ORGANIZATIONAL ACCOUNTABILITY IN THE W.A.S.H. SECTOR: INTEGRATING SUSTAINABILITY FACTORS INTO THE DEFINITION OF SUCCESS

by

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ABSTRACT

The world's poorest people, most of whom reside in under-developed nations, lack access to clean water and sanitation facilities, nutritious food, and education (UMP, 2005). These conditions are linked to malnutrition, disease, and low life expectancies (WHO). In an effort to reduce global poverty, the United Nations (UN) adopted the Millennium Development Goals (MDGs). Under Goal 7c the UN denotes that by 2015 the population without sustainable access to safe drinking water and basic sanitation as compared to the proportion who do should be halved. As a response to this objective the international development (ID) sector has implemented projects aimed at increasing access to clean water and sanitation facilities, yet reports of high rate of project failure continue (Ika, 2012). In this thesis factors contributing to project failures are outlined based on the literature. In response to these findings this thesis explores the components of sustainability as it relates to the WASH sector and creates a framework for minimum standards that should be met in order for a WASH project to be considered successful. These standards are adapted based on the World Health Organization (WHO), a project funded by the Bill and Melinda Gates Foundation that evaluates WASH projects called WASHCost, as well as the standards proposed by Carter et al (1999). Furthermore, it is argued that if implementing organizations are expected to monitor, evaluate and report on the environmental, social, economic as well as technical components of their implemented project, it will create a level of transparency that promotes organizational accountability that will inherently cause a shift towards more effective WASH projects.

DEDICATION

For you;

Every man, woman, and child

Who has seen the pain

Who has felt the burden

Who has chosen not to stand aimlessly

On the barren grounds of indecision,

But instead has resolved to evoke change that

Spring flowers of hope and prosperity.

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Sara Beck, I thank you for all of the conversations that you had with me during my time at UC Boulder; these conversations inspired me to learn about the issues surrounding development and in many ways have helped to shape this thesis. Your strength and dedication has given me much to look up to, and for that, I am filled with a deep gratitude. To Dr. Madani, thank you for facilitating and motivating a project that allowed me to take my cynicisms and turn them into a thesis that has, if nothing else, helped me to grow and to better understand. To my thesis chair, Dr. Reinhart, thank you for all of your hours of brainstorming, reading, and editing. Without your commitment this thesis would not have been possible. To Dr. Jacques, thank you for your direction, advice, and most of all, invaluable questions that allowed me to further develop this thesis. To Dr. Lee, thank you for taking your time to be part of my committee, it is greatly appreciated. To Colin Forward; my sounding board, support system, editor, chef, running partner, and best friend. Thank you for consistently motivating me to be a better person. To mom and dad, thank you for teaching me values, love, and empathy; for without these I'd be truly lost. To all of my family and friends, thank you for your love and support, both from near and afar.

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INTRODUCTION

The world's poorest people, most of whom reside in under-developed nations, lack access to what many in the developed world take for granted, i.e. access to clean water and sanitation facilities, nutritious food, and education (UMP, 2005). These conditions are linked to malnutrition, disease, and low life expectancies. According to the World Health Organization (WHO), 6.6 million children under the age of 5 died in 2012; more than half of these deaths were linked to malnutrition, diarrhea, pneumonia, malaria and other conditions that most likely could have been prevented through affordable interventions (WHO, 2013).

In order to alleviate these conditions, international assistance has been provided to under-developed countries. Most of this assistance is distributed by international development agencies and organizations through "projects" (Diallo & Thuillier, 2005). These projects focus on creating access to, or improving the state of the economy, education, or health (Golini et al, 2013).

Even with billions of dollars in expenditures, discouraging statistics continue to emerge outlining project failure rates of 30-64% in what has grown to be a $120 billion a year (US) industry (Ika, 2012). Thus, researchers from a multitude of backgrounds have turned their focus towards the international development (ID) sector in an attempt to once again answer the same questions that emerged in the 1950's: Why are development projects failing, and how can we make them more effective (Hermano et al., 2013; Crawford and Bryce, 2002; Ika, 2012)?

Since many of the projects implemented within ID are related to infrastructure and agriculture, a large portion of the sector is composed of participants from engineering disciplines. According to a study by Ika et al. (2012), of 178 World Bank projects, approximately 29% of the supervisors had an engineering academic background; the only discipline with higher representation was economics at 41%.

Organizations continue to emerge with the intention of applying specific technical skills to implement projects for the social good of developing communities. This includes many development agencies and non-governmental organizations (e.g. Engineers Without Borders, Peace Corps, WaterAid). Many engineers offer their technical competencies towards implementing projects in developing communities, but are not trained to address the social and political barriers of such projects. The adverse effects that accompany failed projects can cause consequences ranging from social tension within a community, to environmental issues, to something as great as an increase in disease and contamination (Greene et al, 2012). When development projects fail, it is the "beneficiaries" of said projects that have to deal with these consequences (Keene, 2007). Many times, the focus of projects becomes the technology as a means to a successful project, but in reality the implemented technology is only a component of overall project success. Thus in order to avoid project failure, and implement more effective projects, development workers must be educated on the economic, social, and environmental sensitivities involved in such endeavors. This thesis will address the known components that should be addressed in order for a Water and Sanitation Hygiene (WASH) project to be considered successful.

There are historical, economical, political, environmental and social implications of foreign development projects that are pertinent to understanding the costs and benefits of any given project. The value of a project must be measured by more than the financial balance sheet of a project, or the mere "success" of a technology being implemented. In order to implement truly successful projects the cost-benefit analysis must include economic prosperity, environmental responsibility, as well as social equity, which encompass technical and managerial sustainability factors (Harvey & Reed, 2004). By understanding these factors that contribute to the sustainability of WASH projects and applying them to the definition of success, a project that creates more value to the beneficiary is possible. Learning, even if by failure, and in turn becoming more effective, efficient, and productive can be noble, but this is where a distinct line must be drawn. Learning lessons that have already been well established at a community's detriment can be considered nothing less than abhorrent. The WASH sector must adapt well established guidelines and frameworks that are adhered to in order to confront these complex issues before they materialize into "failures". There are ethical standards under which engineering technical skills are put to use, these standards must expand to recognize the social and environmental costs and benefits to under-developed societies.

This thesis argues that the WASH industry within ID must under-go a cultural shift that recognizes the adverse environmental, economic and social affects produced by failed projects. As a response to this recognition, organizations must hold themselves accountable to adapt new strategies that prevent these failures and ensure that the beneficiaries continue to receive a net benefit. Since project success is often defined by meeting the goals set by the implementing organization, the results produced by each organization vary greatly. Without a proper system to

hold these organizations accountable for their work, they have the ability to declare a project complete and "successful" without confirming that there is positive community adaptation and use of the project in the long term.

This thesis explores the components of sustainability as it relates to the WASH sector and highlights minimum objectives that should be met in order for a WASH project to be considered successful. These objectives are adapted based on the World Health Organization (WHO), a project funded by the Bill and Melinda Gates Foundation that evaluates WASH projects called WASHCost, the standards proposed by Carter et al (1999), and an Indian based non-profit called Gram Vikas. It is argued that if implementing organizations are expected to monitor, evaluate and report on the environmental, social, economic as well as technical components of their implemented project, it will create a level of transparency that promotes organizational accountability. As donors and communities begin to support the organizations that have proven they have created a model that is marked by positive social, environmental, and economic benefits over a length of time, it will inherently cause a shift towards more effective WASH projects.

First an overview of ID is presented by defining important terminology, history, as well as controversies. These are explained in order to gain a greater understanding of the relationship between the donors (developed countries) and the beneficiaries (rural communities, WASH recipients within the developing world). Next a review of literature specifies origins of failure that sheds light on the obstacles within ID. By examining a prominent WASH organization in India, Gram Vikas, a proof of concept that exhibits the ability for organizations to implement

projects that positively impact communities; socially, environmentally, as well as economically. It is thus argued that there should be a cultural shift within the WASH industry that recognizes organizations based on their ability to provide a viable proof of concept. This proof of concept should exhibit the ability to implement sustainable projects that are adapted to fit the needs of specific communities, their ability to monitor, evaluate and report on each implemented project, and the organization's ability to adapt to the organizational changes needed to implement sustainable projects.

BACKGROUND

This section introduces important terminology, history, and theories associated with the field of ID. It highlights the regions of development, the flow of transactions, and associated controversies.

Human Development Index

The human development index (HDI) has been published since 1990 in the United Nations Development Programme's (UNDP's) *Human Development Reports* (HDRs) as a way to measure the development of countries (Ravallion, 2012). Rather than measuring the development based on national income alone, the HDI takes into account life expectancy and education, as well as income (UNDP). These reports advocate for human development and as a consequence often times influence policies regarding development, as well as transactions of donor aid money (Ravallion, 2012). The HDI is measured on a scale from zero to one, where zero is least developed, and one is most developed.

Terminology

Although the HDI is an imperfect model for measuring development, as it fails to measure human resources such as literacy, health and nutrition, the HDI framework is an adequate way to discuss the development of certain regions for the scope of this thesis.

Least Developed Countries

Least developed countries will include any country with an HDI below 0.51. Characteristics of these countries include low life expectancies, limited access to education and healthcare, and minimal infrastructure. Some of these countries are marked by political instability. They include much of sub-Saharan Africa, parts of the Middle-East such as Pakistan and Afghanistan as well as countries in South and Central Asia. These countries were once categorized under the name “the third-world” and are now sometimes referred to as “the global south”. For a comprehensive list as well as their corresponding HDI, please refer to Appendix A.

Developing Countries

Developing countries will include any countries with an HDI below 0.792. These include all countries that are not considered developed, including much of South America, Asia, and Russia as well as the countries listed as “Least Developed Countries”. For a comprehensive list as well as their corresponding HDI, please refer to Appendix A.

Developed Countries

Developed countries will include any country with a HDI ranging from 0.792 to 1. These countries are considered “affluent” with high per capita incomes, life expectancies, literacy rates, technological infrastructure, as well as access to health care. These countries include North America, Western Europe, Australia, Japan, and South Korea. For a comprehensive list as well as their corresponding HDI, please refer to Appendix A.

International Development

ID deals with a host of factors that contribute to the overall well being of a population. These factors are not limited to, but include poverty reduction, health care, agriculture, education, infrastructure, economic development as well as issues of human rights. The origins of modern day "international development" are usually associated with Post-World War II initiatives (Cohen, 2013). Many cite the beginning of modern ID as the inception of the International Monetary Fund (IMF) and the World Bank which were a result of the July 1944, Bretton Woods Conference. These institutions were inaugurated with a goal to "establish a framework for economic cooperation and development that would lead to a more stable and prosperous global economy (IMF, 2013)."

There are many controversies and questions surrounding the ID sector; Is foreign aid and the subsequent development projects helping or inhibiting the growth of developing nations (Easterly, 2009)? It has been stated that aid is often brought in through inefficient channels that cause developing countries to accrue debt and inhibit market growth while many times benefiting the donor country, and lining the pockets of the leaders of the developing world, rather than helping people out of poverty(Williamson, 2010).

On the other side of this argument are statistics of decreased child mortality and increases in overall life expectancy often times attributed to initiatives such as the MDGs, which are highly dependent of foreign aid (WHO, 2013). Malaria is being fought, and the issues of HIV and AIDS are being addressed. There are improvements in access to water and sanitation and to schools and education (WHO, 2013). Gender and class inequalities are being discussed and solutions are

sought. Although ID is a highly controversial subject, studies have shown that ultimately development is increasing the quality of life of people (Cohen, 2013) and can provide positive social change (Gam Vikas).

The following section of this thesis addresses the issues and theories that affect the way the ID sector operates as well as how it is perceived globally. It defines the mechanisms of aid which funds ID.

Aid Delivering Mechanisms

In a study by Michael Cohen (2013), he divides the $2.2 trillion dollars in international aid that has flowed to developing countries since 1950 into three distinct delivery mechanisms:

- Bilateral distribution of resources from one government directly to another. This is defined as bilateral Official Development Assistance (ODA);
- The distribution of aid via international organizations such as the World Bank and other regional development banks. This is multilateral ODA;
- The final delivering mechanism is that of private organizations whose mission fits within the definition of international development. These organizations include groups such as Engineers Without Borders and Water for People.

Each of these mechanisms of delivering aid has their own motivations, intentions, inefficiencies, and side-effects. Although one can find the amount of money that is sent from the developed world to the developing world in the form of foreign aid, the intentions of the donors are widely debated. Hans Morgenthau (1962), released a paper which outlined a theory on

foreign aid as a policy. Morganthou states "*The policy of foreign aid should be taken just as seriously as military policy*". The implication of this statement is that foreign aid is not only used to help develop outside economies, but is also used as a policy to ensure the best interests of the giving country are considered. This is especially true any time aid is "tied" to products or resource purchases, or political alignment requirements (Williamson, 2013).

Arnup Shah (2012) outlines four issues regarding aid, most specifically referring to ODA. First, aid is sometimes given to recipients under the condition that they spend the money on goods and services from the donor country. This implies that although a certain amount of aid is going to developing regions, it has conditions that impede the so called beneficiary from using it where it is really needed. Rather than the bid or solicitation going to the Kenyan engineer or construction worker, it goes to a non-profit (or for-profit) from the developed world. Developing nations spend aid money facilitating the skills of the developed world, rather than their own nation's people. Aid money flows back to the people at the top of the developing nations, and back to the developed world rather than flowing to the people who need it most, the world's poorest people. Another issue is that massive projects face corruption and the donors' funds are embezzled rather than spent on the intended purpose. Sometimes, the developed world creates a level of protectionism (e.g. tariffs), inhibiting and or denying developing nations' products access to the market. Meanwhile, the developed world uses aid and the relationships forged through aid to keep the market doors open to them in the developing world. This last issue keeps money flowing from under-developed regions of the world to the developed world rather than vice versa.

Cohen, in “Giving to Developing Countries: Controversies and Paradoxes of International Aid” (2013), outlines multiple instances where the U.S. sends funds to developing countries via these ODA mechanisms in the interest of their own cause: aid to Colombia to fund the war on drugs, to Pakistan in order to fight the Taliban, to Egypt to keep Egyptian President Hosni Mubarak in power, etc. These policies may be positive for the donor country, but they do not always benefit the citizens of the nation receiving the aid.

With the fall of colonialism in the late 1940’s and early 1950’s, some believe that the developed world replaced military force with the debts and loans that often come with ODA. These thought leaders characterize foreign aid as yet another vehicle to control the resources of the underdeveloped world. The intentions of development work itself are thus a controversial issue. Although not all ID has such strong political and financial motives, it is important to understand how aid has been used and why there is at times such a stigma around such endeavors.

Paternalism vs. Empowerment

An important issue surrounding international development is the sentiment that “handouts” (in the form of aid) make economies dependent on foreign aid rather than consolidating and growing their own resources and services, and this inherently inhibits development. This thought process became known as the “Dependency Theory” and many versions have been published since the late 1950’s (Ferraro, 2008).

Ugandan journalist and major adversary of foreign aid to Africa, Andrew Mwenda, gave a talk regarding some of these issues in June, 2007. Mwenda discusses the way the West portrays Africa- as if rather than investing in the economies of Africa, the quantity of aid should be increase; rather than highlighting the investment opportunities, the West instead chooses to use charity as the mechanism of change. It pulls at the heartstrings of donors, rather than the minds and wallets of investors. Aid - rather than business development - is used so much, that Mwenda reports for many African countries greater than 10% of their GDP is comprised of foreign aid dollars (Mwenda, 2007).

According to dependency theory, rather than empowering people and allowing them to find solutions to their own problems, the Western world takes the "paternal" approach of coming up with the solution; usually in the form of aid. These comments frame the paternalism versus empowerment debate that has saturated the conversation around international development.

Increasingly there is evidence that in order to make a lasting change one must empower the local people (Harvey & Reed, 2004). In order to combat this idea of paternalism, strides have been taken within the development community to ensure that beneficiaries are able to take control, and maintain the projects being implemented (Pless & Appel, 2012). It has been found that the implementing agency must learn to be project facilitators rather than implementers; where local resources and local knowledge are consolidated to find and implement a local solution (Aune, 2000).

Development Projects

One vehicle by which the funding mechanisms discussed previously operate are called "development projects." Development projects are funded by private donors and organizations as well as multilateral and bilateral ODA. The aim is to increase the overall quality of life for the community in which the project is implemented. These projects generally implement infrastructure in least developed nations; e.g. roads, wells for access to water, schools for education, agricultural development. This next section is dedicated to better understanding the project cycle and the main entities involved in such projects.

Stakeholder

"Stakeholder" is commonly used in development literature to describe one of the entities involved with the implementation of a development project. The three main stakeholders are:

1) The funding agency or donor
2) The implementing agency or organization
3) Beneficiary: the community in which the implementation occurs

The relationship among these three entities is of the highest importance. The goals, motivations, intentions, and communication amongst the stakeholders are all variables that affect implementation and project success. There may be other organizations involved. For example, there may be a separate planning organization or monitoring and evaluation team. The governing body within the beneficiary nation may play a huge role in the implementation of any given

project. All such entities are considered stakeholders. All in all stakeholders are the people, organizations, agencies and communities that are involved with a given development project.

Water and Sanitation Hygiene (WASH) Projects

In 2000 the United Nations created the Millennium Development Goals with the intention of creating quantifiable decreases in global poverty. Under Goal 7c of this initiative, the United Nations set a goal to halve the world population without sustainable drinking water and basic sanitation by 2015 (UMP, 2005). According to the UN Secretary-General, Ban Ki-moon, this initiative is imperative to efforts in poverty reduction and sustainable development, as well as successful attainment of the Millennium Development Goals (UNICEF-WSH). According to the World Health Organization, WASH related facilities decrease the occurrence and spreading of many debilitating and deadly diseases. Some of these include diarrhea, malaria, trachoma, hepatitis, and fluorosis (WHO-WSH, 2004). Diarrheal diseases alone kill an estimated 1.8 million people each year, 90% (1.62 million) of whom are children under 5 years of age. It should be noted that 88% of these deaths occur in the developing world and are largely attributed to an unsafe water supply and or inadequate sanitation and hygiene (Pless & Appel, 2012). It has been found that increased access to WASH related amenities and education can significantly reduce mortality, increase quality of health, and eliminate the prevalence of diseases (WHO, Esrey et al. 1991).

Carter et al (1999) summarizes the water and sanitation hygiene needs in developing communities as being comprised of three components; water supply, excreta disposal, and wastewater disposal. They note that these three components are considered to be the foundations

of an adequate water and sanitation project. Projects that promote sustainability, time saving, longevity, and community health should thus include water supply and, a form of excreta disposal, as well as hygiene education programs.

Table 1: Summary of WASH related problems adapted from Carter et al 1999

COMPONENT	ESSENTIAL PROBLEM	CONSEQUENCE
Water Supply	• Source is marked by great distance • Source is not reliable; poorly built and/or maintained • Source is contaminated or of poor quality	• Community (mostly women and children) must expend time and energy collecting and finding water • Injuries occur from hauling heavy loads • Water-borne diseases
Excreta Disposal	• No proper facility for feces disposal • Facilities that do exist aren't used for intended use • Lack of water for anal cleansing and hand-washing • Lack of privacy for defecation	• Contamination to groundwater, surface water as well as the surrounding soil where open defecation occurs • Inadequate cleansing and hygiene leads to the spread of diseases • Women don't have a safe contained place to defecate, and open defecation is often deemed unacceptable
Wastewater Disposal	• Lack of existing facilities for waste disposal	• Lack of waste disposal monitoring and regulation leads to increased environmental contamination, vector quantities, as well as increased downstream disease occurrences

WASH Project Failure

Although WASH projects play an important role in increasing global health, these projects are not always marked by longevity. "Improve International: Ensuring Clean Water & Sanitation Service for Generations" is a non-profit organization whose mission is to improve the efficiency of WASH programs by coordinating with ID organizations. This organization has an

online forum that reports recent studies that outline failures within the water and sanitation sector (Improve International, 2013). These reports indicate staggering project failure rates. They include findings of latrines that are dilapidated, over filled to the point they are more likely to spread disease than to prevent it (Greene et al, 2012). There are implemented projects that never get used such as the wells scattered across Africa that are nonfunctioning (Improve International, 2013). These findings indicate that the implementing organizations are not fulfilling their duties to their donors, their cause, or the beneficiaries.

Under current definitions, organizations can consider their project a success before they see the long term effect of project implementation, thus many of the implementing organization may not know whether or not their project is still working (Harvey & Reed, 2004). Without the use of proper monitoring, evaluation, and reporting systems, projects considered "successful" upon completion, have the potential to create negative impacts in the long run (Harvey & Reed, 2004) which may create adverse consequences (Keene, 2007). Organizations focused on increasing access to WASH facilities must begin to create standards for success that contribute to the benefit of the community in the long term.

The Engineer's Role in Development

The engineer's role within WASH projects is very distinct, and imperative to the many stages of the project cycle. Engineers choose the technology, plan and ensure the feasibility of projects, and are thus crucial to the implementation phase. Engineers generally develop technologies that allow organizations to assess and monitor projects, both during and after completion. Although engineers play pertinent roles in the development of WASH projects, these

technical components of the project cycle are not the only factors that affect the success of any given project. In order to have projects that have a lasting positive impact, many issues outside of the technical component of the project must be taken into account. In the book “Field Guide to Environmental Engineering for Development Workers” the environmental engineer is described as protecting the health of humans and the environment by applying mathematics, physics, chemistry, engineering science, sustainability science, engineering science, and engineering economics, as well as social science (Mihelcic, 2009).

Engineering skills are pertinent to many of the issues plaguing the developing world, but the projects implemented to diminish these problems must be designed and built while taking into account the technical, economical, and environmental, as well as social aspects of the affected community and region. In many ways, success is about finding common ground among the stakeholders involved. It is not just about the engineer coming up with a feasible technology, but instead about implementing a technology that is genuinely accepted and used by the beneficiaries. The beneficiaries must be willing to invest both time and money into the project. Project success should therefore be monitored in such a way that the multidimensional aspects of success are measured.

FACTORS OF SUSTAINABILITY AND THE DEFINITION OF SUCCESS

Perception of Success

ID projects are complex in their overall not-for-profit nature, the inherent language barriers and distance by which most transactions occur. In ID, clients, beneficiaries and project managers may all have different perceptions as to what a successful project entails (Diallo & Thuillier, 2005). The project manager and donors may attribute success to the factors defined by Frimpong et al. (2003), among them, staying on schedule and, on budget, and meeting the technical goals of the project. An engineer's perception of success may only be the attributed to whether or not said technology works. The stakeholders directly affected by the implementation of the project (beneficiaries), may be focused on the capabilities of the implemented technology itself and the overall efficacy and delivery of the needed benefit.

In this thesis it is argued that success should only be measured by the ability of the project to bring beneficiaries long term access to clean water and sanitation facilities. Only projects that promote sustained health, and increased well-being among the community should be considered a success.

Sustainability Framework

The original definition of sustainable development is attributed to a report published in 1987 by the World Commission on Environment and Development (WCED). This report contended that sustainable development is the ability of the present generation to meet their

"needs and aspirations without compromising the ability of future generations to meet their own needs." Although sustainability is considered a subjective term as the meaning often changes across cultures (Barnes & Ashbolt, 2010), industries, and programs, it is an important term as it implies the ability of a system to continue to work over an extended period of time (Giné & Pérez-Foguet, 2008). According to the Oxford Dictionary, success is *the accomplishment of an aim or purpose*. The same source defines "sustainable" as *being able to be maintained at a certain rate or level; conserving an ecological balance avoiding depletion of natural resources; able to be upheld or defended* (OxfordDictionary, 2014).

So, while success is met upon the achievement of defined goals and objectives (in this case a specified amount of access to clean water and sanitation facilities), sustainability is a characteristic of the methods employed to achieve the goals of the project.

The term "sustainability" changes with time and context. Sustainability happens within ever-changing systems (technology, environment, society, etc) and thus the means to sustainability are consistently changing. Within each industry the components by which sustainability is met and the factors affecting it differ.

We can identify some examples of sustainability factors within WASH projects. If a development project leaves a community dependent on a new technology for access to clean water, there must be contingency plans in place in case issues arise with the technology. For example, if a project's success is dependent on the deployment of new machinery, the community must be prepared to repair the equipment should it break, or else the project's methods should not be deemed sustainable. Similarly, a sustainable project plan needs to include

measures to ensure that the community can afford to operate, maintain, and expand the need, or replace the equipment by end of expected life.

One of the frameworks for measuring sustainability, called the triple bottom line, states that the financial, environmental, and social sustainability of an endeavor must be taken into account. In this framework the point where these three criteria meet is where overall sustainability is found (McConville, 2006) (**See Figure 1** for representation). This framework is applied across disciplines and is used for a wide array of projects and endeavors.

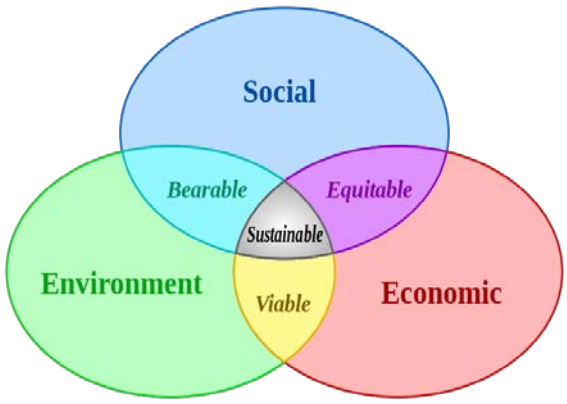

Figure 1: **Venn Diagram of sustainable development at the confluence of three constituents (Johann Dréo).**

Andrew W. Savitz (2006) describes the triple bottom line as a scorecard whose components must be balanced, and whose value creation to both shareholders and society must be measured. The components of each of these criteria are displayed in Table 2.

Table 2: Components of Sustainable Development adapted from Savitz (2006)

Economic (Profit)	**Environmental (Planet)**	**Social (People)**
Profit maximization, Return on Investment (ROI), Sales	Air Quality	Labor Practices
Taxes Paid	Water Quality	Community Impact
Monetary flows	Energy, Land, and Water Use	Human Rights
Job Creation	Waste Produced	Product Responsibility
TOTAL	TOTAL	TOTAL

Barnes and Ashbolt (2010) define sustainability within the water and sanitation development sector as the "ability of services to continue to provide recipients with the intended human health and lifestyles benefits without a significant adverse effect on other people or existing or potential services." The first portion of this definition highlights the importance of project longevity. The framework upon which a sustainable project is implemented in this case is expanded from environmental, economic, and social to include technical and human health criteria. By highlighting these last two components, an emphasis is placed on their importance to overall project sustainability.

Giné and Pérez-Foguet (2008) further expand the factors of project sustainability within international development to include environmental, institutional, managerial, social, financial, and technical aspects of a project or program (Figure 2). Figure 2, displays both the factors of sustainability as well as how they are interconnected. This interdependence is what makes each component of the system essential to the next. If project planners become too focused on one or

two components or factors outside of the context of the rest of the system, sustainability can never be realized (Harvey & Reed, 2004). Thus, a holistic approach is needed in order to develop and implement WASH projects that can sustain themselves in both the short and long term.

Therefore, the way to ensure that projects are sustainable is to require that project planning outlines methods that satisfy the components of sustainability as defined by an established framework such as the triple bottom line or the model proposed by Giné and Pérez-Foguet (2008).

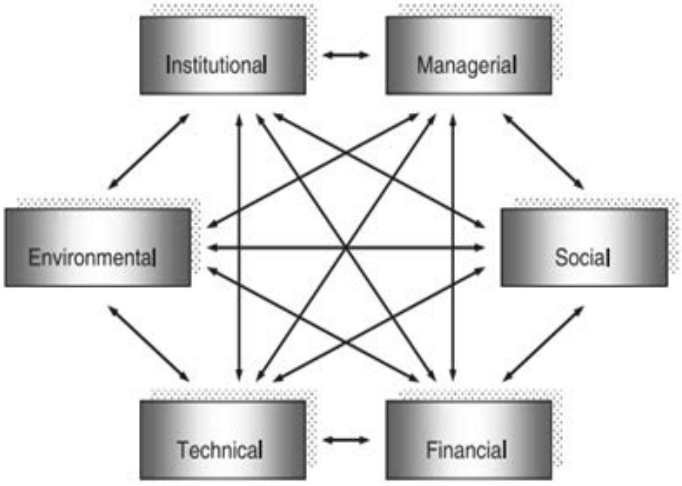

Figure 2: ID Sustainability Factors (Gine and Foguet, 2008)

Sustainability re-defined for WASH purposes

Thus for the remainder of this thesis, a sustainable WASH project for the foreseeable future; will be socially embraced and used by the intended beneficiary, will meet or exceed the water and sanitation requirements of the beneficiary, provide the desired life style and health

benefits and will be maintainable, manageable, expandable or upgradable to the needs of the beneficiary, and be replaceable all within the financial constraints of the beneficiary.

This definition requires that some kind of long term assessment and feedback take place to assure that the project is actually sustainable.

In order to assess whether or not an organization is succeeding in providing successful WASH projects to beneficiaries, there must be standards upon which this success is measured. In developing countries, the resources available for creating a system of accountability such as a proper governing body are often times lacking or otherwise non-existent. The capital funding for development projects are financed by the developed world (whether by government or private funding), yet the developed world's standards aren't expected to be met when implemented in the under-developed world.

It is easy to show that in the developed world even the smallest towns have requirements of well monitoring (even private wells), filtering, pathogen removal and limits and requirements that water be available inside each living quarter. Water from open rivers, lakes and streams is rarely allowed to be used as drinking water without complete processing. Septic systems must meet or exceed local standards including septic tanks and fields and sewer systems, above ground processing plants etc, are required for even small high density communities. VIP latrines are reserved for extremely rural, rarely used conditions such as remote access in federal lands and parks.

International development is a $120 billion a year industry (Ika, 2012) which stands to gain massive increases in positive impact on the beneficiaries that it serves; if only the system

purges itself of inefficiencies and makes coherent strides towards projects that are sustainable. Although “sustainable development” itself has been called a “buzzword”(Estes, 1993), the concept of making a change that lasts over an extended period of time is essential to eliminating the death of millions of children, as well as increasing the standards of living for billions. If the factors of sustainability described by Giné and Pérez-Foguet (2008) were integrated into the aims and objectives at the inception of the project, then projects that have negative impacts to society could not be “deemed” successful by the implementing organization. Measuring the success of project goals when they do not integrate concepts of sustainability is a task that does not display the true effect the project has on its beneficiaries.

In order to do this, it is argued that a system of organizational accountability must be set into motion. A portion of this must happen through a cultural shift that recognizes organizations that implement projects with a lasting positive impact. There must be both expectations of standards and transparency from development workers, donors, as well as the implementing organizations themselves.

First the factors affecting the outcome of development projects will be discussed. Following this discussion, a framework for creating accountability in the WASH sector will be formed through the use of organizational standards and transparency.

THE PROJECT CYCLE

Biggs and Smith (2003) describe the project cycle as a series of phases that begins with identifying a problem, to planning and implementation, through project completion, and into the

assessment stage (**See Figure 2**). This cycle provides organization and insight into the structure of development activities while illuminating key objectives and issues. Thus in this thesis, "project" will include each stage of the project, from assessment through monitoring and evaluation. This is important to define, as factors of success will come from varying phases of the project cycle. It should also be noted that the project cycle might have slight variations depending on the organization (Biggs and Smith, 2003). An adapted version of Biggs and Smith's (2003) project cycle is outlined below.

Programming/Strategy

At this stage a broad range of problems within an area are established. The needs of a region or sector are identified, and objectives are formed. These objectives will ultimately be met through the implementation stage of the project.

Identification

A particular population is identified, on the basis of the needs identified in the previous stage. Requirements to address these needs are determined, and potential beneficiaries may be consulted. Many forces may contribute to the conclusions reached within the "identification phase" of a project. Some of these forces are pressures created by political, religious, or ethnic groups.

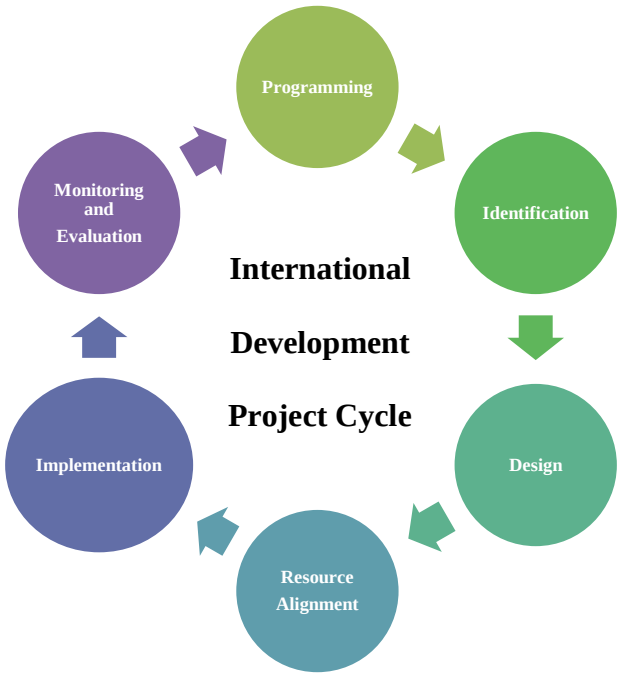

Figure 3: The Project Cycle adapted from Biggs and Smith (2003)

Design

Project ideas formed during the identification phase are now manifested into specific goals and methods that take into account criteria such as topography, social stratification, environmental impact, and longevity of implemented technology.

Resource Alignment

Project support is gained by reaching out to different political, financial, and partner organizations. Each of these stakeholders have their own visions, thus, the project design may need to be tailored to fit their standards and negotiated in order to appease their objectives.

Implementation

The final design and resources are used to implement the project. Unknown circumstances may arise causing shifts in the original plan, but the ability to adapt to these changes will allow for the project to see fruition.

Monitoring and Evaluation

The project should be evaluated based on the effect it has on the target community as well as its ability to address the identified needs of the community. Monitoring and evaluation is a way to measure these impacts as well as to find ways to improve both project and organizational processes of implementation. This phase may also include a long term assessment of the implemented technology that evaluates longevity as well as the impact it has on both society and the environment.

Project Failure

Anecdotal Story: Adverse Effects

A project that does not function in the long term, is not only a failure, but it may also be a threat to the society in which it is implemented. Each stakeholder has a duty to understand the implications of the project failing, in both the long and short term. There are health, and social consequences to failed projects that must be understood. All too often organizations avoid admitting failure, and in doing this they ignore the consequences of their failure. While the planners and implementers from these development organizations- with kindness and compassion and a sense of accomplishment- return home to their families, most of the time safe

in the developed world, the struggle of the developing world continues. These organizations instill hope and confidence in these communities, yet the unintended adverse effects of project failure can be far more brutal than development workers are willing to admit.

Ned Breslin, lived in Africa and worked on water and sanitation projects for 20 years, he came back to Denver, CO, and now works as CEO of Water for People, an organization whose mission it is for everyone, everywhere, to have access to clean water, forever (WFP). At a 2010 conference, Breslin gave a lecture titled "Fixing the water crisis" in which he relayed the following message (Breslin, 2010):

"…$25 saves a life, go up to congress and get more foreign aid because we got to do something about it and we do, and money matters. You turn the page and there is a whole new reality, kids are drinking water, kids are happy, they're lapping the water, it's good. The non-profits, the NGOs, the United Nation's development agencies will then tell you that everything is good. Here is a picture of a girl, drinking water. Here is a report. Here are receipts showing that we spent the money well. That's transparency. Now give us more money we need to move on. We got more things to do, more people to help. Let's go, let's go, let's go. But what happens, when we leave? What happens, when that system has to run for a while? Are the children still smiling? Are the girls back in school? Is water flowing?..."

He then transitions in to a story of Maria's son Adamu, who was born in rural Mozambique after a group had already implemented a clean water project. He was a lucky one. From the time his mother weaned him off of breast milk he had clean water to drink, and because

of this, Adamu thrived. One day Ned got a call saying that Adamu was sick and they needed his help to get Adamu to a hospital because the local clinic couldn't help him.

"…I'm driving down the road in rural Mozambique, and I am hitting it hard. I am in a Nissan pick-up truck. It's beaten up; I can't push it much harder. I am sweating, it is hot. I am holding the wheel tightly..."

"*That water point [had] broke, that donor and NGO long gone, and Adamu's family had to go back into the rivers that they thought they had long since abandoned. Adamu tasted that water, his body couldn't cope, he had never had those pathogens in his body, and his life was running away."*

Adamu's life left him before Ned Breslin ever reached the clinic.

The recipients of development projects are not just beneficiaries, to call them such is an over simplification. It lumps the people of entire villages and regions into a single term. In reality the beneficiary is a brother. They are the women who have seen war and have fought disease. They are the children who walk hours each day to collect water, just so their family can drink. They are people with hopes and dreams and aspirations. The beneficiary is Maria. It is her son Adamu, whose body hadn't built the resistance needed to fight off the river's pathogens.

When the water sourcefails, it affects the lives of many people. When projects don't continue to work, and disease returns to the bodies of these people, sometimes they can fight it, sometimes they can't.

Ned continues to talk

"Africa, Asia, and Latin America are littered with broken technology, broken dreams, broken promises. We have got to turn this around…. You change the world by saying; is the

water that you put in 10 years ago still running? And if you don't know, you are not a serious organization; because it means what you are possibly doing is you are replicating failure. You are scaling failure."

Factors of Project Success

Factors of project success recognize the variables that affect the value, longevity, and completion of any given project. Within each phase of the project there are factors that should be taken into account in order to increase the positive impact of any given WASH project. These factors address everything from communication and technical competencies to team moral.

Success Factors in Phases

Khang and Moe (2008) separate the success of a project into two parts; project management success, and project success and use the LFA to organize these criteria. This separation allows for an evaluation of both the success at each phase of the project cycle and the success of the overall project by evaluating the quality of end-products and achievements. Since each phase of the cycle is an input to the successive phase (Biggs & Smith, 2003), it is imperative that each level of development takes into account the critical success factors that may inhibit the success of the project. The following is a discussion and summary of the criteria that affect project success at each phase of the project cycle as identified in the literature.

Factors of Success: Programming and Identification

Khang and Moe's (2008) research showed that the conceptualizing phase of an ID project is successful if the following criteria are met:

- Target beneficiaries have been identified and their relevant needs have been assessed to match the development priorities of the donors;
- Appropriate implementing agencies have been identified and notified that are capable and willing to carry out the purposed project; and
- Initial awareness and support of all key parties concerned have been adequately raised in order to ensure project enters the planning phase.

When identifying the needs of a region, many factors should be taken into account. One must understand the "historical, political, social, economic and environmental contexts of a given community, country or region" (Keene, 2007). It is important to not only know that a quarter of Ugandans, or equivalently 8.8 million people, lack access to safe drinking water (WATERAID), but it is also important to take into account the historical and political context in which this fact lies, as the cultural norms, as well as laws and regulations of the governing party in the region may have a major effect on the outcome of project design and sustainable implementation.

Knowledge about these factors allows stakeholders to make informed decisions about what types of problems a region has, as well as whether or not a project is feasible. When the project is evaluated in this broader context, decision makers may be able to avoid future complications by making more informed decisions. Taking these complex issues into account from the beginning will open the doors to better communication and allow for more efficient planning as well as resource alignment. Knowing how customs in terms of festivals, funerals,

and weddings affect community productivity as well as calendars can completely change the project outcome (McConville, 2006).

Equity must be a prerequisite of the initiation of any project (Harvey & Reed, 2004). Since ingrained in the concept of sustainability is the idea that all community members have access to both water and sanitation it is important to address the poor and underrepresented. One way to promote equity is to ensure that women and minorities hold key positions on committees that make decisions within the community (Pless & Appel, 2012).

Even where these issues will not lead to failure, often times addressing them will result in a more productive, efficient implementation more readily accepted by the community as a whole. When these issues aren't addressed they compound into other phases of the project, creating weak spots, resulting in pitfalls, higher costs to the stakeholders, and technologies that are not accepted, understood or used by the beneficiaries, or miscommunication that could easily affect the ability to complete the project within time and budget constraints.

Factors of Success: Design

The objective of this phase is to design a project that meets the needs and cultural requirements of the beneficiaries in the long term. Projects often fail due to aspects of the project that happen in early stages of development including selecting the participant, timing, choice of infrastructure, as well as how issues such as gender and community training are handled (Barnes and Ahsbolt, 2010). If the proposed technology or program is not accepted by the community at large, it implies that it will not be used, and thus will fail. According to the participatory approach, in order for the project to be socially sustainable, the community must be

empowered to make their own decisions. Local knowledge and participation is an important factor in success (Kang & Moe, 2008), because when it utilized, it is more likely that the beneficiary will adapt and accept the project being implemented. Meanwhile the donor and implementing organization's role is to facilitate and consult the community using the knowledge, expertise, and experience already learned through other projects both internally and externally. Importantly to success in all phases of the project, time should be set aside for building of relationships, creating trust, and ensuring clear and concise communication; (Barnes & Ashbolt, 2010, Diallo &Thuillier, 2005).

Although social and institutional problems were consistently mentioned as a project issue, in a series of 30 interviews with implementers from varied regions Barnes et al (2014), reported that the main reason given for project failure is poor technology choice. Thus, it should be noted that community involvement does not mean foregoing technical competencies to appease the donor or the beneficiary, but instead ensuring that the community's interests, beliefs, and traditions are acknowledged and taken into account. This means that proper training programs must be implemented when necessary.

Designing needs to produce not just the construction plans, but also the associated training programs as well as maintenance, monitoring, and evaluation of the project, as these factors will be especially important when aligning resources for the project. Although the components and benefits of monitoring and evaluation (M&E) will be further emphasized, it is noted here that the integration of an M&E system is essential to understanding the impact of a project, and thus must be part of the project plan (Harvey & Reed, 2004).

A successful project is not just about designing and installing a well in Africa, for example, it is about that well working for the community for the foreseeable future from the day implemented. It is about empowering the people to have the ability to maintain, repair, expand and even replace the broken technology. It is time to break the cycle of organizations building a new hand-pump next to the one that failed and was abandoned. This behavior is not sustainable in any sense of the word. At best such actions might be considered "emergency relief" only. At worst they are actions that create a sense of worthlessness within the community of beneficiaries.

Factors of Success: Resource Alignment

There are many resources that are needed for any given project. These resources include, but are not limited to money, engineers, project managers, construction workers, materials, and tools. They include the time and money used for training and education programs. This phase also includes gaining the support of the local government, the community, as well as the donors.

One pitfall in the resource alignment phase of the project is only assigning costs to the initial implementation of the project, while failing to take into account project longevity as a factor in fulfilling a successful project. The associated story of Ned Breslin's experience in rural Mozambique is an example of just this; an organization implementing a project without following through on the associated maintenance of the project. WASHCost (2012) defines the Life-Cycle Cost Approach (LCCA) as a way to generate awareness on the true costs associated with WASH programs. According to this approach, project costs include not only construction and maintenance of infrastructure, but also must take into account the needed "hardware and software, operation and maintenance, capital maintenance, the cost of capital, source protection,

and the need for direct and indirect support (e.g. training planning and institutional pro-poor support)." LCCA also accounts for the longevity of the project by including replacement costs as well as the cost of expansion due to increases in demand. By including this in the cost, the longevity of the project will be sustained, allowing for the project to provide the ongoing services to the beneficiaries.

Another alignment is the implementing team itself. The selection of a competent group of people (whether volunteers or hired), that are dedicated and passionate is crucial to the project (Khan et al, 2003). The importance of the type of people involved in the project cannot be over stated. The development workers recruited to work on the project by the implementing agency should have skills high in merit, commitment, and integrity (Barnes & Ashbolt, 2010). In the literature produced by Diallo and Thuillier (2005), they mention trust and communication as critical success factors. Although essential in other phases of the project cycle, in the resource alignment phase it is absolutely crucial. Expectations must be clear, motivations and intentions must be understood, and of course, there must be enough resources to both implement and sustain the project. Trust and communication directly affect project management, attitude of implementing personnel, senior managers' understanding of the project, and alignment of clients (Ika, 2011).

Another factor that may contribute to success is community buy-in or ownership. Some organizations have found that in order for the project to be sustainable in the long-term, the community must have a stake in the project (Water For People). Many times organizations consider community labor used during the implementation phase a form of investment in the

community, while other organizations have found that there must be a monetary value placed on the project in order for it to be successful (Gram Vikas). In the resource alignment phase of the project, these expectations and agreements will be made with the community and its leaders. Sometimes this investment comes in the form of tariffs, while other times the beneficiary pays a portion of the direct cost. Ideally, this investment or community buy-in assures the beneficiary commitment to the project.

Factors of Success: Implementation

When all other phases of the project are efficiently set into motion, then the stakeholders are ready to move on to the implementation phase. As any infrastructure project, there may be fluctuations in the expected timeline due to unforeseen circumstances; thus, flexibility is pertinent to the implementation phase (Aune, J., 2000, Khan et al, 2003). While the framework built in the design and planning stages gives structure and expectations to a project, flexibility coupled with strong project management (Vickland and Niusdfsdf, 2005), are critical to rebounding from unexpected events and scenarios.

The project engineers should have skills and expertise needed to properly implement the technology (Mihelcic, 2009). These technicians should have strong communication skills and the ability to adapt to changes in the project. Training is another important aspect of success, and should be done by people who are highly skilled at educating people, as well as communicating and conveying knowledge.

Factors of Success: Monitoring and Evaluation

A strong monitoring and evaluation plan can be utilized to know the state of the project both initially and long after implementation. This phase enables organizational learning, ensures high performance through informed management decisions, and increased transparency by way of documentation and communication (Crawford and Bryce, 2003). The monitoring and evaluation of any project keeps track of whether or not the needs of the beneficiary are being met. Through surveys and other forms of evaluation the community's perception of the project can be assessed. It can also give insight as to whether or not the technology and infrastructure is still being used and if not to assess why. It is essential in figuring out what the pitfalls are in any given project (Cotton et al, 2013). Monitoring is the tool for ensuring the longevity of a project including but not limited to beneficiary financial, maintenance, expansion, replacement and even through monitoring of pipe flows, and the use of wells.

Since the mission of each of these organizations is to provide long term access to water and sanitation hygiene, if these needs have not been met, the project should not be deemed a success. Monitoring and evaluation is a way to hold organizations accountable for the work they have done, while allowing project implementation to become more effective and efficient.

Project Approaches

In response to project failures, there has been an influx of different approaches to international development project planning. Approaches are described below.

Logical Framework Approach (LFA)

The LFA has been used since the 1970s to both develop the goals, visions, and objectives of a project as well as to measure its value. The LFA is implemented through the use of a logframe (LF) which is comprised of a four-column, four-line matrix, that defines the why's, what's, and how's of the project being undertaken (Couillard et al., 2009). This framework has a seven-step procedure used to identify the necessary project components and is usually used in conjunction with a project planning matrix (Aune, 2000). While the LFA is, for the most part, adequate at organizing design plans and ensuring that all critical factors have been taken into account, it is missing the social element of the project.

Participatory Rural Appraisal

As a response to human interactions not bearing enough weight on project planning, the participatory approach, or participatory rural appraisal was proposed. This framework addresses the issues associated with the overall longevity of a project. It is clear that although the project may be deemed a success upon completion, many times these positive results are not sustained or sustainable. In many cases, the collapse of a project has to do with lack of maintenance and or use or lack of beneficiary funding for the future, which may be related to the beneficiary's sense of ownership (Aune, J. 2000). Organizations design and implement a project according to their own standards, beliefs, and social norms. Donors fund the project, the beneficiaries haven't been placed in a position in which they take ownership of the project, thus the project fails as soon as the implementing organization leaves. The Participatory Rural Appraisal (PRA) attempts to address these issues. PRA focuses on local empowerment, local knowledge, and problem

solving at a local level (Aune, J., 2000). The way one veteran of development, Barlett (2007), puts it ; *"stop planning for people, and let people plan for themselves"*. Although the PRA system addresses many social and empowerment issues, its lack of structure can cause poor planning.

Combined Approach

While many researchers believe that the LFA and PRA are opposing approaches, Aune (2000), proposes that by combining them, the weaknesses and shortcomings of each can be significantly diminished. In his paper, he recommends that the LFA be used to organize the information, and create structure for the planning process. While the LFA assists in ensuring that all appropriate factors are considered, it should also be used in a flexible manner. In the combined model, the PRA can be used to ensure that minorities and underrepresented factions of a community are heard, and that the ultimate decisions come from the beneficiaries rather than the implementing organizations and donors. Rather than opposing each other, it is recommended by Aune that these models be used in parallel, allowing each to benefit from the other.

Sector-Wide Approach (SWAp)

With the Sector-Wide Approach, the donor allocates funds to the government within a developing country with the purpose of improving WASH facilities and programs. The government then allocates this money to local government entities whose responsibility it is to disburse money for WASH programs in that region. One advantage to this approach is that it allows the local governing body to identify the needs of its community, and initiate programs

intended to last for an extended period of time. For this approach to work there must be a way to hold the governing bodies accountable (Harvey & Reed, 2004).

A CALL FOR ORGANIZATIONAL ACCOUNTABILITY

In the United States, the Environmental Protection Agency (EPA) sets air quality limits, minimum requirements for water quality, wastewater treatment, and solid and hazardous waste management. It is the environmental engineer's job to meet these standards while staying within specific budget and time constraints. The engineer is also expected to design these services to last over an extended period of time. With infrastructure projects the population of a community is projected out 15-20 years to account for increases in growth (Gould, 2012); the project is then designed to meet this population projection. The engineer is held accountable by professional engineer (PE) standards, and if a failure is caused via design errors, the PE is held responsible. The cost of failure can mean the loss of license, career, or even imprisonment. This accountability is what dictates the standards of bridges, roads, water and wastewater treatment facilities; these standards keep millions of people safe each and every day.

In many underdeveloped and developing countries, usually no governing body has the ability to set these limits or standards, nor do they have the resources to enforce them. Most WASH sector-related standards for water quality are recommended by entities such as the World Health Organization, but these entities don't have the jurisdiction to enforce the restrictions. This leaves a gap in the system, as organizations may go into foreign countries and implement projects that don't meet any specific requirements, especially sustainability.

As a result of this gap, organizations and people without the resources, qualifications and competencies necessary to complete projects in a sustainable fashion enter the field. When failure is the result, there are little to no consequences, except the negative impact that it has had

on the “beneficiaries.” Adverse effects of failed projects are real and must be considered by anyone working or volunteering with the field of ID.

As many times there are no local standards, laws or requirements for WASH programs, engineering firms, donors and developed world stakeholders are the only parties that can enforce responsibility and only upon themselves. These developed world stakeholders must create a new paradigm which embraces a “we do it right, or we don't do it” attitude. They should look to every project being sustainable as a requirement of success. This requires long term commitment, monitoring, beneficiary ownership, and monitoring in any project. These developed world stakeholders must create feedback and reporting systems for success and failure. In a way, they must initiate a type of “continuous improvement” cycle, hopefully one that not only reports but publishes successes and failures for the benefit of their own future projects as well as others'.

ORGANIZATIONAL OBJECTIVES AND TRANPARENCY

Now that factors affecting the outcome of the project have been discussed, the following is a proposition of WASH standards that should become the expectation rather than the exception within the development sector.

Outcome Checklist

Table 3 is a framework for addressing the variables that affect project outcome based on the “Outcome in Phases” section of this paper. By creating minimum standards for each of these variables, and ensuring that they are both accepted and recognized by the WASH industry, it is possible to create expectations from organizations that produce projects with an increased value to the beneficiary while avoiding the adverse effects caused by project failure.

Carter et al (1999) outline the aims that organizations should have when implementing WASH facilities in developing countries. These aims address impacts in terms of quality, capacity, environment, cost, as well as society.

Table 3: Aims and Objectives for WASH projects adapted from Carter et al 1999

Summary of Overall Project and Program Aims:
▪ Bring health improvements, privacy in defecation and reductions in time and effort spent in water hauling to the entire community ▪ Protect soil, surface water, and groundwater from fecal contamination ▪ Improve hygiene practices through appropriate means ▪ Achieve these goals through affordable capital and recurrent costs ▪ All goals should last into the foreseeable future
Specific Objectives in Relation to Impact:
▪ Implemented project is capable of providing a minimum of 20 liters per capita per day ▪ Time spent hauling water is reduced to a maximum of one person-hour per day ▪ Improvements in access to water-hauling technology ▪ Water quality target of 10 fecal coliforms per 100 ml at the point of use ▪ The water supply is fully functional at least 98% of the year (downtime of no more than 7 days per year) ▪ Implement a system of safe excreta disposal for the entire community (minimum: improved pit latrine) ▪ Bring methods of safe disposal of wastewater (minimum: a functioning soak pit) ▪ Achieve full adoption of adult good hygiene practices (Including hand-washing after defecation, before food preparation or consumption, care in the disposal of infant excreta, proper care of water storage containers, use of drying racks for crockery) ▪ Implement a project that achieves equity in all aspects ▪ Decrease soil, surface water and groundwater contamination from human excreta ▪ Supply these services at a per capita cost of no more than £20 ▪ Supply these services at a per capita recurrent cost of no more than £2 per year

Some of these requirements and objectives were offered by Carter et al (1999) more than 15 years ago, and are no longer in compliance with the requirements proposed by current research. WHO and UNICEF created the Joint Monitoring Program (JPM) with the objective of accelerating progress towards sustainable universal access to water and sanitation facilities (JMP, 2010). Due to the differences in the definition of "improved facilities" across different countries and regions; the JMP has established a base-line used to analyze country datasets (UNICEF-WHO, 2013). The following is a proposition for what the minimum standards that should be adopted for the delivery of WASH projects in rural communities in developing countries. It should be noted that some developing countries do have their own standards for such

infrastructure and where this is applicable their minimum standards should be used for development projects, where these standards are sustainable.

Sanitation Objectives

The JMP uses a diagram called the "sanitation ladder" to denote the level of access that people have to sanitation facilities. The ladder begins with "open defecation" and ends with "improved sanitation facilities". The definitions as defined by JMP are as follows:

- Open defecation: when human feces are disposed of in fields, forests, bushes, open bodies of water, beaches or other open spaces or disposed of with solid waste.
- Unimproved sanitation facilities: do not ensure hygienic separation of human excreta from human contact. Unimproved facilities include pit latrines without a slab or platform, hanging latrines and bucket latrines.
- Shared sanitation facilities: sanitation facilities of an otherwise acceptable type shared between two or more household. Only facilities that are not shared or not public are considered improved.
- Improved sanitation facilities: are likely to ensure hygienic separation of human excreta from human contact. They include:
    - Flush/pour flush to: piped sewer system, septic tank or pit latrine
    - Ventilated improved pit (VIP) latrine
    - Pit latrine with slab
    - Composting toilet

Open defecation causes contamination in soil, surface water, as well as groundwater. When humans come into contact with one of these contaminated environments the risk to health is great; it can lead to infections, diarrhea, malnutrition, and can ultimately lead to death especially in children under the age of five (Department for International Development (DFID), 2013). Household sanitation facilities provide many benefits when compared to "shared" facilities as they promote ownership which leads to increases in use, and substantial health benefits (Montgomery & Elimelech, 2007). The JMP's standards for "improved sanitation" will thus be used as the baseline for the minimum standard for implementation of sanitation facilities.

Sanitation facilities by themselves are not enough to decrease the spread of infectious diseases caused by the transmission of fecal contamination. Facilities such as pit latrines need to be designed and maintained in a way that ensures a reduction in vectors and odors. The inherent warmth, shelter and humidity that comes with the use of pit latrines creates an ideal environment for the breeding of mosquitoes, cockroaches and flies which can increase the transmission of vector-borne diseases such as lymphatic filariasis and diarrhea (DFID, 2013). Standard latrines have also been linked to groundwater contamination through highly concentrated nutrients and bacteria that leach through the soil and into the water. Standard latrines are thus not an acceptable technology as they cause adverse environmental and health effects in the long term. A technology that addresses these issues that is still cheaper than sewer systems is the ventilated improved pit latrines that feature ways for odors to escape, impede vectors from entering, and seals the pit to inhibit leaching of contaminants (Montgomery & Elimelech, 2007).

When sanitation facilities aren't maintained, people within the community begin to revert to open defecation, restarting disease cycles. Appropriate facilities must be coupled with marketing and education programs that promote continued use and maintenance of the facilities and services. Since a single member reverting to open defecation places the community as risk, for a sanitation project to be truly effective, each member of the community must adopt best-practices (Pless & Appel, 2012). Cultural limitations and sensitivities are crucial in ensuring lifetime adoption of sanitation best-practices. An example of this is found in India where people in rural India will not use latrines if they do not have access to water to clean themselves afterwards. This means that if sanitation projects are going to be implemented, it needs to be coupled with (direct) access to water, and proper hygiene education (Gram Vikas). Sanitation facilities must create a sense of privacy, security, and pride in using them. This means that they have to be well built, well maintained structures that are accepted by society. It should be noted that the GV model uses sanitation in every home and has been highly accepted, used and adapted by virtually every beneficiary, to the extent that girls now refuse to marry into a town that does not have sanitation and water in the home.

The cost of maintaining and implementing sanitary facilities must be affordable. According to WASHCost (2012) the capital and recurrent costs for different types of latrines are outlined in Table 4. The cost varies considerable depending on the chosen sanitation facility design as well as where you will be implementing it. The cost of recurrent expenditures should noted, as both capital and recurrent costs need to be planned for.

Table 4: Cost of Sanitation adapted from WASHCost (2012).

Cost Component	Implemented Latrine Type	Cost Ranges [min-max] US$ 2011 *Based on interquartile values from original data set
Total Capital Expenditure (per latrine)	Standard or traditional pit latrine with an impermeable slab	7-26
	Improved Facility; Pit latrine with concrete slab, VIP latrine	36-358
	Pour-Flush or Sepetic-Tank, concrete or brick-lined pit/tank with sealing impermeable slab, flushable pan included	92-358
Total Recurrent Expenditure (per person, per year) *see original source for break down of recurrent expenditure)	Standard or traditional pit latrine with an impermeable slab	1.5-4.0
	VIP latrines	2.5-8.5
	Pour-flush or septic latrines	3.5-11.5

As a conclusion the standards that integrate factors of sustainability for sanitation must include; sanitation facilities for each individual household, a choice in technology that is culturally sensitive, allows for privacy, is maintained, and decreases the environmental contamination due to excreta.

Water Supply Objectives

The JMP created a drinking-water ladder that displays the level of access a community has to clean water. This ladder begins with “surface water” and ends with “piped water on premises.” The definitions of each of these as defined by the JMP are as follows:

- Surface drinking-water sources: River, dam, lake, pond, stream, canal, irrigation channels.

- Unimproved drinking-water- sources: Unprotected dug well, unprotected spring, cart with tank/drum, surface water, bottled water.
- Other improved drinking-water sources: Public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs, rainwater collection.
- Piped water on premises: Piped household water connection located inside the user's dwelling, plot or yard.

Clean water is essential to the health and development of a community as it reduces the prevalence of waterborne, water-based, and water-related diseases and parasites that are known to cause adverse health effects (Montgomery & Elimelech, 2007). Like sanitation issues, these diseases and parasites can lead to sickness, malnutrition and even death (Gadgil, 1998). The issues discussed in the "Outcome in Phases" section of this paper included the choice of technology, social issues such as equity, willingness to pay, as well as monitoring and evaluation. All of these factors must be addressed in order to have a successful project that can be sustained over an extended period of time.

The chosen water-supply infrastructure must take certain criteria into account in order to maximize the benefit that it has on society. According to the JMPs new proposed standards for meeting the definition of a "basic drinking-water supply" the water collection must take less than 30 minutes round trip (WHO-UNICEF, 2013). This is also the standard set by WASHCost (2011) in their evaluation of water supplies. This restriction is proposed in order to limit the time spent collecting water, allowing members of society in which this burden normally falls to be able to spend their time on more productive tasks (Montgomery & Elimelech, 2007). However, it

should be noted that the GV model delivers sanitation to every home as well as water and has proven that increased affluence and ability accompanies the full acceptance and use and ownership created by this model.

Another issue with water-supply is the capacity and reliability of the service. The standards set by Carter et al (1999) listed in Table 5, is the water-supply's ability to provide at least 20 liters of water per person per day. This same requirement was also used by WASHCost (2011). This minimum will thus be used for in the framework for minimum standards that implementing organizations should adopt. Reliability is based on how many days per year the water supply is available for use. Carter uses 2%, or 7 days a year downtime for the implemented technology, while WASHCost uses a benchmark of 350 days, or downtime of 15 days a year.

In many countries there are water quality standards set, but for those that do not have any Carter et al (1999) will be used, at a standard of 10 fecal coli forms per 100 ml. Note that this standard just denotes one aspect of water quality. When working in regions at high risk of toxins (such as Bangladesh with Aresnic), techniques and monitoring should be specific to meet these needs.

The technology must also come at an affordable price. One failure of many organizations is their ability to finance the capital cost of infrastructure while ignoring the recurrent costs of operations and maintenance. After four years of collecting, analyzing and studying water and sanitation projects implemented in Burkina Faso, Ghana, Andhra Pradesh (India), and Mozambique, WASHCost (2012), found the yearly expenditures on basic maintenance can be a significant portion of the capital cost of the infrastructure itself. A breakdown of these findings

for water-supply is shown in Table 5. In order to both cover these costs and ensure a sense of ownership within the community, community-wide water tariffs are often implemented. The cost will be different for every project, but the life cycle cost must be taken into account, and there must be a plan in place accounting for both capital and recurring costs.

Table 5: Cost of Water Supply Technology adapted from WASHCost (2012).

Cost Component	Implemented Water Supply Infrastructure	Cost Ranges [min-max] in US$ 2011 *Based on interquartile values from original dataset
Total Capital Expenditure (per person)	Borehole and handpump	20-61
	Small schemes (less than 500 people) or medium sizes (500-5,000) including mechanized boreholes, single-town schemes, multi-town schemes and mixed piped supply	30-131
	Intermediate (5,001-15,000) or large size (>15,000)	20-152
Total Recurrent Expenditure (per person, per year) *See original source for recurrent cost breakdown	Borehole and handpump	3-6
	All piped schemes	3-15

Proposition of Minimum WASH Objectives

Table 6: Proposed minimum WASH implementation Objectives

Variable	Consideration	Proposed Minimum Sanitation Standard	Proposed Minimum Water-Supply Standard
Quality	-Does the project meet minimum country standards for "improved" facility? - Does the implemented infrastructure increase quality of life? - Is the service maintained in such a way that it promotes hygienic practices?	- Meets or exceeds country standards. When N/A the minimum of an improved pit latrine will be used. Cultural sensitivities will be taken into account when design is chosen. -Facility will promote privacy, and decrease the risk of illness through fecal contamination - Facility is cleaned and	-Meets or exceeds country standards. When N/A a maximum fecal coliform count of 10 per 100 ml will be met. All known regional pollutants will be assessed and a quality that promotes health will be reached.

		maintained regularly.	
Population Reached	- What percentage of the community has been reached? - Are the people who weren't reached part of a certain class, sect, religion, gender?	- 100% of community is reached through initiative.	- 100% of community has access to water supply.
Accessibility	- Do the beneficiaries use the implemented project or service? - Is it used for its intended purpose? - At what capacity has the implemented project fulfilled its purpose? (e.g. How many liters of water per capita/day? Are available) - How often is the selected technology working/running? - How long must the beneficiary walk or wait to use this facility?	- 100% of community uses facility. - For improved access each household must have access to their own sanitation facility. Where this is not possible, default on JMP's proposition of shared between no more than 5 households. - Open for use at all times except for maintenance and cleaning -Facility is within close walk of intended household(s)	- Each community member has access to a minimum of 20 liters of water per day. - Technology works 98% of the time (7 day per year down time). -Each member of community has to travel no more than 30 minutes round trip to collect water
Longevity	- How long after implementation will the project reliably work? - Are there systems in place for maintenance and operation? - Does the organization know whether or not said technology/service is still in service?	-Works for the foreseeable future. - Facilities are maintained for continued use. - Project facilitates training and costs associated with prolonged use -Implementing organization is in continuous contact with community to ensure prolonged use of facilities	- Works for the foreseeable future. - People within the community are trained and held accountable for the repair and maintenance of water-source - Project is monitored for a minimum of 10 years by organization.
Cost	- Has a life-cycle cost estimate for project been analyzed? - Are the beneficiaries willing and able to meet the cost of maintenance and	- Project takes into account capital and recurring cost and systems for collecting money for maintenance of facilities is in place - A system in place that ensures	Project takes into account capital and recurring cost and systems for collecting money for maintenance of facilities is in place - A system in place that

	operations? - Is the beneficiary dependent on an outside source to sustain the facility?	the community is not dependent on outside financial sources and promotes a sense of ownership	ensures the community is not dependent on outside financial sources and promotes a sense of ownership
Social Impact	- Does the implemented project create jobs within the community? - Does this project promote equity?	- When possible project will promote job creation. - Project will include gender /class/sect minorities in decision making capacities as to promote equality	- When possible project will promote job creation. - Project will include gender /class/sect minorities in decision making capacities as to promote equality
Environmental Impact	- Are there decreases in pollutants found in surrounding water sources and soil? -Does project create conditions that are a need for concern? -Is the technology depleting water sources at an unsustainable level?	-Sanitation facility is designed to ensure contaminants do not leach into water source or accessible soil. -Vector and odor reduction are taken into account in the design and implementation of project.	-Design doesn't cause pooling of water that increases vector quantities. - Water source is managed in a sustainable fashion.

The objectives proposed in Table 6 are just an example of the expectations that organizations should be held accountable for. The WASH industry within ID needs to decide on objectives that promote health, and economic growth in the long run, and these standards need to be increased with the ever changing capabilities of technology. Donors that want their money and resources to be used to promote clean water and sanitation initiatives must have a clear idea of what to look for when choosing organizations to fund. The WASH industry needs to create clear expectations that will promote sustainable projects.

Monitoring, Evaluation and Reporting

The literature surrounding WASH projects has made it clear that monitoring and evaluation play an essential role in ID projects. These mechanisms allow stakeholders to assess whether or not projects have achieved their set objectives, among these objectives longevity (Harvey & Reed, 2004). Monitoring and evaluation is the tool upon which organizations have the ability to learn and adapt to become more effective. In a paper that outlines the lessons learned by WaterAid, a well-known WASH organization, the value of monitoring and evaluation on organizational improvements is emphasized. The use of appropriate monitoring, evaluation and reporting can facilitate the changes needed to increase efficiencies in project delivery, correctly allocate limited resources, and thus more effectively implement WASH projects and programs (Cotton et al, 2013).

In order to facilitate a culture of organizational learning, that emphasizes adoption of practices that will more efficiently and effectively deliver projects, it is essential that monitoring, evaluation, and reporting become the norm. According to Harvey and Reed (2004), a pertinent reason that rural water supply projects are not sustained, is that the planning and implementing organizations are ignorant to the state of existing systems. By creating a system in which the organization is held accountable for knowing and reporting the state of the implemented project, massive increases in project longevity and effectiveness stand to be gained.

Monitoring, evaluation, and reporting are important aspects of organizational transparency, that can be used as tools for proving to stakeholders the success and sustainability of projects, thus leading to increases in funding and opportunities. In order for this transparency

to be accepted by the industry, there must be a culture that chooses to incentivize high value projects thus creating an organization shift towards sustainable practices. If other tactics such as threats of job security and financial resources are used, it may create a culture in which suppressing and changing results rather than "facing the consequences" is born (Harvey & Reed, 2004).

High WASH industry standards coupled with expectations that organizations monitor, evaluate, and report the projects that they have implemented are essential to the effectiveness of ID.

Case Study: Proof of Concept India's Gram Vikas

One of India's poorest regions is the state of Orissa (also known as Odisha, is located in the East of India on the Bay of Bengal), of which over 45% of its residents live in poverty. Orissa's population reaches above 40 million; 86% of whom live in rural areas. India historically has distinct socioeconomic, religious (caste system), and gender stratification that makes equity within development projects difficult. For decades both the Adivasi and Dalits, (considered "indigenous tribes" or "castes" respectively), have been denied social, educational, and economic opportunities. The result of this repression has led to villages that suffer from extreme poverty including lack of proper sewage and water distribution systems. Open defecation prevails and village ponds are used for bathing, clothes washing, and water for both drinking and cooking. These conditions lead to sickness and death (Pless & Appel, 2012).

Gram Vikas (GV) is a development organization based in India that was founded in the 1970's. It works in the state of Orissa, bringing opportunities to some of India's poorest people.

Since its inception it has built schools and houses, participated in disaster relief and agricultural projects, and in 2003 started an initiative called Movement and Action Network for the Transformation of Rural Areas, also known as MANTRA (Gram Vikas). Through MANTRA, GV is able to fulfill its goal of giving people the opportunity to live more dignified healthy lives by helping them gain access to drinking water distribution systems and sanitation facilities (Gram Vikas). GV has become a famous social enterprise as well as rural development organization whose model for implementing water and sanitation projects is an ideal example of how to navigate the difficult historical, cultural, social, and political barriers when implementing WASH projects.

When working with communities to install WASH facilities, GV has a 100% inclusion policy. GV will only undergo project implementation once each community member has agreed to contribute to the implementation of the project both actively and financially. Each family contributes approximately 60% of the cost of sanitation and 30% of the cost of a piped water supply system. GV believes that community level governance is a key to success, and thus a Village Executive Committee is elected to make decisions for the community. To ensure equity, the committee is 50% women, and equally represents all castes and socioeconomic classes proportionately (Gram Vikas Annual Report, 2012-2013).

When implementing WASH projects, GV ensures that a piped water supply reaches each household from a rechargeable source; there are three taps- one in the toilet, the bathing room, as well as the kitchen. Each household has their own sanitation facilities, with superstructures that ensure privacy. To make sure that the village ponds are not used for bathing, each household gets

their own bathing room. This reduced skin diseases as well as gynecological and reproductive health problems among women. Alongside facility implementation GV also considers hygiene education a pertinent component of the project. The organization places emphasis on environmental sanitation and hygiene issues.

According to a case study by Pless and Appel (2012), in which they reviewed GV and their 100% inclusion model; they are able to improve health, empower women, and bring opportunities to people that break the cycle of poverty. "*The case demonstrates how to create sustainable change at the local level through democratic, self-governing management systems* (Pless & Appel, 2012)."

Gram Vikas is proof that there are ways to sustainably provide services to the world's poorest people, while empowering them, and truly improving their quality of life. If more organizations built models that paralleled the standards of GV, massive societal gains stand to be realized.

CONCLUSION

It is known that where there is an increase in the use of WASH facilities and programs there are increases in health, decreases in child mortality, as well as an increased level of economic benefits that comes with productivity (Montgomery & Elemelech, 2007). Water and sanitation, hygiene projects have thus proven to be an important role in global development initiatives such as those set by the Millennium Development Goals (DFID, 2013).

This paper touched on the issues surrounding development. It pointed out that the intentions and motivations of government agencies when allocating foreign aid money are not always in the best interest of the so called beneficiary. The “dependency theory” which described the idea that international development through foreign aid projects creates a dichotomy whereby developing countries become dependent on the developed world, was able to create context for the participatory approach that rose with the idea of “community empowerment”. These issues gave insight as to the different perspective the world has on ID initiatives.

Through the literature it was found that factors contributing to project success include longevity, strong communication between stakeholders, community participation, appropriate choice of technology, as well as commitment and willingness from beneficiaries to maintain services. These factors play a role in whether or not a project will be successfully implemented with sustained benefits to the beneficiaries.

This thesis argues that with clear standards and expectations from the WASH sector, along with concise expectations of monitoring, evaluation and reporting there will be increases in

the effectiveness and value of WASH projects implemented in developing countries. Holding the implementing organizations accountable for project outcomes will require clear expectations for delivery standards as well as a solid foundation for reporting. This means expanding the definition of “transparency” to include reporting on finances and externalities as well as project sustainability.

Reliable reporting on such variables over extended periods of time requires a culture shift in the WASH community from all project stakeholders. It requires a widespread shift of attention to extended life projects, rather than the quantity of projects completed. When organizations are expected to work with communities for extended period of times, it incentivizes the organizations to build lasting relationships with the community members. Since trust and communication are important factors in projects development, this should in, in theory, increase the likelihood of a successful project.

Creating a culture within the WASH sector where openly reporting why and how things went wrong is standard practice; creating a culture where failing is okay - as long as there is a willingness to change and adapt organizational models and practices to facilitate the changes needed to promote projects of a higher value - will be beneficial to the whole industry. These requirements and expectations will allow donors to funnel their money towards organizations that exceed the minimum standards, and are willing to talk about how to facilitate the changes needed for success. It is time to find ways to facilitate a culture that asks not “how many people did you help?”, but instead asks “what quality of help did you provide?”

Taking into account equity, and ensuring that the project is designed in a way in which the beneficiary is in control of the decisions that need to be made promotes community empowerment. Ensuring that the project is empowering the community rather than making the community reliant on foreign entities, this is success.

Each person with a hand in development must realize the adverse effects - social, financial, and environmental- that failed projects can have on communities. With this in mind, the people working within development must promote, fund, and operate organizations with high competencies, credentials, and standards in order to facilitate a culture where organizations meet or exceed industry standards, create sustainability and are willing to change for the better. This means that donors must ask tough questions before committing to an organization. Sometimes truly making a difference means choosing not to support or participate in a project or organization. Supporting, participating in, and promoting organizations that may be, as Ned Breslin said it, “scaling failure”, is something that each worker, each engineer, each donor, each volunteer must learn to think and talk about.

In order to ensure that organizations are not scaling factor, this thesis argues that the WASH industry must integrate factors of sustainability into its projects. Success must be measured based on objectives that take into account social and environmental impacts, as well as economic costs and benefits. These must be measured relative to the beneficiary. In order to do this, expectations of transparency must expand to measure not only the financial obligations of the project, but also the social, environmental and economic impact of implemented projects. As

this becomes an expectation, a rule rather than an exception, there is an opportunity for a cultural of successful projects to prevail.

APPENDIX A

APPENDIX A: Human Development Index (HDI)

*All HDI data is taken directly from United Nations Development Programme, *Human Development Reports* (UNDP, 2013)

	Human Development Index
HDI rank	Value
VERY HIGH HUMAN DEVELOPMENT	
1 Norway	0.955
2 Australia	0.938
3 United States	0.937
4 Netherlands	0.921
5 Germany	0.920
6 New Zealand	0.919
7 Ireland	0.916
7 Sweden	0.916
9 Switzerland	0.913
10 Japan	0.912
11 Canada	0.911
12 Korea, Republic of	0.909
13 Hong Kong, China (SAR)	0.906
13 Iceland	0.906
15 Denmark	0.901
16 Israel	0.900
17 Belgium	0.897
18 Austria	0.895
18 Singapore	0.895
20 France	0.893
21 Finland	0.892
21 Slovenia	0.892
23 Spain	0.885
24 Liechtenstein	0.883
25 Italy	0.881
26 Luxembourg	0.875
26 United Kingdom	0.875
28 Czech Republic	0.873
29 Greece	0.860
30 Brunei Darussalam	0.855
31 Cyprus	0.848
32 Malta	0.847
33 Andorra	0.846
33 Estonia	0.846
35 Slovakia	0.840
36 Qatar	0.834
37 Hungary	0.831
38 Barbados	0.825
39 Poland	0.821
40 Chile	0.819
41 Lithuania	0.818
41 United Arab Emirates	0.818
43 Portugal	0.816
44 Latvia	0.814
45 Argentina	0.811
46 Seychelles	0.806
47 Croatia	0.805
HIGH HUMAN DEVELOPMENT	
48 Bahrain	0.796
49 Bahamas	0.794
50 Belarus	0.793
51 Uruguay	0.792
52 Montenegro	0.791
52 Palau	0.791
54 Kuwait	0.790
55 Russian Federation	0.788
56 Romania	0.786
57 Bulgaria	0.782
57 Saudi Arabia	0.782
59 Cuba	0.780
59 Panama	0.780
61 Mexico	0.775

HDI rank		Human Development Index (HDI) Value
62	Costa Rica	0.773
63	Grenada	0.770
64	Libya	0.769
64	Malaysia	0.769
64	Serbia	0.769
67	Antigua and Barbuda	0.760
67	Trinidad and Tobago	0.760
69	Kazakhstan	0.754
70	Albania	0.749
71	Venezuela, Bolivarian Republic of	0.748
72	Dominica	0.745
72	Georgia	0.745
72	Lebanon	0.745
72	Saint Kitts and Nevis	0.745
76	Iran, Islamic Republic of	0.742
77	Peru	0.741
78	The former Yugoslav Republic of Macedonia	0.740
78	Ukraine	0.740
80	Mauritius	0.737
81	Bosnia and Herzegovina	0.735
82	Azerbaijan	0.734
83	Saint Vincent and the Grenadines	0.733
84	Oman	0.731
85	Brazil	0.730
85	Jamaica	0.730
87	Armenia	0.729
88	Saint Lucia	0.725
89	Ecuador	0.724
90	Turkey	0.722
91	Colombia	0.719
92	Sri Lanka	0.715
93	Algeria	0.713
94	Tunisia	0.712
MEDIUM HUMAN DEVELOPMENT		
95	Tonga	0.710
96	Belize	0.702
96	Dominican Republic	0.702
96	Fiji	0.702
96	Samoa	0.702
100	Jordan	0.700
101	China	0.699
102	Turkmenistan	0.698
103	Thailand	0.690
104	Maldives	0.688
105	Suriname	0.684
106	Gabon	0.683
107	El Salvador	0.680
108	Bolivia, Plurinational State of	0.675
108	Mongolia	0.675
110	Palestine, State of	0.670
111	Paraguay	0.669
112	Egypt	0.662
113	Moldova, Republic of	0.660
114	Philippines	0.654
114	Uzbekistan	0.654
116	Syrian Arab Republic	0.648
117	Micronesia, Federated States of	0.645
118	Guyana	0.636
119	Botswana	0.634
120	Honduras	0.632
121	Indonesia	0.629
121	Kiribati	0.629
121	South Africa	0.629

HDI rank	Human Development Index (HDI) Value
124 Vanuatu	0.626
125 Kyrgyzstan	0.622
125 Tajikistan	0.622
127 Viet Nam	0.617
128 Namibia	0.608
129 Nicaragua	0.599
130 Morocco	0.591
131 Iraq	0.590
132 Cape Verde	0.586
133 Guatemala	0.581
134 Timor-Leste	0.576
135 Ghana	0.558
136 Equatorial Guinea	0.554
136 India	0.554
138 Cambodia	0.543
138 Lao People's Democratic Republic	0.543
140 Bhutan	0.538
141 Swaziland	0.536
LOW HUMAN DEVELOPMENT	
142 Congo	0.534
143 Solomon Islands	0.530
144 Sao Tome and Principe	0.525
145 Kenya	0.519
146 Bangladesh	0.515
146 Pakistan	0.515
148 Angola	0.508
149 Myanmar	0.498
150 Cameroon	0.495
151 Madagascar	0.483
152 Tanzania, United Republic of	0.476
153 Nigeria	0.471
154 Senegal	0.470
155 Mauritania	0.467
156 Papua New Guinea	0.466
157 Nepal	0.463
158 Lesotho	0.461
159 Togo	0.459
160 Yemen	0.458
161 Haiti	0.456
161 Uganda	0.456
163 Zambia	0.448
164 Djibouti	0.445
165 Gambia	0.439
166 Benin	0.436
167 Rwanda	0.434
168 Côte d'Ivoire	0.432
169 Comoros	0.429
170 Malawi	0.418
171 Sudan	0.414
172 Zimbabwe	0.397
173 Ethiopia	0.396
174 Liberia	0.388
175 Afghanistan	0.374
176 Guinea-Bissau	0.364
177 Sierra Leone	0.359
178 Burundi	0.355
178 Guinea	0.355
180 Central African Republic	0.352
181 Eritrea	0.351
182 Mali	0.344
183 Burkina Faso	0.343
184 Chad	0.340
185 Mozambique	0.327
186 Congo, Democratic Republic of the	0.304
186 Niger	0.304

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