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Best Practices in Community-Based Water Projects

Deborah Anyaibe

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Best Practices for Community-Based Water Projects

By

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Bachelor of Arts in Environment, Planning and Design, 2011

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A Thesis Submitted in Partial Fulfillment of Requirements for the Dual Degree of

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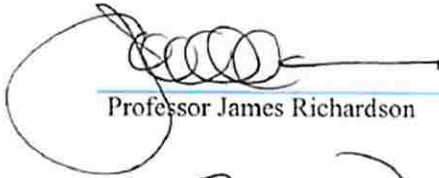
The Master of Community & Regional Planning and Water Resources Thesis of Deborah H. Anyaibe, entitled Best Practices for Community Based Water Projects, is approved by the committee:



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Abstract

Best Practices for Community-Based Water Projects

By

Deborah Anyaibe

Bachelor of Arts in Environment, Planning and Design, 2011

International potable water projects are becoming more common in underdeveloped countries. The necessity of getting clean drinking water to remote areas, or areas with limited access to water is becoming more desperate. This desperation is causing more people to seek to give aid to those in need but often times this comes with a price to the community. This price comes in the form of infrastructure that is unsustainable, building materials left behind instead of disposed of properly, and systems that require upkeep without proper training, as well as many other cultural and economic negative impacts. Many times aid organizations go into communities, set up shop, put in a potable water system and leave without discussing the process or even the upkeep with community members. This may lead to projects that are unused or go into disuse. It is very important that water developers and planners seek to make the process of designing, implementing and upkeep of water systems truly participatory. Well-structured and managed participation ensures that knowledge is shared and that the water system goes into effect in an area where it will be used, as well as have low impact on the environment. By focusing on the social processes, practices, relationships and the meanings behind these, understanding will be gained about the way of life of the people before interaction. This, along with minimizing outside influence, making the process truly participatory and analyzing existing natural and environmental systems, water developers and planners, along with community members, can create systems that fit well with the form and cultural analysis of the community as well as its natural resources, water and ecological system.

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Introduction

My thesis argues that, access to safe, clean drinking water is a basic human right that is essential for the enjoyment and longevity of life. Although this essential right is required by all, access to it, is a privilege that not all are afforded. It is crucial that potable water is accessible to those currently without it. Differences in access to water, as well as the quality and quantity of that water will imply difference in the well-being of people¹. There is a direct correlation between access to safe, clean drinking water and the physical, emotional and mental health of those in the community². Even today, as many as 783 million people in the world remain without clean, safe drinking water. That is 11% of the world population³. Of those without access to safe and clean drinking water, 16% (130 Million) live in Latin America⁴. Globally 1 in 9 people do not have access to clean drinking water and nearly 1 in 5 childhood deaths of those age 5 and under are due to water related disease⁵. The situation worsens in rural areas because in general the farther people are from a central hub or large city, the harder it is to gain access to infrastructure, not to mention that those in rural communities often have less income. The following data was obtained from UNICEF to illustrate the access to safe drinking water and how it differs from country to country and also between urban and rural settings.

¹ (Guardiola, 2014)

² (Global Issues: Water, 2015)

³ (Global Issues: Water, 2015)

⁴ (Water Facts: Global, 2015)

⁵ (The Water Project, 2014)

As shown in Table 1 below, the use of improved drinking water sources is lessened significantly in rural areas as well as improved sanitation facilities.

Table 1

PERU	
ACCESS TO SAFE DRINKING WATER	PERCENT
Use of improved drinking water sources (%) 2011, total	85.3
Use of improved drinking water sources (%) 2011, urban	90.9
Use of improved drinking water sources (%) 2011, rural	66.1
Use of improved sanitation facilities (%) 2011, total	71.6
Use of improved sanitation facilities (%) 2011, urban	81.3
Use of improved sanitation facilities (%) 2011, rural	34.4

http://www.unicef.org/infobycountry/peru_statistics.html Accessed: Sept. 2015

When compared to another Latin American country, Honduras, we can see that there is a much more even distribution of access to improved drinking water sources as well as use of improved sanitation facilities, seen in Table 2. Honduras was chosen because of its similarities to conditions in Peru. Throughout this work Honduras will be used to highlight important factors and distinctions about access to safe drinking water.

Table 2

HONDURAS	
ACCESS TO SAFE DRINKING WATER	PERCENT
Use of improved drinking water sources (%) 2011, total	88.9
Use of improved drinking water sources (%) 2011, urban	96.5
Use of improved drinking water sources (%) 2011, rural	80.7
Use of improved sanitation facilities (%) 2011, total	80.6
Use of improved sanitation facilities (%) 2011, urban	86.3
Use of improved sanitation facilities (%) 2011, rural	74.4

http://www.unicef.org/infobycountry/honduras_statistics.html

Accessed: Sept. 2015

As compared to the United States, access to clean drinking water and sanitation facilities, in both Peru and Honduras, pale in comparison as seen in Table 3. No less than 94% of people have access to improved drinking water sources and sanitation facilities, regardless of whether the setting is urban or rural.

Table 3

UNITED STATES	
ACCESS TO SAFE DRINKING WATER	PERCENT
Use of improved drinking water sources (%) 2011, total	98.8
Use of improved drinking water sources (%) 2011, urban	99.8
Use of improved drinking water sources (%) 2011, rural	94.0
Use of improved sanitation facilities (%) 2011, total	99.6
Use of improved sanitation facilities (%) 2011, urban	99.8
Use of improved sanitation facilities (%) 2011, rural	98.6

http://www.unicef.org/infobycountry/usa_statistics.html

Accessed: Sept. 2015

A side by side comparison may help to better illustrate this point. (Table 4)

Table 4

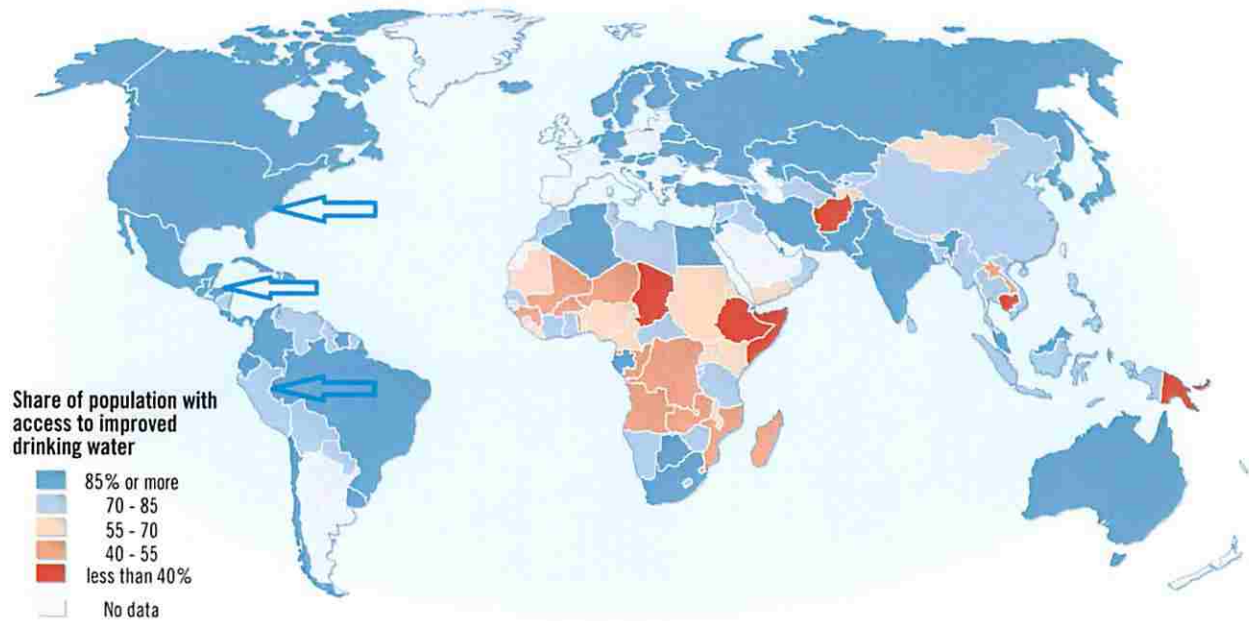
ACCESS TO SAFE DRINKING WATER	% POPULATION		
	PERU	HONDURAS	UNITED STATES
Use of improved drinking water sources (%) 2011, total	85.3	88.9	98.8
Use of improved drinking water sources (%) 2011, urban	90.9	96.5	99.8
Use of improved drinking water sources (%) 2011, rural	66.1	80.7	94.0
Use of improved sanitation facilities (%) 2011, total	71.6	80.6	99.6
Use of improved sanitation facilities (%) 2011, urban	81.3	86.3	99.8
Use of improved sanitation facilities (%) 2011, rural	34.4	74.4	98.6

Of the three countries, the biggest disparity and worse access, between urban and rural populations is occurring in Peru.

According to the map below 85% or more of populations in Honduras and the United states have access to improved drinking water according to the World Health Organization while only 70-85% have access to improved drinking water in Peru. Improved drinking water is water that has been treated for various contaminants and is readily accessible when needed⁶. This leaves up to 30% of people without access to improved drinking water in Peru.

Figure 1

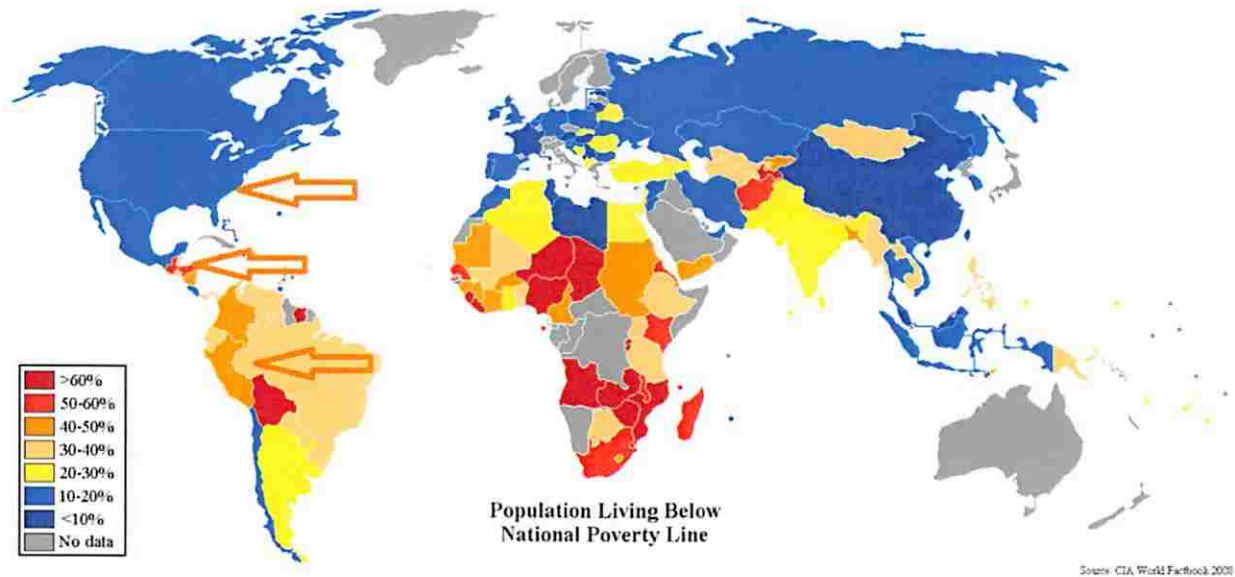
⁶ (The Water Project, 2014)



<http://www.madote.com/2013/04/eritrea-access-to-clean-drinking-water.html> Accessed Sept. 16, 2015

When the above map is compared to a map illustrating the percent poverty globally (below), we can see that there is a strong correlation between access to potable water and poverty level. In Peru 40-50% of the population is living below poverty level. In Honduras 50-60% of the population lives below poverty level and in the US only 10-20% of people live below the national poverty level.

Figure 2



http://aventallearning.com/courses/GEOGx-HS-A09/a/unit03/GEOHS_3.E.5.html. Accessed Sept. 19, 2015

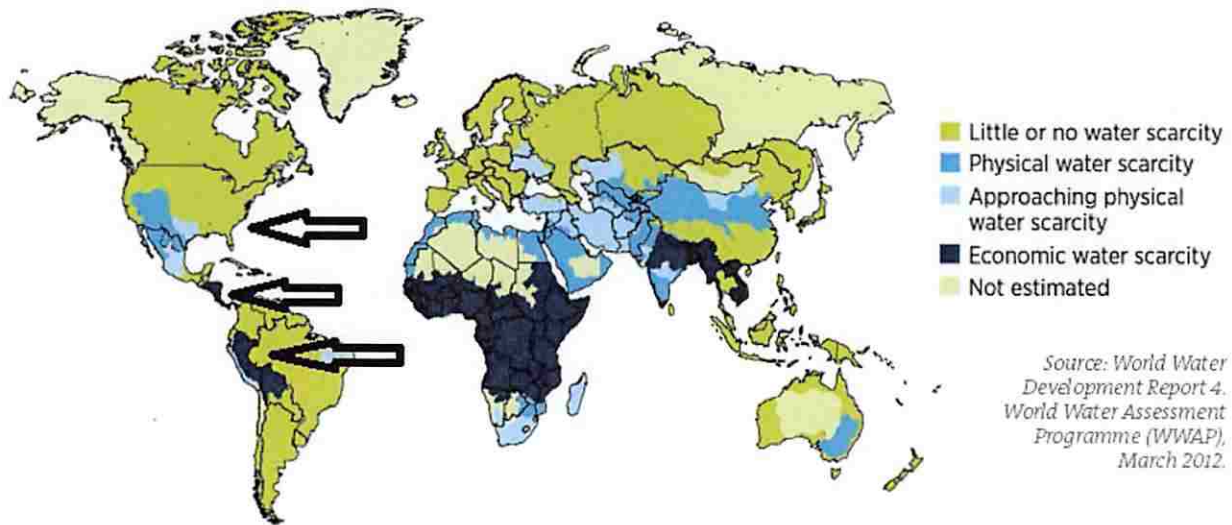
It is also true that 31% of Peru's population lives in rural areas while Honduras has a staggering 59% of its population living in rural environments⁷. The discrepancy, in this case, between access to potable water, poverty level, and rural population comes partly from the amount of water available by way of precipitation. Peru receives an average of 73 inches of rain a year while Honduras receives between 77 and 82 inches of rain per year⁸. This can also be attributed to the "vacation factor" that Honduras provides. Many aid organizations are willing to assist in Honduras because of the visibility it provides, which Peru does not, especially rural Peru.

The below map illustrates that in Peru and Honduras water scarcity is due largely to economic factors such as poverty and underdevelopment, while in the United States, there is little or no water scarcity, except when water is physically unavailable.

⁷ (Rural Population, 2015)

⁸ (Rural Population, 2015)

Figure 3



<http://www.un.org/waterforlifedecade/scarcity.shtml> Accessed Sept. 19, 2015

In order to provide potable water, international water projects are often undertaken. While these projects are often very helpful and many times achieve the final goal of bolstering the health of the surrounding community, it is important to understand all facets of local life when rendering assistance to the international community. This understanding will help in establishing a safe, successful and compatible solution to water needs. The right cultural context, background information, participation and environmental awareness, in each situation must be achieved in order to ensure that water is treated as a social and a cultural good more than an economic good⁹.

Water developers and water project planners should focus on effective ways to build on local values and cultural practices to design and implement community based water projects. These community based water projects are essential because instead of changing or manipulating water

⁹ (Guardiola, 2014)

uses or practices, they draw upon current uses and practices and support them. Local values and practices will provide insight into the way people view and use water and therefore inform the ways in which water projects can effectively be developed and implemented.

The questions guiding this research, are as follows: “What is culture and how should we view it?” It is important to understand what the idea of culture is, how it was developed and what it encompasses. If we don’t know how to view culture we can use the communities view of spirituality, gender, history, politics, etc. as ways to begin a cultural analyses. The next question “How should we design and carry out international water projects?” is important to educate developers and planners prior to engaging the community. It is important to be as familiar as possible with culture, local traditions and community practices before actually meeting with community members. “In what ways can we make the process truly participatory?” This key question should be asked in order to ensure that local residents are included in the process from start to finish, to make certain that all projects are in keeping with the wishes of those impacted by any and all changes. Finally, “How do we respect the natural systems to make projects easy to implement and upkeep with as little impact as possible?” Assessing and using current natural systems to the advantage of the project is a necessity. Knowing about local vegetation, slope, current drainage and surface water use, will help to mitigate impacts of the installation of a local water project. This, as a final planning step, will round out a comprehensive list of best practices.

By answering these questions I intend to highlight the best practices in developing, designing and implementing water projects, based on planning, participation, culture and sustainability. This is compelling because so many times people come from the outside and automatically believe that their ideas are best for the local people and that they have the right solution no matter what the cultural context. I believe that this mindset is one that creates more harm than good. We cannot

begin to help people if we believe we know the best way for them to live without knowing their social processes and practices. We must first learn what makes the community unique. We also cannot begin to help if we don't understand first, how they, as a people, view water.

In the following pages I will outline the background of the problem and my interest in it. After describing the problem and the area in which I encountered it, I will then outline a number of best practices and how these best practices would have assisted in the successful implementation of not just the project that I was a part of in Peru, but also in a similar project in Honduras.

Methodology

I will be doing a largely qualitative study of the importance of proper practices when attempting potable water projects. I will be using my personal experience in three Peruvian villages in 2014 as a basis for this research, bolstered by an extensive literature review and summed up in a comparison with a case study of a potable water system project in Honduras. Through these avenues I have developed a number of best practices to be followed in the design, implementation and upkeep of potable water systems. I sum these up in five categories: Culture, Approach, Minimizing outside Influence, Participatory Process and Environmental Systems. My goal was to create a list of best practices that would optimize community participation while minimizing outside power influencing decision making. I selected these practices based on how much impact they may have on local communities, in an attempt to minimize negative impacts.

Background

I originally became interested in these complexities when I was watching a documentary about India and the Ganges River. The cultural and spiritual importance of this river is so intertwined in the people that efforts to clean the river go ignored and have been shunned. Many people see the

river as holy and do not believe that there is any reason to change or cease the multiple things for which the river is used on an everyday basis.

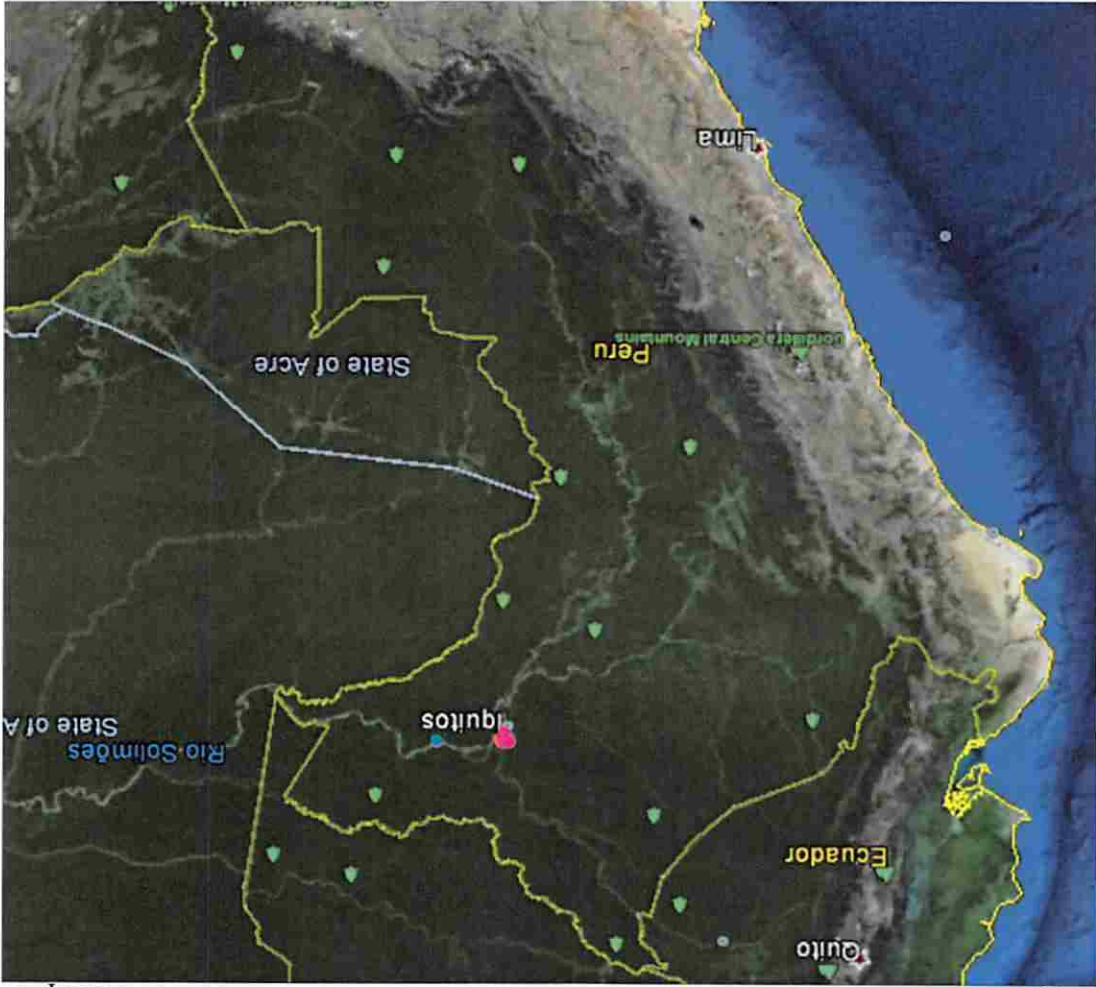
I became even more interested in the relationship between cultural analyses and water when I traveled to Peru, South America. The group I was with intended to put in clean water systems for three villages along a tributary of the Amazon River and quickly realized that the ideas we had coming in, would simply not work because we had not worked with the villages in planning the water systems and choosing what options would be viable. We knew almost nothing about the people and culture, or even the climate and ecosystem we were entering. This made me realize that I had come in with the same beliefs that so many others do. I believed that if we give the communities choices about what they want to have implemented we have done our due diligence in having the community involved. I did not consider, however, that the ideas we were letting them choose from might not be the best or even feasible, for any of the communities. Just because I saw the options as the most viable and likely to work, doesn't mean that they would be the best options for the communities or even for individuals in the community. This is the issue confronting most participatory processes. What level of participation makes a process truly participatory?

The population of Peru is 29,849,303¹⁰. The age range is concentrated in 2 groups, 39.4% of people are aged 25-54, and 27.3% are aged 0-14. The median age in Peru is 27 years old. The dependency ratio in Peru is 53.7% with 43.6% being comprised of youth. Of the population in rural Peru 71.6% have plumbing and the rest do not. This leaves 28.4% of the rural population using natural water sources, such as rivers and stream, as drinking water sources. The area in Peru which I visited is approximately 150 miles downriver of the nearest major city. The city, Iquitos and the villages are

¹⁰ (Peru, 2015)

The spatial relationship is shown in the map below. Madre Selva, the camp in which we stayed, is centrally located among the three villages and Iquitos, the nearest major city is circle in pink. The travel time by from Iquitos to Madre Selva is 18 hours.

Google Earth Created by: Deborah Anyatbe on September 3, 2015



Regional Placement
Map 1

located in the Amazon Basin, along the Amazon River and its tributaries. The picture below shows the city of Iquitos (pink dot) and the location of the villages that were visited (teal dot) in relation to the surrounding region.



ESRI GIS. Created by: Deborah Anyaibe March 2015

These very rural villages are accessible only by boat and have very little contact with anyone outside of their immediate communities.

The villages are located close to each other and trade among themselves. In this instance it would be necessary to create a project that would benefit all three villages simultaneously because of the way they are located in the watershed.



ESRI GIS. Created by: Deborah Anyaibe. March 2015

A project that affects one village will affect the others. In this way, it is necessary to ensure participation from all three villages and their representatives as well as local leaders and any authority figures who are interested in the successful implementation of a potable water system.

Having not considered the spatial relationship between these communities and assuming that we knew what the terrain was like, what local practices might be, and how local water sources were used ensured that the project that was envisioned for these communities would fail. It was poor practice, on the part of the organization I was working with to come into the community with a plan and system already planned out, without having consulted the community. This was the motivation to develop a set of best practices when attempting to develop a potable water system.

I draw significant information from a case study done in Honduras to illustrate how the best practices I have developed would have assisted in the successful planning, implementation and upkeep of three community based water projects. The goal of the case study in Honduras, done by a Graduate student in the Master of Water Resource Management at the University of New Mexico “Community Management for Improved Sustainability: Case studies of Three Rural Community Water Supply and Sanitation Projects in Honduras” by Christine Casey, was to investigate three community water supply and sanitation projects done previously and to see how these projects were fairing years after their completion. Each system had issues, either physical issues or social issues that could have been avoided or mitigated if the following best practices had been followed.

Best Practices

In order to have a complete understanding of communities and also to implement successful water projects within the international communities, best practices are identified as to how to best understand the local social process, practices and meanings behind them, this will be instrumental in deciding how a project should be approached from the onset including how to carry out legitimate participation and make the process as participatory as possible, this should also include ways of assessing and working with existing natural systems. The criteria I followed in selecting these best practices, was to look for steps and procedures that were both as localized as well as holistic as possible. I wanted to incorporate practices that were participatory and community based. The reason why I picked practices in this way is because no two places are entirely the same. And potable water projects need to be created specifically for the communities that will be using them. These best practices are meant to assist water developers, rural planners and others involved in intercultural water projects in completing successful community based water projects. After an extensive literature review, drawing on academic literature, including a case study from Honduras,

and the experiences I had while in Peru, the following are a compilation of best practices that were developed based on my research

Culture

Social processes, practices, relationships and the meanings behind them must be considered whether one is working internationally or intra-nationally. It is an important topic and is often discussed when potable water projects are discussed. Cultural analysis is a lens of observation relating to a “distinguishable domain of human activity”¹¹. In this case the domain being discussed is the one surrounding the use of and ideas about water. The ways in which this domain is analyzed will determine the design and implementation of potable water systems. “Interaction between different social groups, most importantly tension and conflict over difference as well as unequal relationships of power are the basis for culture”¹². Unequal relationships of power will begin to determine who is included in the potable water projects. These relationships, and the tension they cause can stall or completely stop the participatory process project. In this way, culture often dominates society because it is a lens through which social order is relayed, recreated and experienced¹³.

The idea of “culture” came to stand in for history, power, social class, race and knowledge. Eliding holistic understandings of how people become the way they are and do the things they do¹⁴. Several things that explain why people are the way they are and do the things they do include, history, power, social class and race which were completely taken out of the discussion when culture was in play. Conceptualizations of people, places or things are always historically situated¹⁵

¹¹ (Trouillot, 2003)

¹² (Valencia, 2015)

¹³ (Valencia, 2015)

¹⁴ (Trouillot, 2003)

¹⁵ (Trouillot, 2003)

which creates a need for history and social context to be understood. Two substantive propositions are integral to the way in which to conceptualize culture. Number one, human behavior is patterned and number two those patterns are the result of social processes¹⁶. Human behavior is often exhibited in ideas and practices specific to certain groups and tied to historical processes and events rather than the natural world¹⁷. Biology cannot explain the transmission of specific ideas and practices but culture can, culture explains what biological notions of race cannot¹⁸.

Power is a main component of culture as well and is also manifest differently in different places and in different social spaces. Culture is fragmented and incomplete and is often contested between people living in the same space. Culture often times brings about tension because “Culture is always a representation of the momentary outcome of power struggles over different perspectives and possible alternative interpretations”¹⁹. Many people are defined by the abundance or deficiency of power in their role in society. For instance, tribal leaders, state, country and international leaders experience everyday life much differently than the impoverished in society, even though they are seen as coming from the same group with the same social processes. It is important to note that power is not shown in one particular way. Evidence of power relations are not overt and may be hard to navigate in development projects, and therefore developers must be extremely sensitive to the situations in which they are engaging, to carefully gauge the power relations that they enter into. It is important that in instituting a water project, the power of one group is not bolstered, while another is undermined.

¹⁶ (Trouillot, 2003)

¹⁷ (Trouillot, 2003)

¹⁸ (Trouillot, 2003)

¹⁹ (Valencia, 2015)

These manifestations of power are important to locate in a process that is to be participatory because it may lend insight into how power and privilege are exercised. It is important to realize that we often speak from a privilege that we do not always recognize and that this privilege is institutional²⁰. This was manifest during my time in Peru when we, coming as outsiders were speaking as “experts” because of our academic knowledge and experience, while not at all supporting local knowledge. We did not realize or acknowledge the institutional power and privilege that we possessed. Not realizing this creates a dynamic that breeds distrust and lack of participation. We should not set out to change the people we come in contact with, we are meant to assist them, in ways in which they see fit and have the ultimate say in. Structural constraints shape social process and practices as well as political and economic agency²¹. These structural constraints shape the history, power relationships, social class, race and knowledge of any community. It is important to understand these structural constraints because these constraints are often seen as cultural deficiencies when they are not²². We can no longer let the word “culture” be self-explanatory. Overall, culture is a lens by which power is analyzed. In my time in Peru, the structural constraints were such that the people in the villages were often unable to voice their opinions on the quality of their water because they were seen as uneducated and had no forum in which to voice their opinions. They were also often given things that they needed, rainwater catchment systems, solar power, etc. in exchange for political votes. The people lacked economic and political resources and were constrained by structures of power.

Overall, it would have been very helpful for me to have spoken to the villagers in the communities in Peru and asked in what ways water is used and how we can be of most help to them. They could

²⁰ (Trouillot, 2003)

²¹ (Valencia, 2015)

²² (Valencia, 2015)

have then given us insight into local knowledge, ways of doing things, social relationships and structures of power, which then could have been used in framing a conversation around a potable water system.

Approach

The first and most important step is to analyze local conditions before planning a water project.

This approach in international water projects is an essential step to take before starting a project.

This analysis may include, political/power structure, social details (religion, gender roles, rituals, etc.), economic factors, environmental indicators, social and economic needs of the people (as seen from the outside), previous aid efforts (if any) and the interplay between these factors²³.

Prior to venturing to the location where the water project is to be undertaken research should be done in order to approach the project with as much context about the people and the place as possible²⁴. Next, researching physical elements of the location (terrain, climate, etc.) as well as local, institutional structures and systems (religion, politics, history, rituals, etc.) will help to make the transition easier when engaging with the community. This research is essential in creating a community-based process that is truly participatory. Learning about the people and the place prior to meeting them helps to create a context and key connections for a discussion when water project developers enter the community. It is important to note, however, that remote information gathering may result in false assumptions, so it is important that facts are checked and information is clarified by community members.

The following are ways in which this pre-project planning and research may be carried out:

²³ (Cherrett, 2001)

²⁴ (Cherrett, 2001)

1) Explore Place-Names. Place names are especially important when trying to understand different communities. Place names should be studied in order to gather historical and contextual information regarding, not just the people, but also the ways in which the land and water have been used over time²⁵. Often times, places are named based on their ritualistic or environmental use, for subsistence, or otherwise. This is useful information when determining how uses have changed over time and how land and water may best be used, based on historic practices. Place-names may also provide insight into who used the land in the past, how they gathered and used water and therefore, if natural systems are similar, how water may be used or captured to be made potable.

2) Identify Inequalities. Environmental and social inequality is a huge factor in why water is distributed and used the way that is. These inequalities need to be understood when considering water projects²⁶. In order to equalize the distribution of, and access to water, the environmental, social and political dynamics behind what has caused the current inequality must be understood. If these dynamics are better understood, compensating for the inequality, to create even access to participation and water, becomes easier. This understanding is also helpful in assisting in determining which stakeholders should be involved, as well as in organizing future dynamics in group meetings. It will also help in determining where potable water systems should be placed to promote equitable access and use.

3) Project Management. It is important that project management teams consists of people with different expertise from different educational and social backgrounds to ensure that

²⁵ (Trouillot, 2003)

²⁶ (Paulson, 2005)

the process is as inclusive and efficient as possible. People familiar with participatory planning methods, those familiar with the environment and water quality and quantity standards, someone who can insure that the infrastructure is stable, etc. are key to a successful project. Having people from different backgrounds, focused on the common goal of participation and equality, will ensure that, after a conclusion is come to by stakeholders, project(s) can move forward safely and be completed as planned²⁷. Project management teams should draw on the local expertise and knowledge. This means that it would be best served if the team created ways for project planners, water developers and community participants to work together and collaborate in the design, implementation and management of the water project. There may be ways of lessening impacts or increasing productivity and longevity that academic knowledge may not account for, but local knowledge will. On the other side, project planners and developers may be able to pair their technical knowledge with local knowledge to come up with unique solutions to the problems of water quality and access.

4) Prepare Management Plan. The preparation of a national, regional or even local water resource management plan may benefit communities into the future. This plan should start with the examination of whether a river basin community exists or not. If this community exists how do they interact and coordinate with each other, and how do they share the benefits of their work²⁸? Researching and answering these questions will determine the next step in the planning process. If communities exist in a specific river basin it can then be examined how they interact, how they share benefits, if at all and how this is affecting access to potable water. If they are not currently working together, ways in which that may

²⁷ (Fernandez, 2006)

²⁸ (Saravanan, 2009)

be beneficial should be researched, and presented to the community members. Overall, planning for the specific local ecology and water cycle even on a village by village scale, may help to mitigate problems in the future and perhaps repair past issues. This plan should not, however, disregard local water law or determine the way water should be allocated or any exact details. It should simply be an overview of what the resources are and outline the end goal of a potable water system.

5) Explore Spatial Relationships. It is important to explore spatial relationships between different activities that are practical and meaningful in economic, ritual, cosmological, spiritual and ecological terms²⁹. These, and other, spatial relationships may give a glimpse into contributors to water quality, as well as environmental indicators in the area. It will also give notice as to where there are already spaces used for gatherings or meetings that may be convenient for future project and community meetings. Spatial relationships help to explain the way in which people use and view the land and their relationships with it. The way places are organized, the way people access resources, the way people interact, are all indicators that may be helpful to water planners and developers.

6) Examine Community Activities. According to Susan Paulson, author of Political Ecology: Spaces, Scales and Social Groups ". . . activities to examine: subsistence and economic activities, kin-based social relations, strong oral traditions, religious practices and particular forms of knowledge and use of ecosystems"³⁰. The examination of these activities illustrate the ways in which people interact, not only with each other, but also with the natural environment in which they live. The specific ways in which these activities are important are as follows: 1) Examining subsistence and economic activities helps to

²⁹ (Paulson, 2005)

³⁰ (Paulson, 2005)

understand how community members make a living, whether they sell goods, barter, or grow and consume their own goods. This information is important when formulating a potable water plan because it will give insight into how the water might be shared in the area. 2) Kin-based social relationships allow a look into the ways in which families interact with each other and the way in which family units interact within society. The observation of this dynamic will allow developers to decide on the best ways to structure participatory actions throughout the process. 3) Oral Traditions are important because stories and tradition are passed down from generation to generation allowing an understanding of the past social structures, power dynamics, environmental conditions, migrations, and other important information to be passed down. It provides a continuum that shows changes over time. 4) Researching religious practices allow us to see in what ways water is used or required for religious practices, if at all. Many religions have their own set of oral traditions that will also speak to the evolution of the religion and the way people interacted with religion over time. 5) Understanding the way that ecosystems are used is essential to the placement of a potable water system as well as to gaining understanding into the way that particular ecosystems work. Understanding ecosystem uses will also allow developers and planners to account for ways that may interfere with proposed projects.

In Honduras only some of these were explored and it seems, only once the projects were underway. In order for homeowners to have a latrine they were supplied with the bowl, piping and necessary roofing materials but the homeowner was sometimes responsible for buying the cement and rebar³¹. It was not discussed beforehand whether the homeowners had the means to purchase these items, it was simply assumed that they did. This led to many people not

³¹ (Casey, 2005)

having latrines and having the remaining building materials left to ruin. The case study also lists components of a sustainable water system, but it seems that these were not explored prior to the implementation and installation of the systems.

My Experience in Peru

In the same way, had I done research before entering the Peruvian Villages, perhaps I would have already had an idea about their uses of water as well as current practices surrounding water. The below pictures illustrate the ways in which water was captured and used in the Peruvian Villages I visited.

Rain Catchment in Santo Thomas



Personal Photo Taken by: Deborah Anyaibe November 2014

Many individuals utilize rain water catchment systems that I was unaware of before we entered the villages. Had this been known ahead of time, we could have discussed with villagers ways in which these were working for them and ways which they could be improved and use local knowledge in creating a better system.

Bath Time Nuevo Israel



Personal Photo Taken by: Deborah Anyaibe November 2014

Most people use the river water to bathe in, as well as drink from as well as sink their trash bags in. Knowledge of the multiplicity of uses beforehand, would have allowed us to bring along appropriate water testing equipment as well as to be informed of the education that would assist in bringing awareness to the necessity of a potable water system.

Laundry

Personal Photo Taken by: Deborah Anyaike November 2014
The same water is used for cleaning clothes as well.



Rainwater System



Personal Photo Taken by: Deborah Anyaibe November 2014

2 out of the three villages also had communal rain water catchment systems. These were used to store larger amounts of water for times when the rain wasn't coming as steadily.

In the systems pictured above, we discovered the tanks were not properly sealed and because of the heat and humidity there was a high amount of algal and fungal growth in these cisterns. Knowledge of these issues would have made us aware that perhaps an entirely new system isn't necessary but that upgrades to existing systems, with the help of the community and their knowledge of the weather patterns, might be more beneficial.

Minimizing Outside Influence

The first visit to the community should be strictly informational. It is important to put all of the things learned into spatial and social context as well as gain clarity by actually experiencing the place and the people. Meeting with community members with the understanding that in the future a potable water system may put in is essential. It is important to be as transparent as possible but also to not push ideas and projects on the community.

It is important that there is a minimum of outside influence such as bringing predetermined water systems from other areas and trying to apply them universally. Ideas should not be brought in and suggested, and options should not necessarily be presented as the only ones available. It is important that water developers and planners use initial interactions as learning experiences. Community members should be heard and their ideas, if feasible, are the ones that should be implemented.

In order to emphasize the importance of place there should be as little outside influence as possible. Not only in the suggestions that are made but in every facet of the process from planning to implementation. All project components, labor, building material, knowledge, upkeep should come from local forms³². How the project is planned for, community meetings and participation should be carried out in a way that accommodates local customs. If the people usually meet every other Friday for an hour, for instance, it is a good idea to keep with that time or format. In this same vein, it is important for rural developers and project managers to be as clear, transparent and accessible as they possibly can in order to build the trust and cooperation of the people³³. If there are times or customs from which normality must be deviated from, project managers should

³² (Field, 2007)

³³ (Acosta, 2013)

explain the reasons for this deviation as well as thoroughly explain the process to be undertaken. Although the project managers and developers should offer expertise where applicable, it is also important that local knowledge be adhered to.

For instance, although engineers need to structure the physical parameters of large scale potable water projects, siting of the project should be based upon local knowledge given by community members.

The Servicio Autonomo Nacional de Acueductos y Alcantarillados (SANAA), the national water and sanitation authority in Honduras had a huge part in the development of the water systems in the remote villages. This outside influence led to little or no understanding of the workings of the systems but also, because of the unequal power manifestations led to SANAA not fulfilling its role in providing support and infrastructure to several of the villages³⁴. SANAA defined the regulations for use and the maintenance of the system with no help from the communities leaving them to struggle through when SANAA stopped providing support. They also required a monthly tariff for the use of the water but then did not provide the assistance required of them³⁵. This is an example of how outside influence, although it may bring monetary support for a short time, in the long run may simply be to the detriment of the community. This is also seen in the building of latrines in these Honduran communities. Many latrines were not even built due to the fact that people did not have the expertise or the money for the additional supplies or they simply were not interested in having a latrine. This shows that the priorities of outside entities may not always, and often do not,

³⁴ (Casey, 2005)

³⁵ (Casey, 2005)

match up with the priorities of community members³⁶. This should be avoided in Peru as well as other countries implementing potable water systems.

Participatory Processes

Community engagement is essential if the project is to legitimately consider place and people. It is very important that steps are taken to ensure that the process is participatory and that all involved voices are heard. There should be a participatory process that can be applied in multiple steps of the process to keep methodology and decision making uniform. In order to keep people involved in the process it is important that people's basic needs are met before any other needs can be met or progress expected³⁷. If people's basic needs i.e. food, water, clothing, etc., are not met it will be hard for them to focus on the tasks asked of them. It will also be hard to get the most useful information if minds are on other things. Keeping that in mind, providing breakfast is often a good way to start off a meeting; besides meeting this basic need, meetings involving food are often more productive and cordial.

It is important to do a stakeholder analysis in the startup phase to determine social and political place as well as necessity of involvement. This analysis should include the roll of the stakeholder in the society, economic and political standing, as well as locality³⁸. Although it is important to allow participation from all those who wish to participate, it may be necessary to have separate stakeholder meetings and confidential interviews in order to ensure that all involved feel free and confident to voice their honest opinions about issues and solutions. If there are issues of one person or group of people oppressing another or hostility between groups, having them in the same working environment will be unbeneficial and perhaps ruin the process all together. Regardless of

³⁶ (Casey, 2005)

³⁷ (Moraes, 2007)

³⁸ (Saravanan, 2009)

which individuals participate, it is important to keep the process individuals accountable and transparent. This means that all stakeholders should know who is participating and the nature of all of the interviews and discussions. Ideas agreed upon by one group should be shared with the others, in hopes that intergroup consensus can be made. In this way everyone gets to discuss each piece of the process. After identifying stakeholders, a set of by-laws should be drafted outlining each person's or group's responsibilities³⁹. The idea of what consensus means should also be discussed as part of the by-laws in order to determine if it is necessary to have 100% agreement or overwhelming agreement, or another agreed upon definition of consensus to make decisions.

1) **Support Communication**. It is important to provide environments in which stakeholders feel comfortable to communicate. The use of workshops, knowledge sharing activities, and capacity building exercises are ways to get the stakeholders to communicate to ensure that the outcome is one that benefits everyone⁴⁰. A space must be created to foster community engagement and participation. This neutral space should be used for things like stakeholder interviews and other gatherings necessary to facilitate the progression of the project⁴¹. To understand communities in which water developers or planners are working it is important to observe, survey, and interview all involved. All interviews and surveys should be done in local languages to avoid any confusion and in order to obtain all pertinent information⁴².

A key element to foster dialogue between the stakeholders and to bring about consensus, is aiming to create a well-designed and executed water quantity and quality monitoring program. This monitoring program should be comprised of factors (who will monitor flow, how the quantity will

³⁹ (Finley-Brook, 2011)

⁴⁰ (Acosta, 2013)

⁴¹ (Gaventa, 2013)

⁴² (Paulson, 2005)

be maintained, etc.) agreed upon by all involved stakeholders⁴³. These clearly defined roles and responsibilities will help each member understand how they fit and what they need to do. This will create a sense of community. Had this been done in Honduras, the systems may have remained in operation longer because everyone would have known exactly which part they play. The lack of such roles added to the confusion and a feeling of distance between the people and the project⁴⁴.

2) Consider Literacy. While considering participation and negotiation is important, other issues, such as literacy must be considered when preparing participatory activities and an alternative activity must be available in case reading and writing is not a skill possessed by all involved⁴⁵. Illiteracy may limit the pool of candidates, which may skew results of surveys as well as other exercises so it is important to have other options such as participatory mapping and transect walks as well as surveys dictated in the local language, available that convey the same information in a similar fashion⁴⁶.

3) Use a Variety of Methods. Ways in which to gain community participation are many. Participatory mapping, where community members are asked to draw the location of their homes or land, as well as any other relevant locations, are often beneficial to the planning process. These maps can convey religious sites, agricultural sites, sites where water is used and how it is used, depending on the goal of the session. Mapping helps because it is visual. It helps not only developers, but also other stakeholders see things through each other's eyes. It also helps those drawing the maps start to think about where a potable water system might be beneficial to themselves and others.

⁴³ (Bebbington, 2008)

⁴⁴ (Casey, 2005)

⁴⁵ (Paulson, 2005)

⁴⁶ (Finley-Brook, 2011)

Another beneficial way to gain local knowledge and participation is to do transect walks. Transect walks are helpful because land owners take developers and other stakeholders, if they wish, around their land and point out important historical, social, environmental, spiritual, and other important locations. This helps to determine how each individual views their land and their interaction with it. It will also give those involved an idea of how their land is the same or different from others and help to begin forming ideas about land uses in the area and where access to water is perhaps more vital than other areas. Through these transect walks and mapping sessions, personal narratives will likely be discussed, which will contribute all the more to the local knowledge of the area⁴⁷.

4) Educate the Participants. The process of implementing and developing a water project is complex. Because of this, there should be time, and funding allocated to educating the participants on the phases of the project as well as the maintain and management of a system, should one be installed⁴⁸. Reasons why potable water is being discussed should be clearly described for participants as well as what it means to have potable water. General education about what the current water state is, how it affects health, if at all, and how the project is meant to help assist in curing the health of the community should be available. If the process and logistics are not understood, the end product will not be well informed and the reflections and insight of local participants will be similarly constrained.

Before and after the systems in the villages in Honduras were implemented, a minimal amount of training was given to the community members. This education allowed the members to patch up water lines, assist in building latrines and patch small holes in holding tanks. Even this minimal

⁴⁷ (Paulson, 2005)

⁴⁸ (Finley-Brook, 2011)

amount of education helped when attempting a project of this magnitude. In Peru, there were no teaching materials or information about the current quality of the water, which would have informed people of the reasons why a potable water system was needed. Without educating the people about the reasons for the need for a water system, people will be less likely to support the design and implementation of such a project.

5) Ask Local Participants to Rate the Options. When trying to develop options, the participants should be looking for the most feasible and practical option for each situation as opposed to the ideal solution⁴⁹. An ideal solution may not be physically or theoretically feasible and due to that fact, the most feasible option is one that should be reached for and sought after. Once a plan for implementation and upkeep is decided on, several alternatives to the preferred option should be developed by the community in order to adapt and be flexible if a problem arises⁵⁰.

6) Consider the Tools of Activist Researchers. While collaboration is essential it cannot be taken on simply to gain knowledge without also sharing knowledge. In the same way, it may be helpful, as a component of collaboration, to actively support the community in solving issues important to the community that are related to the vision of the potable water project proponents⁵¹. There are several “pillars” of activist research and collaboration: organized endorsement, community participation, local collaboration and collective validation⁵². These pillars allow developers to not only get participation on the projects they have planned but also allow them to advocate for changes pertaining to their projects, building solidarity and trust within the communities in which they work. These pillars are embodied in a project by project planners and developers by the

⁴⁹ (Mollinga, 2007)

⁵⁰ (Field, 2007)

⁵¹ (Field, 2007)

⁵² (Field, 2007)

bolstering of community support through the creation and implementation of a project that reflects the needs of the community and its members.

Natural and Environmental Systems

In order to implement a successful potable water system, that has as little environmental impact as possible, a survey of natural environmental systems must be done. Taking a survey of natural resources and environmental systems, for planning and implementing water projects, is essential. Using things like vegetation, slope, soil condition, habitat and current water patterns will help to mitigate impacts of the installation of a water system or other environmental projects. It is important that the natural environment be left in the same or better condition than before the water system was installed. In order to make sure that this is done, an assessment must be made of the resources in their current condition so that developers may improve the ecosystem rather than inadvertently degrade its quality. This knowledge will allow communities and planners to come up with a way to improve the ecosystem while providing potable water for community members.

A good way to begin the process of maintaining and restoring these environmental systems is by establishing watershed committees. These committees may be chosen and maintained by people in the various watershed communities. In rural communities, people work together and understand the reason behind the formation of the committee as well as the responsibilities of the committee ⁵³. These committees should be responsible for assessing the health and biological quality of a stream as well as beginning a watershed management plan in order to maintain decided upon standards

⁵³ (Moraes, 2007)

Follow the Dublin Principles

In 1992 the Dublin principles were written in an attempt to explain the difficulties that would be faced in water management. “1) freshwater is a finite and vulnerable resource, essential to sustain life, development and the environment 2) water development and management should be based on a participatory approach involving users, planners, a policymakers at all levels 3) women play a central part in the provision, management and safeguarding of water 4) water has an economic value in all its competing uses and should be recognized as an economic good”^{54 55}. Freshwater is a finite resource and it is necessary to understand how this finite resource needs to be managed so that it is used in the most beneficial manner.

Making the planning and development process participatory ensures that knowledge is gathered and shared collaboratively in order to design and build a potable water system. It is important that women are included in this process because in many communities women play essential roles in the use of water, as well as in the distribution of water. It is dangerous to think about water solely as an economic good absent social and cultural context. An economic good is “a product or service that can command a price when sold”. Water is a universal right that carries health, social and cultural values

Although it is true that water has an economic value, it is important that water is used first to meet basic needs and access to potable water should not be constrained because of price. The goal is to gain access to clean water for all people, not to block access to the much needed basic necessity. If the price of water is too low, as it is in much of the southwest, the water may be

⁵⁴ (Paulson, 2005)

⁵⁵ (Vishwanath, 2008)

used as if it is an infinite resource. If it is priced too high, as it is in many developing countries, those with low or no income will not be able to purchase this vital resource.

Recommendations

The right to safe, clean potable water is a basic human right essential for the enjoyment and longevity of life. It is important to realize that if potable water projects are not implemented in a way that fits with local social processes and practices, customs and norms, taking into account the politics and historical references that shaped these norms, the projects are likely to fail. The best practices in this report can be used in order to ensure that, from start to finish, water developers are informed about the places they are entering and the people they are interacting with. It also ensures that people are given a chance to truly participate in the process from planning through construction to the maintenance and management upkeep of a well-informed project. As water developers and planners it is important that we guide communities through a process, not make community members subject to adapt a “standard” potable water system under the guise of necessity.

Social processes, practices, relationships and the meaning behind them must be considered whether one is working internationally or locally. Cultural analysis is a lens of observation relating to a “distinguishable domain of human activity”⁵⁶. In this case, the domain is the use of and ideas about water. The ways in which this domain is analyzed will determine the design and implementation of potable water systems. “Interaction between different social groups, most importantly tension and conflict over difference as well as unequal relationships of power are the basis for culture”⁵⁷. Unequal power in community relationships will determine who is included in

⁵⁶ (Trouillot, 2003)

⁵⁷ (Valencia, 2015)

the potable water projects. These relationships, and the tension around them can stall or stop a participatory project. In this way, culture often dominates society because it is a lens through which social order is relayed, recreated and experienced⁵⁸.

Approaching an international water project can be difficult. In order to make it less difficult, researching the people, place, politics, social structure, etc., before entering the community is helpful. Prior understanding of the ecologic and social indicators in the area may make the transition into working with the community easier. It is important to remember, however, that research done from afar may not present an accurate representation of the true conditions. This research ahead of time is simply to give greater understanding when visiting the community and the community members can then bring context to the research you have done.

The process, after the initial research and the initial meeting of the community, should be open to all community members. From the first decision about who gets to participate to the decision about what type of system should be designed and where it should be placed must be based in the traditions, sense of place and community values. It is important that local knowledge is respected and included so that any implemented water system will fit within local social, spatial, and ecological norms and will remain in use over the long term. Getting this information can be done in many ways, mapping exercises and transect walks are two ways that make the process not only participatory but also builds trust and mutual respect. Participation is key in maintaining local sovereignty while delivering a potable water system.

After trust has been built and stakeholders identified it is important that, after an environmental assessment is done, watershed committees are formed to oversee the maintenance of

⁵⁸ (Valencia, 2015)

environmental systems. A time frame should be established for when and where to do stream health and biologic surveys in order to begin to put together a watershed management plan. It is important to take stock of the existing environmental systems in order to inform the placement and construction of a clean water system. Understanding the topography, stream flows, vegetation types and location, will help shape an appropriate way to complete the project.

Everyone should have access to clean drinking water, in the process people's culture, identities and social practices must integrally guide and shape to the most fundamental aspects of the design of potable drinking water systems. It is also important to have a plan, and the best practices in this thesis are important to have in place before international water aid projects. Together with active participants, these best practices must be considered uniform practices to follow.

Limitations

This study was limited by the fact that it was largely a qualitative study based on literature review and limited on ground experience. Had there been more time and forethought this list of best practices would have been implemented before and during my time in Peru. This was also limited because, in theory, these practices are appropriate and my intention is to make them broad enough to encompass many situations but it does not mean that they are universal and appropriate in all situations.

Conclusion

The best practices outlined in this project should be followed where they apply in international rural contexts. The best practices may be adapted to different communities, in different parts of the world to ensure that proper participation is acquired. It is important in all situations that water planners and project developers understand the community they are going into as much as possible, before hand and that once in the community, that community participation is the main

goal. Community participation will provide a level of knowledge that may not be gained through observation. It is also important that the meanings, social processes and practices of each community are taken into account when designing and implementing a potable water system. It is my overall recommendation that outside influence be minimized and community participation be maximized in order to create a system that the community members will be proud to take responsibility for.

It is important to realize that all change that comes about from outside help is not negative. International aid, especially when related to water, is essential in providing a healthier, happier lifestyle for community members. If potable water is provided, water borne illness is likely to decrease, leading to longer, fuller lives. It is the ultimate point of potable water systems to change community members' lives in a positive way. It is essential that negative impacts are minimized and positive, self-determined change is bolstered.

Glossary

Potable Water- water that is safe to drink; drinkable

Sustainable- able to be maintained at a certain rate or level

Water Developers- those who assist in the building and upkeep of water systems

Water Planners- those who assist in the arrangement and sustainment of water resources

Participation- the action of taking part in something. In this case when related specifically to community members

Environmental Systems- a system where life interacts with the various abiotic components found in the atmosphere, hydrosphere, and lithosphere

Urban- in, relating to, or characteristic of a city or town

Rural- in, relating to, or characteristic of the countryside rather than the town

Improved Drinking Water- by nature of its construction or through active intervention, is likely to be protected from outside contamination, in particular from contamination with fecal matter.

Culture- a lens through which religion, art, music, etc. can be analyzed based on power institutions in specific communities or groups of people

Best Practices- procedures that are accepted or prescribed as being correct or most effective.

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