important reasons to share your draft and final report (at least verbally, and depending on the level of your Spanish, in writing) with those who contributed to its development:

1) to offer another opportunity for feedback
2) out of respect for their input (even if an activity of high interest to them was omitted they deserve to know the rationale)
3) to offer an opportunity for collaboration

Share and go over the report with them both during the process and once it is finalized!

Presentation at In-Service Training

At your Reconnect Conference you will have an opportunity to summarize key aspects of your diagnostic and present them to your group for a peer review. You will only have 10 minutes for your presentation and 5 minutes for questions, so we suggest that you focus your presentation on:

1. key activities you undertook to complete your diagnostic
2. key findings relevant to your work
3. new ideas or approaches you have initiated that could be beneficial to your peers
4. issues or challenges that you would like to discuss with the group: we will give you notecards on which to write these so that we can discuss common challenges in small groups
5. key activities / approaches you foresee for the next 6 months, including secondary activities

We ask that you make your presentation in Spanish to the extent that you can express yourself in Spanish, and that the discussion that follows be in any language.

CEHDP Format (suggested guidance)

A suggested outline for compiling your data follows. The most important reason for formally writing and presenting the report is to provide an opportunity for feedback to those who read the report. By specifically listing which organizations and individuals may have a stake in Volunteer projects and asking your work partners and partner institutions to review the information with you, the likelihood of you making important linkages early in your service will increase. In other words, aim for clear organization, not too many irrelevant details, and seek opportunities for local input.

Because the report will be shared with your community, it needs to be written in Spanish. The content and format will vary depending on the Volunteer and the community. Keep in mind that the emphasis should be on

meeting the goals of your primary project. A quality report is expected to be 5 to 8 pages long, perhaps with a few annexes. We have tried to keep the instructions flexible enough to meet the needs of your varied sites and work styles, yet specific enough to provide guidance for a quality piece of work that meets the purpose we set forth for the report. It should feel relevant and important to you. If you would like additional guidance or would like preliminary feedback on a first draft, please feel free to contact your APCD.

I. Introduction (Introducción):

a. ***Purpose of Analysis and report (Propósito del analisis y reporte):*** State the purpose of the report,

b. *Preliminary primary and secondary Volunteer activities (Lista preliminaria de actividades primarias y secundarias)*: list the initial activities envisioned by the APCD during site development. Also list any additional interests that will be explored in the diagnostic.

c. ***Goals and indicators (Metas e indicadores):*** Specifically list the goals of the PCV primary (and likely secondary) project(s), these can be taken directly from the EHP Framework.

d. ***Information Collection techniques (métodos de recopilacion de la información):*** How did you gather your information: how many focus groups, individual meetings, house to house interviews, community leaders interviewed, break down of number of people, ages, etc. This is important to report, as this is where your credibility is held on the line.

e. ***How the draft and final Plan will be shared with those involved (Como se compartirá el borrador y el final del Plan con los involucrados)***

II. Community Profile (Perfil comunitario): This section is included for completeness, and is not intended to occupy a great deal of the PCV's time unless relevant.

a. ***General information (información general):*** Name of, province, district, canton, etc. = the history of your community- how, when and why was the community founded, general facts about the community, why is it called what it is, who founded it, etc.

b. ***Characteristics of community (caracteristicas de la comunidad)*** geographical description, transportation, population, population trends or fluctuations, economy, Include FREEHOPP or other PACA tools (e.g. community map, activities calendar, daily activities schedule) analysis here if appropriate.

c. ***Community FODA, if appropriate;*** in general, Volunteers in smaller communities find a community FODA to be relevant, while those in larger communities find that institutional FODAs are more relevant (see section IV)

d. ***Baseline Data relating to any changes that PCV may influence (datos de base relacionado a cambios que el voluntario podra influir)*** For example, for business Volunteers, answer questions such as what are the business practices and incomes of the members of the target group. Refer to the diagnostics section under your project Annex for information to include.

e. ***Leaders and communicators (Líderes y comunicadores)*** Incorporating the principles of key people who can influence behavior change as summarized in "the Tipping Point", identify key people who may be:

- *Connectors* – people who know lots of people and bring people together
- *Mavens* –experts in their field who others recognize and respect
- *Salesman* – people who are good at convincing others to try something new
- *Early Adopters*- those who are likely to be the first to try out something new

III. Institutions / Programs (Instituciones y programas) List the governmental and non-governmental institutions and programs present in or involved with your community that relate to

your primary project or potential secondary projects. For each institution or program, specify their areas of work, resources available, contact information, and key contact (person) within that institution. Refer to the "Institutions / Organizations to Seek out in Your Community" section under your project Annex, and be sure to ask about the existence or operations of these organizations in your community. You may also want to list networking resources within the Peace Corps community.

IV. Challenges and Opportunities (Desafios y oportunidades):

a. ***General (General):*** What are some of the general challenges that are faced by the community that may impact PCV activities? How might these be addressed?
b. ***SWOT Analysis (Analisis FODA):*** as relates to the target issue(s), if appropriate, may be included
c. ***Specific (Especifico):*** If not addressed above, mention specific challenges to the potential activities of the PCV and how these may be addressed.
d. ***Existing projects addressing challenges (Proyectos existents relacionados a estos desafios)*** what projects exist that focus on the challenges, issues, etc. faced by young people and families? What are their services, how long have they been working on the project? Who is involved, etc.?
e. ***Potential Volunteer contribution (Lo que un Voluntario podria hacer para colaborar)*** identify how the Volunteer could help community address challenges and capitalize on resources and opportunities.

V. Draft Volunteer Strategic Plan (Plan Estrategico del Voluntario, Borrador): Based on the analysis, specify a new list of primary and secondary activities for your work as a Volunteer or include a copy of your first trimestral tasks and plans. Refer to the planning and training sections under your project Annex for suggestions on what to include in your strategic plan. For each key activity (or set of activities), include:

a. objective(s)
b. key collaborating institutions and individuals,
c. a schedule of sub-activities, roles, and resources

Remember that virtually all Volunteer activities should include a capacity-building component. You may include preliminary training plans.

Appendix B WasteSTAR Guidance Document

Peace Corps Panama Environmental Health Project

Water Systems Technical Assistance Report(STAR)Guidance

Sanitation WASH Matrix for household and community sanitation indicators

- This should be performed on each household in the community. The Sanitation WASH matrix is on your thumb drive.

Hygiene education and committee capacity development plan

- This usually manifests itself as required charlas for all beneficiaries of the project.
- One is usually a disease pathways charla, and the second is often a technical charla about latrine placement, and usage that needs to be adapted depending on latrine type.
- This section should just be an outline of the plan that there will be mandatory charlas and a description of these charlas.
- NOTE: There is a bit of a cart before the horse problem here because it would be nice to adapt the overall WasteSTAR manual to have volunteers doing these types of charlas earlier (i.e. just after community analysis) in order to identify the type of sanitation projects are needed in the community. However, this is how it has historically been handled and since the new Sanitation manual as yet isn't in circulation, this is still how it should probably be approached.

Community map showing houses, current coverage, and water sources/streams.

- This should be done with GPS (where practical).
- The location of the house and presence of a latrine should be clearly identified.
- All public locations like schools and community buildings should be clearly noted.
- All water sources and streams should be included.
- It should be noted if the particular house is connected to the aqueduct
- Note: it would be nice to tie this map to the scores that each house received in the WASH analysis to identify "hot spots" (but for now this might be too much).

Initial latrine designs with SWOT

- Which latrine did you pick? Say why (geography, water table, social acceptance, community organization, cost, project scope). Describe the design by referencing the manuals we already have.
    - SWOT (FODA)
    - A picture of the charla paper you used with your community to identify the need for this project and more specifically type of latrine is a good idea. Add a discussion of the FODA meeting below the picture.

Materials survey

- What is locally available (sand, gravel, mix, wood, hardwoods. Ect.) This could even extend to tools. There is no need to buy $20 picks and shovels if everybody already has one.
- What do I need to buy (cement, rebar, seat mold, zinc, ect.) where can I buy it (give a specific location and contact person including their phone number)

Community/household contract (monetary deposit, work group and workshop participation, material contribution, completion date)

- Household contract is a document that all project participants sign, and agree to, stating that they will comply with all the rules and deadlines of the project. In the past this has not been mandatory, but volunteers have had good luck using them.
- Some people have also had community members give a 5 dollar deposit that is returned if people meet the project deadlines.
- These are all good ideas and this section is to note those intentions and state project benchmark timelines such as: pit completion date, date to have all local materials on site, delivery dates, pad completion dates, housing completion date.

Transportation logistics

- How much is transport from the hardware store? Do I need a 4wd vehicle or boat transport? How close can I get to site? Does the time of year change that? Will materials have to be transported by hand\horse? Does my timeline account for that?

Work group logistics

- How many people are in the project?
- How many work groups will there need to be?

- Who is in each work group?
- What are the responsibilities of each member?

Recommendations

- Give an outline of the above report sections. Briefly explain the type of project that has been chosen and why? If someone only reads this section of the report they should be able to get the outcome of your process and an idea of the why it is that way.

Photos

- A picture is worth 1000 words right.
- Try to give a snapshot of your community in its current state and the need.
- It's also always nice to have a professional cover page with a picture (not mandatory). But maybe there is something that gives your community a sense of pride (maybe there is a geographic thing, or maybe they make great sombreros or canastas).

Remember that this report is a great way to professionalize your service and outline the need for your community. It is also a great way to organize your thoughts, and you may even run across a "T" you forgot to cross or an "I" your forgot to dot. It should eventually be in Spanish so that it can be shared with the community and agencies.

Also, once this and the CEHDP are done, the PCPP will write itself.

Appendix C Small Grants Monitoring Questions

PEACE CORPS SMALL GRANTS PROGRAM

Small Grant Project Monitoring Questionnaire

PROJECT # _____ _____ _____ - _____

Grant Type | FY | Country Code | Grant #

Volunteer NAME:_____ Project Title:_____

1) Has this small grant project achieved the goals or objectives outlined in the original proposal? If no, why not?

2) What, if any, have been the major difficulties associated with this project?

3) What efforts have been taken by the project's organizers or participants to ensure sustainability?

4) How often are the resources or equipment used? (if applicable)

5) (If pertinent) How are the resources or equipment being stored? Have you had any issues with keeping them secure?

6) Have there been any other uses for the resources or equipment that were not mentioned in the original proposal?

    a. Has there been any training or capacity building associated with the project that wasn't in the original proposal?

7) How has the training associated with the project gone?
8) How have the financial aspects of the project gone? Did you have any trouble getting the community contribution? Were there any unexpected costs or cost savings?

a. If there were cost savings, how is that money being used?

9) Talk to stakeholders related to the project. What are their opinions of the project?

10) Have you submitted your Completion Report and all receipts associated with the project to the Small Grant Coordinator?

Appendix D Site Closeout Form

Panama Site Report **Form G**

Name of the PCV: _____ Sector:_____

Dates of Service:

Site: Corregimiento:

District: Province/Region:

PLEASE ATTACH YOUR COMMUNITY/SECTOR ANALYSIS TO THIS REPORT (as specified for your sector)

Body of the report:

PART 1: COMMUNITY AND PROJECT INFORMATION

1. **Location of the site and how to reach it**
2. **Community infrastructure: Phone, water, utilities, roads, bridges, and any communication/transport challenges**
3. **Population; % men/women; average # per household (if not included in your community/sector analysis)**
4. **Your housing arrangements (including names, rent amounts, and type of housing) for both living with a host family and independently**
5. **History of the community, economic activities, educational institutions, agency involvement, NGO, CBO activity, and any impacts on the community by any particular political, social, or climate changes in the community, region, etc. Please include a list of contacts, especially for non-community members, and any people we should continue to work with or not.**
6. **Updated information about community organizations, in regards to their current leaders, the number of group members, and activities they have completed and that are ongoing (as they may be different from what PCV is doing). Please also mention the names of any additional active community members and promoters and what they are doing.**
7. **The work you did in your site and neighboring sites (if applicable).**
8. **Any additional safety issues that should be considered (besides communication/transport)**

PART 2: RECOMMENDATIONS FOR FUTURE VOLUNTEER

1. **PCV work that has to be continued by a new Volunteer (details). Please list any technical topics which you might suggest the new Volunteer should be familiar with or have information about.**

2. **Has the community been, or will it be, or expected to be included in any National (Government, NGO, Private) initiatives, involvement, investments, as this may have an impact on the PCV's work or community, etc.**

3. What are the diversity/gender issues that a follow-up Volunteer might face, if any?

Appendix E Sanitation WASH Matrix

Outcome Indicators	Capacity Building Needed = 1	Capacity Developing = 2	Strong Capacity = 3	Observation
Waste disposal	Leave trash out and do not dispose of trash appropriately (burn plastics while cooking food).	Burn all trash or occasionally deliver trash to nearby dump site, if available.	Members bury and burn their waste appropriately or take it to a dump site, if available.	
Drainage/Standing water	Frequent standing water and mud. Mosquito larvae are present.	Some drainage, but some standing water	No standing water and there is good drainage around the house	
Distance from House	Latrine is far too close to a house (within 10 feet)	Latrine is 15-30 feet from a house.	Latrine is 30 to 50 feet from any house.	
Distance from Water Source	Latrine is far too close to the water source (within 30 feet).	Latrine is 30- 50 feet from the water source.	Latrine is 50 to 70 feet downhill from the water source.	
Covered Hole	Latrine has no top and is left uncovered most or all of the time	Latrine has a top but is frequently uncovered	Hole has a top and is always covered.	
Privacy/enclosed area	Latrine does not have a door, walls or roof that are well built or is not enclosed, allowing frequent entry from animals and others creating unsafe and unhealthy access	Latrine has a door, walls and roof, but they are somewhat decayed and sometimes allow entry of animals.	Latrine has a door, walls and roof that are well enclosed, provide privacy and are safe from the entry of animals or children.	
Pit Latrine: Appropriate depth/maintenance	Latrine is below the water table, fills up when it rains, overflows, or is near to full (within three feet of surface)	Latrine is above the water table and does not fill up when it rains. It may be near being full and needing to be topped off (within five feet).	Latrine has appropriate and proper depth; it does not fill up with water when it rains and is at least five feet below the top (fill)	
General cleanliness of kitchen area	Floors and surfaces are not kept clean. Insects (flies or cockroaches) are visible.	Floors and surfaces are sometimes clean. Just water is used to clean.	Floors and surfaces are kept clean. Bleach, soap or lime is used frequently.	
Hand washing	No water, or soap is visible. Family rarely or never offers water for hand washing.	Water is available and visible. Family offers water to wash hands.	Soap is available. Water is available, clean and covered. Family offers clean water to wash hands.	
Latrine use	There is no latrine, or if there is one, it is clearly not being used for its intended purpose.	There is a latrine. It seems to be used.	Latrine is available for use and is clearly used by family members on a regular basis. Family member will frequently wash hands after using the latrine.	
Potable Water	No aqueduct	Public aqueduct, with public taps	connected to aqueduct at the home	
Are you happy with your latrine?				
Did you have a latrine at your home prior to this one?				

Appendix F Volunteer Questionnaire

What sort of training sessions did you require of project beneficiaries?

What materials did you buy, and what materials were locally sourced?

How did you organize your project? (i.e. timelines, work groups, ect.)

Did you require a deposit? How much?

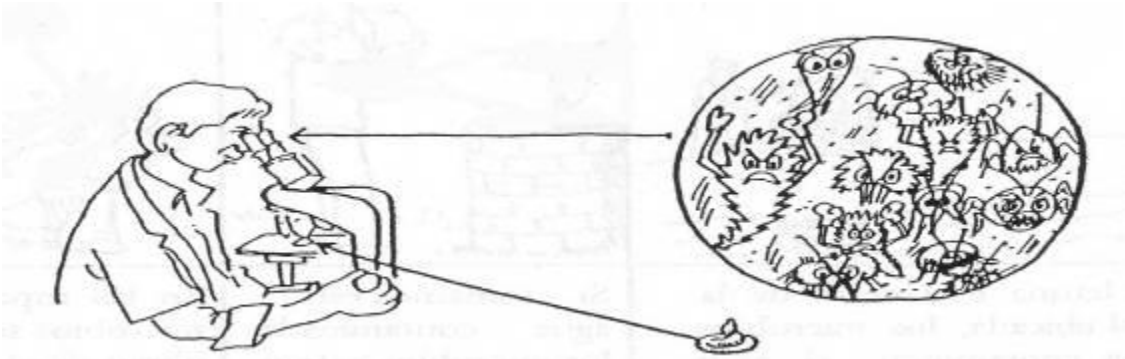
Did you have a contract?

How successful do feel your project was, and what (if anything) would you change?

Appendix G F-Diagram

EL EXCREMENTO CONTIENE MICROBIOS QUE PUEDEN CAUSAR ENFERMEDADES

Por su contenido orgánico, el excremento es un medio excelente para el crecimiento y desarrollo de microbios (animalitos que no podemos ver con nuestros ojos, solamente con un microscopio).



Los enfermos con parásitos intestinales botan parásitos y sus huevos en el excremento. Además, los enfermos que presentan: diarrea, disentería, cólera, o hepatitis, también botan dichos microbios en el excremento.

LAS PERSONAS PUEDEN ENFERMASRSE CUANDO LOS MICROBIOS DEL EX-CREMENTO ENTRAN A SU CUERPO

3

VIAS DE TRANSMISION DE LAS ENFERMEDADES

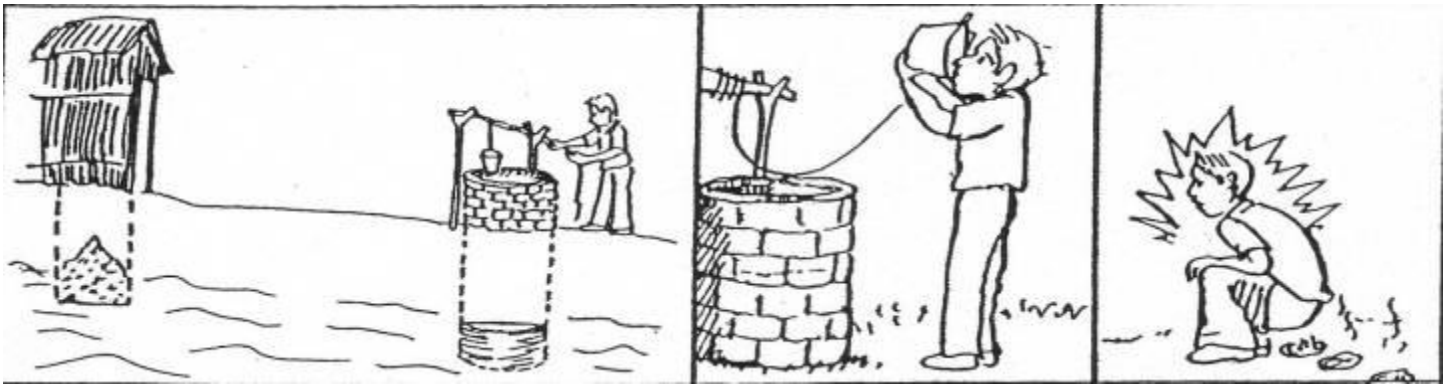
CON EL AGUA CONTAMINADA

Hay varias formas de contaminar el agua con el excremento:

EXCREMENTO ⟶ AGUA/BOCA ⟶ ENFERMO

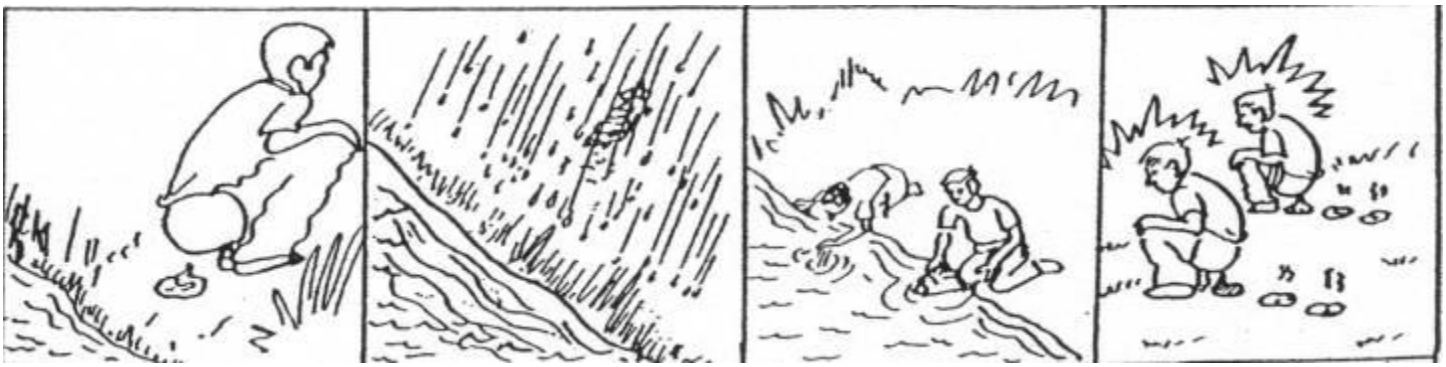
Cuando una persona defeca cerca del río, se puede contaminar el agua. Si tomamos esta agua contaminada los microbios entran a nuestro cuerpo. En los intestinos los microbios se multiplican rápidamente y nos enferman.

EXCREMENTO ⟶ AGUA BOCA ⟶ DIARREA



La letrina está se considera mal ubicada cuando la letrina esta cerca de una fuente del agua porque los microbios que provienen de la misma, contaminan el agua subterránea. Si tomamos ésta agua, corremos el riesgo de enfermarnos.

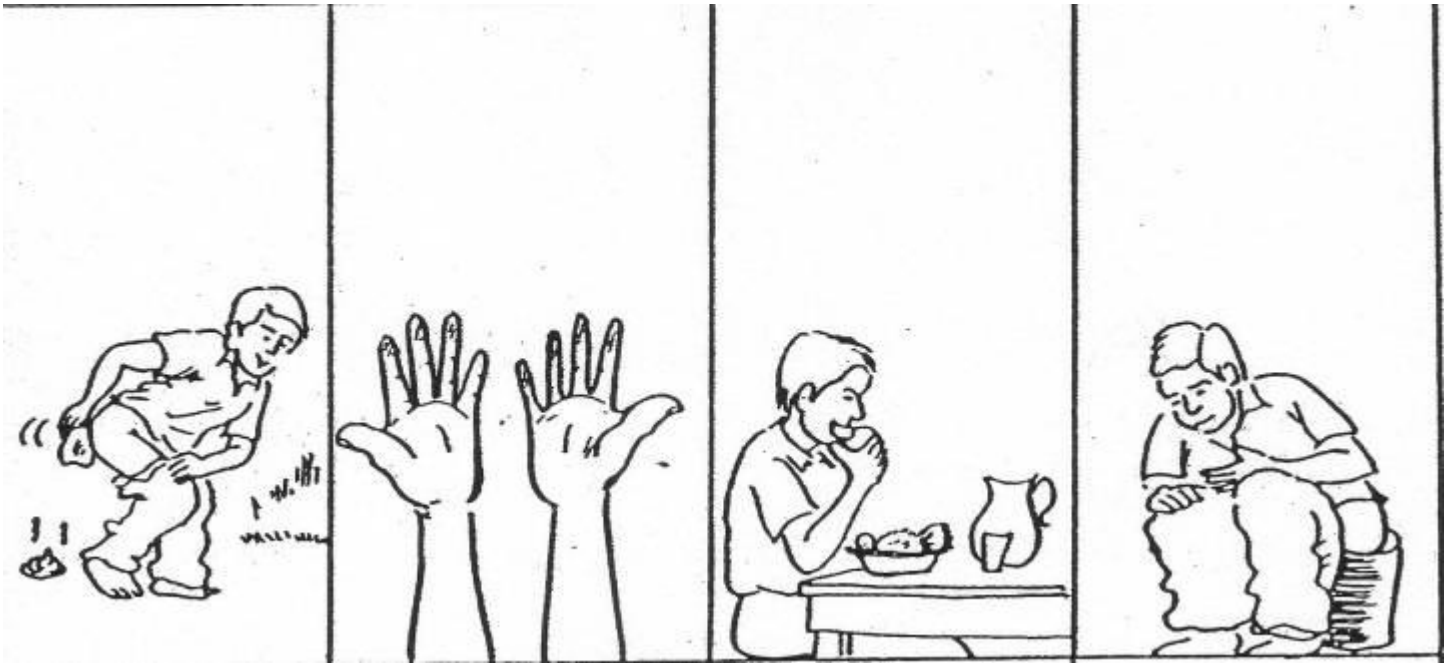
EXCREMENTO ⟶ AGUA BOCA ⟶ DIARREA



La lluvia arrastra el excremento hasta el río y se puede contaminar el agua. Si tomamos esta agua, nos podemos enfermarnos.

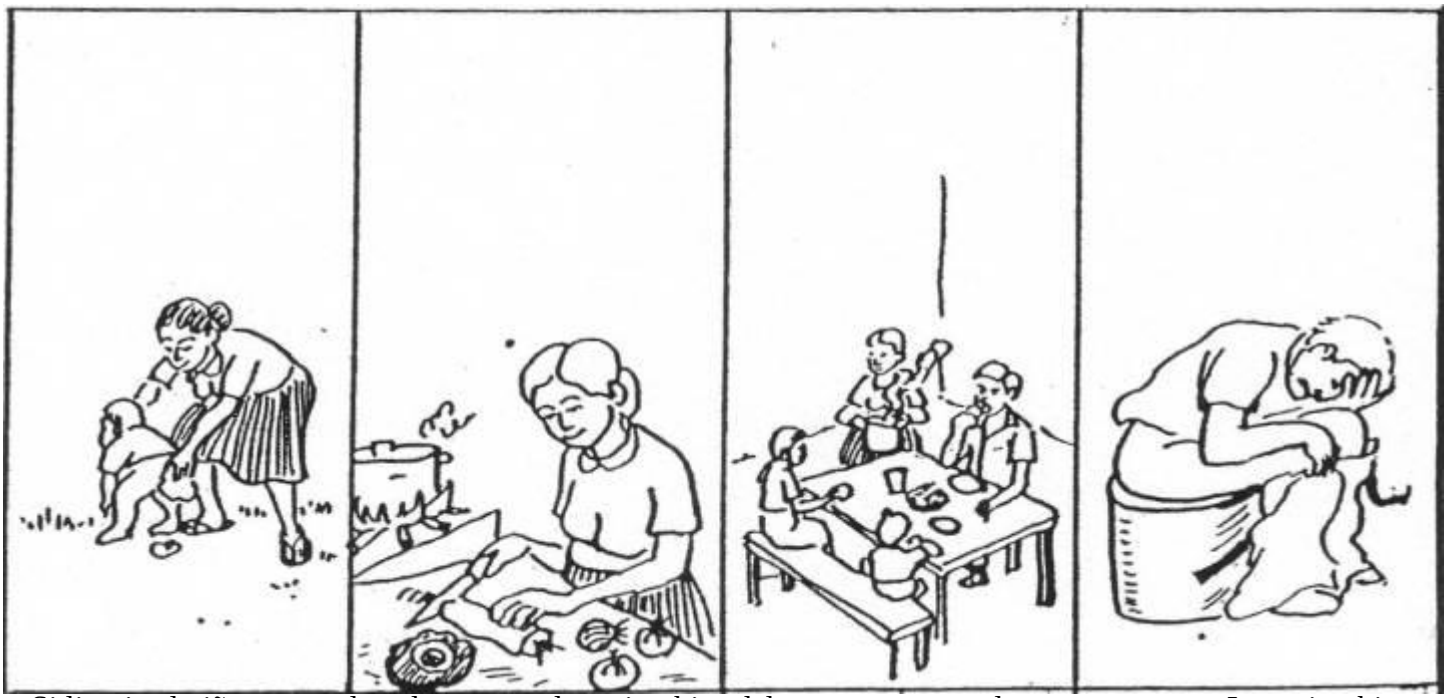
POR LAS MANOS SUCIAS:

EXCREMENTO→ MANOS SUCIAS ⟶ BOCA ⟶ ENFERMO



Cuando una persona se limpia después de defecar, sus manos pueden estar contaminadas con microbios. Si no lava sus manos, se puede enfermar.

EXCREMENTO→ MANOS SUCIAS ⟶ BOCA ⟶ ENFERMO



Si limpia al niño y no se lava las manos, los microbios del excremento quedan en sus manos. Los microbios en las manos sucias contaminan todo lo que tocan.

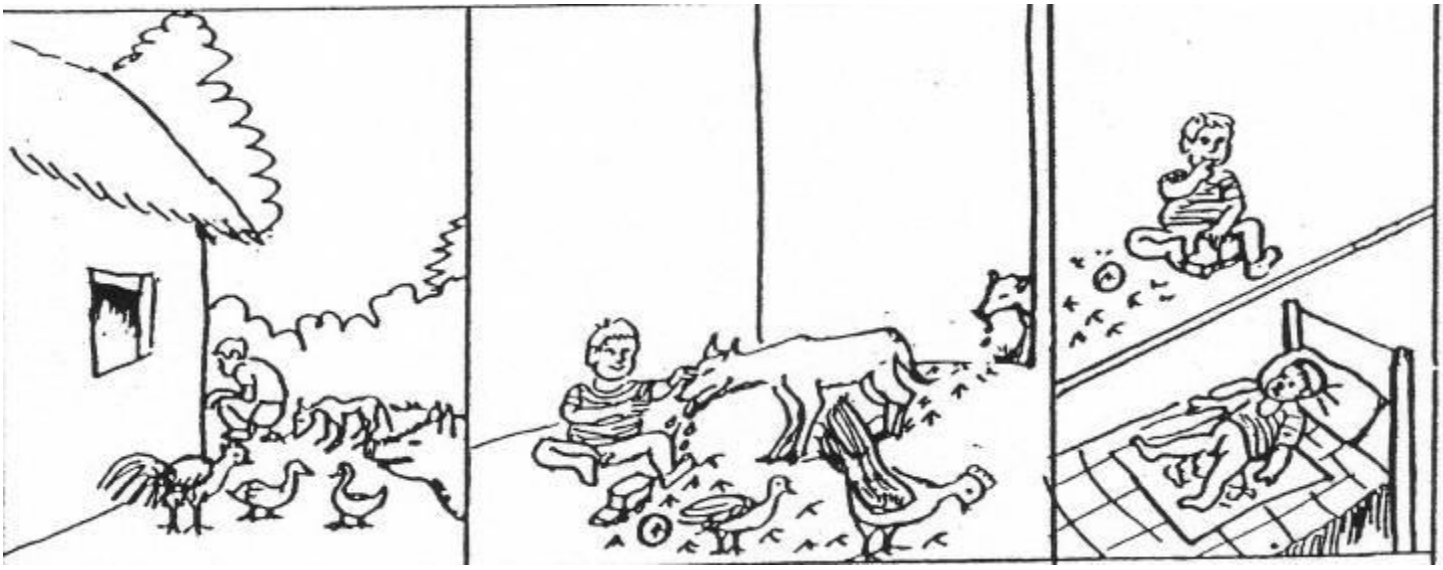
POR LOS INSECTOS:

EXCREMENTO⟶ MOSCAS/ALIMENTOS/BOCA⟶DIARREA

Cuando una persona defeca en el monte y no lo tapa, las moscas y cucarachas llegan atraídas por su color y olor. Después éstos insectos transportan los microbios en sus patas. Si los alimentos están destapados las moscas o cucarachas se ponen en ellos y los contaminan con los microbios del excremento. Si come los alimentos, tendrá alto riesgo de enfermarse. .

POR LOS ANIMALES DOMESTICOS:

EXCREMENTO⟶ ANIMALES/MANOS SUCIAS ⟶DIARREA



Cuando una persona defeca en el monte y no lo tapa, el puerco, el perro, y otros animales domésticos pueden comer o tocar el excremento. Posteriormente, estos animales entran a la casa y contaminan lo que tocan