

DROPS OF SUSTAINABILITY: EDUCATION'S ROLE  
IN SUSTAINABLY DELIVERING CLEAN WATER  
SOLUTIONS TO RURAL THIRD  
WORLD COMMUNITIES

By

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Submitted in partial fulfillment of the  
requirements for Departmental Honors in  
the Department of Marketing  
Texas Christian University  
Fort Worth, Texas

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### ACKNOWLEDGEMENTS

Simply stated: seizing the opportunity to embark on this research endeavor is the single most defining decision I have made in life thus far. For this reason, I am forever grateful to any person who played a role in fostering the ability for me to participate in this initiative. Not only did the outcome of this project lead me to discover the inborn passion I had for Education, but it also transformed the trajectory of my personal and professional life. Special gratitude goes out to my life long mentors and role models, Mike Reilly and Jamie Adams, for placing blind faith in my ability when opening doors that led to my participation with this research. Finally, to the TCU faculty participants specifically, Dr. Stacy Grau, Dr. Bill Moncrief, and Dr. Tracy Williams, for extending to me the academic freedom required by the unconventional nature of this project. From the bottom of my heart, I thank you for playing the primitive roles that allowed for my field research experience to become a reality.

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## INTRODUCTION

### **Third World Development: A Basis for Research**

Consider the following controversial statement: Poverty stricken, uneducated, and suffering third world inhabitants must be held accountable for paying for the aid they receive from affluent, capital-heavy, and privileged first-world charitable organizations.

Identifying the controversy above requires an important assumption about the nature of mankind; that when made aware of the suffering and struggle facing other innocent human beings, our natural repose is to feel compassion and a desire to help. For this reason, coming to terms with the unnatural, yet foundational, truth inherent in the introductory statement has proven extremely difficult for the philanthropic world to do. Visit the slums of India, the deserts of Uganda, or the island of Haiti. You'll witness children suffering from starvation so severe that their organs have started to consume themselves. You'll see teenage girls make daily treks in 110-degree weather to the closest source of clean water carrying multiple 5-gallon containers on their backs. And you may even watch people kneel down to drink water from the bath that they just washed their livestock in.

Increasing global awareness of the barbaric realities that face millions of people living in poverty have generated an exploding "call-to-immediate-action" trend amongst the non-profit and philanthropic communities. Armed with good intentions to quickly pull the maximum number of people out of their impoverished conditions, these entities take fast action to deliver widespread

solutions to the issues they deem most prudent. With monetary inputs dictating the reach of their fast-actions, heightened consideration is placed on accumulating resources that will have the greatest reach, rather than resources that have the greatest impact (Kanter and Summers, 1987). Unfortunately, this response circumvents philanthropists from carefully considering what the root cause of poverty ailments are. Therefore, they lack the capacity to properly diagnose and treat the issue. Instead, the medicine prescribed is ineffective at solving the problem it was purposed for, and root issue still exists (Corbett, 2009). Herein lies the foundational problem with philanthropic aid efforts towards alleviating poverty; The Fallacy of Good Intentions.

### **The Fallacy of Good Intentions**

While it would seem that the only detriment to poverty-misdiagnosis are sunk costs and wasted capital at the expense of the philanthropic entity in question, other concerning damage results. First, for the people living in poverty, whether the solution delivered is ultimately effective or not, its existence represents much more than a physical improvement to their day-to-day lives. It embodies an unfathomable promise of a better tomorrow. So, even though these quick fixes typically offer immediate and initial improvements for the poor, industry trends allow for us to safely assume eventual ineffectiveness of the solution. Results include rusting and rotting foreign capital, no longer a symbol of hope, but instead a constant reminder of the inevitability of a life marked by suffering (Breslin, 2010).

Dependency, although an intangible kind of damage, is another serious outcome that results when people living in poverty are offered welfare in gift-like manner. This dependency ensures the people receiving charitable aid will no longer find value in seeking out a self-developed solution. Further, they have no reason to think about continued cost or maintenance considerations, required by solutions marked by longevity, because all they know is that before this aid, they were suffering, and with it, even if just for a moment in time, they are not. (Breslin, 2010). The real detriment here is the impact dependency has on the already distorted view that the poor have of themselves. The plaguing mentality of 'I am poor because I was born into a family traced with generations of poor people; my parents are poor, their parents were poor, and their parents before them were poor.' This attitude prevents people who are suffering from seizing the opportunity presented in intangible benefits offered through sustainable development tools like education. It is assumed that because these tools can't offer immediate relief of their suffering that they must also lack the ability to improve the environment of poverty they were born into (Corbett, 2009). For all these reasons, while being inspired, willing, and financially capable of delivering aid to the world's poor together represent a mindset of good charitable intention, that mindset alone will not result in sustained poverty alleviation. If the method for delivering the aid fails to match good intention with its desired outcome, clearly, a different approach is necessary.

## **Poverty Alleviation and Sustainability**

Identifying underlying issues inherent to the development category of poverty alleviation served as the starting point for conducting my research. However, the research question driving this study lives under a subcategory of third world development and concerns delivering sustainable clean water solutions to impoverished communities. Before framing my research question providing a working definition of the term 'sustainable' is essential; specifically to delineate the vital role it plays within the framework of poverty alleviation. Moreover, findings discovered during both preparatory and application phases of this research execution will reiterate how The Fallacy of Good Intentions along with other misconceptions about third world development majorly deter the global movement towards alleviating poverty.

Over the last ten years there has been great debate within the world of academia over how to properly define the up-and-coming phrase of the 21<sup>st</sup> century; sustainability. Defining the term sustainability for practice today chiefly depends on whether it is conceptualized as an evolutionary process or a state of well being (Dimitrov, 2010). Abstracted either way, the term embodies a multi-dimensional construct uniquely defined by the long-term implications and goals that are relevant to its specific practice (Dimitrov, 2010). Relevant to this research topic, sustainability is conceptualized in practice within the arena of third world development as an evolutionary process. Unique to delivering sustainable poverty solutions, the process detailing this study encompasses economical, geographical, social, political, and biological considerations while



simultaneously maintaining the betterment of future generations as its core focus (Desta, 2012).

The myriad of capabilities achieved through properly executed sustainable development initiatives, has resulted in various groups of people across the globe fine-tuning broad definitions of sustainability in terms of narrow applications. Unfortunately, due to many of these inaccurate and narrowly defined uses of the term, opportunities for real sustainable change are being missed (Dimitrov, 2010). Likewise, the results of poverty alleviation efforts intentioned for long-term impact appear to be increasingly futile. We can connect the overwhelming misuse of the term sustainability, to the trend of the last few decades, in which development has been framed as a responsive mechanism rather than a restorative one (Gurses, 2009). The impact of this trend, as it relates to the Fallacy of Good Intentions has resulted in philanthropic firms that exist for the sole purpose of third world development to adopt a responsive organizational purpose. Instead of holistically implementing the multi-dimensional construct of sustainability, the mechanisms implemented are individual fixes that deliver immediate relief, but fail to deliver any lasting improvement for their patrons.

Different than mission-driven firms, another large group of philanthropic entities who fall especially hard to The Fallacy of Good Intentions, are those who confuse their organizational mission with the their responsive goals of poverty alleviation. Primarily, this group is made up of religious institutions that approach poverty alleviation efforts with the delivery of charitable solutions

based on evangelism. Because the goal of evangelism conflicts with the inborn goals of a holistic development model, sustainability of the charitable solution is a highly unlikely outcome (Cleary University, 2013). Later this paper will discuss two case studies both covering philanthropic initiatives related to delivering clean water to third world communities, to show how the role of sustainability determines the success or failure of a poverty alleviation effort.

As was alluded to earlier, in order for the Fallacy of Good Intentions to be overcome in a manner that ensures desired outcomes are matched with real solutions to targeted ailments, a framework for sustainability must be followed. Further, specific to its application at the community development level, it is crucial to define the role of education in combating counter-solutions inherent with The Fallacy of Good Intentions.

Consider education as the key to progress. Without learning, understanding or comprehending, how to change, improve, or grow something, humankind would forever be at a standstill. Education, although just one of many pieces that makes up the multi-dimensional puzzle we call sustainability, was found to play the most significant role in determining the durability of improvements for thousands of people in the Dominican Republic. Giving the tool of education rather than of the gift of welfare, even to the lowest of income classes, allows for real, sustainable opportunities for impoverished people to uplift themselves from their present condition (Collins, 2009). For this reason, as the research procedure is broken down and explained throughout the following

sections of this paper, an underlying message about the significance of education's role in the process will be intimately understood.

Part One of this paper is purposed to provide background, details, and context of the project that substantiated pre-emptive study of the third world development content area, the global water crisis. The elaborate content proficiency obtained during the preparatory phase played the rudimentary role in delineating the research question for which this study is purposed to serve. Further, Part One culminates all relevant findings into a solution approach appropriately tailored for answering the research question. Subsequently, the solution approach derived from Part One serves this study as the prerequisite necessity that allowed for testing and quantifying results of the solution approach during the field application phase covered in Part Two.

## PART ONE: PREPARATORY RESEARCH PHASE

### **Esperanza International Water Program**

Esperanza International is a microfinance firm operating in the Dominican Republic. The lending model they utilize offers individualized financial services purposed for empowering poor people to uplift themselves out of poverty. Different than the majority of micro lending firms, Esperanza operates under a business model they call Micro Finance Plus. The 'Plus' component represents additional community development services offered by Esperanza, in which larger loan offerings are made to institutions (schools, churches, etc.) within their patron communities. Specifically, these larger loans are intended for

financing costly capital expenditures characteristic of widespread and sustainable poverty solutions. Most significantly, apart of the actual loan itself, the real value in the 'Plus' services that Esperanza offers, is the partnership role they play throughout the process of bringing poverty solutions through to fruition.

Over the last decade, Esperanza became increasingly aware of the impact that the global water crisis was having on the inhabitants of the Dominican Republic; more remarkably on the rural population. For this reason, they deemed the delivery of sustainable clean water systems a prudent 'Plus' service to offer to the communities they served. For urban areas of the Dominican Republic, sustainable access to clean water is significantly less of an issue. Water projects in these locations are structured as 'water stores' where five-gallon containers are sold for around 25 pesos. These entities are highly regulated by the Ministry of Water and, due to the self-sustaining nature of the user-buyer model under which they operate, they are widely accepted as sustainable clean water solutions for the urban poor.

Four years ago, Esperanza headed the delivery of their first clean water initiative purposed for an urban application. Since then, they have played a primary role in financing more that 26 water projects throughout urban and semi-urban areas of the Dominican Republic. However, as a firm who intimately understood the importance of a holistic approach to third world development, it quickly became clear that the urban solution for clean water would not be appropriate for meeting the drastically different needs of the rural poor. These

less-populated, hard to reach communities are home to the poorest of poor in the Dominican Republic, and the majority have zero access to viable sources of clean water. These are the communities, people, and issues that Esperanza so desperately wanted to reach with their 'Plus' services. However, because so few clean water efforts made by philanthropic firms have been historically successful in rural applications in the Dominican, Esperanza lacked the required capacity to approach the issue with sustainable accord. External research was needed in order for them to gauge the feasibility of incorporating this service into their micro finance plus model.

Understanding the full spectrum of applications, technologies, and various methods for delivery and scaling of third world clean water solutions for the rural application became foundational to the success of the Esperanza's efforts. Whereas great success has been seen in scaling of water projects in urban areas, scaling efforts to reach rural populated areas is especially difficult for non-profit firms to do due to the heightened uniqueness of each individual community (Davis and Iyer, 2002). In order for them to create an individualized and sustainable 'Plus' loan service for these communities, they needed to incorporate financing, system installation, and community education considerations into their delivery method. For these reasons, Esperanza sought out the expertise of a water systems expert researchers to help guide them to making sound investments towards the most sustainable clean water solutions for the rural poor. The next section will provide necessary background detailing how I came to fill the research role as Esperanza's contracted water expert and further, how

filling that role allowed me structure the research question for which my prospective contributions for Esperanza sought to answer.

### **Water Expert Project Background**

Mike Reilly, a mentor who has had the single most significant impact on my life, is a highly active participant of Esperanza International's board of advisors. At the end of my sophomore year at Texas Christian University, Mike was introduced to me on behalf of Esperanza, in their search for a student researcher with unique interests to fill a remote, 3-month, independent intern position. Filling the position with Esperanza as their "Water Expert" gave me the opportunity to broaden my scope of academic interest, embarking on a unique project endeavor that subsequently, frames the background for the research question that drives the topic of this paper.

Expanding the capacity of Esperanza's water-program micro-loan 'Plus' service to reach rural-targeted communities highly underserved with sustainable clean water solutions, is the pivotal undertaking for which Mike Reilly sought out my research expertise to accomplish. After being given complete freedom towards interpreting relevant issues and problems inherent with the undertaking my research was purposed for, I delineated the unique research question for which the execution of this study models a solution.

*What are the holistic model categories prudent to the sustainable success of Esperanza's initiatives towards delivering clean water solutions to the rural poor living in the Dominican Republic?*

Walking into this research role with no personal background or knowledge covering the sciences of sustainability, micro-lending, or the basics of the water world, made establishing intimate relationships with astute members of the water industry essential for starting my research. Traveling all over the United States, I conducted numerous site visits, personal interviews, and shadowing sessions through which water specialists, philanthropists, engineers, and advocates helped me derive the majority of qualitative data supporting the solution of this study. My self-education process was the key mechanism for how I developed the dense, full-spectrum, industry knowledge required for me to deliver “expert” level recommendations to Esperanza’s board of advisors.

After presenting the culmination of my three-month research findings, Esperanza’s board agreed that the method, organization for partnership, and delivery model I had advocated were in fact the ‘most sustainable’ options for them to adopt for piloting their first rural clean water initiative in the Dominican Republic. Subsequently, Esperanza felt that the crucial relationships and large knowledge base I had accumulated during my initial role as water expert, would add great value to the field application of their first water initiative. For this reason, Esperanza requested my presence in the Dominican Republic to fill a new field research role heading the execution of their paramount rural water program; specifically incorporating my checklist for sustainability into the delivery method they utilized.

After petitioning my university with a self-built curriculum to equivocate fifteen hours of Business course credit, I was awarded a prestigious study

abroad grant, allowing for the spring semester of my junior year to be spent conducting field research in the Dominican Republic for Esperanza International. An overview of my role in this study's field research application is covered in Part Two.

The remainder of Part One details category findings unveiled during my time as Esperanza's water expert that I found to be relevant for answering the research question driving this study. Subsequently, this background data supports my initial recommendations given to Esperanza about which method, organization for partnership, and delivery model to adopt in order to head a pilot water program with sustainable accord. It is important to note that while my research question focuses on rural applications of clean water solutions, the full spectrum research approach was necessary for me to become well versed in the entirety of scope covered under the global water crisis category.

### **The Global Water Crisis**

The plaguing nature of the water crisis has left people all across globe suffering from various negative impacts directly correlated to people's underserved access to potable sources of clean water (WHO and UNICEF, 2008). It is estimated that nearly half of people living in poverty across the globe suffer from at least one of six primary diseases categories linked to the consumption of non-viable water sources. The resulting detriment that primary diseases have had on the third world are that they have fostered barbaric and inhumane conditions under which water is obtained by the world's poor (Gadil, 1998). These conditions are escalated in third world countries whose governments fail



to address water policies in the best interest of their citizens. When government does not structure waste management, sewage, and irrigation systems through some regulation mechanism, negative water contamination implications become infinite (Thematic Group, 2005). Additionally, due to changing water consumption patterns and the continual global population growth, there has been a dramatic peak in the demand for water depleting potable sources faster than ever before (UN Water, 2009). Further, due primarily to The Fallacy of Good Intentions, a vast majority of philanthropic water-aid efforts, are failing due to careless implementation and non-sustainable accords (Breslin, 2010). In fact, an estimated \$360 million charitable contributions towards combating the global water crisis are considered to be wasted investments (Breslin, 2010). These failed initiatives are understandably unpublicized by the philanthropic entities that head them. However, the detriment this has on the rest of the sector is this: Because no one is learning from the mistakes of others, the same mistakes keep being made, and more monetary capital keeps being wasted (Breslin, 2010).

The two primary water issues that contribute to the severity and impact of the water crisis on the third world are contamination and sanitation/hygiene. The Rural Water Supply Network estimates that 13% of the planet's population (approx. 916,000,000 people) is currently living in geographic locations where the water available is biologically or chemically contaminated. It is significant to note that the word 'contaminated' in the previous statement, only refers to water sources that if consumed, result in sickness, disease, and often death.

Transmissible diseases caused by various contaminants are recognized by the World Health Organization to be the most common widespread health risk associated with drinking water.

*Dominican Republic Water Profile*

In the Dominican Republic, 86% of the total population does have some access to a potable (improved) water supply service, but that access is extremely restricted due to poor implementation of the water delivery, storage, transportation, etc.. Logistical, legal, and cultural issues surrounding these restrictions will be covered later in this paper. In order to measure the impact that health implications related to water consumption has on Dominican Republic inhabitants, WHO looks at the burden of disease related to water, sanitation and hygiene. They observe this in terms of lives lost and the number of years lived with a disease. In 2004 water, sanitation and hygiene related deaths in the DR numbered 1,261,000 people. This is significant because understanding the environmental factors that are directly related to deaths in the Dominican Republic allows for a more individualized solution to be implemented. Because water contamination varies significantly across different geographic locations, so too does the appropriate treatment technology that is best suited for purifying contaminants of the varied water sources.

### *Water Contamination*

Water contamination can be examined through two different areas; biological and chemical. Biological contaminants are primarily categorized as bacterial, viral or protozoal and are the main concern of developing countries water issues. The most plaguing of any biological disease associated with water supply is diarrhea. Specifically, the detriment diarrheal diseases have on the poverty population of children under the age of 5 is so severe that 400 children die every hour as a direct result (WHO, 2008).

Drivers of biological contaminants that exist in the Dominican Republic are accelerated in comparison to other third world countries due to inadequate sewage and wastewater treatment, lack of regulation, and water sourcing issues. Because of this, water-born and transmitted diseases are responsible for the common occurrences of diarrhea, typhoid fever, and hepatitis. In fact, a study executed by the United States Army Corps reported that around 66% of Dominican sewage is disposed untreated into bodies of water (Roebuck, 2002). When these types of contaminants are exposed to fresh water sources they cultivate and spread rapidly. Becoming aware of these practices adds value to understanding that the water problem is inherently a people problem, an education problem, and a process problem.

Chemical contamination from substances like lead and nitrite are more prevalent in developed countries. Despite this, their contributions to health ailments are just as severe. Understanding which contaminate classes drive specific health issues is important for determining the type of solution most

appropriate for treatment use. Filtration and drilling are the two relevant classes for water treatment in the third world. The scope, scale, and characteristics of these methods will be covered later in this section.

### *Sanitation and Hygiene*

‘Best’ sanitation and hygiene practices for different solution applications will vary depending on geography, culture, and other related determinants. To best communicate potential dangers that poor sanitation and hygiene practices can have in communities plagued by detriments of the the global water crisis, recollections of personal interviews with industry specialists will be used (N. Paynter, Personal Interview, August 2011) (HWI Employees, Personal Interview, August 2011). This relayed insight will also frame the power of education seen in its role as a combating tool specific for protecting against dangers inherent to third world sanitation and hygiene issues.

Nat Paynter is an executive at Charity Water in New York City, a non-profit organization dedicated to delivering aid to impoverished communities who suffering from world’s water crisis. Before Nat was employed at Charity Water, he headed the World Bank’s hand washing initiative and specialized in delivering educational programs to Third World communities that were specifically designed to teach participants about the importance of certain ‘simple’ sanitation and hygiene practices. While the treatment systems or wells may be adequate at providing sources of clean water, the existence of the benefits that come with no longer drinking contaminated water can be easily counter-acted if there is no effort to educate users of the water about other

transportation, storage and source related sanitation issues. For example, people continue to get sick because they put clean water into recontaminated containers. Communicating to users about intangible issues is extremely difficult to achieve due to the deceptive nature of some contaminated water sources (N. Paynter, Personal Interview, August 2011).

Healing Waters International (HWI) is a non-profit water treatment system manufacture with a unique holistic business approach to their method for implementing clean and safe water solutions. A recollection of a laboratory demonstration given at Healing Waters International in Denver Colorado best



communicates how deceptive water recontamination can be.

Ryan Decker, a water engineer employed by Healing Waters, traveled to a near by

river called Clear Creek in Golden, Colorado. He obtained three 5-gallon samples of the river water and brought them back to HWI's headquarters for this demonstration. The three bottles shown in the picture above represent (from left to right): 1. Untreated river water; 2. River water first treated with WaterTechII (HWI's purification system) and then placed back into the original bottle; and 3. River water also purified with the WaterTechII but placed back into its original bottle only after it had been sanitized. Water from each of these samples was then tested for the existence of biological contaminants. To portray the significance that sanitation considerations have on water safety, refer to the

picture on the  
following page.  
The water on the  
left represents  
the test results



(Decker, 2011)

from the bottle that contained purified water, but was placed into an unsanitized container. The right side represents the treated water sample from the sanitized bottle. Even though the clean appearance of the middle bottle does not suggest obvious danger, lurking bacteria was still present due to the fact that the bottle was not properly sanitized. This counter-solution inherently prevents the purified safe water from staying safe (Decker, Ryan. Personal Interview, August 2011).

The underlying message communicated in both examples shared in this section provide supporting evidence to show how detrimental the misconceptions about third world development can be when adopted by well-wishing philanthropic firms who fall short to the Fallacy of Good Intentions. Even if an organization delivers an appropriate and functional water purification mechanism to a group third world users, if education about sanitation and hygiene considerations aren't included in solution's delivery, sustainability cannot be assured due to recontamination susceptibility of the water source

### **The Solution Arena**

In regards to the spectrum of clean water technologies in practice across the globe today, the focal technologies appropriate for third world development

fall under the broad categories of filtration and drilling. These categories however, are not necessarily mutually exclusive to a specific type of water ailment. There are many different technologies purposed for treating many different types of water contaminates. Because of this, technology choice is crucial when it comes to individualizing one's approach to delivering a clean water solution to the third world. The technology selected needs to meet the unique needs of the community specific solution (Breslin, 2010). When first identifying the unique water needs of a community, several considerations must be made. In order for a technology to be accepted for sustained use at the community level it must first be appropriate for the people it is serving.

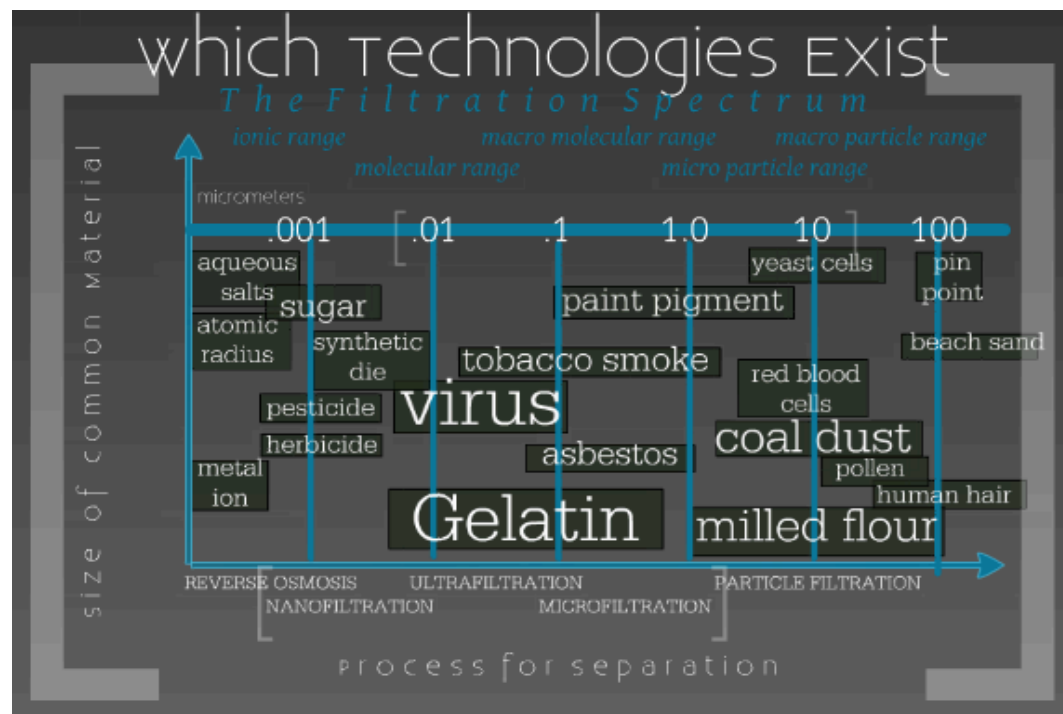
Appropriateness of technology encompasses cost efficiency, ease of operation, reach capacity, water sourcing, maintenance and upkeep, and several other crucial factors. Failure to consider any one of these variables could be the deciding factor in whether or not a poverty alleviation effort is sustainable or not. The wide scope of variables creates a need for careful and thorough research consideration in the selection process to ensure technology decisions are made with sustainable accord.

A vast majority of water aid efforts involve the delivery of a first world piece of equipment to a group of third world users. Subsequently an inherent disconnect exists between the users of the system and their actual understanding of how the system works. If the technology selected is not such that can be taught to and understood by the users at the cultural level, imminent system failure or required maintenance will result. Several different variables

come into play when dictating whether or not a clean water technology will be accepted and understood into the culture of a community.

After briefly covering the array of technologies included in the sciences of filtration and drilling, a specific case example will show how one philanthropic firm fell short to The Fallacy of Good Intentions because they failed to consider the appropriateness and cultural acceptance of a technology selection.

### *The Filtration Spectrum*



(Gorham, 2012)

The depiction of the filtration spectrum shown above is organized across the horizontal axis by process for separation (i.e. the specific purification technology). Common materials found in water that can be removed when put through specific filtration processes are boxed sporadically across this spectrum. As you can see, larger materials such as beach sand and coal dust, only require a



process level equitable of particle filtration to extract them from water.

Oppositely, the filtration process embodied by reverse osmosis technology is such that all material present in the water excluding hydrogen and oxygen are removed. Derived from these five categories of filtration technologies, exist hundreds and thousands of different uses for which manufacturers of water purification systems utilize.

Selecting the most appropriate filtration process first depends on identifying which contaminants are present in water source being treated. Specific to the Dominican Republic, biological contaminants account for a majority of water borne illnesses and embodies materials that live within or over the macro-molecular range. Therefore, all filtration system purposed for purifying contaminated water sources in the Dominican Republic should incorporate a process for separation no less than the material range capable of ultra filtration technology.

Cost efficiencies should weigh heavily on the level of appropriateness for a technology's given application in third world countries because those responsible for financing the equipment are classes of the poorest of poor. Consider, the process for separation of reverse osmosis. This technology has the filtration power to convert ocean water into potable drinking water. However, RO is also the most expensive and wasteful method for purifying water. In fact, for every 20 gallons of clean water to be delivered at the end of the RO filtration process, 100 initial gallons of the water source are needed. Additionally, though RO is successful at removing all harmful particles from contaminated water, the

process also removes materials such as vitamins and minerals that pose no threat at all. That being said, if the contamination need was such that the filtration process had address the presence of dangerous heavy metals, the high cost of utilizing RO technology would be more justifiable. While cost considerations for purchasing the most appropriate water purification system are important, factors relevant to ensure the sustainability of the system take precedent over cost considerations. In these instances, the ultimate decision for selecting the most appropriate filtration technology is likely rooted in cultural, political, or environmental factors that more significantly dictate the sustainability of the over all initiative.

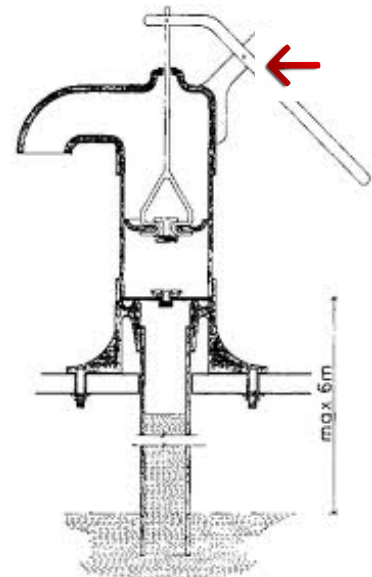
### *Drilling and Wells*

The second focal technology in the arena of clean water solutions appropriate for application in the third world is drilling and construction of water wells. The primary decision heuristic behind whether filtration or drilling will be a more appropriate technology for a given application depends on the geographic environment's water source. Global locations that show historical patterns of highly active and predictable hydraulic cycles are also environments that foster assured access to annual supplies of surface water. Within these environments, water-borne diseases and viruses are the most widespread health ailments plaguing people who don't have access to a clean water mechanism. Since classes of viral and protozoa bacteria account for the majority of clean water issues, in surface water-heavy locations, filtration technologies are the most appropriate water treatment option. However, in geographic locations

where surface water is scarce, drilling water wells creates access to a potable water source called groundwater, that lives deep beneath earth's surface.

Groundwater is a natural clean and safe water source derived through gravitational processes that filter water pulled down from the earth's surface. This water passes through several layers of soil and rock where larger biological contaminants are extracted from the water, leaving an underground pocket of clean water (Gadil, 1998).

Similar to the multiple sub-category filtration technologies having different levels of appropriateness and intricacy, so too are there several mechanisms for drilling and groundwater extraction that covers a wide range of technological complexity and appropriate application. Specific to the context of third world development, there is only one type of water extraction technology that is appropriate for addressing infrastructure and logistics constraints inherent of groundwater-dominant water source environments. The technology mechanism displayed to the right exists within the simple hand pump category. Lifting the lever marked with a red arrow engages a chain-and-pulley extraction science in which a pressure system allows groundwater to be brought upward from beneath the earth's surface, sourced through a spout at the top of the well, and placed into transportable container. Unlike surface water-rich environments, the major health ailments associated with the water source



profile of dry and arid locations are severe dehydration, malnutrition, and illness derived from poor sanitation and hygiene practices.

Technology choice is clearly a crucial variable to consider in order for a clean water initiative to appropriately address the unique needs of a given third world environment. However, as is true for all variables addressed through a multi-dimensional method, no singular, stand-alone variable can play its role correctly unless there is equal consideration for all other relevant variables. No matter how appropriate the technology choice may be, without a method for the delivery of that technology that ensures it is accepted and understood at the community level, the failure of the solution can be assured.

### **A Framework for Sustainability**

The obvious contrast between urban and rural water necessity is such that each application requires a completely unique solution approach individualized to meet the unique needs dictated by factors included in each application's sustainability framework. The framework outlined in this section defined the term 'sustainable' solely for rural application category requirements.

A study recently conducted in Tanzania showed that while 100% of clean water initiatives headed by non-profit organizations were done so with the delivery of the appropriate drilling solution, after two years, only 54% of those projects were still functioning (WaterAid, 2009). This truth further shows that when important considerations are left out of an approach method for delivering aid to the third world, there are a myriad of ways for The Fallacy of Good Intentions can present itself. To emphasize how drastically this fallacy can

circumvent the initial aid delivered by poorly-throughout philanthropic efforts, a case example will be use. This real-world illustration further stresses how the weight of a sustainability framework bears on the overall success of a clean water solution.

### *Case Example – Living Water International*

Fred Probie, a water specialist at Life Water International in San Louis Obispo, CA, possess over 40 years of expertise related to delivering clean water solutions to the third world. Fred shared a personal recollection of a failed clean water initiative he executed during early years of practice within the non-profit sector, to portray how that one failure provided him all the answers necessary for building a proper sustainability framework, forever changing the method to his approach towards third world development. His personal recollection is remembered as such:

Fred's first job within the non-profit sector was as a water engineer working on third world development projects for a firm called Living Water International; a religious based non-profit located in Houston, Texas that funds the drilling and construction of water wells in developing counties. Living Water International's organizational mission aims for the gifting of water wells to result in improved life conditions for people living in poverty. Their approach for carrying out this mission however, is one that frames evangelism as the basis for development efforts in the third world. Accordingly, philanthropic missions rooted in evangelism tend to direct the majority of volunteer's time and energy towards engaging in community interaction. This interaction however, is

purposed primarily for religious patrons to share faith-based testimonies with members of the impoverished community, in hopes that the good news of Christ will lead people to salvation.

Fred had his first opportunity to play a major technical role in a well drilling initiative, as project manager for one of Living Water's mission trips in Tanzania. The team spent 5 days in a small rural community during which the drilling, construction, and installation of a water well was completed. Fred recalled two significant instances from his time in country when he was overwhelmed by the emotion he felt, related to Living Water's mission. First, during the initial community gathering at the completed water well, he described the pure jubilation that the native people conveyed when they realized for the first time, they could drink from a clean water source without hindering fears of diarrhea, malaria, or dehydration. Second, witnessing Living Water's team share with locals the 'good news' of Jesus Christ and their own redemption, Fred remembered actually seeing the 'hope' flood into people's hearts for the first time. For a story that encompasses such extreme levels of deserving need and good, intentional, charitable giving, one would only hope that the story ended there and 'they all lived happily ever after'. Unfortunately, the ending to Fred's story is quite the opposite.

The well that Living Waters had constructed was designed appropriately to be of the simple hand pump category. As discussed previously, the mechanics for operating a simple hand-pump embody arguably the most basic, simple-to-use technology included within the solutions area for clean water systems.

Several months had passed since Living Water's Tanzania trip when Fred received a phone call that would forever change the approach he would take to third world development initiatives. He discovered that just three weeks after delivering the water well to the rural African community, a native was in the process of extracting water from the well when, for one reason or another, the chain positioned to rest in the main groove of the pulley mechanism, had fallen off its track. Although seemingly insignificant, this small malfunction had disabled the hand lever from descending a rope down into the well, removing all feasibility for water extraction. To enable water flow, the necessary action taken would have needed to be simply placing the fallen chain back in to its groove along the pulley track. Despite the simplicity of both the problem and the required solution for this malfunction, the individuals operating the water well were never versed in the mechanics of the technology, and lacked the capacity to even identify what was preventing clean water from flowing.

Nine months passed. Nine months in which this impoverished community had no access to clean water. Nine months of dehydration and water-related illness once again plaguing the native peoples. And finally, nine months, without a single attempt to fix the 'broken' pump, that wasn't 'broken' at all. As is accustomed by most organizations that frequent in third world development efforts, Living Water sends routine repair and maintenance crews back to each one of their drill sites between nine months and one year after installation. Eventually, the Living Water maintenance team made their way back to the small Tanzanian community and immediately discovered that clean water was no

longer flowing. Upon quickly identifying the small technical problem with the hand pump, a member of Living Water's crew simply placed the fallen chain back onto the pulley track and immediately the well regained total functionality. (F. Probie, Personal Interview, August 2011).

The detriment triggered by this story's tragic flaw seems especially hard to cope with. In the end, the suffering people whom Living Water earnestly sought to help were actually left worse off than they were before the aid was given. In this instance, The Fallacy of Good Intentions contributed by masking the community's fundamental need for rehabilitation with Living Water's natural interpretation of the community's immediate need for relief (Corebett, 2009).

The water well gifted to this community was exactly such; a gift. Because the users of the well played no role in the construction or installation processes inevitable disconnect between the native people and their capacity for basic system knowledge removed any possibility for the well's continued operation. Living Water's fatal flaw was overlooking education as a success factor that contributed to their efforts sustainable outcome. No matter how simple the correction of this mistake, not being educated about basic system maintenance, ensured the native users of their inadequacy to addressing the problem.

Dependency is another harmful outcome of aid efforts falling short to The Fallacy of Good Intentions. Without a sense of ownership, education, or involvement with the delivery of the system, users lack the capacity required for self-sustaining their own improvements and instead become dependent on the improvements that are gifted to them. However, for people who are suffering the



choice for whether to accept or refuse gifts of welfare is no choice at all. If the aid being offered has the power to immediately relieve present suffering, no consideration of whether those reliefs will still exist tomorrow will be had because all that matters to those suffering is the relief that exists today. Dependency in this instance halts productivity, circumvents empowerment, and reiterates the false assumption of poor classes that their reality is inevitable. (RWSN, 2012). Several foundational issues unveiled thus far highlight why the need of an individualized sustainability checklist is required by the holistic third world development approach.

### *The Sustainability Checklist*

The sustainability checklist outlined in this section incorporates all success factors prudent to the holistic model for delivering clean water solutions to people living in rural poverty. Overwhelming intricacy and interdependence exists from all success factors within this category through their specific use of education as the tool for ensuring the rural clean water development initiatives are sustainable. Each factor has unique consideration requirements pertinent to the real, sustainable outcome of a clean water initiative. Throughout the preparatory research phase of this project, five consideration categories were identified to be success constituents unique to the sustainability needs of a rural clean water initiative. Execution of this sustainability checklist during the field application phase will be covered in Part Two.

### *1) Community Specific Solutions*

A community specific clean water solution is one individualized to meet the unique needs of the environment it is purposed for. Identifying the water treatment need of a given community first requires testing the water source. This process identifies which specific biological contaminants are attributable to health ailments presently suffered by the native population. Proper water problem identification is chiefly important for selecting the solution technology that is appropriate for addressing contaminants present in the water source.

Community specific solutions must be rooted into the culture of the people who benefit from them. If the clean water solution is not accepted or understood initially at the cultural level, the life improvements derived from the solutions are unlikely to be self-sustained when philanthropic aid is removed. Primary consideration areas to take into account include the country's legislative framework, population density, logistics and infrastructure, pollution and waste management practices (Roebuck, 2002).

Addressing the needs and considerations for environments imbedded in poverty also requires that meaningful relationships be built between those delivering the aid and those receiving it (Akula, 2010). It is important for the support organizations to stay proactive in keeping community members involved and educated about how a solution works and why it is needed. The more meaningful the relationships are between the users of the system and the facilitators of the system, the greater the level of trust will be between the two (Carter, 2009). This allows users to become empowered for taking ownership of

the system being delivered to them (Corebett, 2009). Further, empowerment is heightened when the users are highly active in labor processes required for constructing and installing the system. Finally, fundamental knowledge about the basic mechanics of a water system fosters a sense of responsibility for the owner to maintain the equipment's upkeep, maintenance, and functionality (Breslin, 2010).

### *2) Technology Appropriateness*

The initial consideration for deciding the appropriateness of a given technology is the type of water source available to the community. Upon deciding whether filtration or drilling is more appropriate for the water requirement of the specific location, the next consideration is to make sure the technology selected has the mechanical capacity to meet the contamination needs it is purposed for.

From a community perspective, appropriate means making sure that the technicalities of the system can be taught and truly understood into the cultural infrastructure of the community. If those in charge of the equipment cannot understand the technology and operation of the system because it is too foreign or complex, they won't be empowered to self-sustain the solution (WaterAid, 2009).

### *3) Financing and Accountability*

In order for a third world community to reap sustained life improvements fostered from a first world water purification system, financial ownership of the capital equipment is absolutely necessary. Additionally, in order to ensure that a

third world community will develop the ability to self-sustain the benefits, they must also possess the financial feasibility for covering all the costs associated with future operation.

Micro lending is the most sustainable way to ensure that the users who benefit from clean water solutions are appropriately the buyers of the water. Facilitating access to the capital requirements characteristic of procuring, constructing, and installing water purification systems is the primary mechanism for empowering individuals in a community to claim ownership of foreign equipment.

Appropriately so, before the facilitation of capital requirements can come into play, initial consideration required by the partner organization is to decipher whether or not empowerment will take hold of a community member or institution. Unless there is undeniable assurance that responsibility for the system can be claimed at the community level, inevitable success of the sustainability framework cannot be assured (Breslin, 2010). However, once responsibility has been claimed, an inherent value proposition is created for the empowered person(s) to intimately understand necessary success factors relevant to sustained operation (WaterAid, 2009).

Education becomes the primary tool for the partner organization to utilize, as they teach community members about the basics of financial management and cost considerations of the initial lump sum loan. By incorporating the community partners into the local decision making process about how to micro-business their own solution, each unique project allows for leaders to take

responsibility and accountability for all operations and programs of the water treatment system and health and hygiene (HWI Employees, Personal Interview, August 2011).

#### *4) Importance of Education*

Education is the glue that holds all the pieces of this sustainability checklist together. It is perhaps the most crucial factor to incorporate into third world development efforts. Education is also the sustainability success category overlaps with all the other factors of this checklist most. It is the tool that allows for all the other pieces to be executed. The most important delivery method under the education umbrella covering its role in delivering clean water systems to the third world is utilizing a 'teach-the-teacher' educational style while educating and engaging with the community partner (HWI Employees, Personal Interview, August 2011).

In order for the diffusion of a health and hygiene curriculum to be accepted into a community at the cultural level, the foreign concepts should be taught by an actual member of the community to ensure that no language, culture, or socioeconomic barriers prevent the message from being understood. When considering how to alter the way an entire culture thinks about what is important in regards to health and hygiene best practices, repetition and recognition have to be utilized (HWI Employees, Personal Interview, August 2011). For this reason, the partner organization must first train those responsible for reiterating the relevant concepts so that they are fully equipped with the knowledge to do so. If a community partner can properly teach the

adults in their town healthy habits and preventative, community specific recontamination awareness, it is inherently seen that children living in those households will in turn change the way they see and understand the importance of sanitation and hygiene (Paynter, Nat, Personal Interview, August 2011).

### *5) Monitoring System*

It is important that predetermined metrics for measuring continual impact of clean water solutions be incorporated into the approach method philanthropic firms adopt when heading sustainable poverty alleviation efforts (Gates, 2013). A set of future-focused benchmark tools ensure third world development efforts aim for long-term improvement goals and self-sustaining impact rather than narrow judgments for driving capital inputs to generate the farthest-reaching quick fix solution (Probie, Fred, Personal Interview, August 2011).

Recall the case example used of Living Water International. The outcome showed how improperly defining crucial factors of success for a specific alleviation effort resulted in circumventing their ability to set and reach clear development goals. Failing to match the incremental impact a clean water solution has with dollar for dollar monetary requirement of the aid effort prevents philanthropic firms from knowing whether or not their delivered solution is actually on track for generating sustained life improvements for people several years into the future (Breslin, 2010). Another important consideration for philanthropic firms that strive to scale sustainable clean water efforts is that over time, monitoring systems ensure the heightened efficiency of

projects executed in the future. Keeping track of the quantifiable value and non-value added pieces of a firm's initial method for delivering a clean water solution, subsequently scale their solutions more efficiently (Davis and Iyer, 2002).

## PART TWO: RESEARCH APPLICATION PHASE

### **Esperanza Water Pilots**

The sustainability checklist in the previous section laid out all information necessary for a holistic approach method dictating 'how to deliver a sustainable clean water solution to a rural third world community' to be put in to action. Part Two covers analysis of field research findings that show how I used the sustainability checklist constructed during the preparatory research phase, and individualize its application for the scope of pilot water project throughout rural communities in the Dominican Republic.

Based on the cumulative and directional research presented to Esperanza's board of advisors through my opinion as water expert, a decision was made to invest in a strategic partnership with the water purification system manufacturer, Healing Waters International, as the basis for engaging in Esperanza's first rural application of a clean water solution delivered through sustainable accords.

### *Healing Waters International*

Previously introduced in Part One, Healing Waters International is a philanthropic-based third party provider of holistic water treatment solutions.

Their organizational mission is 'to develop, implement, and optimize durable, cost effective technologies which will be incorporated into safe water treatment solutions to meet the unique needs of partner organizations' (HWI Employees, Personal Interview, August 2011). It is important to note that within the larger scheme of Esperanza's water initiative, HWI plays a much bigger role than simply embodying one side of a strictly transactional relationship. Just as Esperanza requires for sustainability to be at the core of all their third world development practices, HWI holds equal sustainability standards to their agreement to partner with firms who communicate a desire to aid in the world's water crisis. To ensure that system technology will be implemented in a model that results only in sustainable outcomes, they too implement rigorous quality control programs to evaluate the design, production, delivery, installation, and operation of their system equipment (HWI Employees, Personal Interview, August 2011).

As the water expert, my ultimate decision for recommending Healing Waters International as the best place for Esperanza to invest their capital towards sustainable clean water solutions, was specifically based on the holistic nature of the three-prong approach to HWI's system delivery. Each prong makes up one holistic piece included in the per-system cost of their unique clean water solution. The three prongs include the manufactured water treatment technology, a health and hygiene education curriculum, and finally a micro-business pricing model. If an organization desires to partner with HWI they must agree to implement the solution purchased in its entirety, incorporating all three



pieces into the communities served through field applications of the water solution. In order to understand Esperanza's application of HWI's solution, an intimate understanding of what is included in the per-system cost of each unique water project must be understood.

Certain expectations are inherent from all participating parties under HWI's strategic relationship model. First and foremost, HWI identifies responsibilities of their role under the title of 'resource partner'. The resource partner is responsible for providing the three-pronged holistic model and for training and educating the philanthropic firm who desires to purchase the solution. This philanthropic firm is what HWI labels as the 'impact partner'. The impact partner is chiefly responsible for supporting the ground implementation of the holistic model. This entails first selecting and qualifying the site of the water project and the community partner. The impact partner also provides the upfront cost of the system, the training and educating of the community members receiving the solution, and must have a proactive role in the system delivery and relationship building within a specific community. Finally, the 'community partner' is the person or entity responsible for the sustained implementation of the solution. They must develop an intimate relationship with the impact partner to learn how to properly follow the holistic model inborn to the system equipment provided.

The most important thing to recognize about HWI's solution and model for approaching poverty alleviation efforts is how it meets all the requirements dictated by the sustainability checklist. Their holistic approach wholly ensures

that they deliver a community specific clean water solution, encompassing appropriate system technology, a mechanism for ensuring the users of the water are the buys of the water, and a relationship model that fosters monitoring systems of the solution success. All of these pieces to their holistic approach are brought to fruition by providing the impact partner with the education tools that are central to their success in sustainable development missions.

### *Field Application of Sustainability Framework*

Esperanza welcomed the role and responsibilities of impact partner within the strategic relationship milieu fostered by Healing Waters International. The final piece covered within Part Two of this research deliverable is a brief overview of the steps taken by Esperanza during project execution of the HWI's holistic development model.

#### *1) Site Qualification and Selection*

The first responsibility of Esperanza in their role as the impact partner was to qualify and select a site location for heading their delivery of a clean water initiative to a rural community in the Dominican Republic. After visiting and evaluating a several Bateys (Dominican-Haitian communities for sugar cane workers) where Esperanza currently operates its microfinance programs in the Eastern region, the water team produced a final list of eligible pilot sites. Driving the level of eligibility were factors including population, presence of water contaminates, water source, access to bottled water, strong community relationships with local organizations (churches, schools, etc.), and excellent Esperanza microcredit programs.

The initial first pick for a site location was a Batey just outside La Romana, belonging to the sugar cane company Central Romana Corporation Ltd, Batey San German. On the surface San German epitomized a site location destined for success of Healing Waters holistic development model. However, upon further evaluation, Esperanza could not establish beyond all reasonable doubt, that within Batey San German existed a prospective community partner who would wholly adopt empowerment of the system to self-sustain continued operation. For this reason, the site selected no longer qualified as a relevant player meeting the requirements of my sustainability checklist and further site evaluations were conducted.

The second choice option was Batey Margarita, a rural community part of the CEA (State Sugar Cane Company) existing in San Pedro de Macoris. After meeting with several prospective community partners it was determined that HWI's solution delivered to Batey Margarita with the assistance of Esperanza, was extremely likely to provide into a sustained resolution to their water needs. Subsequently, Esperanza selected this site to pilot their first rural water project.

Batey Margarita is home to around 200 families living in severe poverty. Esperanza already experienced incredible success in this community with their microcredit programs and inherently had an already established, strong relationship with local community leaders. The local church pastor expressed exuberant interest in developing a water program, and agreed wholly to being held accountable for ownership of both the equipment and Water and Sanitation committee.

The type of contamination that showed up in the initial testing of the water source was primarily biological in nature. Categories of pathogenic microorganisms classified as diarrheal diseases were of highest concern within this community. Upon the system's delivery, and throughout the duration of its first two years in operation, the local water pilot had the power to deliver around 1000 people from the diseases directly resultant from consumption of the biologically contaminated water.

A unique concern specific to Batey Margarita discovered throughout the site selection process was an infrastructural barrier requiring the community specific category of the sustainability checklist to be altered. Within this community there was not a piece of existing infrastructure that was suitable for housing the system equipment (filters, pipes, wiring, tubes, etc). The impact this lack of infrastructure has on relevant sustainability factors relates to inherent premature failure and/or deterioration of equipment pieces if they are not properly housed (Adekile, 2010). For this reason, financing for an additional construction phase was incorporated into the sustainability checklist in order to ensure a water house was in place to provide security, protection, and a power source for the system.

## *2) Technology Selection*

The production capacity of the pilot water project needed to produce enough clean water to provide all 200 families with one five-gallon container of water per week. Initial testing of the water source showed a need for rapid filtration processes in order to effectively remove present contaminants,

reducing water turbidity to no less than five NTU's (nephelometric turbidity units) (Gadil, 1998). For this reason, larger scale filtration technologies became the sole scope of possible solutions for Esperanza to consider, further supporting their decision to utilize the technology equipment included in HWI's solution.

Similar to the infrastructural considerations discussed above, an external cultural factor unveiled through ongoing quality control measures taken by Esperanza, had major implications on the sustainability checklist's dictation of what an appropriate filtration technology would be. This cultural barrier derives from governmentality issues inherent of most third world countries. In order for Esperanza to adopt HWI's filtration technology bundled into their 3-pronged solution, governmentality issues specific to the Dominican Republic needed to be addressed.

The income gap in the Dominican Republic portrays inequitable concentrations of power and wealth in the hands of the country's political elite. National standards and procedures set by those in power are often rooted in corruption, and made with minimal concern for social order, and disregard for the well being of lower classes (Varman, 2011). The way this impacts cultural reception of a clean water technology stems from the strict regulation of laws dictating which filtration processes (purposed for the sale of clean water), are legally acceptable. While the Reverse Osmosis process for filtration appropriately treats the water need of the DR, the high cost and waste characteristics associated fail to mirror cost efficiency needs of the poorest of poor. Despite this, the Ministry of Water has incentive to ban all other filtration

systems from use, because major players in the Reverse Osmosis industry offer corrupt monetary motivations to ensure their technology will be purchased at a higher capacity for usage in the Dominican Republic.

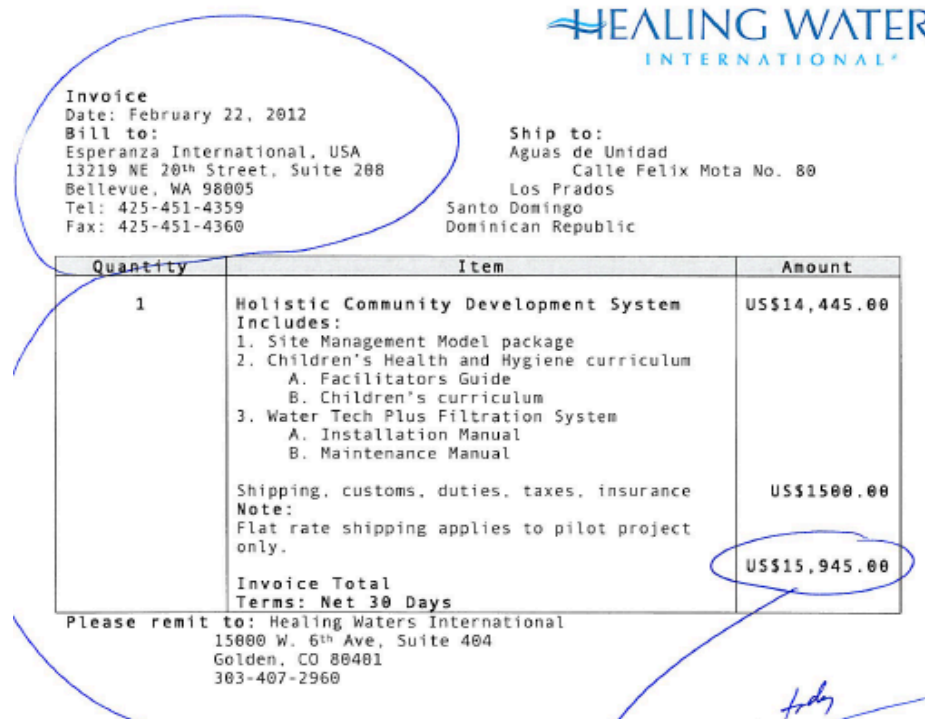
Upon discovering this widely unheard regulation requirement, Esperanza was left with a predicament because the system technology initially recommended by HWI as the most appropriate mechanism for meeting the financial needs of water users, was an Ultra Filtration purification system. Despite this, Esperanza's request for alterations to be made to the initial equipment provided by Healing Waters was obliged, and the new Reverse Osmosis system integrally defeated the cultural barrier, and the sustainability checklist remained in tack.

Discussed in pervious sections of this paper, although technology appropriateness is a crucial sustainability success factor to the sustainability checklist for this research application, cost efficiency is not. While cost efficiencies are important to take into consideration when gauging financing feasibility for purchasers of the system they wage no vitally for sustainable third world development efforts. In fact, it was widely found that poverty alleviation initiatives headed by firms who held cost efficiency considerations to be significant in their selection of system technology, widely failed to deliver systems marked for sustainable success (Kanter and Summers, 1897).

### *3) Financing and Ownership*

On the following page is a picture of the invoice of the purchase transaction made by Esperanza when they covered the upfront financing costs

required for the purchase of HWI's 3-prong clean water solution. Esperanza invested a total of \$15,945.00 in capital expenditures related to the procurement of system equipment, the community training program, and the education curriculum required to bring there pilot water program to fruition.



(Reilly, 2011)

Esperanza's team worked with the local church pastor to prepare a "3-year business plan" depicting a monetary repayment schedule for the microloan and also, a growth plan for standardizing the water services of the water project. In order to achieve sustainability, it was determined that 90% of all costs associated with the implementation, technical support, and logistics before and after the start of operation, needed to be paid back by the church at the end of the 3 year time frame. Due to the already strong micro-credit program existent

in Batey Margarita, less required education was needed to establish the required accountability and ownership necessary for ensuring the loan repayment would be accounted for at the 3-year checkpoint.

The funds needed to pay back the loan are generated wholly within the community through monthly, per-household payments that over a 3-year time frame completely cover the upfront cost of the system. The method for facilitating these payments begins with registering each family as community “health club” members. Membership to the health club requires monthly contributions of RD\$200 pesos (about US\$5). Every month each family will receive a punch card that allows for them to receive four five-gallon jugs of purified water per week, in exchange for required participation in a cooperative health and hygiene education program.

Just as accountability and ownership of the system equipment is crucial for the pastor to be successful in running the water store, making the community users of the water the buyers of the water, is just as significant. For the first time in the history of their community, health club members are able to finance their family’s water needs. Because these payments are made independent of charitable aid, intrinsic social responsibility is established throughout the community for the security, maintenance, and functionality of the system.

#### *4) Education and Training Programs*

In order for Esperanza’s water initiative to address root issues of water contamination in the Dominican Republic, they had to incorporate HWI’s education curriculum in to the training and preparation phases of their delivery.



It was first required that Esperanza's water team go through the entire education training program side by side with the Healing Waters support staff. Esperanza was then responsible for educating the local pastor (the community member in charge of the Community Health Club) about the subcategorized curriculum areas that needed to be incorporated into the community health club's education program. The curriculum developed by Healing Waters is individualized to the education needs of Batey Margarita. It covers lessons in contamination awareness, proper sanitation, individual hygiene, and general micro-business management. Esperanza initiated program training procedures for the pastor and water store employees during the project's prerequisite construction phase. Routine classroom-style sessions were held at the project site to prepare the community partners for starting operations and implementing the health club education program.

At the end of June 2012, a few weeks before the purification system was fully installed, families throughout Batey Margarita began to purchase health club memberships. From each of these families, one adult and a majority of the children would attend bi-monthly health and hygiene "classes" led by the trained community partners at the water store. The health and hygiene curriculum is broken down by age-specific content targeted individually to children and adults. There are three focal areas that community partners educate adult health club members about. The first area focuses on how to identify safe vs. unsafe water. Reiterating this concept involves teaching about the microbe presence in water, water source identification, and appropriate uses of potable and non-

potable water. Second, communicating the concept of disease transmission is primary achieved through educating about blocking techniques and water borne diseases. Finally, sanitation issues involved with infant care are addressed through teaching best practices for formula mixing, diaper care and clean up, and encouraging breast feeding over bottle feeding.

The children's curriculum is taught through repetitive encouragement of simple health improving habits like face and hand washing. Community partners utilize repetition and redundancy as primary techniques for delivering the health and hygiene curriculum to Batey Margarita's youngest generation. Lessons taught through this delivery method resulted in recognizable transformation of previously rooted behavioral norms that were partly responsible for health ailments within the community. Behavioral improvements brought into practice through children will fundamentally change the community's cultural perception about health and hygiene for generations to come.

#### *5) Monitoring Start of Operations and Continued Plans*

Esperanza's first water program pilot formally began delivering clean and safe water to Batey Margarita at the end of July 2012. At the start of operation, over 50 families had registered for membership with the community health club. The goal for expanding the reach of this pilot to serve a higher capacity of people was dependent upon the diffusion of the system into cultural acceptance throughout the community. The 3-year repayment plan projected a growth pattern of approximately 50 new families per year who would likely register as

health club members. Having a mechanism in place for monitoring the growth and success of this pilot was crucial for both Esperanza and the community partner, to ensure eventual independent ownership and sustained operation of the water program was possible. Over the last 10 months, Batey Margarita has met all but three of their scheduled payment dates, and is still being held accountable by Esperanza for implementing HWI's education curriculum. Water store employees will handle continued monitoring of system maintenance, up keep, and functionality, with assistance from the Esperanza water team if needed.

Today, Esperanza maintains complete confidence that this pilot program will be wholly owned, operated, and self-sustained by Batey Margarita at the end of the 3-year time frame. Once the initial micro loan has been repaid in its entirety, the revenue generated from continued sales will finance all required costs associated with sustained functionality of the system. Even more significantly, real opportunities for job creation, economic growth, and quality of life improvements are prone to follow with continued stability of operations. In the coming months, Esperanza will continue to play a proactive role in identifying both positive and problematic variables experienced throughout this pilots 3-year execution. This type of monitoring will allow for Esperanza to tailor their checklist for sustainability, equipping them with an improved understanding for replicating and scaling their water initiatives in the Dominican Republic.

## RESULTS AND CONCLUSIONS

### **Pilot Water Program Takeaways**

My participation with this research project was the direct result of Esperanza taking preemptive measures to ensure sustainable outcomes were resultant from their rural focused clean water initiatives in the Dominican Republic. Through the construction of a carefully researched sustainability checklist, I was able to provide Esperanza with a directional focus that allowed for them to deliver real and sustainable clean water improvements to underserved people living in rural poverty areas.

By facilitating the strategic relationship between Esperanza and Healing Waters (a firm whose services, products, and implementation model met the requirements of my sustainability checklist) the decision was made to purchase HWI's purification system technology and equipment along with their holistic delivery model. Implementing their holistic model for development resulted in the delivery of an effective and appropriate water purification system to Batey Margarita, a rural sugar cane community in the Dominican Republic. A small group of community partners within this community maintain full accountability and ownership of the equipment and its operation.

Accountability and ownership was the direct result of Esperanza ensuring the users of the system were also the buyers of the system. Feasibility for financing the equipment was fostered to the community through Esperanza's micro credit program. Over a 3-year time frame the sale of community health club memberships will generate all funds required for full repayment of the water

purification equipment. The purchase of community health club memberships provide families with access to a monthly supply of clean and safe water, in exchange for participation in an ongoing health and hygiene education program which is led by trained community partner members.

The education component is perhaps the most significant factor relevant to the sustainable success of this water project. In order for diffusion of the foreign technology to be accepted for use it must be understood at the community level. Ensuring continual and proactive participation from both the community partners and Esperanza's water team is crucial. After becoming trained and educated about all relevant variables prudent to the systems success (technology, mechanics, upkeep, maintenance, cost, sanitation, and hygiene,) the community partners were then responsible for educating the rest of the community about the purification system, health club, and health and hygiene curriculum. Ongoing curriculum is provided to the community throughout the water store's first three-years in operation.

Esperanza will continue to monitor the growth and success of this pilot water project in order best plan for scaling the reach and capacity of all future water initiatives serving the rural poor in the Dominican Republic.

### **Final Thoughts and Conclusions**

Gifting handouts to the poor delivers nothing more than a sense of temporary relief disillusioned as the only alleviant for escaping poverty. Giving the tool of education however, approaches poverty alleviation at the community level where the aid delivered is carried out by the individuals in need, allowing for them

to uplift themselves out of poverty. Self-sustaining poverty alleviation efforts deliver empowerment, lasting life improvements, and create growth opportunities contributing to the betterment of future generation's lives, creating hope that one day all of humanity might be delivered from the barbaric realities that plague the third world across our globe today.

The desired outcome of this study was to deliver a single solution approach for a study driven by a single research question. However, because the third world development category that serves as the larger milieu from which my research question was derived, a much broader and multidimensional holistic discovery approach was essential to the success of this study. It wasn't until I possessed the in-depth knowledge about global issues related to philanthropic third world development efforts, that I was equipped well enough to delineate the proper research question required for the pivotal undertaking that this study was purposed for.

The most significant lesson I learned throughout the duration of this research was the importance of the holistic approach to third world development. The Fallacy of Good Intentions can easily be overcome if simple consideration is given to community specific variables relevant to the sustainability of aid efforts. Without taking a holistic approach to conducting this research creating a sustainability checklist that was truly appropriate for delivering clean water solutions to rural communities in the Dominican Republic would not have been attainable.

My cumulative research contributions for Esperanza continue to play a vital role in their ability to deliver real, sustainable clean water solutions to thousands of people living in rural communities throughout the Dominican Republic.

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### ABSTRACT

Within the broad research category of third world development, the purpose of this study derives from foundational issues inherent with philanthropic poverty alleviation efforts. Specific to the global water crisis, the vast majority of clean water solutions delivered in the form of charity and welfare to third world communities are failing, because philanthropic firms unknowingly employ unsustainable approach methods to their delivery. Discovering the underlying issues deemed prudent for constructing a poverty alleviation model that had sustainability at its core, is how the research question framed in this study was unveiled. The purpose of this research is to identify which sustainability success factors must be incorporated into a delivery approach, in order to secure the longevity of improvements that are delivered by clean water solutions to rural-targeted poverty classes. The execution of this study is a multi-phase construct in which initial preparatory research allowed for the eventual field application of my research findings. The field application of my research deliverable involves implementing a carefully constructed sustainability checklist into a holistic development approach for piloting water programs in rural areas throughout the Dominican Republic.