

**CRANFIELD UNIVERSITY**

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**Towards a Comprehensive Understanding of the Impacts of the  
BioSand Water Filter on the Quality of Life for Post-War Rural  
Liberians.**

**School of Applied Sciences**

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## **ABSTRACT**

Numerous forms of low-technology development interventions have been introduced and implemented in an effort to alleviate the cycle of poverty. Nowhere is this truer than in the water, sanitation and hygiene (WASH) sector, where countless technologies with the sole purpose of improving the quality of water for countries, communities and individuals have been invented and implemented. The technology is often effective in its purpose; however, this thesis will demonstrate how the context of the implementation can influence its impacts, resulting in intended and unintended development results. The aim of this thesis is to achieve a comprehensive understanding of the impacts that a key technology such as the BioSand water filter can have on the quality of life of people in post-war rural Liberia. A logical framework of the research was formulated in chapter one and adjusted to the research in chapter seven.

Aspects of quality of life (QoL) indicators and measurements in post-war Liberia, challenges of post-war development and a low-technology WASH intervention, and the BioSand water filter (BSF) were investigated. Data was collected through observational studies over a six year period and through questionnaire and interview surveys of local people, key informants and the INGO community of Liberia. The BSF was used as a lens, as a demonstration of a type of development technology that has the potential to impact the QoL of its beneficiaries.

The results ranged from finding unique QoL indicators that were not expected to elucidating the deep-seated psychosocial influences that a post-war context has on a population. Aspects of ownership, the sense of belonging and the desire to re-establish their lives proved to be the primary motivators that the research revealed – contrary to the intended health impact of the BSF. Coupled with these factors were the entrenched traditional beliefs that Liberians all share and which influence the implementation and impact of a project.

From these findings, recommendations for INGOs in areas of pre-intervention QoL surveys and preliminary psychosocial community and individual assessments of conflict experiences have been noted. The most important recommendation for INGOs being to increase the time they spend and deepen their relationships with beneficiaries. This will increase the likelihood of a development intervention having the intended positive effects on the lives of those who have endured the pain of war.

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## List of Abbreviations and Acronyms

<b>ADB</b>	African Development Bank
<b>BSF</b>	BioSand water filter
<b>CRS</b>	Catholic Relief Services
<b>HDI</b>	Human Development Index
<b>HIPC</b>	Heavily indebted poor countries
<b>HWT</b>	Household water treatment
<b>HWTS</b>	Household water treatment and storage
<b>IASC</b>	Inter-Agency Standing Committee
<b>GDP</b>	Gross Domestic Product
<b>GNP</b>	Gross National Product
<b>GOL</b>	Government of Liberia
<b>MDRI</b>	Multilateral Debt Relief Initiative
<b>NPFL</b>	National Patriotic Front of Liberia
<b>NTGL</b>	National Transitional Government of Liberia
<b>IMF</b>	International Monetary Fund
<b>INGO</b>	International non-governmental organization
<b>ODC</b>	Overseas Development Council
<b>PQLI</b>	Physical quality of life index
<b>QoL</b>	Quality of life
<b>SDI</b>	Social development index
<b>SODIS</b>	Solar disinfection
<b>SP</b>	Samaritan's Purse International Relief
<b>TI</b>	Transparency International
<b>UN</b>	United Nations
<b>UNDP</b>	United Nations Development Program
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organization
<b>UNICEF</b>	United Nations International Children's Fund
<b>US</b>	United States
<b>USAID</b>	United States Agency for International Development
<b>WASH</b>	Water, sanitation and health/hygiene
<b>WHO</b>	World Health Organization
<b>WHOQOL</b>	World Health Organization quality of life

## **1.0 INTRODUCTION**

Approximately 1.1 billion people worldwide lack access to safe water and water sources, with approximately 2.2 million of these dying every year from waterborne illnesses (JMP, 2010). In Sub-Saharan Africa alone, 42% of the population lack access to safe water, with obstacles of conflict and political instability hindering improvement (The Millennium Development Goals Report, 2005). Consequently, water interventions face barriers to implementation and, as a consequence, people go without access to safe water.

Implementing any WASH (water, sanitation and hygiene) project can be difficult, but undertaking one in a post conflict setting is even harder. Although, in the last three decades, the international community has responded by tackling the issue of safe water access through water campaigns and by providing resources, it has not been able to address the best way to implement water interventions in a post-conflict environment. International non-government organizations (INGOs) are continuously challenged in these demanding situations as they try to implement in complex humanitarian emergencies such as post war. Safety, security, psychosocial trauma among their beneficiaries and the destruction of infrastructure are just some of the obstacles that INGO practitioners face on a daily basis working in the field. But in the shadow of conflict there are victims who are in need of the basic human rights of clean water, shelter, food and an improved quality of life. The burden of waterborne disease, coupled with the devastation of war, can hinder the development of a country and affect the quality of life for its citizens.

Contaminated water jeopardizes both the physical and social health of all people (Annan, 2002). Waterborne diseases account for 7% of the burden of disease in developing countries (Lvovsky, 2001). The health of individuals impacts all of society. Cole and Neumayer (2006) state that diarrhoeal disease caused by contaminated water, even when it is non-fatal, as in the majority of cases with adolescents and adults, usually means that the affected individuals are rendered unproductive because they cannot attend either school or work. Contaminated water is a serious issue in developing countries; for developing countries recovering from war, it can be devastating when coupled with the lack of functioning health services due to the war. The Stockholm International Water Institute (2005), states that a

0.3% increase in household access to safe water is associated with 1% increase in GDP. Socially, access to clean water can assist in alleviating poverty because healthier children are able to go to school and develop socially (WHO/UNICEF, 2005). Access to clean water in the home keeps more girls in school and educated girls have better nourished children (Lenton et al., 2005). Furthermore, access to safe drinking water is a basic human right and essential for achieving gender equality, sustainable development and poverty alleviation – all which assist in building social capital (UNESCO, Interagency Task Force on Gender and Water, 2004). All these examples indicate that access to clean, safe water is critical to a country’s success economically, physically and socially.

Liberia, West Africa is an example of a country suffering from lack of safe water and devastated by a civil war that lasted 14 years. In Liberia’s post-war environment only 55.8% of rural populations have access to clean water (White Paper, 2008) and UNICEF states that this number is closer to 51% (2008). Therefore, waterborne diseases are common. There is little to no available health care. Crippled by the devastation wrought by the war and a lack of safe water, Liberians suffer emotionally, economically and physically. Liberia is one of the lowest-ranked nations on the Human Development Index, at 139<sup>th</sup> out of 180 countries (Human Development Report, 2009). Quality of life (QoL), particularly for rural Liberians, is low; much of this is related to waterborne illness which, at any one time, affects six out of every ten Liberians (Impact Assessment, 2010),<sup>1</sup> and the effects of the war.

### 1.1 Logical Framework

Development interventions are often seen as a series of steps linking a problem with the intervention inputs and thereby to the intended intervention result (Garandeanu, 2009). This is illustrated in the figure below taken from Garandeanu (2009):

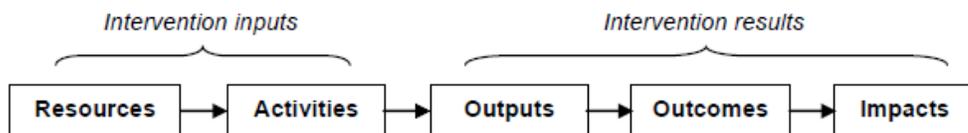
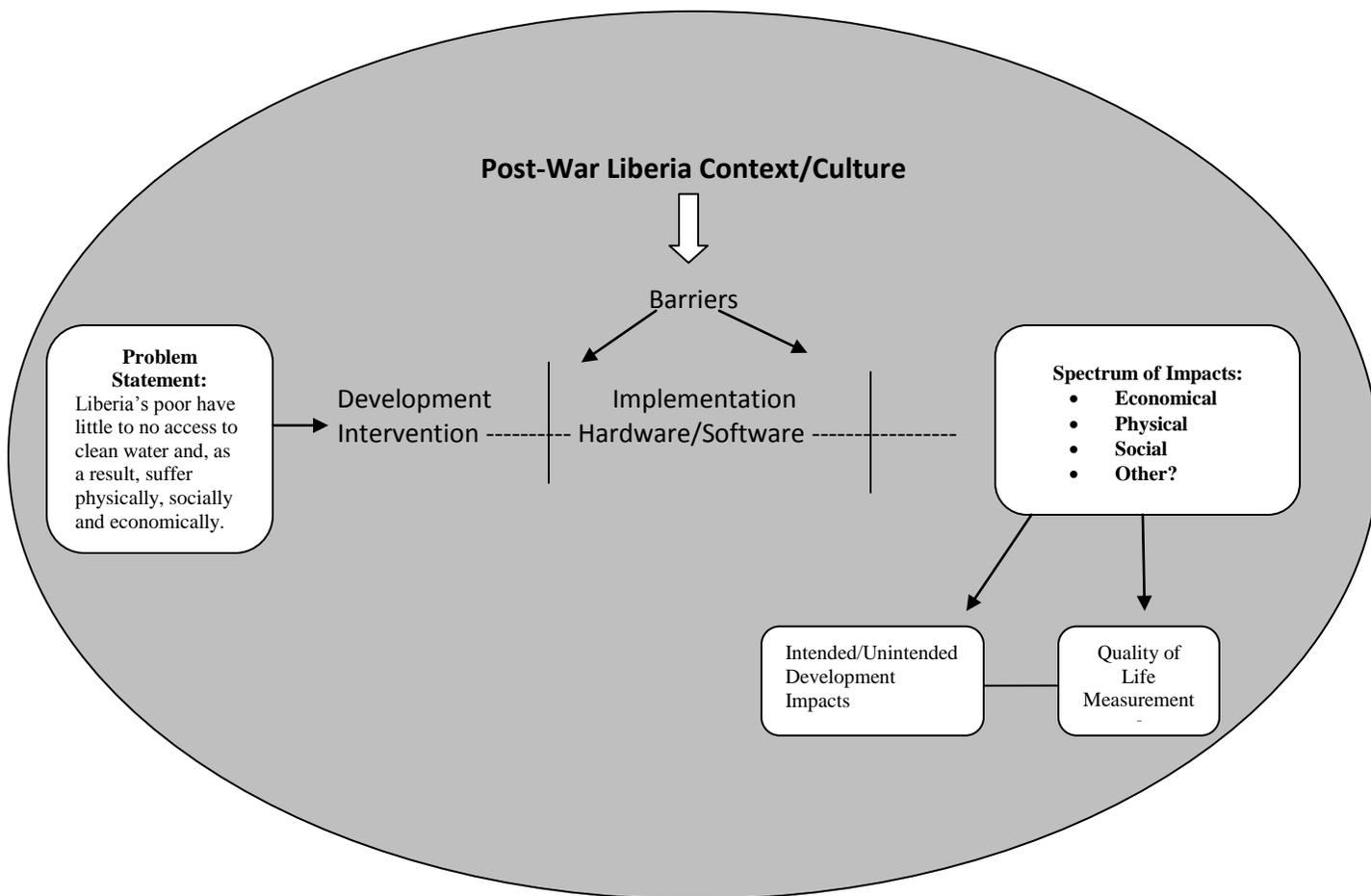


Figure 1. the causal chain of development interventions (after Poulos et al., 2006)

**Figure 1: The casual linear chain of development interventions**

<sup>1</sup> Samaritan’s Purse Impact Assessment: Samaritan’s Purse Liberia field office conducted the impact assessment in 2010, evaluating projects implemented from 2005-2009.

However, what this does not take into consideration is the context in which the development intervention takes place nor the barriers that can considerably alter the intended impacts of the intervention. Therefore, the logical framework for this research takes into consideration the context and the barriers and how they can influence the impact of the development intervention. It is with this information that the logical framework for this thesis is derived. This framework sets out the direction of the research and is explained in detail below.



**Figure 2: Logical framework of the thesis**

As the diagram illustrates, everything takes place in the context of post-war Liberia. The problem statement in this study focuses on the issue of access to safe water; however, the problem statement could be any statement that pertains to any development issue in post-war Liberia. The problem statement declares the issue which leads and justifies a donor to call for INGOs to submit a WASH proposal. The INGO states what type of intervention they are going to use to alleviate the problem, the budget it will take to implement the

project, the timeline of the project and the targets they intend to achieve, taking into consideration the risks and assumptions of implementation. If the INGO is chosen by the donor, they then commence the implementation process.

The implementing INGO continues on their timeline to initiate the hardware and software aspects of the project. These inputs mark the beginning of project and include financial, material and staff resources (Garandeau, 2009). The hardware, in this case, is in the BSF itself with the actual building of the filters, which may include community participation at some stage of the hardware production process. The software stage of implementation is vital to the successful usage of any development technology and involves transfer of knowledge to the beneficiaries. It is hoped that the knowledge being received and understood will manifest itself as proper user compliance and practices.

Throughout the entire process, the INGO encounters various 'barriers'. These can be directly due to the post-war context and the culture. The context and the culture are all encompassing and are omnipresent in all areas of Liberian life. These barriers can be specific at different times and have a greater impact on various stages of the framework. For example, during the hardware part of the implementation, getting supplies to the field is affected by the barrier of bad roads or washed-out bridges. These are barriers to the implementation process but, more importantly for this study, they affect the spectrum of impacts which can have a ripple effect on the QoL measurements and the intended development impacts.

The spectrum of impacts that a WASH development intervention can have covers health, the economy and society. It is known through literature that WASH interventions can decrease disease and impact health. The negative impacts water borne diseases have on the economy are also identified, by Cole and Neumayer (2006) and the Stockholm International Water Institute (2005). Socially, clean water increases the wellbeing of communities and helps in the fight against poverty (Lenton et al., 2005). However, considering the context of post war, the potential for further impacts is present; it will be addressed throughout the thesis and revisited in Chapter 7.

The spectrum of impacts can influence and improve the QoL for the beneficiaries. The QoL indicators, as already mentioned, cover all aspects of life and will take the context into

consideration. The spectrum of impacts will affect the QoL indicators, which then could be measured in terms of intended or unintended development impacts. These are the two areas – QoL, and intended and unintended development impacts – which are evaluated to establish if the WASH intervention has had negative or positive impacts on the problem as originally stated.

Through examining the spectrum of impacts we will be able to distinguish if the impacts that were shown by the data were intended or unintended impacts of the development project. When a WASH intervention is introduced, the implementing INGOs have their ideas about how the technology will impact the people they are trying to assist. However, it is impossible to predict these impacts specifically within a context such as Liberia.

Therefore it is safe to say that there will be some unintended impacts from a project that were not predicated or mentioned in the original proposal. The logical framework will be revisited in chapter 7, incorporating the findings from the research into the areas mentioned in the diagram.

## **1.2 Problem Statement**

The problem statement for the research is, as indicated in the logical framework: **Liberia's poor have little or no access to clean water and, as a result, suffer physically, socially and economically.** The aim or thesis of the research comes from this problem statement.

## **1.3 Key Themes of the Thesis**

One of the main driving forces behind this research was the need to understand whether or not low forms of development technology can impact the quality of life (QoL) for people in a post-war context. For this research, the BioSand water filter was used as a lens to investigate the impacts of development interventions in this context. The BSF is a simple form of household water treatment (HWT) that purifies water through simple slow sand filtration (see chapter 3 section 3). The BSF has been used as a HWT WASH intervention by many INGOs throughout the world. Although this thesis uses the BSF as a lens to measure the impacts development technologies can have, the research can give insight for other development projects and how they are impacting the QoL of their beneficiaries.

The BSF was chosen for many reasons: 1) as stated, I am very familiar with the technology, having worked with it for the past 12 years, and desired to know the BSFs full spectrum of impact. 2) It is a simple form of HWT intervention; all of the materials can be locally bought and it does not require a high educational level to understand how to maintain it. Therefore, it is a reflection of the many forms of low-technology development interventions that do not require a lot of money or education to use. 3) The BSF is a proven technology, but has not been subjected to review in a current post-war society. Again, I desired to know how the BSF impacted the quality of life in this context.

Quality of life, its indicators, how it is measured and what it means for rural Liberians is another theme of the thesis. It is one of the main sections of the literature review, which looks critically at the current QoL indicators and measurements and some of their conventional and non-conventional definitions. It is also a focal point in three out of the four objectives. How the BSF impacts QoL was chosen to help understand all the potential and actual areas of a person's life that it could impact. As will be addressed in this thesis, QoL encompasses many diverse aspects such as a person's physical health, psychological state, level of independence, social relationships, personal beliefs and relationship to the salient features of their environment (WHOQOL, 2007). With such a wide spectrum of possible impacts the BSF could have, using QoL as a measurement was a logical choice.

This research was also driven by the observation that many WASH intervention failures have to do with the lack of understanding of the psychosocial<sup>2</sup> impacts the war has had on Liberian society. In a post-war context, WASH interventions such as hand pumps, wells or household water treatments may be well intentioned but that does not mean they will be used as intended and have the impacts that the INGO or donor expected.

As stated above, the major driving force of the thesis was the need to know if what we, as collected development practitioners, are doing is actually helping those in need. Having

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<sup>2</sup> Psychosocial is defined (from the office of Psychosocial Issues): “**Psycho**” refers to the psyche or the "soul" of a person. It has to do with the inner world, with feelings, thoughts, desires, beliefs and values and how we perceive ourselves and others. “**Social**” refers to the relationships and environment of an individual. It includes the material world and the social and cultural context in which people live, ranging from the intricate network of their relationships, over manifold cultural expressions to the community and the state”.

worked in the sector of water and sanitation for the majority of my career, I have realized that the impacts that we think a development intervention will have, often do not occur. For this thesis I wanted to investigate if the BSF had a spectrum of impacts that had not yet been realized. For this reason I chose to attempt to measure two types of impacts the BSF could have: potential and actual. Before these two types of impacts are introduced in the Objectives section, a clear definition of them both, taking into consideration the context of the thesis, will be provided.

For the purpose of this research and this thesis, potential and actual are defined:

**Potential:** Something that is possible opposed to actual; capable of being or having possibility;

**Actual:** Existing and not merely potential; existing in act and not merely potentially; existing in fact.

([www.Dictionary.com](http://www.Dictionary.com) & [www.merriam-Webster.com](http://www.merriam-Webster.com) accessed 2011)

In the context of this research the *potential* impacts are the impacts that the BSF could have. The BSF, as an efficient HWT, has the capability and the possibility to impact the QoL of post-war Liberians. *Actual* refers to the existing impacts that the BSF has; these impacts exist in reality and are not merely potential. For the purpose of this research the two terms are used as two separate categories. For example, a pill has the *potential* to take a headache away, but a person needs to take it for it to *actually* have that effect. The potential and actual impacts of the BSF have been separated into two objectives (see 1.3) to investigate the following:

- What are the potential impacts of the BSF?
- What are the actual impacts of the BSF?
- How do these spectrums of impacts affect the QoL?

#### **1.4 Aim**

Investigating whether the BioSand water filter (BSF) (which is an example of a low-technology intervention for water treatment) can impact the quality of life for citizens of a developing country recovering from war is at the heart of the research. The aim is derived

from this, in conjunction with the problem statement. **The aim is: To achieve a comprehensive understanding of the impacts that key technologies such as the BioSand water filter (BSF) can have on the quality of life of people in rural post-war Liberia.**

## 1.5 Objectives

In order to assess the impacts the BSF has on post-war rural Liberians, an understanding of what the quality of life indicators are for them in this context is needed. This is addressed in Objective No. 1. Objective No. 2 identifies and explores the *potential* impacts the BSF could have on the quality of life components as determined by Objective No. 1. Objective No. 3 considers whether there are any *actual* impacts and how they affect the quality of life components of post-war rural Liberians. Objective No. 4 is discussed in the final chapter of the thesis. It is designed to give insights and recommendations, discovered through the research, which may enable INGOs to maximize the impact of BSF projects and, potentially, other development projects in a post-war context.

These four objectives will assist in addressing the aim of the thesis. They are:

***Objective 1:*** To define the relevant components of quality of life for people in post-war rural Liberia.

***Objective 2:*** To identify the *potential* impacts of the BioSand water filter on the quality of life of post-war rural Liberians.

***Objective 3:*** To identify the *actual* impacts of the BioSand water filter on the quality of life of post-war rural Liberians.

***Objectives 4:*** To translate insights gained from the research into recommendations that will help to maximize the actual impacts of the BSF in a post-war context.

## 1.6 Structure of the Thesis

- **Chapter 1: Introduction**

The aim of the first chapter is to describe the starting point of the research and how I came to the point of the research. The opening chapter introduces the arduous task of implementing water interventions in a post-war context and how they affect people's quality

of life. This chapter, most importantly, defines the problem statement, the thesis aim and main objectives and the theoretical framework of the thesis.

- **Chapter 2: Contextual Review**

This chapter will address important aspects of the cultural context in Liberia, including traditional beliefs and how they affect the attitudes of Liberians, specifically relating to health. It will also explain in depth my tacit knowledge of the context and the unique insider and outsider view that I have.

- **Chapter 3: Literature Review**

This chapter will cover the areas of literature that pertain to the thesis. It will demonstrate where the knowledge and information gaps are and how the thesis will fill them. The following areas will be reviewed:

- Issues pertaining to post-war development
- Quality of life indicators
- The BioSand water filter technology.

- **Chapter: 4 Methodology**

This chapter will justify the methodologies used to gather the research – both quantitative and qualitative (or Q<sup>2</sup> as it can be described) – and how they complement each other in this research. The practical aspects of the methodology will also be described. These include: the research arena, interviewing, the author's experience, water testing methods used, limitations and challenges, translation, bias and triangulation.

- **Chapter 5: Findings and Discussion**

Chapter five centres on the findings from the data collected. The chapter is outlined using the first three objectives as sub-chapters. The data collected for each of the objectives will be presented then discussed.

- **Chapter 6: Recommendations**

The primary purpose of this chapter is to address Objective 4. The insights gained through the research will manifest themselves into recommendations for INGOs implementing future development interventions.

- **Chapter 7: New Insights and Discussion**

Chapter seven centres on the results and how they relate to current knowledge stated in the literature review, including new insights that have academic and development implications. In addition, the limitations and constraints of the research will be noted. The logical framework of the research outlined in chapter one will be revisited in light of the research findings.

- **Chapter 8: Conclusion**

The last chapter will summarize the findings and implications of the research as manifested in the thesis.

## **1.7 Background – Liberian Context**

Founded as a nation in 1847, Liberia is Africa's oldest independent state. In 1822, the American Colonial Society sent American slaves to Liberia. Some saw this as an act of humanity, others as an appeasement to their consciences concerning the slave trade. As a result, two distinct groups formed in Liberia. The first group is made up of indigenous Liberians, consisting of three major ethnic groups: Mande, Mel and Kwa. Within these groups are sixteen tribes that make up Liberia's indigenous population. The second group was the Americo-Liberians, the ex-slaves who immigrated to Liberia as a result of the work of the American Colonial Society.

As they settled on the Liberian coast, the Americo-Liberians established plantations and farms, and enslaved indigenous tribal people as labourers. The irony of this act is obvious, and it opened a great rift between the two sectors of the population. The hegemony of the Americo-Liberians was unchallenged for over a century; for example, every president of Liberia was of Americo-Liberian descent. In 1980, the military dictator Samuel K. Doe overthrew the Tolbert government and became the first head of the Liberian nation of

indigenous ancestry. In 1989, another Americo-Liberian, Charles Taylor, formed the National Patriotic Front of Liberia (NPFL) and began attacking government forces in the north of the country. By the end of the year, Doe was ousted by Prince Johnson (a faction leader from the NPFL).

Bloody civil unrest continued for the next 14 years. In 2003, under heavy international pressure, Charles Taylor, who had been elected in 1997 as president, left Liberia and accepted asylum in Nigeria (Levitt 2005). An interim government was instituted with the introduction of 16,000 United Nations peacekeepers, one of the largest UN peacekeeping forces in the world. Elections were held in the fall of 2005, and Liberia saw the first female President in Africa, Ellen Johnson-Sirleaf, democratically elected. President Johnson-Sirleaf faces many obstacles and challenges, including bringing access to safe water to all Liberians.

Since President Sirleaf's election the country of Liberia has gone through a slow healing process. Socially and culturally, the country, with its differing tribes and the factions of Americo-Liberians and indigenous people, is still trying to establish itself. The Truth and Reconciliation Commission of Liberia, established in 2006, has assisted in this process. The government has established a system for collecting taxes to increase the funds available to establish the ministries needed for the country to function again. Elections will be held in the fall of 2011 which will be critical to the future of Liberia. A more detailed analysis of contextual information on Liberia relevant to this thesis will be presented in the next chapter.

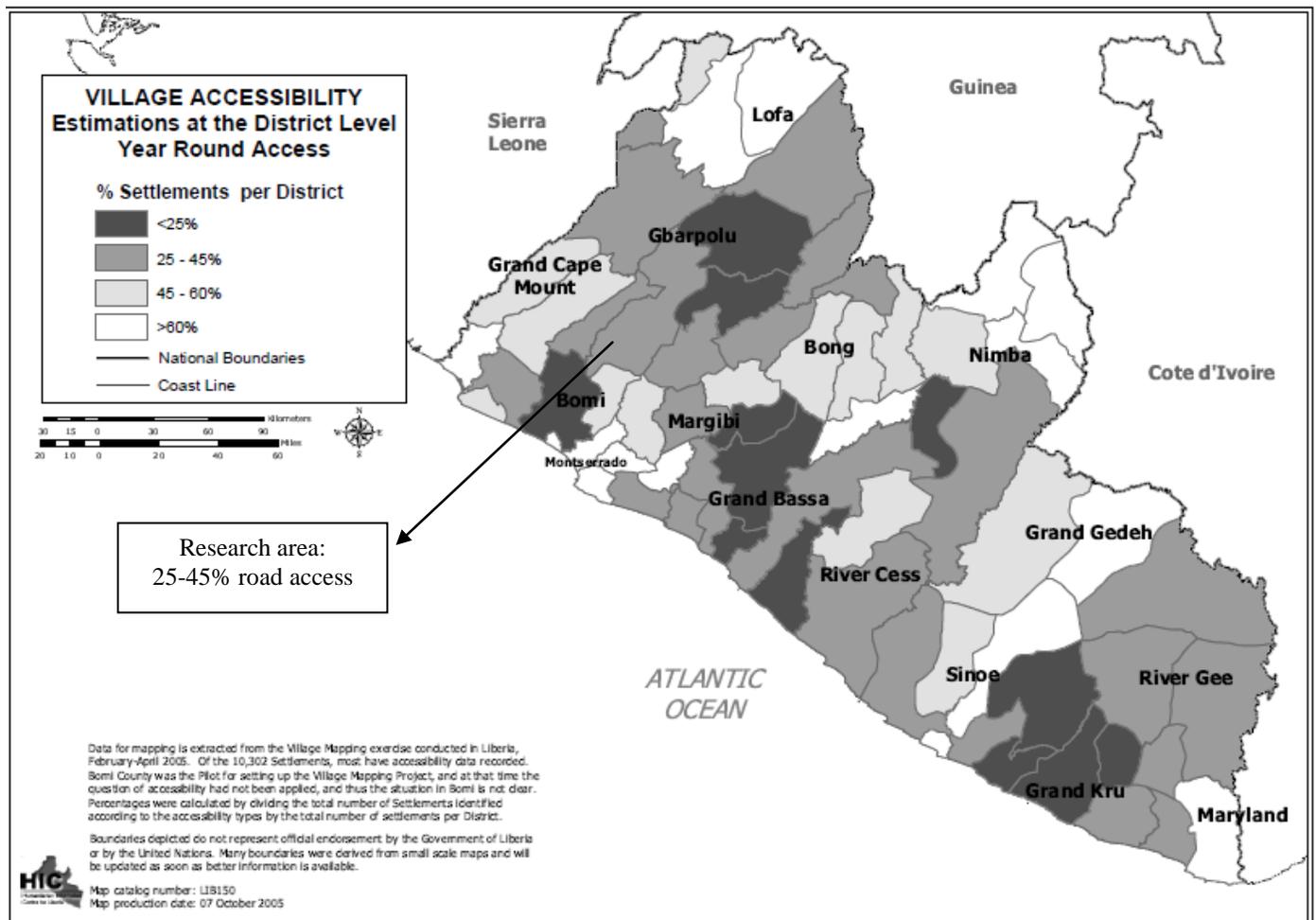
## **2.0 CONTEXTUAL REVIEW**

The purpose of this chapter is to review the context in which the research took place; to consider the unique aspects of Liberian culture that are relevant to this research; and to present the author's tacit knowledge as it pertains to the thesis. A deeper understanding of these areas will give greater comprehension of the author's rationale for the literature review topics and methodologies used. It was deemed important to the thesis to use this chapter to 'set the stage' for the rest of the thesis. As a concise, critical review of knowledge and understanding of Liberian rural culture and post-conflict development, it also represents an academic output of the research in its own right. The first section, as stated, will look at post-war Liberia at the time the research was done. The time period is from 2006 to 2010, with an emphasis on 2006-2008 when the majority of the data was collected. The second sub-chapter will address Liberian culture. Although there is a vast amount of information that could be written on the topic, this section will focus on two main related areas 1) The influence of the secret society bush schools and 2) Liberian attitudes towards Water, Sanitation and Hygiene (WASH) behaviours. The last section of this chapter considers my tacit knowledge and the etic (outsider) and emic (insider) (these terms will be expanded in the methodology chapter) perspective that I have.

### **2.1 Liberia 2006-2008**

In August 2003 a comprehensive peace agreement was signed in Accra, Ghana, ending 14 years of brutal civil war (UNDP Liberia Country Programme, 2009). In the years following, democratic elections were held and, in the fall of 2005, Ellen Johnson Sirleaf defeated George Weah to become Africa's first female president (CRS Report to Congress, 2005). As an informal observer living in Liberia during the 2005 elections, I witnessed that they were conducted peacefully and involved many international observers to ensure their validity. The post-war years not only brought in a new government but also saw the establishment of the United Nations Mission in Liberia (UNMIL) with over 15,000 UN peacekeepers (UNDP Liberia Country Programme, 2009). UNMIL's mandate was very simple – to establish a presence that would deter any future violence in the country.

The war had crippled Liberia in many ways. The economic and demographic situation in the country had been adversely affected by the war although no one knew to what extent exactly (Liberia Demographic and Health survey, 2007). The Liberia National Health Policy stated that “the scale of the destruction caused by civil strife is such that it will be overcome only after decades of sustained efforts.” The war left the infrastructure of the country destroyed, with no municipal running water or electricity. Roads, bridges and community-based water and sanitation facilities were demolished throughout the country, in both urban and rural areas (UNDP Liberia report, 2006). One of the biggest obstacles to INGOs implementing projects in the immediate post-war period was the lack of roads to move supplies and staff to target areas. Below is a map from 2005 indicating the accessibility to villages by road and with a box showing where the research for this thesis took place.



**Figure 3: Map of the accessibility to Liberian villages by road in 2005, specifically the research area. (Humanitarian Information Center, Monrovia, 2005).**

The physical damage to the country's infrastructure could be seen, but there was another obstacle to the research that proved even more difficult to surmount. Government ministries and their capacities were destroyed so comprehensively that almost no data was available from any governmental ministry. In the introduction to the 2007 Demographic and Health Survey the authors state "It was difficult to assess the extent of the large-scale displacement of rural and urban populations, the massive loss of lives caused by the civil crisis, and the destruction of social and physical infrastructure except by recourse to secondary analysis of defective data collected by non-statistical professionals during the crisis." As a result of the war reputable statistics were difficult for the researcher to obtain. Although attempts were made during the course of this research, gathering baseline data on health, population or livelihoods from secondary sources proved to be very difficult and often impossible. Most of the governmental statistics from the past stored on computers or in physical form were damaged or looted during the civil conflict (Liberian Demographic and Health Survey, 2007). The UNDP country report for 2004-2007 affirms this, stating "The lack of reliable data was, and continues to be, a major constraint for effective strategic planning, policy advice and monitoring and evaluation" (UNDP Country Report, 2009). The government had lost most of their records and every ministry was reduced to nothing. As stated in the UNDP report on Liberia in 2006, "By the time the crisis came to an end in the last rounds of full-scale civil war inside Monrovia in July 2003, almost all government institutions had ceased to function effectively and the little capacity that had evolved over the years was ruined." As a result, the international community was left to assist in helping Liberia recover and re-establish the most basic governmental services.

At the time of the research there were a number of INGOs present in Liberia, approximately 50 of which belonged to the Monitoring and Steering Group (MSG)<sup>3</sup>. The MSG has evolved into the LINGO, (Liberian International Non-Governmental Organization) forum which currently has 72 members (LINGO Executive, 2011). In 2006, the atmosphere was still one of 'relief', with relief INGOs such as Doctors Without Borders running clinics, the UNHCR beginning to assist IDPs and refugees to return to their communities, and agencies

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<sup>3</sup> MSG is an INGO steering group that is formed in most areas where INGOs are working via coordination between them. INGO country directors attend the steering committee meetings and make up the leadership of the committee. In Liberia the MSG has evolved into the LINGO but serves the same purpose, which is to keep INGO leadership apprised of coordination, governmental relations and other pertinent issues for INGOs in the country.

such as USAID (The United States Agency for International Development) only funding single-year food security programs. Relief projects focused on meeting the immediate needs of the individual or family, which may be the distribution of food or non-food items such as pots, blankets or shelter supplies. However, many organizations and donor governments and agencies were beginning to shift towards development. Funding agencies were looking to INGOs to implement long-term projects that stressed capacity building, education and long-term agricultural projects such as swamp rice rehabilitation. One of the largest grants was USAID's Liberian Integrated Assistance Program, which focused on the rehabilitation of infrastructure, agriculture and basic health services and had a budget of over 15million dollars distributed between three INGOs. Between 2002 and 2010 ECHO (European Commission Humanitarian Office) has funded nearly 118 million Euros of humanitarian aid to Liberia (Delegation of the European Union to Liberia 2011).

United Nations (UN) agencies have played a large role in the context of post-war Liberia. Funding from governments is funnelled through UN agencies which then look to INGOs to implement the project. After the war UNICEF was the acting managing office for all WASH programs until just recently when the Ministry of Public works was able to reclaim that responsibility. Major funding has been given to UNICEF from governments for not only WASH but also for the rebuilding of the educational system in Liberia. In 2008 UNICEF was given US \$17 million to help rebuild Liberia's primary school system, of which \$12 million was given by the Dutch government.

During the time of the research (2006-2008), there were very few INGOs that had ventured out into the research area. Roads and bridges were still in a vulnerable state and UNMIL was just starting to establish bases in these rural areas to ensure safety. Samaritan's Purse was one of the main INGOs working there with Tear Fund and others joining in 2007. There was evidence that organizations had been there in the past, such as the Norwegian Refugee Council, Children's Fund, German Agro Agra, as it was possible to observe numerous broken and unused hand pumps and latrines that had collapsed over time (researcher's observations 2005-2007). Most villages were just asking for their hand pumps to be fixed, which was frustrating because it seemed that the previous INGO had little or no

sustainable plan when they left the village. The photo below is evidence of a broken and abandoned hand pump that had been completed in 2005.



**Figure 4: Broken and unused hand pump in the research area.**

In 2006 Liberia was still in a fragile state. As the previously-mentioned references from reports stated, it will take a long time for the country and its people to recover from the civil war. It is because of this unique context that it was deemed necessary to include the topic of challenges in post war development as part of the literature review. Liberia is not the only country to suffer the consequences of war, specifically civil war; however, there are gaps in knowledge with regards how to best implement in these conditions to ensure a successful project. This topic will be further developed, therefore, in the literature review.

## **2.2 Liberian Culture**

As mentioned in the introduction of this chapter, this section will address two main areas: 1) the influence of the secret society bush schools and 2) Liberian attitudes towards WASH/health behaviours. The most important aspect of this section is, as previously stated, to give a deeper understanding of how development projects, such as the promotion of the BSF, are affected by Liberian culture and Liberian's distinct worldview.

African traditional religion (ATR) takes on many different forms on the continent. Most African cultures have a belief system based on ancestral worship and which includes initiation into manhood or womanhood (Harley, 1974). In Liberia this takes the form of the ‘bush society’, ‘secret society’ and ‘poro/sande society’ or ‘bush school’. For consistency this will be referred to as the ‘bush society’ from now on. The purpose of this sub-section is to set the cultural stage of the research and to begin to disclose important aspects of the Liberian worldview and how it pertains to the thesis. This section also contains a case study to illustrate the link between the thesis and the bush society.

A demographic study done in 2007 showed that as many as 75% of Liberians were involved in bush society activity, but during a recent assessment, 90% of those asked said that society involvement has become more prevalent over the previous five years (Samaritan’s Purse Impact study, 2010). There is little written about the bush society in Liberia because it is a very secretive and sensitive topic. Those who choose to speak about it often do so at risk of their lives. As a result, much of the information that will be shared in this section will come from “Notes on the poro in Liberia” published in 1974 by the Peabody Museum of American Archaeology and Ethnology at Harvard University. Dr. Harley and his wife, Winifred, established a mission hospital and industrial school and worked at Ganta (five hours northeast of Monrovia by car) from 1926 into the 1960s (Ganta Mission history, 2011). Apart from this document, historical accounts from other sources will be referenced and also interviews with key informant whose names cannot be identified for safety reasons.

The bush society is split up by gender, the male or ‘poro’ society and the female or ‘sande’ society. Both have similarities and differences pertaining to each gender’s role in Liberian society. However, what makes the bush society similar to other ATR is the tribal initiation that takes place for both the men and women of that specific tribe (Harley, 1974). In the research area, the sande and poro bush societies alternate years when young boys and girls enter the bush. One year it would be the sande society and the young girls and women would enter the bush for a specific time and the following year it would be the poro society and the men would go into the bush. Traditional religious activities take place, led by traditional witchdoctors or *zoes*, and are conducted to teach young people about culture and local customs, as well as life and livelihood skills, and to develop a sense of allegiance that

helps to bring order to community life. Most also include the ritual of body cutting/marking and female genital cutting/mutilation (FGC/M) and male circumcision. Spiritually, societies emphasize ancestral worship, witchcraft and how to ‘bewitch’ or ‘curse’ people. Even though each tribe has slightly different bush society traditions, Harley (1974) states that there are some aspects which are consistent between all bush societies. These are:

- Absolute secrecy, with the death penalty for both peepers and informants
- Entrance fees and further fees for each degree of advancement
- A pyramid of degrees, said to be 99 in all, in which members of two or three families are eligible for initiation into the final secrets
- Ordeals of manhood and training in warfare, tribal customs and the various guilds and professions (such as a blacksmith or hunting). Skills in these arts are secret and closely guarded. Women are also trained in customs pertaining to their livelihoods.
- The privilege of contact with the spirit world
- A sign language, songs and dances with hidden meaning.

A credible key informant, who cannot be named, validated these, particularly the first, pertaining to the secrecy of the bush society. This informant has carefully spoken out against some of the harmful practices associated with the bush society, specifically FGM, and fully realizes the threat that they are under because of it. This informant was part of the bush society and saw the “inside” workings, including deaths due to health complications from circumcision. If a young girl or boy gets sick while in the bush the *zoe* administers ‘country medicine’, which in many cases can make the sickness worse (key informant, personal communication). Since no outsider is allowed to enter the bush society, including a nurse or doctor, the person often dies. The influence or power of the bush society on the community and on individuals should not be underestimated. Harley (1974) emphasizes this further, saying that the leadership of the poro society carries power over common men, imposing laws upon people and keeping them in check by yielding a fear of the supernatural powers which the leaders are believed to have.

Although Harley’s paper was written in 1974, from what key informants have stated and from what I have witnessed (only from an etic view), most of the six aspects above remain

in effect. To add to the information that has been given thus far, the following are some illustrations about how the bush society impacts development projects (specifically the BSF) as it pertains to the thesis. These examples come from INGO field workers who are living and working in Liberia for the past four years.

In a recent visit (Buma, 2011): an INGO project manager went to visit the community of Kiatahun, in Lofa County. Training was to be carried out by the INGO in three sectors and the program manager was going to observe all of them. There was to be community health education training, fish pond construction and training and sexual/reproductive health training. The trainers for the INGO (who are Liberian) were there but there were no students. All of the students were assisting with building the sande society 'homes' where the girls stay during their initiation. Each community around the area sent men to help build these houses and therefore there were no men at the fish pond training. All the women were also out preparing the sande society and therefore were not at any of the training. Some of the trainers were upset, although one trainer expected the absenteeism. This is a very good example of the priority that the sande (or poro) bush society has in a community. The community forgoes training that could improve their future to participate in the sande activities. The program manager was allowed special permission to go to the area (the chief and *zoe* took her) and was allowed to take a picture of the area.

Another example of the bush society affecting projects, occurred in a recent third quarter of a women's literacy and livelihood program in the village of Sappimah (just outside the research area). All literacy classes were affected during the reporting quarter while women were in the bush school. The program manager had to report on the quarter and tell the donor that the majority of the women were not attending classes because of the bush society. A few women still attended and the rest of the class that came back later fell behind, causing difficulty in teaching the class (Byker, 2011).

## Case Study 1 Implementing a BSF Project during “Bush School”

In 2009 the government of Japan gave an allotted amount of money to UNICEF specifically to use in the implementation of WASH projects in Liberia. UNICEF granted the funds to Samaritan’s Purse. The project was to be no more than nine months long and was to incorporate the rehabilitation of broken hand pumps and wells, the BSF, sanitation in the form of latrines and a health and hygiene component. Added to the time constraint was the inaccessibility of the project area, with no road access to 85% of the communities targeted. Supplies and staff had to either hike through bush trails, in some cases for up to nine hours, or fly in by helicopter. Most of the supplies were distributed to the communities by “sling loading” them in by helicopter.



The trail into the bush society school where palm leaves drape down over the entrance that only the members can walk under and through.

Upon commencing the project in one community, the SP WASH staff soon noticed the absence of young girls and women. I (the researcher) approached one of the elders of the village and asked if all the young girls and women were on the farm and when they would be back. The elder replied that they were in the “bush” and would be there for the next six months.

When this was discovered the implementation of the WASH project was in jeopardy. The health and hygiene component of the project was to cater to women as they are usually the ones who get water for the family and take care of the young children. I inquired if it would be possible for me to go into the “bush” and plead with the *zoe* to let the girls out for the time that the health and hygiene workshop would be held. The chief laughed and replied “Ma, even I cannot go in there. It would mean my life”.

What was the WASH Program Manager to do?

UNICEF had a set number of targets, one being the number of women trained in health and hygiene practices. What should we report?

What is an alternative when not being able to ensure families can participate in the WASH program?

How does the bush society affect the impact of a WASH project, specifically the BSF?

The power and influence of the ‘bush society’ or ‘secret society’ on Liberians should not be underestimated. As one participant in an INGO’s women’s literacy class stated:

*“I was very small when I started school. My parents did no assert effort in my schooling; instead they focused purely on farming. After my initiation into the sande society, this was the end of my schooling.” (Key informant, 2011).*

Power wielded by fear, is a constant in some rural areas, with bewitching and cursing often carried out by the witch doctor or ‘bush devil’. One author states that the poro society and its power can be used to inflict punishments which are in the interests of the whole community; it is the guarantor of order (Ellis, 2007). I would agree with this statement as I have heard of the bush society members inflicting consequences on a boy after he got caught stealing a phone. Ellis insists that the some of the terms used for the bush society, such as the ‘bush devil’ are false definitions made by white missionaries. I disagree with this statement because in all rural communities I have visited Liberians have referred to this person as the ‘bush devil’.

The traditions and beliefs run very deep and cannot be discarded by any INGO planning to implement development projects. Development project implementation is difficult at the best of times and, as has been noted and will be further discussed in the literature review chapter, a post-war context can intensify the difficulties. Also having to implement in a culture that is steeped in a powerful, traditional and at times oppressive belief system (see results and discussion section 5.1.1 under Freedom of Rights section) can make the success of a project almost impossible. This belief system also impacts rural Liberians’ attitudes towards health and water, which will be addressed in the next section.

The attitudes in Liberia’s rural areas towards health and water play a very large role to the success of a WASH project. In Sub-Saharan Africa there is one ‘traditional healer’ (see country doctor) for every 500 persons, compared to one Western trained doctor for 40,000 people (Truter, 2007). Truter also states that disease is viewed as a supernatural phenomenon governed by a hierarchy of vital powers beginning with the most powerful deity followed by lesser spiritual entities, ancestral spirits, living persons, animals, plants and other objects (2007). This world view of health and disease obviously impacts health-related projects such as water and sanitation. The following section will illustrate and give

examples of some of these attitudes and how they relate to the thesis. The thesis addresses the possible impacts that simple forms of development technology can have on the quality of life for rural Liberians. However, it must be realized that, for rural Liberians to understand the benefits of development, their world view or the traditional beliefs they have held for generations may need to change.

The motivation for Liberians to use technology such as the BSF may be very different from that of the implementing INGO. Dr Val Curtis (London School of Hygiene and Tropical Medicine) emphasizes this point, stating that we (as western INGO practitioners) are much less used to trying to see hygiene from the point of view of the people who practice it. To the recipients of training, hygiene is not simply a matter of avoiding germs (or, in this case, drinking clean water); it is far more complex (Curtis, 2001). In Liberia much of the health behavioural motivation comes first from Liberian's belief system and traditions. The motivation is rarely because the development intervention may have a health benefit. However, this can change over time as they start to see firsthand some of the health improvements in their own lives. The following stories and quotes are from a number of INGO practitioners, doctors, nurses and others who have worked in Liberia.

The attitude towards water is deeply rooted in tradition and beliefs related to the bush society aspect of ancestral powers. In a recent conversation with a SP manager, a chief exclaimed that they drank from the river (which was an unsafe water source) because the river was a gift from their ancestors. They had suffered with diarrhoea but this was accepted as a part of life in the village. In the previous year a project focusing on the rehabilitation of clinics and health services had been implemented. A hand pump was installed at the health clinic and health and hygiene education was carried out. The chief stated that since the education and the pump the people have seen for the first time that you can live without diarrhoea. With the chief as a 'convert' to using the hand pump the rest of the village soon started using it as well.

There are two things to understand about this example:

1) In most cases people in rural Liberia do not know that the water they are drinking is the cause of any type of sickness. How can a river given to them by the powerful ancestors also be the cause of sickness? In one study in South Africa, it was noted that people believed that once water flows there is no disease in it (Mnukwa et al., 2001). Much like the belief, here in Liberia, that there is no disease in Africa, this is a common saying that is also taught in rural schools (Key informant, 2011).

2) Once a chief or *zoe* is on board with using any type of technology the village is quick to follow. The people may not know the benefits of the technology, but the fact that the chief or leader understands that it is beneficial is often enough for them. Individuals influenced strongly by the wider community, particularly public opinion and community leaders (Curtis, 1997).

Disease is often considered a consequence that has been handed out by ancestors. If a child is born with a deformity or if a mother dies during childbirth, many believe the child is cursed. Nowhere is the belief system stronger than in the area of health. For example, attitudes towards conditions such as epilepsy remain rooted in the belief in supernatural phenomena and evil spirits. Traditional therapies involve the use of laxatives to drive out evil spirits (Bernet-Bernady et al., 1997). Even with the common disease of malaria, most rural Africans believe that the cause is supernatural (Attaran et al., 2009). If a person becomes sick, their first response is to go to the ‘country doctor’<sup>4</sup>, which is what we would call a witch doctor. The witch doctor will then administer a host of ‘treatments’ and perhaps sacrifice a chicken – and, of course, charge a fee that must be paid<sup>5</sup> before the curse is reversed and the person can be well again. Unfortunately, many times the traditional medicine causes the person’s condition to become worse. The medicines used are often secret recipes that are drunk, smoked, inhaled, smeared on the body or used in enemas. In one place in South Africa, enemas are commonly used for medication. The enema mixture

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<sup>4</sup> Country doctor is Liberian English and refers to a man/woman that administers country medicine. This would include a number of different leaves, herbs, and using other traditional means to treat sickness. An example is ‘hauling bones’ if a person has a broken bone. The country doctor would ‘haul’ or pull the bone back into place then brace it with sticks and wrap it with mud.

<sup>5</sup> Payment could be cash and food. For payment of the bush school, depending on the tribe, every parent that sends their children into the ‘bush society’ or school has to pay the *zoe* a fee. This is usually cash (up to 10USD/child), but could be up to 15 cups of rice, a gallon of oil or other food items. This is paid every month in most places, putting economic stress on the family.

is an acidic beetle that is cooked, ground into a powder, mixed with water and administered to the patient (Kale, 1995). However, these treatments can have negative effects on the rest of the body, specifically the mouth, stomach, intestines and anal canal (Kale, 1995). In one case where a mother took a sick child to a traditional healer the child become worse and by the time she got to a hospital she had meningitis. Because of the delay in treatment, she was left blind, deaf and with frequent convulsions (Cairns, 1995). Cases like this are common in Liberia.

The belief in the super natural or curses is a norm of Liberian life. As one Liberian stated, “Yes, everybody. Even as we work here all of us working here we know it and we believe it. Whether it actually happened or it not but people believe it. Sometime people die; sometime there is no natural death. Most deaths in Liberia people relate it to witch. They witch the person. The person did not die by themselves. The clear fact so everybody believe it.” (Lori, 2009). Sickness in Liberia is not a scientific description of cause and effect, (e.g. drink contaminated water and you will get sick), and it is not based on germ theory. In developed countries hygiene behaviour or understanding of health is rooted in models such as the Health Belief model or Theory of Reasoned Action, which focus on a cognitive and rational motivation for hygiene behaviour (Curtis et al., 2009). In Liberia motivation is a mix of ATR and other religious beliefs. To illustrate this further, here is a quote from an American nurse who had worked in a rural and an urban hospital in Liberia for over three years:

*I think, especially in more rural settings, you find a lot of beliefs about spirits, other people (spells, etc) and "African sign" making people sick. I would say this is especially true of illnesses that are chronic (not the Liberian definition of chronic, which they would use to mean severe), with vague symptoms. So things like TB, HIV, etc., are usually attributed to "African sign," or evil spirits. Other things like malaria may or may not be attributed to spirits, but even among relatively educated people, they may not believe a parasite carried by a mosquito gave it to them, either. I could usually tell what kind of an illness a person thought they had by how they had tried to treat it – usually by seeing a medicine man or traditional healer or using herbs first. Usually the hospital is the last resort for treatment, ... thinking you go to the hospital to die. (Olson,2011).*

This is something that is very difficult for an ‘outsider’ to understand. However, the more time you spend in the culture, especially in rural areas, the more you see and hear about it. Curtis describes this as looking at hygiene in two ways, from an etic, outside view and from an emic or insider’s view. She states that we are less used to trying to see hygiene from the point of view of the people who practice it (Curtis, 2001). This is also the case for the introduction of simple forms of technology such as the BSF, or health and hygiene education on clean water and sanitation. As with the bush society section, there is a lot more that could be written on the topic of Liberian’s attitudes towards water, hygiene, and health. This summary has shown the importance of understanding the context that INGOs operate in and that our western ‘formulas’ for development are often impeded by cultural and traditional beliefs. The final section of this chapter will demonstrate how, over time, the researcher’s tacit knowledge of Liberian culture has matured to assist in understanding this context.

### **2.3 Researcher’s Tacit Knowledge**

For the past ten years, the author has been involved in, and has managed, numerous development projects such as the one being investigated. Along with this experience, the author holds a master’s degree in international development leadership<sup>6</sup>. The author’s experience in development has primarily been with the BSF technology as part of her work for Samaritan’s Purse International Relief, an INGO. During that work she has engaged in the following phases of development projects: proposal writing, project set-up, construction, implementation, education, monitoring and evaluation, and follow up.

Living in the research area, Liberia, for the past six years, the author has achieved a degree of acceptance by local people which was crucial for carrying out the research. For example, in Kpelleh and Loma (the main tribes in the research arena) villages I have been given tribal names: *Wilkema* which means ‘love’ in Kpelleh and *Bolu Kolu* which means ‘the woman warrior who goes before us’ in Loma. These names are used instead of my English name. I recognizes them and, upon entering the village, only answers to the tribal name. Other expatriates who came with me also use my tribal name to address me. (They too have and

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<sup>6</sup> From Trinity Western University, Langley, British Columbia, Canada

use their own tribal names.) A level of trust and acceptance I have been given is recognized in these villages. As a result, the author can move freely around the village without disturbing the everyday routine of the community members. Being able to observe and participate with such freedom has allowed greater access to qualitative data that reflects normal, unmodified behaviour.

At the commencement of the research, as the Liberia WASH manager, I was directly involved with the project and interviewees. However, this involvement has diminished, because I am no longer in that role. (The position has been filled by another expat field worker.) I was still involved in implementing projects for the INGO, as the Household Water Treatment Manager for West Africa. There are pros and cons to the degree of involvement experience I in the research area and with the interviewees. The positive aspects are knowledge of the area, the projects being implemented there and the technology. On the other hand, the potential for observer bias and difficulty in disengaging from the overall project's goals, thus jeopardizing validity of the research, could have had a negative impact. Bias was decreased by involving Liberian BSF staff members in the interviewing process. Interviewing was witnessed by thesis panel member Dr. Jen Smith of Cranfield University, who was able to give valuable feedback about it and noted no bias. Portions of the interviews are documented in the results and analysis section.

This section will attempt to further explain my perspective, taking into consideration the time spent in Liberia and with BSF projects around the world. As the researcher, I will explain my perspective through different sociological and anthropological terms and theories. The purpose of this section is to give validity to the methods used in the research from the perspective of someone who has spent a considerable amount of time in the context at more than a surface level.

Not being Liberian makes me an outsider from the outset. When the initial research was taking place in 2006, I had only been in Liberia for two years; I had, however, seven years of experience with the BSF. As an outsider I needed to know my context and be aware of the setting in which the study was going to take place because this would enhance not only my credibility but also increase interest among the participants in the study (Robson, 2000).

Before I started the research or was even aware that I would be doing a research study, I committed to becoming aware of the setting and people with whom I was in contact. Some of them were part of the BSF program; however some of them were not. Establishing relationships with rural Liberians could be seen as more of a feminist theory approach, which is defined and explained further in the methodology chapter section 4.2. This would be true to a point; although I empathized with rural Liberians and wanted to be their friend I had not experienced what they had during the war nor what it means to be Liberian. In the case of interviewing, the interviews were feminist as they were loosely structured, allowed interviewees to 'talk back' and were treated more as conversations (Rubin and Rubin, 2005).

In essence I am between two worlds. At times I was/am taking an emic approach where I not only saw what was happening but felt what it is like to be part of a setting or program (Patton 2002). The emic approach was experienced by immersing into Liberian culture, living in the village, taking on a tribal name, eating their foods and talking their language (Liberian English). As an outsider, the etic approach involved standing outside of Liberian culture to be able to see its separate events with a western mindset and world view. There are advantages of both; as an outsider I can see things from a different perspective and more objectively. Patton explains, "The challenge is to combine participatory and observation so as to become capable of understanding the setting as an insider (emic) while describing it to and for outsiders (etic) (2002).

Monaghan and Just state that "the 'outsider perspective' is one of the main strengths of the ethnographic method" (2000). They also state that if one is able to build up trusting relationships with people, there will be an increased likelihood that they will confide and explain events and motivations beyond their superficial appearance. This enables one to discover what situations are 'really about' and to evaluate the content of the answers received. It is difficult to say if either of these statements is true. I would disagree that an outsider's perspective was one of the main strengths in this research. As an outsider, specifically working for an INGO, in many cases I had to fight the perception that I was going to bring something for people. This made gathering research trying at times, because interviewees would be more concerned with telling me what they wanted from me or SP

than they were in the interview. I also found that Liberians, to keep from being embarrassed, will tell you what you want to hear. I would agree up to a point with Monaghan and Just that when a relationship and trust was built it increased the chances of getting a more truthful answer from the interviewee. But, I am still a ‘white’ outsider and no matter how long I live in Liberia I will not be able to fully know the intricacies of Liberian culture or the ‘truth’.

Many of the observations that I have made have come from both an etic, outsiders, view and from an emic perspective, leaning more towards feminist theory. I have observed and experienced the destroyed infrastructure, corruption, and many more of the consequences of the war. Coupled with this has been the rich experiences of living in the many communities for a period of time, establishing relationships and seeing development success and people’s desire for transformation fuelled by a hope for the future. Working with WASH projects, the majority of them using the BSF, explains why I chose the BSF to study. Having implemented BSF projects in nine countries around the world I have become a supporter and a critic of the technology. This research forced me to step back from what I knew of the BSF and see it from a different perspective. My perspective was not to establish the effectiveness of the technology but to understand its impact on a specific society – one where I was both an outsider and insider. The longer I live in Liberia, the more I learn about its culture and people. I believe the tacit knowledge that I have gained from living in Liberia has not only assisted in my research but has given me the advantage of both an insider’s and an outsider’s perspective.

Throughout the research I was very aware and sensitive about stepping back and being the researcher not the WASH program practitioner. During the research, instead of commenting on the use of the filter or if low user compliance was observed, I would not say anything to the beneficiary. However, when I met with the WASH program manager later I would inform her of any program issues that I may have seen. I wanted to have a distinct separation between the time when I was the researcher and collecting data and the instances when I was a development practitioner.

## 3.0 LITERATURE REVIEW

In compliance with the thesis aim and the objectives outlined in the introduction, critical reviews undertaken in specific areas are documented in this chapter. Issues pertaining to post-war development, quality of life indicators and measurements, and the BioSand water filter technology will be critically reviewed. These three topics are linked with the thesis aim and four objectives listed in the previous chapter. To recap:

**The aim:** To achieve a comprehensive understanding of the impacts that a key technology such as the BioSand water filter can have on the quality of life of people in rural post-war Liberia.

**The objectives are:**

*Objective 1:* To define the relevant components of quality of life for people in post-war rural Liberia.

*Objective 2:* To identify the *potential* impacts of the BioSand water filter on the quality of life of post-war rural Liberians.

*Objective 3:* To identify the *actual* impacts of the BioSand water filter on the quality of life of post-war rural Liberians.

*Objectives 4:* To translate insights gained from the research into recommendations that will help to maximize the impact of the BSF in a post-war context.

The thesis aim and objectives came in large part through the author's interest in the subject of how water projects, specifically the BSF, could have a lasting impact in a post-war country. In researching this inquiry, it was evident that there were 'gaps' in knowledge that neither development practitioners nor academics in the field of international development had addressed. The following sub-chapters will look critically at the topics pertaining to the question underlying the thesis.

### 3.1 Issues Pertaining to Post-War/Conflict Development

The main objective of the research is to seek understanding regarding implementation of BSF projects in a post-war/conflict context. This section looks at some of the issues pertaining to implementing development projects in a post-war/conflict country.

The dire consequences of conflict are complex, difficult to measure, and yet have long-lasting and dismal effects on societies and individuals. Implementing development projects to assist in reconstruction and recovery in any context is challenging; however, post-war development can be particularly complex. Thus, conflicts are often referred to as ‘complex emergencies’ and, as Duffield (1994) explains, “Unlike natural disasters, complex emergencies have a singular ability to erode or destroy the cultural, civil, political and economic integrity of established societies....they attack social systems and networks.” Steenkamp (2009) states, “...post-war reconstruction recognizes the importance of economic, political and social development in order to achieve a sustainable peace and prevent the return to violent conflict.”

This section will review the many issues pertaining to post-war development. It will look at three main problems that hinder development in a post-war country such as Liberia: 1) lack of vital infrastructure, which has been purposefully destroyed, 2) psychosocial issues, and 3) shattered or non-existent systems of governance. After exploring these three issues, this section will conclude with a discussion of the need for INGO sensitivity in development programming in a post-war context. The first issue to be discussed is infrastructure. For this research the links between destroyed infrastructures and the consequent effects on development and on people, specifically the psychosocial effects, are discussed.

### ***Infrastructure:***

A 2004 report by Medact stated that the impact of war and violence goes beyond the conflict causing death and injury with weapons; rather, the greater long-term suffering is linked to damaged infrastructure (Panch et al. 2004). The interdependence of the sectors makes the damage more devastating; when part of a sector is destroyed it affects others. Partial to extensive infrastructure damage to communication networks, hospitals, power sources and government buildings are some of the first effects of war. The destruction of infrastructure affects many areas of society, as is noted in the following description:

“Infrastructure Damage and Resource Diversions – direct damage, destruction, and overconsumption of material and mechanical infrastructure, resources, and surpluses such as production facilities, storage, transport networks, vehicles, water supplies, croplands, food, medical supplies, etc.; indirect damage to the society’s resource and infrastructure bases

(opportunity costs) through the official diversion of resources and funding to the war effort and away from infrastructure construction and maintenance and the provision of social services” (Marshall, 2001).

The following photo’s show some of the destruction during the war.



**Figure 5: A bridge near the research area**



**Figure 6: A collapsed bridge**

*These bridges were destroyed at some point during the 14-year civil war. They were hastily rebuilt by locals as they returned to their communities. However, due to the lack of infrastructure capacity these bridges are not built well enough to sustain either the weather or the traffic on them. As a result, they are decrepit, in constant need of repair and often impassable during rainy season, slowing the flow of supplies considerably.*

There are different categories of conflict; Marshall classifies the Liberian civil war in the following way:

**“Category 04 – Serious warfare:** Available technologies of destruction are at a lower level and/or applications remain limited; challenger groups’ authority, discipline, and objectives are often diffuse and/or indistinct. Areas affected by warfare may be extensive but the intensity and the effects are limited; otherwise, warfare is confined to distinct areas and/or periods of time. If armed conflict is protracted, long periods of dormancy will be punctuated by sporadic operations (re)establishing opposing group boundaries. Population dislocations

may exceed one hundred thousand in affected regions; deaths range from fifty thousand to one hundred thousand. Contemporary examples include Angola 1961-75, Israel-Arab theatre 1967-70, and Liberia 1990-97” (Marshall, 2001).

Post-war development, reconstruction and recovery are daunting tasks. Facing a large number of traumatized people, the challenge for development workers in a post-conflict society is to create hope and encourage reconciliation through community healing and participatory democratic community development (Ackermann et al., 2005). Destroyed infrastructure is not a beacon of hope and therefore can be a psychological hindrance to development as well. Furthermore, the cost of re-building destroyed infrastructure after a war can be an immense burden on the new government. Warring factions deliberately destroy each other’s communications and support lines, such as telecommunications, airports, roads and bridges (Hoeffler et al., 2003). All of these are costly to repair and the most needed for recovery.



**Figure 7: A building destroyed during the war in Foya, Lofa County, 2007(photo by Joni Byker).**

***Psychosocial Impacts:***

Psychosocial impacts of war and conflicts can have lasting effects on individuals and communities. As stated in the introduction, psychosocial, according to the Office for Psychosocial Issues (2010), is defined as follows:

“**Psycho**” refers to the psyche or the "soul" of a person. It has to do with the inner world, with feelings, thoughts, desires, beliefs and values and how we perceive ourselves and others. “**Social**” refers to the relationships and environment of an individual. It includes the material world and the social and cultural context in which people live, ranging from the intricate network of their relationships, over manifold cultural expressions to the community and the state”.

An alternate definition is “pertaining to the influence of social factors on an individual’s mind and behaviour’ (Gilbert, 2005). The term psychosocial also emphasizes the relation between psychological effects (e.g. emotions, behaviours and memory) and the social effects (e.g. change of relations as a result of death, separation and family and community breakdown) (Ager et al, 2004). Both the individual and his surroundings are part of a person’s psychosocial experiences. What happens to people affects not only them, but also their relationships to others and the context in which they may find themselves. The psychological and social impacts of emergencies may be acute in the short term, but they can also undermine the long-term mental health and psychosocial well-being of the affected population (Inter-Agency Standing Committee (IASC), Guidelines on mental health and psychosocial support in emergency settings, 2007). When society experiences disaster, conflict or some sort of trauma, a victim’s psyche is affected. A study of victims from post-conflict communities in Algeria, Cambodia, Ethiopia and Palestine indicated that post traumatic stress disorder was evident in those individuals who were exposed to violence that was associated with armed conflict (de Jong et al, 2003). The traumatic event could be a one-time experience such as a flash flood or it could be a repeated experience, for example a woman being raped on numerous occasions over a period of time. Unfortunately, the psychosocial costs of war have not been quantified and may not be quantifiable (Martz, 2010).

The IASC (2007) states the following psychosocial problems can occur in emergencies or conflicts that are highly interconnected like that of a civil conflict:

- Pre-existing (pre-emergency) social problems (e.g. extreme poverty; belonging to a group that is discriminated against or marginalised; political oppression);
- Emergency-induced social problems (e.g. family separation; disruption of social networks; destruction of community structures, resources and trust; increased gender-based violence)

All of these were and in some cases still are present in post-war Liberia.

The psychosocial wounds that Liberians endured throughout the 14-year civil war run deep and continue to reveal themselves in all facets of society. The human trauma experienced during the civil crisis ran deep and left many scars. The Ministry of Health and Social Welfare (2008) states, “The levels of trauma that Liberians suffered as a result of bombings, ethnic cleansing among some groups, torture, arbitrary imprisonments, forced displacement, mass executions, threats and intimidations, egregious forms of gender-based violence, rape, sexual slavery, and forced termination of pregnancies. People were dehumanized and the social fabric collapsed”.

The trauma and destruction induced by the Liberian civil war penetrated into every component of society. Approximately 250,000 people died during the war and an additional 326,000 internally displaced persons (IDPs) and refugees ([www.internal-displacement.org](http://www.internal-displacement.org) accessed June 2010) were affected. With the amount of trauma-affected and transient people there were bound to be social consequences. Education stopped, families were separated, traditional beliefs compromised, farms were abandoned; the government had failed and little to no safety or security existed. The conflict also ripped through the socio-economic fabric of Liberian society, breaking down family and social values (National Human Development Report Liberia, 2006). Nearly every family incurred loss and many suffered from psychological stress and trauma. Family and household incomes were eroded due to the collapse of economic activities (National Human Development Report Liberia, 2006). As in Sierra Leone, which like Liberia has also suffered recently from a brutal civil war, there were little to no psychological interventions to address both the educational needs and psychological distress among displaced children in this post-conflict setting (Gupta et al, 2008).

As in its neighbour, Sierra Leone, child soldiers were pawns used by both government and rebel factions in Liberia. Child soldiers were lured into fighting by the promise of food, protection or gifts such as radios and clothes (Mallinak, 2005). During the war, children were forced by both rebel and government fighters to kill people older than them, to show their allegiance and be accepted into the battalion. As either faction made its way through villages it would ‘recruit’ children as young as six to fight. On most occasions, the

recruitment was oppressive and forced upon the children. They were kept docile with drugs and alcohol, and made to rape women three times their age and to kill family members. Children were added to Charles Taylor's forces and formed into "small boys units" (SBUs), with 'commanders' as young as twelve leading a unit (Human Rights Watch, 2004).

Because the educational system was not functioning during the war and many of the school-aged children were fighting, this 'lost' generation is largely illiterate. With the end of the war, over 101,000 ex-combatants were demobilized (Congressional report, 2005). Now in their late teens or early twenties and uneducated, to go to school they would have to enter primary grades. "The recruitment of children and involvement of youths in armed conflict not only destroys the lives of children and squanders development opportunities but also erodes the ability for rapid recovery after the conflict" (Achodo, 2000). As a result of being child soldiers during the war, this 'lost' generation has had little to contribute to the reconstruction of post-war Liberia. People are affected many ways as a consequence of war, the main areas being: human capacity (skills, knowledge and capabilities), social ecology (social connectedness and networks), and culture and values (Ager et al, 2004). Post-war Liberia suffered in all these areas and, as a result, development has and will take a considerable amount of time.

The violence endured during the 14-year civil war impacted many of the social norms and values of Liberian society. The ramifications of this psychosocial trauma have directly influenced the morality of this generation and Liberian culture as a whole. As the National development report of Liberia recorded in the aforementioned quote, Liberia suffers the challenge of controlling crime, violence, abuse of alcohol and drugs, intensified corruption, acts of violent revenge, abuse and rape of young girls and women, and lack of respect for authority. Psychologists have warned that children who have sustained exposure to bloodshed combined with a lack of professional help can become habituated to violence that they will continue to use as adults (Howard, 2007).

This generation has little concern for the typical African culture of respect for elders or for the family structure. For example, child soldiers were forced to kill family members or elders of a village, which goes against the social norm of respect for elders and family.

Steenkamp (2009), in her book “Violence and Post-war Reconstruction”, argues that when violence impacts social norms and values in such a way as to foster a greater social tolerance of individuals’ violent behaviour, this could lead to further violence. Former combatants are not the only group that sustains a culture of violence. After war it has been found that those who were victims want revenge, resulting in promotion of a cycle of violence (Summerfield, 2006). The effect of violence on Liberian culture has hindered post-war reconstruction and development. Countries emerging from violent conflict, such as Liberia, have to deal with a society where violence loses its political meaning and people use violence to deal with everyday issues, instead of other methods of communication. Also, violence becomes a way for people to achieve power and status (Steenkamp, 2009).

The gap that this research hopes to fill is to better understand the psychosocial issues, as illustrated in the above paragraphs, involved when implementing a development project in the context of a post-conflict situation. One of the main challenges for development practitioners working in a post-conflict society with a traumatized population is to create hope and reconciliation (Ackermann et al., 2005). In Liberia a truth and reconciliation commission was formed in June of 2006 (TRC) and has proven to be a positive voice for healing in Liberia to begin. It focuses on four main areas; speak the truth, forgive with an open heart, reconcile and justice (<http://trcofliberia.org/>, accessed 2011). The aim of the TRC in Liberia is:

*“It aims to part a mountainous and depraved sea built on 186 years (1822-2006) of misunderstanding, inequality, poverty, oppression and deadly conflict with the enduring principles of truth, justice and reconciliation.”*

In addition to this aim is the Commissions mandate<sup>7</sup>:

*“Its core mandate of investigating and determining responsibility for ‘egregious’ domestic crimes, ‘gross’ violations of human rights and ‘serious’ humanitarian law violations as well as examining the root causes of Liberia’s various episodes of state breakdown and violent conflicts to recommend measures to ensure that truth, justice and reconciliation become permanent features of Liberia’s socioeconomic, political, legal and cultural landscape.”*

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<sup>7</sup> Taken from the Truth and Reconciliation Commission for Liberia Preliminary Findings and Determinations Report, 2009.

However, the best way to incorporate psychosocial treatment is still being debated between psychologists and development practitioners. Ager et al (2004) state that the most effective primary care treatment for post-traumatic stress disorder as a result of a complex emergency has yet to be established. Ensuring a lasting peace is the most effective external intervention to support community restoration which can aid in the psychosocial healing process (Toole, 2002). The Inter-Agency Standing Committee (IASC), Guidelines on mental health and psychosocial support in emergency settings was established to establish and coordinate a set of minimum multi-sectoral responses to protect and improve people’s mental health and psychosocial well-being in the midst of an emergency. Agencies such as this have realized the important need for a humanitarian response to psychosocial victims of conflict. These needs are vital to encourage and sustain peace, improve human rights and for development to occur (IASC, 2007).

In the table below, psychiatrist Jane Gilbert illustrates the challenges and the possible solutions that can be implemented between psychologists trained in trauma response and NGO practitioners.

**Table 1: Current and Recent Mental Health Issues Confronting the Humanitarian Sector (Gilbert, 2005)**

<b>Confusion</b>	<b>Controversy</b>	<b>Progress</b>
Words with a specialist meaning in mental health are common parlance. ‘Trauma’ – meaning a host of things – is used by journalists and the public. Newer words such as ‘psychosocial’ and ‘social well-being’ are not clearly defined.	Is the concept of ‘post traumatic stress disorder’ useful when whole populations have been subject to catastrophic events? Is it a way of transferring responsibility to Western professionals? This question continues to generate powerful controversy.	NGOs now discuss mental health issues far more openly, and lessons are gradually being learned. It is increasingly recognized, though not fully accepted, that psychological wellbeing needs to be integrated within all programmes.
The distinction between mental illness and the <b>normal and expected</b> emotional distress following catastrophic events is often blurred.	Should mental health and psychosocial issues be addressed if basic needs for food, shelter and safety have not been met?	Many NGOs now undertake mental health and psychosocial programmes: some of the plethora following the tsunami have seemed to impose Western models, other have been truly psychosocial and thoughtful, supporting the restoration of community life and recognizing the crucial role of local religious beliefs in the process of healing.

<p>Assessing and measuring the impact of mental health/psychosocial programmes is difficult. Donors prefer quantitative data, but how can this catch the 'invisible changes' of emotional healing which enabled someone to begin to return to the ordinary – the washing, mending the roof.</p>	<p>Do assessment tools, methods and treatments developed in the West have any relevance?</p>	<p>Since 2004 the <i>Sphere Handbook</i> has included 'Mental health'. In recent publications WHO:</p> <ul style="list-style-type: none"> <li>-emphasizes the normality of acute emotional distress within populations exposed to extreme stress</li> <li>-questions the useful application of PTSD to large populations</li> <li>-advocates for a psychosocial approach to mental health – the rebuilding of communities and social structures, and the role of religion and traditional rituals within this process.</li> </ul>
<p>Emotions are a universal part of being human, but how emotional distress is expressed and understood differs between cultures.</p>	<p>Should agencies offer counselling – alien and potentially stigmatizing – that might destabilize and undermine local healing and community resources?</p>	<p>It is now being recognized that minds and bodies are not separate and that a holistic approach is needed. Fundamental issues of culture and language, and communities' normal emotional reaction to distress are being better understood.</p> <p>It is acknowledged that aid workers are psychologically at risk and that training in psychological self-care should be part of all pre-departure training.</p>

Gilbert acknowledges the progress that has been made by INGOs in addressing the psychosocial issues pertaining to the context in which they may be working. However, there is still much work to be done. Coordination between INGOs is necessary to ensure that the best possible practices are being carried out in these post-conflict environments (Akashi et al., 2006). The Sphere project handbook also recognizes the need for understanding and treating psychosocial impacts on people's mental health. Like Gilbert, Sphere includes guidance and indicators to help victims of war that may be suffering with psychosocial trauma. They constitute activities such as:

- Regular cultural and religious events-such as church services, other significant events that are regularly held in the country (Independence Day for example).
- Isolated people such as orphans, widows and child combatants have access to social networks
- People have access to ongoing reliable information
- As soon as possible, children and adolescents have access to formal and informal school and recreational activities. (Sphere, 2004).

More importantly, Sphere states the need for community-based psychological interventions that begin with an assessment to help understand the socio-cultural context of the people who have been traumatized (Sphere, 2004). The main point that seems to be at the crux of the Sphere guidance is helping trauma inflicted societies to get back to the normalities of life such as school for kids, football matches for teams, church services-the normal everyday activities that take place during peace. Individually, the importance lies in supporting the vulnerable and ensuring they are not further harmed or isolated.

Ager et al (2004) outlines an action plan for treating mental health issues in complex emergencies, as do van Ommeren et al (2005). Both of these sources list basic principles that should be in place to assist victims of war, which can be used by mental health workers or development practitioners. There are some similarities but also some differences. Here is a summary list of the two plans:

**Ager et al (2004)**

1. Coordination of mental health care
2. Assessment and monitoring
3. Early intervention phase
4. De-facto mental health system (build capacity)
5. Training and education
6. Implement, manage and monitor
7. Ethics and community participation
8. Prevention of negative mental health in health workers
9. Outcome assessment and research

**van Ommeren et al (2005)**

1. Contingency Planning
2. Assessment of socio-cultural context
3. Long-term perspective
4. Collaboration
5. Integration into primary health care
6. Access to services
7. Thorough training and supervision
8. Monitoring indicators

Both of these plans incorporate building capacity within the health system and within the cultural context. They also ensure that proper assessments are carried out at critical times, in the beginning and at the end. In essence, these two action plans or basic principles address the need for psychosocial care after a complex emergency such as war.

As stated below, humanitarian workers and psychiatrist/psychosocial specialists realize that, working together, they can assist not only in meeting the physical needs of the victims but also in addressing their psychological needs. The Office for Psychosocial Issues explains that the well-being of people can only be improved if:

- Individuals are seen as having social, material and psychological needs and capacities

- The dynamics between individuals and their groups/the collective are understood and addressed.

There are many differing views on how psychosocial issues or mental issues caused by trauma should be treated. A psychosocial working group consisting of universities and INGOs<sup>8</sup> presented a conceptual framework for psychosocial intervention in complex emergencies. The first point of the framework stated: “The field of psychosocial intervention in complex emergencies is currently characterized by a lack of consensus on goals, strategy and best practice.” (Psychosocial Working Group, 2010). This area of study requires further research.

The previously listed post-war/conflict issues can all affect a BSF project, so are relevant to this thesis. Particularly in Liberia, psychosocial impacts are not primarily considered when implementing a development program. Knowing the characteristics of communities, as well as individuals, may be important determinants of post-traumatic stress in low-income countries, such as Liberia (Rockers et al, 2010).

### ***Governance***

The lack of organized government or poor governance after a conflict is another challenge of post-war or -conflict development and reconstruction. The main characteristics of post-war failed states that impede the development process are: 1) corruption, and 2) dependency on foreign aid and debt to major donors (such as the World Bank and other countries’ governments).

Corruption in developing countries, specifically in post-conflict areas, often hinders development. Todaro (2006) defines corruption as “the abuse of public trust for private gain; it is a form of stealing.” The joint staff advisory note written by members of the International Monetary Fund (IMF) and the International Development Association (IDA) on the poverty reduction strategy for post-war Liberia states that, for poverty reduction to

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<sup>8</sup> The membership of the Psychosocial Working Group comprises five academic partners (Centre for International Health Studies, Queen Margaret University College, Edinburgh; Columbia University, Program on Forced Migration & Health; Harvard Program on Refugee Trauma; Solomon Asch Centre for the Study of Ethnopolitical Conflict and University of Oxford, Refugees Studies Centre) and five humanitarian agencies (Christian Children’s Fund; International Rescue Committee, Program for Children Affected by Armed Conflict; Médecins Sans Frontières - Holland; Mercy Corps and Save the Children Federation). The work of the group has been supported by a grant from the Andrew Mellon Foundation. Further details at: [www.forced migration.org/psychosocial](http://www.forced migration.org/psychosocial) and [www.qmuc.ac.uk/cihs](http://www.qmuc.ac.uk/cihs)

take place there, the government needs to take important steps to reduce corruption (2008). Development and governmental or societal corruption cannot exist together. Corruption in government comes in many forms, but has the same debilitating effect of stifling development initiatives. Post-war governments are vulnerable to corruption as they attempt to re-establish order and government systems. One of the main areas in which corruption can be found is in the appointment of government officials at all levels. In Liberia there is also the problem that government officials are paid very little and use bribes to boost their incomes. Transparency International (TI), an INGO that works to fight corruption, stated (2009) that “many local government agencies lack capacity and staff is often inadequately paid, creating an environment that may incentivise petty corruption as a means for officials to supplement their income.” TI goes on to state that, at the local community level in Liberia, superintendants and officials are ‘appointed’ by the national government. This usually means that the political elite are chosen, precluding participation by local people. Liberia’s ruling elite the “Congo-Liberians” – those who can trace their ancestors to the freed American slaves who colonized Liberia – appoint those of the same social class. Division and tension between the indigenous people and the Congo-Liberians results (TI, 2009). This tension was one of the main reasons for civil unrest starting in 1980 when the first indigenous leader, Samuel Doe, overtook the then Congo-Liberian President Tolbert. Coupled with these social divisions, government corruption in Liberia is fostered by former ‘warlords’ who, through corruptive means, were ‘democratically’ elected in 2005.

At the end of the war in Liberia, the National Transitional Government of Liberia (NTGL) governed until elections were held in the fall of 2005. In a Congressional report by INGO Catholic Relief Services (CRS), “Liberia’s Post-war Recovery: Key Issues and Developments” (2005), it was noted that the corruption within the NTGL was rampant, most notably in the areas of “import-export transactions, government contracts, and the issuance of commodity marketing or concessions rights”. The report also noted that the NTGL even went as far as to resist “reforms and audits aimed at fighting corruption”. As a result of the NTGL defiance and obvious corrupt behaviours, international donors such as the World Bank and foreign governments threatened NTGL officials that they would be penalized if they continued in their corrupt practices. The US Embassy released a statement in November 2005 expressing their disappointment in the post-war government:

“The US government is shocked and disappointed by the recent incidents of transfers of Liberian government property and resources into private ownership. This drains vital government resources that could otherwise be used for critical developmental programs, and sends the wrong signal to international donors who finance such programs. It also perpetuates the culture of abuse of public trust and impunity that has contributed to two decades of decline in Liberia. The U.S. Embassy considers these transfers unscrupulous, irresponsible, and contrary to the public interest of the people of Liberia. Liberian government resources are for the benefit of the Liberian people and should not be misappropriated for private use.<sup>9</sup>”

Using an in-depth methodology for a “Corruption Perception Index” Transparency International releases a world map of rankings of the most corrupt countries. The countries with the highest perceived corruption rate are largely post-war or presently in a conflict, for example, Sudan, Angola, Iraq, Iran, Myanmar, Congo, Somalia and Guinea. It is interesting to note that the majority of Africa is rated in the bottom three rankings for the CPI and that Africa currently has the most complex emergencies and active civil wars (Relief Web, 2010). This suggests a correlation between conflict and governmental corruption.

In 2008, the government of Liberia under President Sirleaf established the Anti-Corruption Commission Act. The following framework was established in this Act:

**“WHEREAS**, Corruption in both public and private sectors of the Liberian Society has undermined the Institutional framework of good governance; and, as a consequence, has hampered sustainable Sociopolitical Tranquility and retarded development and growth of Liberia;

**REALIZING** that, due to the debilitating consequences of corruption, the people of Liberia have declared Corruption as public enemy number one and resolved to combat and eradicate it;

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<sup>9</sup> U.S. Embassy, Monrovia, “U.S. Embassy Shocked and Disappointed at Abuse of Public Trust,” Press Release, Nov. 18, 2005 and IRIN, “Liberia: Scramble for Goodies Ahead of Political Handover,” Nov. 21 2005.

**ACKNOWLEDGING** that, Government has adopted an anti- corruption policy and a comprehensive Strategy that outlines the preventive, educational and enforcement measures to be taken to combat Corruption in Liberia; and specifically provide for the establishment of an independent Anti-Corruption Commission to investigate and prosecute cases of corruption; and

**RECALLING** Chapter 10, Article 89 of the 1989 Constitution of Liberia which empowers the Legislature, this Act declares the seriousness of corruption in Liberia- and the government’s response to it. The process of ridding Liberia of corruption is difficult and will take time.

Although the government has taken an active role in trying to alleviate corruption, it is still a huge problem, as the graph below from the 2009 Global Integrity Report’s report card on Liberia indicates:

Liberia: Integrity Indicators Scorecard

**Overall Score: 54 (+/- 2.05) - Very Weak**

**Overall Implementation Gap: 22**

<b>Category I</b>	<b>Civil Society, Public Information and Media</b>	<b>59</b>	<b>Very Weak</b>
I-1	Civil Society Organizations	79	Moderate
I-2	Media	82	Strong
I-3	Public Access to Information	17	Very Weak
<b>Category II</b>	<b>Elections</b>	<b>72</b>	<b>Moderate</b>
II-1	Voting & Citizen Participation	92	Very Strong
II-2	Election Integrity	72	Moderate
II-3	Political Financing	54	Very Weak
<b>Category III</b>	<b>Government Accountability</b>	<b>45</b>	<b>Very Weak</b>
III-1	Executive Accountability	47	Very Weak
III-2	Legislative Accountability	43	Very Weak
III-3	Judicial Accountability	31	Very Weak
III-4	Budget Processes	60	Weak
<b>Category IV</b>	<b>Administration and Civil Service</b>	<b>24</b>	<b>Very Weak</b>
IV-1	Civil Service Regulations	26	Very Weak

IV-2	<b>Whistle-blowing Measures</b>	0	Very Weak
IV-3	<b>Procurement</b>	70	Moderate
IV-4	<b>Privatization</b>	0	Very Weak
<b>Category V</b>	<b>Oversight and Regulation</b>	<b>51</b>	<b>Very Weak</b>
V-1	<b>National Ombudsman</b>	0	Very Weak
V-2	<b>Supreme Audit Institution</b>	95	Very Strong
V-3	<b>Taxes and Customs</b>	81	Strong
V-4	<b>State-Owned Enterprises</b>	50	Very Weak
V-5	<b>Business Licensing and Regulation</b>	29	Very Weak
<b>Category VI</b>	<b>Anti-Corruption and Rule of Law</b>	<b>71</b>	<b>Moderate</b>
VI-1	<b>Anti-Corruption Law</b>	100	Very Strong
VI-2	<b>Anti-Corruption Agency</b>	63	Weak
VI-3	<b>Rule of Law</b>	68	Weak
VI-4	<b>Law Enforcement</b>	52	Very Weak

(<http://report.globalintegrity.org/Liberia/2009/scorecard> accessed 2011).

In a corrupt environment, there are numerous challenges for INGOs trying to initiate development programs. Although this section only addresses corruption in governance, corruption is not limited to that arena. Corruption in government, the private sector and even among individual citizens affects development projects at the “very root by skewing decision-making, budgeting and implementation processes” (TI, 2008). For this study, the challenge of corruption at the government level is addressed. Further study would be required for an in-depth review of the effect that corruption in developing countries has on post-war reconstruction and development.

The second area of governance issues pertaining to the challenges of post-war development is the government’s dependency on aid and being in debt to foreign lenders. This too is an area for further study and it will be discussed only as it pertains to the thesis and objectives. Post-war countries are often burdened not only with rebuilding their nation, but also with large international debt to other countries and institutions such as the World Bank, the International Monetary Fund (IMF) and African Development Bank (ADB). It is difficult to convince businesses to invest in a country so laden with debt and that may also be unstable. However, there are some cases in which governments of developing countries show

improvements and where fiscal responsibility for debt has been relieved. Such is the case for Liberia, which qualified as part of the “[Initiative for Heavily Indebted Poor Countries](#)” (HIPC)<sup>10</sup>. Under the Multilateral Debt Relief Initiative (MDRI)<sup>11</sup>, Liberia was awarded debt relief to assist in re-investing and re-building the country.

Liberia is still dependent on aid from other governments. At a recent USAID meeting (October 27, 2010), it was stated that 25% of aid to Liberia is from the United States. Receiving aid from large governments can assist in the reconstruction of the country; however, government ministries can become dependent on this aid. Instead of building capacity within the government to reduce the dependency, due to corruption issues already mentioned the government may take a long period of time to ‘stand alone’. It could be argued that governments in developing countries rarely ‘stand on their own’. This research will not address this area further as it does not pertain directly to the thesis aim.

For development projects such as the BSF to have the potential and positive impacts on the QoL for people in a post-war context, the challenges discussed above need to be considered. Unfortunately, INGOs and donors do not fully understand these challenges as they prepare to implement post-war development projects. This discussion will be continued in the recommendations and conclusion chapter in the light of the findings of the research.

## **Summary**

The issues pertaining to post-war development can be obstacles for INGOs to help those in need. The role INGOs play in post-war/conflict is vital and there could be serious consequences if their work is carried out ineffectively. Destruction of infrastructure is

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<sup>10</sup> The [HIPC Initiative](#) was launched in 1996 by the IMF and the World Bank to ensure that no poor country faces a debt burden it cannot manage. It entails coordinated action by the international community, including multilateral organizations, governments, and private creditors. In 1999, the initiative was modified to provide faster and broader debt relief and to strengthen the links between debt relief, poverty reduction, and social policies. (<http://www.imf.org/external/pubs/ft/survey/so/2010/car062910a.htm> )

<sup>11</sup> The Multilateral Debt Relief Initiative (MDRI) provides for 100 percent relief on eligible debt from three multilateral institutions to a group of low-income countries. The initiative is intended to help them advance toward the United Nations’ [Millennium Development Goals \(MDGs\)](#), which are focused on halving poverty by 2015. (<http://www.imf.org/external/pubs/ft/survey/so/2010/car062910a.htm> )

obvious and handicaps the movement of vital materials and supplies. Contextually, in the case of the Liberian civil war, infrastructure was destroyed so extensively that it debilitated the entire country to the point of being a failed state. The effects of war are not limited to just physical structures but, more importantly, include the psychosocial impacts on society. Complex psychological problems of distrust, fear, frustration, powerlessness and anxiety are a few of the challenges that victims of conflict face. The psychosocial trauma endured by victims of conflict can hinder post-war development. The consequences of a failed state often include an increase in corruption and dependency on foreign aid. Both of these have taken their toll on government agencies, INGOs, businesses and society in Liberia. All of the issues that have been addressed in this sub-chapter illustrate the challenging environment that INGOs have to negotiate to assist those in need.

## **2.2 Quality of Life Indicators and Measurements**

Out of the four objectives, three have to do with establishing the Quality of Life (QoL) of rural post-war Liberians and how the BSF affects those indicators. War has direct consequences on a society's QoL, as Marshall (2001) describes:

**Diminished Quality of Life and Non-reciprocal Resource Transfers** – tangible and intangible losses (both short- and long-term) associated with general deterioration in the immediate, aesthetic quality of life, access to basic needs, and future prospects in affected societies; humanitarian crises; capital outflows (e.g., “brain drain,” “capital flight”); devaluation and unequal terms of exchange; lack of investment and exchange; losses in human potential due to lowered self-esteem and lowered expectations, self-destructive behaviours, alienation and introversion, and within-group factionalization and victimization.

Liberia has experienced all of these characteristics of a post-conflict country. As a result, the QoL for most Liberians is very low. However, as this sub-chapter will describe, QoL measurements for countries like Liberia maybe inadequate.

Discussions of QoL indicators and their measurement include participants such as the United Nations, psychologists, sociologists, municipal and federal governments, and individuals. Glatzer (2004) highlights this by stating “Quality of life, in the full sense of the term, is interdisciplinary: different approaches use it in varying ways. There is no other area

of research where so many scientific fields are involved: sociology, political science, economics, psychology, medicine, philosophy, marketing, environmental sciences and others”. Different QoL indicators and measurements for diverse contexts and cultures make it difficult to narrow down common QoL indicators. What is a useful QoL indicator to one culture may not be for another. The same can be said of different countries and even people. In his book “Development as Freedom” Amartya Sen states “The focusing on the quality of life and on substantive freedoms, rather than just on income or wealth, may look like something of a departure from the established traditions of economics, and in a sense it is” (1999). This section will look at the differing views and definitions of QoL and the measuring tools used to formulate quality of life indicators from different sources. It will then consider possible gaps in QoL indicators for post-war/conflict contexts such as Liberia.

Defining “Quality of Life” is challenging as it crosses into many facets of study and opinion. Glatzer (2004) emphasises this, stating “Due to its complexity, no individual can claim to evaluate its quality of life with full validity depending alone on the individual experience; however, the social sciences – in the broadest sense – are necessary to engage in the definition, measurement, exploration and explanation of quality of life...” The purpose of this section is to show the differing definitions and measurements and to look critically at them in the context of rural post-war/conflict in Liberia.

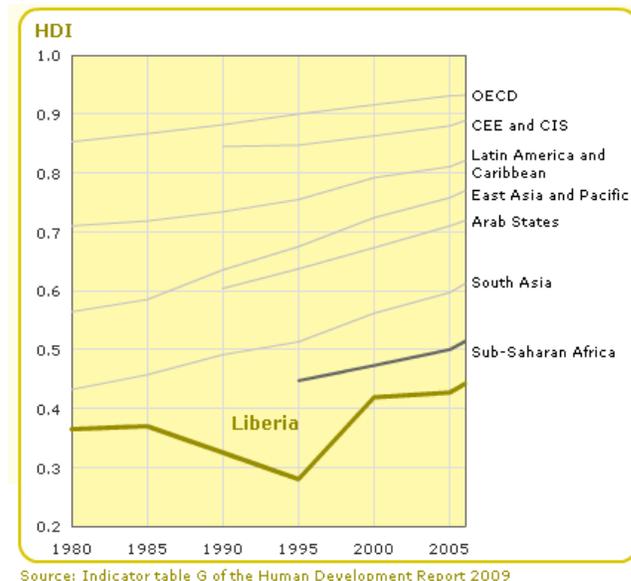
QoL has been defined as “the liveability in a certain area or the absences of issues such as teenage pregnancy, poverty, and disease” (Epley, 2008). The Economic and Social Research Council goes as far as establishing ‘wellbeing’ indicators, stating “Wellbeing is the state of being with others where human needs are met, where one can act meaningfully to pursue one’s goals, and where one enjoys a satisfactory quality of life” (Copestake, 2008). QoL is incorporated into the state of wellbeing and not separated; however, wellbeing does not indicate what a ‘satisfactory quality life’ is or how it is measured. It should be noted that Epley’s definition is directed to a North American context; however, he does recognize the differences in definition and opinion about what quality of life means. The World Health Organization on Quality of Life, WHOQOL, defines QoL as “individuals’ perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns. It is a broad-ranging concept

affected in a complex way by the person's physical health, psychological state, level of independence, social relationships, personal beliefs and relationship to the salient features of their environment" (WHOQOL, 1997). This definition focuses on the individual and verifies that QoL is unique to each person, depending on the context and environment in which they are living. This will be further addressed and noted in the proceeding chapter.

In a context of a developing country, the definitions of QoL include other aspects of life. Edwor (2004) states in his article "Towards Enhancing the QoL in Africa" that other indicators such as infant and child mortality, availability of medical services and sanitary facilities, prevalence of child malnutrition, life expectancy, literacy and access to safe water may be equally important as GNP. Sen (1999) goes further, stating that quality of life concentrates on the way human life goes, perhaps even the choices one has, and not just on the resources or income that person commands. Both of these definitions indicate a need for freedom of choice and the availability of services being necessary as a starting point for QoL indicators.

Measuring QoL is as complex as defining QoL. This research will review the main measurements used to rank a person's or country's QoL. In some studies, QoL is referred to as 'social development' or, as previously mentioned, 'wellbeing'. For the purpose of consistency, the term QoL will be used throughout this research. Historically, two of the most widely-known and used measurements of QoL have been the Physical Quality of Life Index (PQLI) and the United Nations led Human Development Index (HDI) (Ray, 2008). Other measurements such as the Calvert-Henderson QoL, released in 2000, and the Social Development Index (SDI) have been used to measure different aspects of people's lives and to rank countries in order of most to least developed or desirable to live in. Many, varying areas are measured. Nolting et al as quoted in Glatzer states, in his article "Bringing Together the Concepts of Quality of Life and Sustainability" state that there are four 'spheres' of quality of life; the material sphere, social sphere, personal development and self-realization sphere and the societal (coexisting with society) sphere (Glatzer, 2004). These measurement tools will be critically reviewed regarding their use and how or if they can be applied in a rural post-war context.

The HDI takes into consideration three main QoL measurements, which are: 1) life expectancy, 2) adult literacy, and 3) gross domestic product (GDP) per capita. Developed by the United Nations Development Program in 1990, the HDI, with these three main measurements, covers health in life expectancy, knowledge or access to education in adult literacy, and economic state in GDP (Epley, 2008). These three factors are plotted on a scale between zero and one, and then combined to achieve a composite score; values less than one indicate the extent to which a society fails to enjoy the best possible life available in other nations (Epley, 2008). With these three indicators (life expectancy, adult literacy and GDP) it can be said that health, education and income are the central sectors of life that are measured by the HDI. Countries are ranked from the best (the country having the highest score over the three indicators) to the worse. Countries are divided into four groups: very high human development, high human development, medium human development and low human development. The UNDP (2009) top four countries ranked in the very high development category are Norway, Australia, Iceland and Canada, and the lowest-ranked countries in the low human development category are Central African Republic, Sierra Leone, Afghanistan and Niger (the worst at 180<sup>th</sup>). It should be noted that three out of the four lowest ranked countries are in a state of post-war, and Niger has areas of conflict in specific locations. Liberia is ranked 169<sup>th</sup>, which indicates the effects that the 14-year conflict had on the country, leaving it as one of the world's least-developed countries by HDI standards. The following graph illustrates Liberia's ranking:



**Figure 8: Liberia's HDI Ranking Compared to Other Parts of the World.**  
(Human Development Report, 2009).

The HDI is a measurement of development and does not take into consideration QoL of individuals in a specific context. It is an overarching measurement using specific indicators to rank a country's development, which may seem redundant and similar to already-established development indicators. McGillivray questions whether or not the HDI reveals anything more than other development indicators, such as social and emotional aspects of life, and whether the HDI is useful (1991). He concludes that the HDI does little to provide new development measures compared to the traditional indicator, GNP per capita.

The Physical Quality of Life Index, PQLI surveys similar aspects to the HDI, excluding a measurement of income. PQLI measures a country's adult literacy, life expectancy at birth and infant survival rate (Ray, 2008). Established by Morris for the Overseas Development Council (ODC) in the late 1970s, the PQLI was designed to reflect the "end results of a development process and relate to the conditions of the vast majority of the population" (Ray, 2008). Ray further explains that the PQLI was also used as a simple way for the US government to measure the impact of foreign development aid given to developing countries (2008). The PQLI has been used to measure the fulfilment of basic needs or as a measurement of social development (van der Lijn, 2010).

The PQLI measures the 'physical' aspects of an individual or country to indicate any development improvement, leaving gaps in other areas of life such as mental, spiritual and freedom or rights which are just as important to a person's quality of life. However, the PQLI does not hide the fact that it does not measure these things and is, as Morris states, "an attempt to create a practical measure of social distribution that will avoid the limitations of the GNP, which will minimize cultural, and development ethnocentricity, and that will be internationally comparable (1978).

There have been other QoL indicators that have been established and used for different contexts. An example is the Calvert-Henderson QoL indicators. Released in 2000, these were "constructed by a multi-disciplinary group of practitioners and scholars from government agencies, for-profit firms, and non-profit organizations". They are utilized primarily in the United States, drawing information from economic, social and environmental data sets and the different institutions in society (Flynn et al, 2002). However, the Calvert-Henderson is geared towards what Americans "deem integral to quality of life" (Flynn et al, 2002). There is an array of other studies and surveys that measure QoL by assessing a community's crime rate, access to health care, recreational programs, proximity to universities, programs for different ethnic groups, number of religious buildings, and a host of other indicators that would constitute a high QoL or 'wellbeing' community. Although aspects of these QoL are important to everyone, the difference could be argued that in developed countries there are more opportunities to participate in these QoL indicators. In a developing country recovering from war those opportunities are greatly limited due to the challenges cited in section 3.1. The problem is that these QoL indicators mostly cater to the developed world where freedom is enjoyed and not to people living in countries that do not have the same democratic freedoms. Therefore, some, such as Sen and Rihani noted below, have argued that, to measure the aforementioned QoL indicators, certain fundamental rights of opportunity and capability would have to be in place (Sen, 1999 & Rihani, 2002).

Amarty Sen, a welfare theoretician, is one who has stated that QoL or wellbeing is dependent on people's capability to function – what they can do or can be – instead of concentrating on what they possess. For example, if people do not have the capability to

gain access to health facilities or educational facilities, due to war, societal oppression (caste systems), gender oppression, or lack of freedom or rights, they will not have a high QoL or wellbeing (van der Lijn, 2010). Sen (1999) reiterates this line of thought, explaining that there are forms of ‘un-freedom’ which also deprive people of political freedoms and basic civil rights. Due to this “un-freedom”, people do not have the opportunity or capacity to pursue QoL. Rihani (2002) explains that development can only emerge from the ‘wasteful chaos’ if people are free to interact and capable of interacting. Both Sen and Rihani underline the importance of freedom and capability. Rihani (2002) goes on to state that “few developing countries meet the freedom criterion. State repression, against whole populations or sectors targeted by gender, religion or ethnic background, is widespread.”

### **Summary**

I would agree with Rihani and Sen regarding the need for fundamental freedom, and the opportunity that freedom brings, to even begin distinguishing what the QoL could be for a society. If freedom is present and people have the ability to build capacity, there is opportunity for QoL to be realized. Attempting to measure the QoL based on criteria that are impossible to either measure or obtain in a country like Liberia would be unwise. Countries measured on QoL indicators that are impossible for them to obtain often find themselves at the bottom of the HDI or the PQLI. Knowing this, the importance of an alternative measurement or criteria for establishing specific contextual QoL indicators could help an INGO think through their strategy before implementation. The challenge arises when donors dictate the intended development impacts that they wish the INGO to achieve and do not consider the context or the specific QoL that a community or individual has.

### **2.3 The BioSand Water Filter (BSF) Household Water Filter Technology**

This research centres on a low-tech form of household water development technology in a post-war context. It has been used as the ‘lens’ through which to view the way that simple forms of development technology can impact the quality of life in a post-war context. As stated in the introduction, the BSF was chosen for the practical reason that it has been the main development technology that I have worked with, but also I wanted to know what impact development projects like the BSF were really making on the QoL of people in a post-war context. Apart from this, the BSF is an appropriate example of a development

intervention to use due to the intimate relationship that it has with the household user. This will be further manifested in the results and discussion chapter. The BSF is a form of household water treatment, therefore the household or, in most cases, one person, is the caretaker of the BSF. Instead of seeing how a hand pump impacts a community, this research looks at the micro-community, the family and individual, to distinguish what impacts a simple form of development technology can have. In a way, the BSF is the ‘lab rat’ of if and how simple development technology can impact the QoL of a specific population. It helps in that it is a very simple form of technology, there are no moving parts or chemicals, and education can be contextualized. This section of the literature review explains the history of the BSF, how it works, and the evaluations that have been done on it. It must be understood that this research is not to test and show the efficiency of the filter, but to see how the filter impacts an individual’s and a family’s QoL. As noted, the BSF is just the lens to illustrate the challenge of implementing simple forms of technology in a post-war context and how it may or may not impact the QoL of its beneficiaries.

### **2.3.1 BSF Technology and Theory**

Two of the four objectives for this research centre around the BioSand water filter, its potential impact on the quality of life for post-war Liberians and the actual impacts that the filter has had on rural post-war Liberians. They are:

**Objective 2:** To identify the *potential* impacts of the water filter on the quality of life in specific communities

**Objective 3:** Measure and identify the actual impacts of the BSF on the quality of life of rural post-war Liberians

Slow sand filtration has been used as a safe form of water treatment for over two hundred years, originating in the UK (Huisman, Wood et al, 1974). Used in many different ways, slow sand filtration employs the simple action of passing untreated water through a column or bed of sand which separates the impurities from the water. Research reveals that in the late 19th century, just before the 1900s, the first study of the benefits of filtered water took place. Two neighbouring cities in Germany obtained their drinking water from the River Elbe; one city did not treat the water, while the other did. “When a cholera breakout polluted the river, those who drank untreated water were fatally affected, while those who drank filtered water escaped unscathed” (Huisman, Wood et al, 1974).

The BioSand water filter (BSF), invented by Dr. David Manz, is a household water filter which uses a variation of traditional slow sand filtration. Its design has evolved over the past twenty years, as Dr. Manz has been improving and testing the BSF in different countries, climates, environments and cultures. Unlike the traditional slow sand filtration process, the BSF is known as ‘intermittently operated slow sand filtration’ (Manz 2007), which means the filter is used as water is demanded. Often called a ‘point of use’ (POU) filter, it enables those without access to safe water to provide clean water by treating it at home (Elliot, Sobsey et al, 2008).

Much like the traditional forms of slow sand filtration, the BSF uses the sand to remove parasites and larger particles from the input water. However, to remove the smaller bacteria and viruses the filter relies on a biological process, combining both filtration processes (Manz, 2007); hence the name of the filter – “**BioSand**”. The accumulation of micro-organisms develops into a thread-like slime or “schmutzdeke” (German for dirty layer) (SP BSF Manual 2008) that gathers on top of the sand. Once the contaminated water is passed through the top of the filter, the filtration processes begins. Figure 9 illustrates the parts of the filter. Water is poured into the top of the filter and passes through a diffuser plate. The diffuser plate has a grid of 3/8” holes that are spaced equally one inch apart. This allows the water to pass through evenly and slowly so to not disturb or damage the sand surface where the biofilm is located.

The purification process then begins, through four filtration processes that take place in the filter; these are not in sequence but in combination.

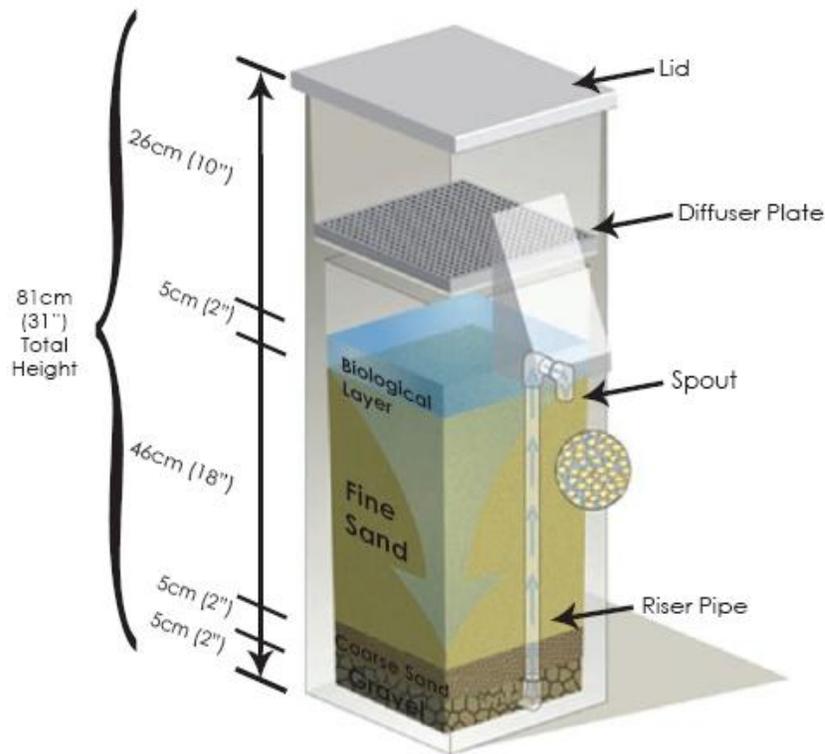
- 1) **Mechanical trapping** takes place as the fine sand traps organic material at its surface. This trapped organic material then forms a layer of biological matter.
- 2) **Adsorption:** The fine grains of sand in the filter hold a static charge, which causes organisms to stick to them.

- 3) **Natural death:** This takes place as the water travels down the column of sand, where there is little light, air or food, so that disease-causing pathogens starve.
- 4) **Biological predation** is derived from the organisms that are in the water, such as algae, protozoa, bacteria, and plankton, becoming their own food chain in the first few centimetres of the sand and forming a biological layer. This active food chain breaks down organics and disease-causing pathogens (Huisman and Wood, 1974).

The filter contains three distinct layers of media: the under-drain gravel, the coarse sand, and the fine sand. All three layers have to be a specific size for the filter to achieve optimum filtration. The fine sand makes up the largest part of the media column. The sand plays a crucial role in the filtration as has been stated, and therefore its selection is very important. The sand size must be within 0.15mm-0.35mm (Manz, 2007). It cannot be beach or riverbed sand as those sand particles may be contaminated and are rounded, limiting the surface area needed to allow pathogens to attach themselves (Manz, 2007). Sand, or rock dust, is usually harvested from a rock quarry. The sand is then transported back to a BSF work site to be sifted to the correct sizes needed for the filter.

The flow rate of the filter also is specific to maximize the four filtration methods. The BSF yields a flow rate of between 0.65 and 0.85litres/min with a +/- 10% margin (Manz 2007). The sand plays a large role in the flow rate: Once sifted to the correct size the sand is tested to observe if it yields the ideal flow rate. If it is too slow, the sand is washed to remove some of the silts and then retested. If the flow rate is too fast silts are added to the sand and again the sand is retested in the filter. This process can take time as the adjustments are made to the sand to yield the ideal flow rate. Once the ideal flow rate is achieved, whatever adjustments were made to the sand are continued to ensure consistency for each bag of sand that is prepared for each filter. A slow flow rate does not jeopardize the filtration process; however, people will be less willing to use the filter as they will have to wait longer for clean water. A fast flow rate will jeopardize the purification process because pathogens do not have time to be affected by the various filtration processes.

The filter is designed to suit the environment of developing countries. Made of cement, it is strong, watertight, has no need for power or chemicals, and all materials can be found locally. The three layers of media are encased in a cement housing that is 95 centimetres in height and 36 centimetres in width (Baker et al, 2005.)



**Figure 9: Measurements for media and specification of parts.**

### 2.3.2 Evaluations and Impact Studies

The BSF has undergone a number of external and internal (within Samaritan's Purse) evaluations. Leading epidemiologists, university research students and organizations have conducted investigational studies, including health impact evaluations, on the filter. These studies, evaluations and impact studies were performed primarily to analyze the filter's *effectiveness* in its removal rate of disease-causing organisms. The following table describes the type of evaluation/impact studies done on the BSF and their findings.

**Table 2: Studies/Evaluations Conducted on the BioSand Water Filter**

<i>Author of Study/Organisation</i>	<i>Location/Date of Study</i>	<i>Purpose of Study</i>	<i>Methodology Used</i>	<i>Results/Conclusions</i>
Paul Earwaker Cranfield University	Ethiopia , 2005/2006	Evaluation of the BSF in Ethiopia to fulfil MSc requirements	Semi- structured interviews  Oxfam DelAgua kit – # of thermo-tolerant coliform colony-forming nits per 100ml of raw water (Earwalker, 2006)	71.8% of the filters tested have a >99% removal rate of faecal contamination (Earwalker, 2006).
William Duke, MD, University of Victoria, & Derek Baker, P.Eng., Centre for Affordable Water and Sanitation Technology (CAWST)	Haiti, 2005	Evaluate the use and performance of the BSF in 107 households.	Semi-structured interviews  Water samples prepared and membrane filtration and turbidity measurements of coliform colonies were counted	The filters tested averaged an <i>E. coli</i> removal rate of 98.5%. 20% of the filters tested were above the WHO limit for ‘safe water’ with a limit of zero <i>E. coli</i> /100ml (Duke et al, 2005).
Eric Fewster, Adriaan Mol & Cleo Wiessent-Brandtsma 30 <sup>th</sup> WEDC International Conference	Kenya, 2004	The long-term sustainability of household bio-sand filtration. Measuring the performance of filters installed 4 years previously	Surveying user perception and maintenance practices, along with <i>E. coli</i> and turbidity measurements. Water samples for the latter were taken from 51 filters.	Of the 51 filters tested, 36 indicated acceptable coliform levels (0-10CFU/100). Poor performing filters were a result of low user compliance and education. (Fewster et al, 2004)
Heather Lukacs Massachusetts Institute of Technology	Nepal, 2002	Fulfilment of the requirements for a Master of Engineering in Civil and Environmental Engineering degree “From Design to Implementation: Innovative Slow Sand Filtration for Use in Developing Countries”	Presence/absence H <sub>2</sub> S bacteria test. This test is done to determine if there are hydrogen sulphide producing bacteria which are associated with the presence of coliform bacteria, indicating the presence of water-borne pathogens (Lukacs, 2002)	Before testing could be done, factors of sand source, installation procedures, and education had to be considered, along with the amount of time from installation to testing (Lukacs, 2002).
Andrew Buller & Marianne Marteaux, MSc, Samaritan’s Purse Ethiopia Kale Heywet Church	Ethiopia, 2007	Final report for phase II of a Canadian International Development Agency (CIDA)-funded BSF project implemented by Samaritan’s Purse	Water testing and focus group questionnaires were used to determine the overall effectiveness of the BSF and the level of user compliance over time.	82% decrease of incidence of diarrhoea in BSF households compared to non-BSF households. BSFs removed, on average, 97.3% of <i>E. coli</i> and 80% turbidity (Bueller et al, 2007)
Melanie Pincus Massachusetts Institute of Technology	Nepal, 2003	Fulfilment of the requirements for a Master of Engineering in Civil and Environmental Engineering Degree “Safe Household Drinking Water via BioSand Filtration Pilot Project Evaluations and Feasibility Study of a BioSand Pitch Filter”	Membrane filtration and presence/absence testing conducted measuring Turbidity and <i>E. coli</i> removal	Filters tested and observed removed average of 99.2% of turbidity and, when a ripened biofilm is present, <i>E. coli</i> removal increased upwards to 95% (Pincus, 2003).
Dr. Mark Sobsy et al, Dept. of Environmental Sciences and Engineering, University of North Carolina.	University of North Carolina lab testing and Dominican Republic (2005) field testing	A study done on the BioSand filter for <i>E. coli</i> reduction in a controlled laboratory and during field use	Both lab and field testing used water testing equipment to identify the <i>E. coli</i> reductions (Sobsy et al, 2006).	Filters tested in the lab indicated an <i>E. coli</i> removal rate of 94%-99%. Filters from the field test averaged a removal rate of 93% (Sobsy et al, 2005).

Quantitative results indicating *E. coli* removal rates, turbidity and reduction in diarrhoea are the main indicators of the BSF's potential effectiveness. Potential effectiveness assumes that where user compliance is high, the effectiveness of the filter in removing disease-causing organisms is also high. Lukacs (2002) proved that results from testing the BSF depended on many factors such as the implementation of the filter project and how it is managed, sand source, overall user compliance and giving the filter adequate time to be used before testing the effluent water.

Among the studies inspected and data reviewed, there were no clear studies of the social impacts of the BSF on communities and specifically the beneficiary, thus leaving a research gap for the BSF. By investigating past the efficiency of the filter a deeper understanding of how the BSF impacts society can be realized. This is important to know the full impact of a low form of technology-the opportunity for development projects to deeper their impact and maximize the help that can be given to vulnerable people. Testing and evaluating that the technology is doing what it is made to do is the primary indicator of success and positive impact. The research described in this thesis is designed to give insight into the impacts of the BSF at a wider level than just overall water treatment effectiveness.

## **Summary**

The literature pertaining to the BSF does essentially focus on the household water treatment's effectiveness. It is, of course, natural and understandable that a technology would be adequately and thoroughly tested in different environments and within different projects to observe and record its effectiveness or deficiencies. That is not the case with this research, as has already been mentioned. It is important to see that the BSF is, in of itself, a viable efficient water treatment; but most of the studies carried out are by engineers, epidemiologists or health experts who are focusing on the quantitative results of the filter. In no way am I undermining their studies, I am, however, in this literature review attempting to demonstrate that there is a gap of knowledge pertaining to the BSF and the qualitative data relating to the QoL of its beneficiaries. As stated previously it is important to recognize this relationship between low forms of development technology with the full spectrum of impacts it can have on society. If it is realized that the spectrum of impacts can improve QoL, the full potential of project could go beyond the initial intention and assist in the recovery of conflict.

The topics of the three sub-chapters in this literature review have been critically examined and considered in relation to the thesis aim and objectives. Issues pertaining to post-war/conflict development have given insight to the uniqueness of program implementation in post-war Liberia. It is clear that INGOs are still learning to work in this context and need to share information with the stakeholders involved in greater depth. Understanding the various perspectives and measurements of QoL in relation to the research area has demonstrated the need for contextual QoL indicators. Understanding and critiquing the BSF has demonstrated its historical and technical aspects and some of the evaluations that have been done on the filter. The gap in research regarding the BSF concerns its potential and actual impact on QoL in a post-war context. The literature review has revealed the gaps in research. This chapter, in partnership with the previous chapter on contextual review, will aid in understanding the methodologies stated in the next chapter that will yield the results to be shown in the findings and discussion chapter.

## 4.0 METHODOLOGY

Considering the gaps identified by the literature review and the aim and objectives of the thesis, this chapter will outline the methodologies chosen. It will look at the methods used and why they were selected, including methods of quantitative and qualitative analysis, themes of triangulation, and strategies for limiting bias. The limitations and challenges of data collection will also be discussed. To review, the thesis aim and objectives are:

**Thesis aim:** To achieve a comprehensive understanding of the impacts that a key technology such as the BioSand water filter can have on the quality of life of people in rural post-war Liberia.

### **Objectives:**

**Objective 1:** To define the relevant components of quality of life for people in post-war rural Liberia

**Objective 2:** To identify the *potential* impacts of the BioSand water filter on the quality of life of post-war rural Liberians.

**Objective 3:** To identify the *actual* impacts of the BioSand water filter on the quality of life of post-war rural Liberians

**Objectives 4:** To translate insights gained from the research into recommendations that will help to maximize the actual impacts of the BSF in a post-war context.

The methods chosen were based on a consideration of the following questions:

- What types of data are needed to answer the research aim and meet the objectives?
- What is the best way to gather information from Liberian people, taking into account their post-traumatic sensitivity caused by the war?
- What knowledge can I use from past experience in BSF projects to assist in answering the research question and achieving the objectives?

The data collected was done over a time period from 2006-2010:

- 2006-2007- BSF questionnaire and the interview survey: n=27
- 2009 October -Water Testing: n=7
- 2009-2010 – QoL and Development desires survey: n=40

The sub-chapters that follow will begin with a discussion of some practical aspects of the methods selected, including the choice of the research arena. A sub-chapter on the collection of social data will follow, then the quantitative and qualitative data collection methods, their strengths and weaknesses and the role that they play in the research will be explained. The last two sections will address triangulation and bias, and discuss the limitations and challenges of data collection when employing the selected methods.

## 4.1 Practical Aspects of Methodology

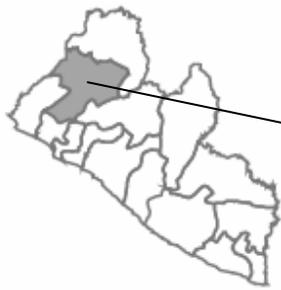
### 4.1.1 Research Area

The research arena is country specific, based on the author’s location, which is a post-war country, and a rural context. After 14 years of civil war, Liberia is an ideal environment to investigate how development projects, and the specific technologies that they often introduce, can positively influence a society recovering from war. Since much of Liberian society is based rurally, where the majority of the population lives, many development projects take place in rural communities; therefore rural communities were chosen. The table below outlines the main criteria for the research arena:

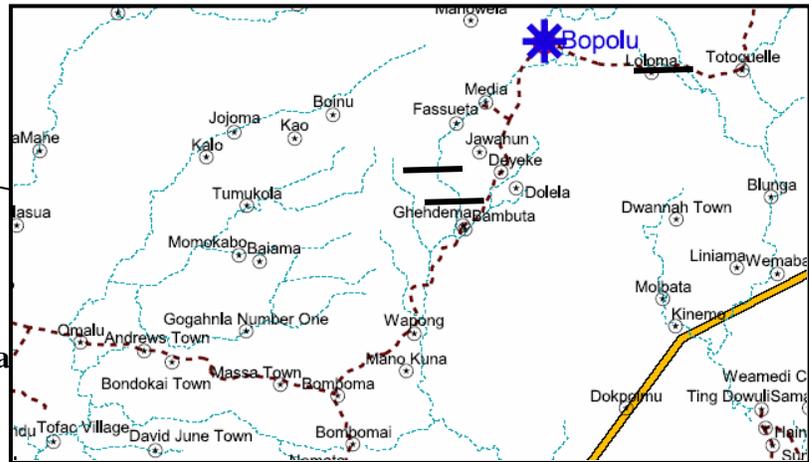
**Table 3: Criteria for County, Community and Interviewee Selection.**

1. County	<ul style="list-style-type: none"> <li>• Gbarpolu County see Fig. 2&amp;3</li> </ul>
2. Communities	<ul style="list-style-type: none"> <li>• Within two hours travel from Bopolu City, the county capital. See Table 5</li> <li>• With a population between 30 and 500 people</li> <li>• No closer than 5-10 minutes (by car) and no more than two hours travel from each other</li> <li>• With similar experiences during the war</li> <li>• Where Samaritan’s Purse and no more than two other INGOs were doing projects in the community</li> </ul>
3. Interviewees	<ul style="list-style-type: none"> <li>• Owned a BSF for a period of between six months and three years</li> <li>• Representing a cross section of the society/culture in the county:               <ul style="list-style-type: none"> <li>○ Men and women from the Kpelleh tribe</li> <li>○ Men and women in both leadership and non-leadership roles in the community</li> <li>○ From different economic and social backgrounds</li> <li>○ Who had experienced diarrhoea before getting a filter.</li> </ul> </li> </ul>

Information in this table will be expanded on in the following section, which will explain the choices made regarding the research area and the interviewees. The most important criterion was that every interviewee had received a BSF.



**Figure 10: The 15 Counties of Liberia**



**Figure 11: Research Arena - Gbarpolu County, Bopolu District**  
 (The underlined towns are 3 out of the 7 where interviews were carried out. The other towns are not indicated and there is no map that has all of the research villages listed. See table 5.)

Gbarpolu County, the area where the research was carried out, was chosen due to the number of BSF project sites available. The projects are based in towns in primarily rural areas that were destroyed during the war and which are now in the midst of rebuilding. Town populations ranged from 30 to over 500. The research arena was directly affected by the war; many (75-80%) of its inhabitants had to escape to the jungle or flee to IDP camps in Monrovia. Houses, clinics and schools were destroyed and farmland was abandoned during the fourteen years of fighting (1989-2003). Communities are rebuilding as people return from IDP and refugee camps. Community members have returned to destroyed private and community buildings, overgrown farms and broken hand pumps, leaving them vulnerable to disease and poverty. Over 80% of all housing in rural areas was destroyed during the war; those returning have to literally start from scratch (UNDP Report, 2005).

During the research period, Samaritan’s Purse was the main INGO in the area, although other organizations had been working there previously. Because the Liberian civil war was fought over many years, there were periods when these INGOs could not reach vulnerable communities. This is reflected in the number of hand pumps found in the research area. Hand pumps that had

been installed in 2001-2003 were no longer functioning. The United Nations peacekeeping force had also done infrastructure projects focusing on roads and bridges. During the research period Samaritan’s Purse was the primary INGO in the Bopolu area.

For the research to be valid it was necessary to choose villages that were not all adjacent to each other, but adequately spaced; therefore villages within a radius of 200 km of each other in were chosen. Villages were no more than two hours and no less than thirty minutes apart by vehicle. If the villages had been too close, allowing the research subjects to interact, future interviewees could have been made aware of the questions to be asked in the interview. This could skew the qualitative data being collected. Nonetheless, villages were chosen to include a constant people group, the Kpelleh tribe, with similar livelihoods, war experiences and economic and social structures. This was important to reduce the variability from vast differences between villages, people, tribes and environment. The tribe and group chosen is a representation of that social group with a common background and common war experiences. The villages are in Gbarpolu County and all within a radius of 200 km of each other.

**Table 4: Distance and Time by Truck to Research Communities**

<b>Town</b>	<b>Distance from Bopolu in Kilometres</b>	<b>Estimated Time by Vehicle from Bopolu</b>
Gokala	28 SE	45-60 min
Small Bong Mines	13 S	30 min
Porkpah	11 S	25 min
Totoqulleah	10 E	15 min
Dorely-la	9 S	15 min
Dukley-lay	7S	13 min

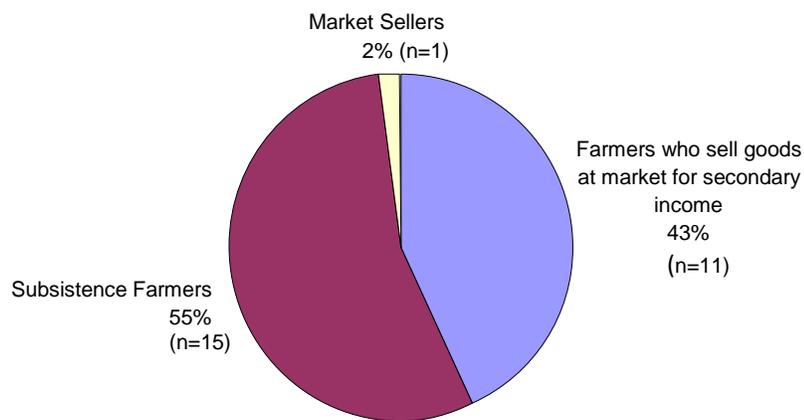
It seemed advisable that the villages selected should also provide a representative cross-section of beneficiaries of the BSF project. These included families of differing economic status, larger and smaller populations, family villages, numbers of children and education levels. Education levels vary from village to village and this can directly affect user compliance for the filter. From my prior experience working in this area, I knew beforehand that the educational levels of

each community would be different. This was taken into consideration when designing the methodology to ensure that, as far as possible, interviewees representative of all education levels were included. Those who are more educated will be able to read the instructions and have a better understanding of how diseases are spread.

To understand the impact of the filter on families' and communities' quality of life, the following factors were also considered in the process of selecting specific villages for study:

- ***Economic***

Variation in socio-economic status was taken into account, along with the type of livelihood. For example, interviews were held with families who were subsistence farmers – the occupation of the vast majority – but interviews were also held with the somewhat wealthier minority – shopkeepers and market sellers. Most people interviewed made less than one US dollar per day; however, it was important to include those of higher economic status due to their ownership of land or engagement in other business, such as market selling. This will permit analysis of whether there are positive or negative impacts on beneficiaries depending on their economic status and occupation.

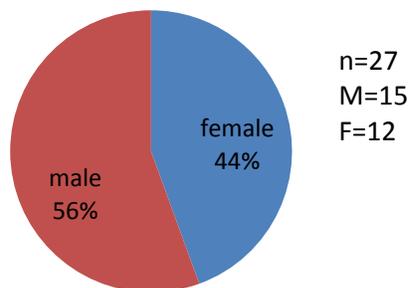


**Figure 12: Occupation of BSF Interviewees (n=27)**

- **Social**

To gain an adequate sample or cross-section of interviewees, people from different parts of society were included. Again, the reasoning is to distinguish the impacts the BSF has on different social groups and on society as a whole within that selected community. In each community, diverse BSF beneficiaries were selected. Town chiefs, the elderly, larger families, village leaders such as pastors and elders, women and men were all surveyed. This will be discussed further in the section on triangulation. The graph below indicates the gender breakdown of the interviewees.

## Gender



### **Figure 13: Gender Breakdown of BSF Interviewees and BSF Survey**

- ***Health***

To analyze the health impacts of the BSF appropriately, it was important, when possible, to choose beneficiaries with up-to-date health records. This can be difficult, as clinics do not always keep current, accurate files and many medical records were destroyed during the war. Families with children under five were chosen, as water-borne diseases have the greatest effect on this age group. Through the project's initial assessment, it was evident that, among the beneficiaries who signed up for a filter, the majority were suffering from diarrhoeal illnesses.

- ***Age of Filter Project***

How long a filter had been used was also important when choosing interviewees. To gather data that would give a snapshot of a filter in use at any given time, different filter 'ages' were chosen. As noted, filter age ranged from six months to 30 months and every filter was built by the same construction crew during that time. Data collected from the filters indicated their effectiveness in removing *E. coli*, which is an indication of the presence of water-borne disease-causing bacteria. Data from past studies have shown that if the filter is used properly it will continue to have the potential for removal rates of 80-100%. (See Table 2 of Literature Review section.) However, to add validity to the research, the filters needed to be tested in this context. Knowing the age of the filter also helped show if the filter had long-term health impacts on an interviewee. For those who had a filter for more than three years, the impacts may differ from those who have only had one for six months. User compliance can decrease the longer someone has a filter, with the maintenance not being carried out consistently or being forgotten altogether. This can reduce the effectiveness of the filter, which can negatively impact the user. However, if a filter beneficiary has experienced positive impacts of proper filter use, he or she could be motivated to maintain the filter properly. This change in behaviour could indicate a change in attitude to clean water.

**Table 5: Description of Selected Villages**

Village Details	No. of Filters	No. of Interviewees	Types of Interviewees	Economic Factors	Social Factors	Health Factors	Age of filters	Other
Gokala Population: 250 Mostly farmers	27	6	One-on-one interview with one or two family members. Semi-structured, with room for ‘conversation’ type of dialog that is less structured	People are subsistence farmers who take any extra goods to market. There are a few little shops in the village too.	Most people are Kpelleh and fairly poor. Many moved to IDP camps in Monrovia during the war.	Like most rural villages, Gokala suffers with malaria and some cases of dysentery.	Filters have been in Gokala for four years. It was one of the first villages where filters were installed.	Located along the side of a main market road, which brings many visitors.
Small Bong Mines Population: 75 All farmers - both crops and sheep	35	6 and one focus group	Semi-structured interviews, along with one focus group interview with five women. Five out of the six women were in IDP camps in Monrovia. The other was in a refugee camp in Sierra Leone.	Subsistence farmers	Very tightly knit community. Chief is highly engaged in development projects. Most fled to IDP camps during the war.	Same as above	The filters range from six months to three years old	Filters are largely used by women. A women’s focus group to discuss the filter was initiated.
Dorely-la Population: 150 Farmers and a few tradesmen After the war the men returned to this village and started rebuilding.	17	4	One-on-one interview with one or two family members; semi-structured, with room for ‘conversation’ type of dialog that is less structured. Triangulation used; interviewed chief, women and men	Everything was destroyed in the war including the farms. Inhabitants have re-established their farms to help sustain their families.	Many talked about the relief from having to “run in the bush” as they did during the war. The chief was very cooperative.	Same as above	At the time of the interviews, filters were approximately seven months old.	People appear to be working more on their own to get re-established, although there is a strong chief who wants to improve his village.
Dukly-la Population: 58 Farmers Mostly from one family	9	6	One-on-one interview with one or two family members; semi-structured, with room for ‘conversation’ type of dialog that is less structured	Subsistence farmers who take any excess harvest to market for secondary income	This village is occupied mostly by relatives from one family.	Some skin infections along with malaria.	Filters have been in the village for two years.	Examine the economic and physical impacts of the filter on a family unit.
Totequallah Population: 1,000 Large town Population’s economic status varies	98	7	One-on-one interview with one or two family members; semi-structured, with room for ‘conversation’ type of dialog that is less structured	Market sellers and farmers	Large town which was completely destroyed in the war.	Malaria and some cases of dysentery.	Filters have been in the village for two years	Town has a large number of filters. One side of the town has filters, the other uses a hand pump. Interesting to contrast the two.
Porkpah Population: 78 All farmers Mostly families	14	4	One-on-one interview with one or two family members; semi-structured, with room for ‘conversation’ type of dialog that is less structured	Market sellers and farmers	Returning from IDP camps at the time of the interview	Same as above	Filters have been in the village for almost two years.	Their perception of NGOs was different from others. See results/analysis chapter.

## 4.2 Aspects of Social Research

The research is primarily social; inquiring about the impacts that the BSF has on the quality of life of rural post-war Liberians. Neuman (2006) defines *social research* as “A collection of methods and methodologies that researchers apply systematically to produce scientifically-based knowledge about the social world.” He suggests two distinct methods to look at social science, and to observe measure and understand society (Neuman, 2006):

- ***Positivist social science paradigm*** emphasizes the discovery of causal laws, using empirical observations and value-free research. This is one of the most widely- and commonly-used social research paradigms and is generally quantitative.
- ***Interpretive social science paradigm*** emphasizes meaningful social action, socially-constructed meaning and value relativism. Its main purpose is to understand social meaning in context and it is qualitative in nature.

Additionally, the social research conducted was influenced by feminist research theory. “Feminist theory or research argues that a more open, loosely-structured research methodology is necessary to learn about society, specifically women, to capture their words, concepts and the importance of events in their world” (Rubin and Rubin, 2005). Many of the interviewees were women, because they are the main users of the BSF. Traditionally, women in Africa have been the main collectors and caretakers of water within their households. The United Nations Development Fund for Women (UNIFEM) states that women are often responsible for domestic and community water management and in charge of determining the sources of water, and the quantity and hygiene aspects of its use (UNIFEM, 2004).

Liberian women suffered greatly during the war and play an important role in rural Liberian society. A 2004 WHO study of Liberian girls and women who had been victims of gender-based violence revealed that many of them felt humiliated, embarrassed, frustrated and powerless (Martz, 2010). Listening to their stories, what their life was like before the war, how they define quality of life for themselves and their families, and what impact, if any, the BSF has had on

their lives is important to answering the research aim. As noted in Table 5 above, one of the interviews was conducted with a group of women from one village who are well known to the interviewer. The research situation was an informal but focused conversation, after a church service, in which they shared their experiences from the war. This type of social research involves the interviewer demonstrating empathy and a sensitivity to the women being interviewed. Demonstrating empathy can cause bias; however, this risk was anticipated and I carefully considered this I through the interviewing process. It can also be stated that the fact that a woman allowed her to gain access and be able to interview women. It allowed flexibility in choosing the research techniques that could collect as much information as possible. Considering the scope of this social research and the thesis, these three information-gathering methods formed the basis for the methods used. They are listed in the table below. The first two, interpretive social science/feminist theory and interviewing are qualitative, with the positivist methodology making up the quantitative aspect of the research.

**Table 6: Methodologies Chosen**

Methodologies Chosen	<i>Use in Research to Meet Stated Objectives</i>	<i>Participants</i>
<p><b>Interpretive social science/feminist theory (qualitative):</b></p> <ul style="list-style-type: none"> <li>• Observation.</li> </ul> <p>Information gathered through observing the community as a whole and individual households</p>	<ul style="list-style-type: none"> <li>• Survey the overall ‘cleanliness’ of a village and households, through observation.</li> <li>• Examine the community water source for vector and surface contamination to understand the need of household water treatment HWT through the BSF</li> <li>• Observe communication and interaction of community members with each other</li> </ul>	<ul style="list-style-type: none"> <li>• Community and individuals</li> </ul>
<ul style="list-style-type: none"> <li>• <b>Interviews</b></li> </ul> <p>Using different types of qualitative interviewing during each conversation with an interviewee, each being unique and generating distinct insights into the research question. Both topical and cultural (see interview methodology for definitions) interviewing took place.</p>	<ul style="list-style-type: none"> <li>• <b>Ethnographic interpretation</b> considering the cultural aspects of the research area and interviewees, in this case the context of post-war Liberians</li> <li>• <b>Oral History</b> interviewing to explore past experiences of the interviewees, their life before, during and after the war (Taken from Rubin and Rubin 2005)</li> </ul>	<ul style="list-style-type: none"> <li>• Individual interviewees</li> <li>• Key community members</li> </ul>

<b>Positivist social science (quantitative):</b> <ul style="list-style-type: none"> <li>• Data collection questionnaire. (See Appendix )</li> </ul>	<ul style="list-style-type: none"> <li>• Raw numerical data indicating overall health, user compliance, incidence of diarrhoea, livelihoods, number of children, and any other data listed on the survey</li> </ul>	<ul style="list-style-type: none"> <li>• Individual interviewees</li> </ul>
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This type of research typically lends itself to the *grounded theory* of qualitative research which emphasizes the creation of theories from the data collected (Neuman, 2006). In pure grounded theory, a researcher starts with a blank slate. The collection of data is coded and concepts grouped, leading to categories that are used to generate a theory. The process of data collection runs alongside that of analysis and becomes gradually more focused as the project progresses (Gilbert, 2008). As a result, the theory explains the subject of the research. It is a qualitative approach whose procedures are not usually statistical or quantitative. Instead, grounded theory research focuses on the area of study, gathering data from interviews and field observations (Haig, 1995). I bring into the data collection bias, both acceptable and unacceptable (described in greater detail in the triangulation and bias sections 3.6.1 and 3.6.2). The research is built on my worldview and bias which means it is not a “ground zero” or pure grounded theory.

In the case of this research, there was no “ground zero” for reasons mentioned earlier. However, I do agree with Gilbert’s statement in that data were being analyzed alongside the collection, which made the research become more focused. From this, themes did start to emerge, as will be addressed in further detail in the findings and results chapter.

### 4.3 Qualitative and Quantitative Research

Different methods uncover unique data that, when combined, give validity to the research. Knowing when to use each method is dependent on the subject and the area of research being investigated. In this research, although the approaches are described separately, when conducting the research they were often combined. In practice, there was a mixed approach, often using different methods at the same time. For example while I was collecting quantitative information for the BSF questionnaire I was also asking questions to the interviewee in an informal conversation. The conversation would become formal when we sat down and started the interviewing process; however, the informal conversation and what the interviewee said was

written down. Using both quantitative and qualitative methods is categorized by many sociologists as employing mixed methods. Although there is debate within the social research realm about whether “mixed methods” (Q<sup>2</sup>) means more than this (Hulme, 2007), for this research mixed methods refers to the use of more than one method of data collection. Within both quantitative and qualitative methods there are also mixed methods of data collection. This will be discussed in sections 3.3.1 and 3.3.2.

Berg (2009) states that, “qualitative research refers to meanings, concepts, definitions, characteristics, metaphors, symbols and descriptions of things. In contrast quantitative research refers to the counts and measures of things.” To further understand the role that the different methods played, each will be considered separately, including their weaknesses and strengths, in the table below. To use research methods effectively, “one has to avoid moving into situations where an approach or method finds it necessary to attack other approaches or methods” (Hulme, 1997). Each approach has its own beliefs and assumptions stemming from two distinct social science paradigms, positivist (quantitative approach) and interpretive (qualitative approach). As a result, they view the world very differently and require different approaches and procedures to collect data (Glesne et al, 1992).

**Table 7: Summary of the Strengths and Weaknesses of Qualitative and Quantitative Approaches, after Hulme, 2007**

Method of Data Collection	Strengths	Weaknesses
<i>Qualitative</i>	<ul style="list-style-type: none"> <li>✓ Provides a good picture of the social context</li> <li>✓ Open-ended questioning can reveal new or unanticipated information</li> <li>✓ Provides deeper insights into causes and direction of casual processes</li> <li>✓ Provides researchers with insight into intra-household relations and processes</li> <li>✓ Gives a holistic interpretation of the detailed processes that have and are shaping people’s lives</li> </ul>	<ul style="list-style-type: none"> <li>✗ Difficult to demonstrate the scientific rigor of the data collection</li> <li>✗ Analytical methods are poorly specified and vary from researcher to researcher</li> <li>✗ Findings less likely to influence policy as they lack the legitimacy of science and the precision of numbers</li> <li>✗ Completion of research is often dependent on a single individual</li> </ul>
<i>Quantitative</i>	<ul style="list-style-type: none"> <li>✓ Results from sample surveys can be generalized for entire populations</li> <li>✓ Results can be broken down into socio-economic groups for comparison</li> <li>✓ Reliability of data and findings</li> </ul>	<ul style="list-style-type: none"> <li>✗ Sacrifices potentially useful information through the process of aggregation</li> <li>✗ Often wasteful in that large amounts of the dataset are never used</li> </ul>

	provides powerful indicators to guide policy ✓ Transferability of data set to other analysts means it is not dependent on an individual	✗ Neglects intra-household processes and outcomes ✗ Sacrifices potentially useful data by placing households or events in discrete categories
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The strengths and weaknesses stated by Hulme raise key points to consider when using both qualitative and quantitative methods. However, some would argue that those inclined to qualitative data collection see themselves as very scientific because they adopt various systematic processes and employ rigorous standards when gathering information (Berg, 2009). Some see quality and quantity as the fundamental dichotomy in social science research, with the interpretive ethnographers on one side and positivistic scientists on the other (Robson, 2000). The qualitative vs. quantitative debate within the realms of social research is real and intense. William Trochim (2010) argues that at the level of data there is very little difference between the two, however at the level of assumptions the difference can be profound. The assumption is that qualitative data does not hold as much ‘scientific rigor’, for example, or that quantitative data does not take into consideration the human or societal inputs. Trochim (2010) states, in actuality, anything qualitative can be assigned a numerical value. I would tend to agree with Trochim in that the debate largely centres on assumptions about the two types of data collection. Even within WASH evaluations both quantitative and qualitative data can be applied. Quantitative data such as numerical results can be easily stored, analyzed, averaged and compared across time (Garandeanu, 2009). However, qualitative are participatory in WASH evaluations and give more importance to people’s perceptions, qualitative approaches might be more appropriate to understand complex human and social processes, within communities and also within the WASH intervention itself (Garandeanu, 2009). This is very evident in the methodology tools used in this specific research. There are more important aspects of Q<sup>2</sup> or mixed methods of data collection that should be considered, instead of their differences and whether one is better than the other.

It should also be noted that this research was not pure action research. Action research involves a collaborative approach that provides people with the means to take systematic action in an effort to solve a specific problem (Berg, 2009). The research was primarily motivated and conducted by myself and, therefore, not collaborative with the interviewees or any INGOs

(including SP). However, the aspects of action research present were the methods and techniques of investigation that take in to account the participants' history, culture, interactive activities and emotional lives (Berg, 2009). Thus, some components of action research were present, but this was not the predominant methodology.

Throughout the research, to elicit the essential information it was imperative to understand the strengths and weaknesses of both quantitative and qualitative data. The goal of the Q<sup>2</sup> approach in this research was to achieve balance between the two methods and use them in a complementary manner. To ensure that both forms of data collection were being optimized, the interviewing schedule had to mirror the pattern of the data collection.

#### **4.3.1 Quantitative Research Theory**

Collection of quantitative research data for development purposes “is characterized by studies that apply mainly statistical analysis to data collected by standardized questionnaires(s) through survey methods that have been numerically transformed (and simplified) and that comes from a sampling frame that indicates it is representative of a broader population” (Hulme, 2007). It is largely based on empirical data collection, with the data gathered according to rules and procedures, and expressed in numbers, percentages and ratios (Neumann, 2006). Quantitative research follows more of a positivist paradigm where observed data are readily measured objectively (Lincoln et al, 1985). All of these definitions are legitimate and are used frequently in differing types of research.

Methods of quantitative data collection are primarily surveys or experiments. Surveys ask people questions and their answers are then analysed statistically (Gilbert, 2008). Experiments usually take place in a controlled environment such as a laboratory where something is being tested. Numerical data are collected and analyzed to assist in answering the research question. Other types of quantitative research methods are nonreactive research, in which individuals being studied are not aware of it, and existing statistics research, which re-examines and analyzes quantitative data that have already been gathered through other research (Neumann, 2006).

One of the main advantages of quantitative data is the precision of the statistics and the ability I had was to be unambiguous. In this research data became relative precise, especially in the cases

of the BSF and QoL surveys. The statistics that were most precise came from answers that only required a 'yes' or 'no' response and that did not involve a respondent. For example, "Is the bucket under the spout?" 'Yes' or 'no', the bucket is either there or not, and the question can be answered precisely. However, the state of the bucket is not indicated. The bucket could be there but be very dirty. That is where using a mix including qualitative observation methods is needed.

#### **4.3.2 Qualitative Research Theory**

Qualitative data collection puts emphasis on the researcher as the primary instrument of data collection, with the researcher being more interested in processes and how people live, their experiences and their worldview (Merriam, S.B. et al, 1988). Qualitative methods of data collection are often "characterized by mainly narrative analysis focusing on the meanings that actions have for people. Data are usually collected through conversations, semi-structured interviews, life histories, oral histories and observation or participatory methods" (Hulme, 2007). Much of the data collection for this research was done in this way. The nature of the research question and objectives demanded that the methodology put people at the centre of the research.

One form of qualitative research is ethnography, which combines several qualitative methods such as interviewing and observation (Gilbert, 2008). Ethnography finds its origins in cultural anthropology, with 'ethno' meaning people or culture and 'graphy' being to describe something (Neuman, 2006). Patton (2002) states that ethnography is the earliest distinct tradition of qualitative inquiry. The research carried out was ethnographic in nature because it took place in the midst of what was being studied and attempted to describe social impacts or expressions between people (Berg, 2009). The research was on a specific aspect of society in a specific context. To extract the data from the social setting as it pertains to the thesis, a combination of qualitative methods was necessary, thus making the processes ethnographic. Ethnographers are found in the field doing research from the viewpoint of an insider, which facilitates their understanding of the data (Neuman, 2006).

This research used more qualitative methods of data collection than quantitative. Interviews and observation played the primary roles and the majority of the results were derived from these two methods. However, quantitative data collection was important to the research and the results that

these data brought forward were vital to reconciling the thesis aim and objectives. The next two sections will explain in greater detail how these two types of methodology were maximized to produce the data necessary to fulfil the aim of the thesis and meet its objectives.

### 4.3.3 Quantitative Practice for Data Collection

For this research quantitative data were gathered through two questionnaires (see appendix) and through water testing. The following table summarizes the quantitative practices used; they will be discussed in further detail below.

**Table 8: Quantitative Data Collected and Methods Used**

Summary of quantitative practice data collection	<ul style="list-style-type: none"> <li>• Positivist approach, analyzing raw numerical data pertaining to the BSF and QoL for beneficiaries</li> <li>• Analysis of data, comparative against the qualitative data collected; also to assist in answering the outlined objectives</li> </ul>
Type used:	<ol style="list-style-type: none"> <li>1. <b>BSF follow-up questionnaire – n=27</b> <ul style="list-style-type: none"> <li>• Specific to BSF and beneficiary</li> <li>• Multiple choice format</li> </ul> </li> <li>2. <b>QoL survey – written questionnaire – n=40</b> <ul style="list-style-type: none"> <li>• Measurement through rankings from 1 (being most important) to 11 (least important).</li> </ul> </li> <li>3. <b>Water testing – n=7</b> <ul style="list-style-type: none"> <li>• Measurement of the effectiveness of the BSF Millipore membrane filtration testing</li> </ul> </li> </ol>

### BSF Questionnaire

The BSF follow-up questionnaire was prepared and then assessed by myself and my supervisor. The questionnaire was used to gather information on user compliance from the beneficiaries and on their perception of the BSF. Upon validation that the survey was permissible to use for the research, it was given to those being interviewed. The questions focused on both the ‘hardware’ of the filter and the ‘software’ component of the BSF health and hygiene education.

The ‘hardware’ portion dealt with the overall integrity of the filter and its components, such as the lid, bucket, sand and spout. The ‘software’ portion looked at the understanding of the use of the filtered water, such as what the respondents used the water for, how they perceived their health since using the filter and whether they washed their hands with the filtered water. Below is the complete BSF questionnaire:

**Follow-up Checklist**  
Family name: \_\_\_\_\_ Interviewer's name: \_\_\_\_\_ Check-up date: \_\_\_\_\_  
Village name: \_\_\_\_\_ Number of people in the household: \_\_\_\_\_ Check-up flow rate: \_\_\_\_\_ /min

**BSF Water:**  
Source water:  dug well  drilled well  pond  rain other \_\_\_\_\_  
Pre-treatment:  none  roughing filter  cloth filter  settling other \_\_\_\_\_  
If using rain water, does it last all year?  Yes  No  
Explain: \_\_\_\_\_

**Drinking Water:**  
Source water:  dug well  drilled well  pond  rain other \_\_\_\_\_  
Do you boil your water before drinking?  Yes  No  Use Filter

**BSF Water Usage:**  
 drinking  washing food  washing clothes  animals  
 cooking  washing hands  bathing other \_\_\_\_\_

**Visual Inspection:**

	<i>1</i>	<i>2</i>	<i>3</i>
External appearance:	<input type="checkbox"/> very dirty	<input type="checkbox"/> dirty	<input type="checkbox"/> clean
Location of filter:	<input type="checkbox"/> unprotected	<input type="checkbox"/> shade	<input type="checkbox"/> shelter
Integrity:	<input type="checkbox"/> leaking	<input type="checkbox"/> cracked	<input type="checkbox"/> fine
Level:	<input type="checkbox"/> angled	<input type="checkbox"/> almost	<input type="checkbox"/> level
Position:	<input type="checkbox"/> moved	<input type="checkbox"/> turned	<input type="checkbox"/> original
Lid:	<input type="checkbox"/> missing/aside	<input type="checkbox"/> damaged	<input type="checkbox"/> always in place
Inside:	<input type="checkbox"/> insects/food	<input type="checkbox"/> dirty	<input type="checkbox"/> clean
Spout:	<input type="checkbox"/> extension	<input type="checkbox"/> dirty	<input type="checkbox"/> clean
Storage containers:	<input type="checkbox"/> dirty	<input type="checkbox"/> uncovered	<input type="checkbox"/> clean/covered

**BioFilm:**

	<i>1</i>	<i>2</i>	<i>3</i>
Diffuser basin:	<input type="checkbox"/> missing/aside	<input type="checkbox"/> rusted	<input type="checkbox"/> always in place
Sand surface:	<input type="checkbox"/> scoured/pitted	<input type="checkbox"/> uneven	<input type="checkbox"/> smooth
Standing water level:	_____ cm		

**User Compliance:**

	<i>1</i>	<i>2</i>	<i>3</i>
Knowledge of maintenance:	<input type="checkbox"/> none	<input type="checkbox"/> vague	<input type="checkbox"/> clear
Have you needed to maintain your filter yet?	<input type="checkbox"/> Yes		<input type="checkbox"/> No
If yes, how often do you maintain the filter:	_____ per _____		
How often do you clean the spout:	_____ per _____		
How many litres of water do you pour through the filter every day?	_____ L		

**User Perception: (compared to previous water)**  
Taste:  worse  no difference  better  
Smell:  worse  no difference  better  
Colour:  worse  no difference  better

**Hygiene:**  
Health:  worse  no difference  improved  
Diarrhoea:  worse  nodifference  improved  
When do you wash your hands with soap  before eating  before cooking  after using latrine  
 After cleaning a child who has defecated  never  other (specify: \_\_\_\_\_)

**OFFICE USE**

Flow Rate: \_\_\_\_\_ L/min  
Water Level: \_\_\_\_\_ cm  
Maintenance: \_\_\_\_ per  
Visual: \_\_\_\_\_ / 27  
BioFilm: \_\_\_\_\_ / 6  
Compliance: \_\_\_\_\_ / 3  
  
Total: \_\_\_\_\_ / 36

**Figure 14: BSF Questionnaire**

This questionnaire was given before the qualitative interview proceeded. Upon arrival to a chosen community, I would first fill out the BSF questionnaire with the assistance of a SP water

and sanitation staff member. We would often do it together, visually looking at the filter, at the bucket, lid, looking inside the filter, all the while asking the interviewee the questions on the questionnaire. The “office use” section I used to keep a score of each questionnaire. Data sets collected via the questionnaire were largely statistical in nature and are presented and discussed in the results and discussion chapter.

### **QoL Questionnaire**

A second survey evolved after it was determined by me and project supervisor that the quality of life (QoL) of Liberians warranted further inquiry. As the thesis aim is to understand how the BSF impacts the QoL of post-war rural Liberians, a questionnaire to determine what those QoL indicators are was needed.

The QoL indicators and development desires were chosen by me through a process of discussions and observations of Liberians. They were chosen through comparison with other QoL indicators (see literature review) which were not deemed contextually relevant for the research. For example, then I found no relevance in measuring the GNP of a country with a failed economic system as a QoL indicator. Instead, she chose job/employment as the QoL indicator to measure how important the economy is to each individual. Therefore, after considerable research in QoL indicators and using aspects of the World Health Organization on Quality of Life, WHOQOL definition of QoL (2007), decided to use general societal categories that cover the economy, psychological and physical status, societal relations, freedoms, belief systems and environment. These categories were chosen on the basis of informal and formal discussion with Liberians during the questionnaire development period. Some were staff members of the INGO, some were from rural communities and some were Liberians who had lived in the U.S. and now have returned. The most important aspect of the categories was that they were simplified to all areas of life – physical, mental, spiritual and intellectual.

**Instructions:** Rank in order of importance to YOU. 1 being the most important and 11 being the least important.

___ Safety/security	___ Job/money	___ Health
___ Education	___ Family	___ Home/shelter
___ Electricity/power	___ Freedom of rights	___ Infrastructure
___ Environment	___ Belief system/religion	
___ Others please list below:		

**Figure 15: Components of Quality of Life**

The questionnaire was administered in 2009/2010 by me and in some cases, SP WASH staff. The nature of the questionnaire and what every choice meant was thoroughly explained to people. The participants then filled it out with limited supervision. It was conducted entirely in English unless people did not understand at all what was listed, which was very rare. Most people could understand English and, if not, the questionnaire was given again in Liberian English and finally, if needed, in Kpelleh. It was not given exclusively to BSF beneficiaries because it was not a survey about the BSF but about QoL; therefore, it was given to a cross-section of rural Liberians. It was designed to elucidate, for example, what constitutes quality of life for women or men, people from different economic backgrounds, educated and non-educated, young and old, and those who are not participating in any development projects implemented by SP. People ranked a list of eleven quality of life (QoL) indicators (things deemed important to the individual) and had the opportunity to add other indicators that were not included on the list.

Ranking their development desires for their village required them to indicate what they deemed important to a community. The title and categories of development desires I established through

conversations with community members, SP staff and observation. This part of the survey was established to inquire what people consider important developments for their community and if those developments aligned with their own individual QoL indicators. The list was prepared building on the QoL categories (e.g., health as a QoL, with clinics/hospitals as a development desire) and using my experience of what sectors and development projects exist. Not all the development desires chosen relate to programs that are being implemented in the research area or by SP, but they are programs that have been implemented by other INGOs in Liberia. The development desires survey is shown below:

**Instructions:** Rank in order of importance to YOU, 1 being the most important and 11 being the least important.

___ Clinics/hospitals	___ Education -construction of schools -paying of school fees	___ Housing/shelter
___ Water and sanitation -hand pumps -wells -latrines	___ Agriculture -farming asst. -animal husbandry	___ Micro-finance
___ Churches/Mosques	___ Infrastructure -roads -bridges -power	___ Vocational programs -mechanics -baking -masonry
___ Environmental programs -Community clean-up -Reforestation of trees -Climate change issues		___ Advocacy programs - Gender empowerment programs - Peace building - Human rights - Truth/reconciliation
___ Others please list below:		

**Figure 16: Development Requests**

## **Water Testing**

Another form of quantitative research conducted was water testing. The following sections outline the methodology used for testing.<sup>12</sup>

- ***Overview of Water Testing Methodology***

Membrane filtration testing was performed on the inflow and outflow of seven BSF filters in order to assess filter performance. The membrane filtration method measures how many total coliform and *E. coli* bacteria are present in a 100 millilitre sample of water. These are standard “indicator bacteria” for faecal contamination of water. BSF filters were randomly selected during field visits on October 29 and 30, 2009. SP staff visited project sites in the representative villages of Totoquelleh, Small Bong Mines and Dukuly. The villages were selected based on the following:

- Number of filters in the community; ideally a substantial cross section of villages with numerous filters and those with few.
- Number of years the beneficiary has had the filter; ideally a cross section of older filters and newer filters.
- Number of follow-up visits by SP WATSAN staff; ideally a cross section of the amounts of time that had been spent with beneficiaries discussing BSF user compliance and education.

Samples of the filter inflow were taken either directly from the user’s bucket/jerry can or from the inflow basin of the filter.

### ***Lab Setup, Testing Supplies and Equipment***

All samples were transported to either the Samaritan’s Purse compound in Bopolu or the guest house in Monrovia and tested within eight hours of collection. The water testing method used was with the Millipore m-ColiBlue24® which is an approved method of testing water quality as established by the US Environmental Protection Agency (Millipore, 2011). In each situation, a

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<sup>12</sup> The section of water testing methodology was written with the advice of John Dallman, MSc, P.E., Samaritan’s Purse Water and Sanitation Technical Advisor.

simple laboratory was set up on tables where media were transferred into Petri dishes and the samples filtered. Ambient temperatures in the testing area were typically between 27 and 32 °C during the time the samples were being processed. The room was protected from wind and the tables were wiped down with a disinfectant before testing commenced. The following testing equipment and supplies were used:

- Filter stand: stainless steel filtering stand by Millipore with plastic vacuum tubing.
- Manual vacuum with 50-ml syringe
- Filters: 47mm diameter white gridded filters with 45 µm pore size; by Millipore.
- Filtration funnels: Disposable one-time use Microfil® filtration funnels; by Millipore.
- Petri dishes: Petri-Pad™ gamma sterilized Petri dishes with pad for 47mm filter cultures on broth; by Millipore.
- Media: m-ColiBlue24® broth (EPA approved media for coliforms and *E. coli*), ±2 ml plastic ampoules; by Hach. Media were kept refrigerated until the time of use.
- Incubator: Portable incubator, set to 35°C

- ***Testing Procedures***

Samples were processed within eight hours of collection in “whirl-pak” bags. Media from pre-packaged and sterilized m-ColiBlue24® ampoules were transferred into Petri dishes in as quick and controlled a manner as possible. Only enough dishes per sample were made at one time. Prior to processing, Petri dishes were labelled with the appropriate identification (BSF identification number, type of water sample, and dilution factor). Prior to each and every sample filtration for each and every dilution, the filter stand surface was flame sterilized for several seconds, as were the metal tweezers used for placement of the gridded filter paper. Pre-packaged, pre-sterilized filtration funnels were placed on the filter stand over the filter paper immediately upon filter paper placement. The appropriate sample was poured into the filter funnel and a vacuum was drawn on the filter via a 50 ml syringe and tubing. In order to draw a

#### **Dilution Water**

Dilution water for the first day’s test was taken from a bottled water source – Bon Agua. For the testing on the second day, filtered water from a Berkefeld ceramic filter was used. Dilution water blank samples were run with each test to confirm sterility. Some concerns were discovered for the Berkefeld filtered water which may have more to do with hygienic handling and storage than filtering. Consequently, dilution results for the 2<sup>nd</sup> day’s test were cast in doubt and several samples thrown out.

100 ml of sample through the filter, the 50 ml syringe had to be used twice per sample. The appropriate serial dilutions were made just prior to filtration. Filter pads were immediately removed from the filter stand and placed into pre-sterilized Petri dishes containing 2 ml of m-ColiBlue24® broth. Petri dishes with filter pads and media were placed into the incubator for a period of 24 hours. After the 24-hour incubation period had elapsed, Petri dishes were removed and colonies counted. The results from the water testing are given in the results and analysis chapter.

### **Summary of Quantitative Data Collection**

After questionnaires were collected, I checked them for accuracy and to make sure every question had been answered. Surveys forms that were missing data were from the QoL survey due to the fact people did not rank all eleven indicators. These surveys were disregarded. The data were then entered into an Excel spreadsheet so that they could be graphed and analyzed. This time proved valuable for reflection on the data and to decipher what the data were 'saying'. Issues concerning authentic answers or if the interviewees were telling the truth was evident. In some cases where the interviewee claimed through the questionnaire to be using the filter, it was evident through observation that the filter was not in use. The same could be said for the QoL and development desire survey. Reflection on the survey results and what was observed through naturalistic observation were constantly being compared.

Water testing proved to be vital and provided valuable information on the actual potential of the BSF. A filter, unlike a human, cannot lie and therefore the water testing results provided the purest form of quantitative data for the research. The water testing was used to validate whether the BSF hardware was functioning as it should.

As noted previously, the QoL questionnaire did evolve after the aim of the thesis changed slightly to represent the QoL indicators of post-war rural Liberians. Through this process I learnt the value of the quantitative research and how it could work with the qualitative data collected.

### **4.3.4 Qualitative Methods for Data Collection Interview Methodologies**

As noted in section 4.2 table 6 there were three types of data collection; two of these, interpretive social science/feminist theory were done through an interview schedule. The qualitative interview schedule questions were located on the back of the BSF questionnaire making it easier to keep all the data on one form. The first rounds of interviews were conducted early on in the research and were with individual filter beneficiaries. This first interview schedule was an integrated approach of both quantitative and qualitative questions, which was made up of the BSF questionnaire with the interview questions on the back of the same sheet. The first interview methodology focused on open-ended questions leading to casual conversations. From these conversations, pertinent information and data were extracted to help meet the research objectives, specifically pertaining to the components of the quality of life for Liberians (Objective 1) and the impact of the filter on their lives (Objective 2). The second survey was conducted among not only BSF beneficiaries, but with a cross section of Liberians (see QoL questionnaire section) to assist specifically in gaining insight into Objective 1, the quality of life indicators for post-war rural Liberians. The BSF questionnaire along with the interviews were administered and transcribed by the author. The QoL and Development desires survey were explained by the author, however, the participants filled them out themselves. The second interview was administered, explained and supervised by the author.

To understand the interview methods chosen, it is imperative to understand the cultural context of Liberia. As in most African cultures, “storytelling” or “lecturing” is the prevalent way of communicating. Traditionally, Africans are good story tellers as their culture is rooted in oral culture and traditions (Agatucci, 2008). Knowing this, the interview schedule questions were chosen to encourage the telling of a story. For example, the first question was “Tell me about your life here in this village.” Depending on the interviewee, the interview could take different directions. For example, an interviewee giving an oral history would often reveal ethnographic information that was useful to the overall research. Although most of the interviewing was done to collect qualitative data, there were aspects of the interview schedule that were intended to collect quantitative data. The diagram below indicates the spectrum of the interview process and what type of Q<sup>2</sup> data was collected.

<i>Cultural Interviews</i>	<i>Topical Interviews</i>	<i>Standardized Closed Fixed Response</i>
<hr style="border: 0.5px solid black;"/>		
<b>Qualitative data collection</b>	-----	<b>Quantitative data collection</b>

### **Figure 17: Spectrum of Interviews used to Collect Q<sup>2</sup> Data.**

Interview methods used to collect the qualitative data took different forms depending on the interview. Most were conducted using an interview-guided approach, where the topics and questions to be asked were determined by the interviewer in advance; however, the interviewer chose how to word the questions throughout the interview (Patton, 2002). Topical interviews focusing on the events and the subjects' life prior to and during the war, or the event of receiving a filter were also conducted. Probing with open-ended requests such as "Tell me about your life before the war" gave insight into their quality of life then and compared it with the quality at the time of the interview. The interviewing process was also one of cultural interviewing, as an investigation of the peoples' common values, activities, beliefs and world view (Rubin and Rubin, 2005). Cultural interviews are much more flexible, in the form of informal conversations covering a wide range of topics. Rubin and Rubin state "cultural interviewing involves more active listening than aggressive questioning" (Rubin and Rubin, 2005).

On average, one to three interviews were conducted in a full day (8-10 hours), depending on how far the village was, the road conditions, if people were home and how long each interview took. Interviews were of a minimum of one hour long and a maximum of three hours long. The interviews were not bound by time, therefore making it easier to just let the interviewee talk and not feel pressured that they were under a time constraint. If I felt that the interviewees had a lot to say, then they were allowed to talk as long as they wanted. It was vital to let the interviewees have their space to tell their own story. The interview questions from the schedule are listed below. (They were critically reviewed by Dr. James Webster, former head supervisor.)

#### **Interview Questions with beneficiaries**

1. Tell me about your time the last few years? Did you stay here? (If left go to question a)
  - a. When did you return?
  - b. What is life like here now?
  - c. What was life like before the war? Did you have a home? Farm? Anything else?

2. Tell me about your health and the overall health of this community:
  - a. Do you get sick? (If yes go to b.)
  - b. What type of sickness affects your family?
  - c. What did you do when you got sick?
  - d. Are you still able to work?
  - e. Do kids still go to school when sick?
3. What was life like here before the filter? After?
4. Who uses the filter most often?  women  men
5. What do you think about this water? Why?
6. What do you do for food? How do you make a living?
7. Do you have any questions or concerns regarding the filter?
8. What do you think of NGOs who come to Liberia? Your village?
9. What things in your life are important?

The questions were kept simple to bring forth the best and most information. From experience I knew that simple questions could lead to a great amount of details about a person's life. As already stated, the interview lasted as long as the interviewee continued with his or her story. There was a richness to what they were stating which was crucial to the research. The questions often did not even have to be asked because, as the interviewees talked, they would often answer questions that were going to be asked eventually. Interviews stopped and time was taken to reflect on the information gathered once it became apparent that the same answers were being given for the same questions by the interviewees. This indicated a theoretical saturation point was reached. This was determined by analyzing the quantitative data collected but, more importantly, listening to the interviews. Interviews stopped when no new responses were given and were similar to interviewees in another community.

All interviews were conducted with the permission of the interviewee. The interviewer respected any confidentiality that was articulated by not using any information that the interviewee did not want shared or used. Individual interviews were conducted in the interviewees' homes, usually in the room where the filter was located, or on the 'porch' or outside in a covered area of the hut. I always asked where the interviewees would like to sit and talk about the filter, therefore letting them decide where they would be comfortable. In the majority of cases the interviewee desired to sit near the filter, in essence "showing it off". This was evident by their body language, smiling and pointing to it while they talked about it, or patting it on the side while stating "The filter is fine-oh!" The focus group interview with women from Small Bong Mines was located in the church where there was room for everyone to sit, affording privacy from the rest of the community. The translation section will address what languages were used in the interviews.

A small recorder was placed between the interviewer and interviewee. If interviewees were uncomfortable with the recorder, I would record them and play it back for them to hear. This helped them understand what the recorder was for. It cannot be emphasized enough that a sufficient level of trust had been established with the interviewees. This trust had been developed over time through the involvement of the interviewer with the beneficiaries.



**Figure 18: Interviewing a BSF recipient in Dukley-la village (2006)**

Many of the interviewees had been part of the BSF program for three years and knew who I was. Interviews lasted anywhere from 30 minutes to over an hour, depending on the direction of the conversation. In some cases, outside noise interference from animals or children hindered the interview or the interview had to stop until the animals and children were removed. The statements made by the interviewees are their own statements and do not reflect the views of myself, organization or people group. In the transcribed quotes, I am denoted as “R”, the interviewee was denoted by their initials and it was indicated if a translator was used. Quotes from the interviews are presented in the findings and discussion chapter as they pertain to the explanation of the data.

### **Coding**

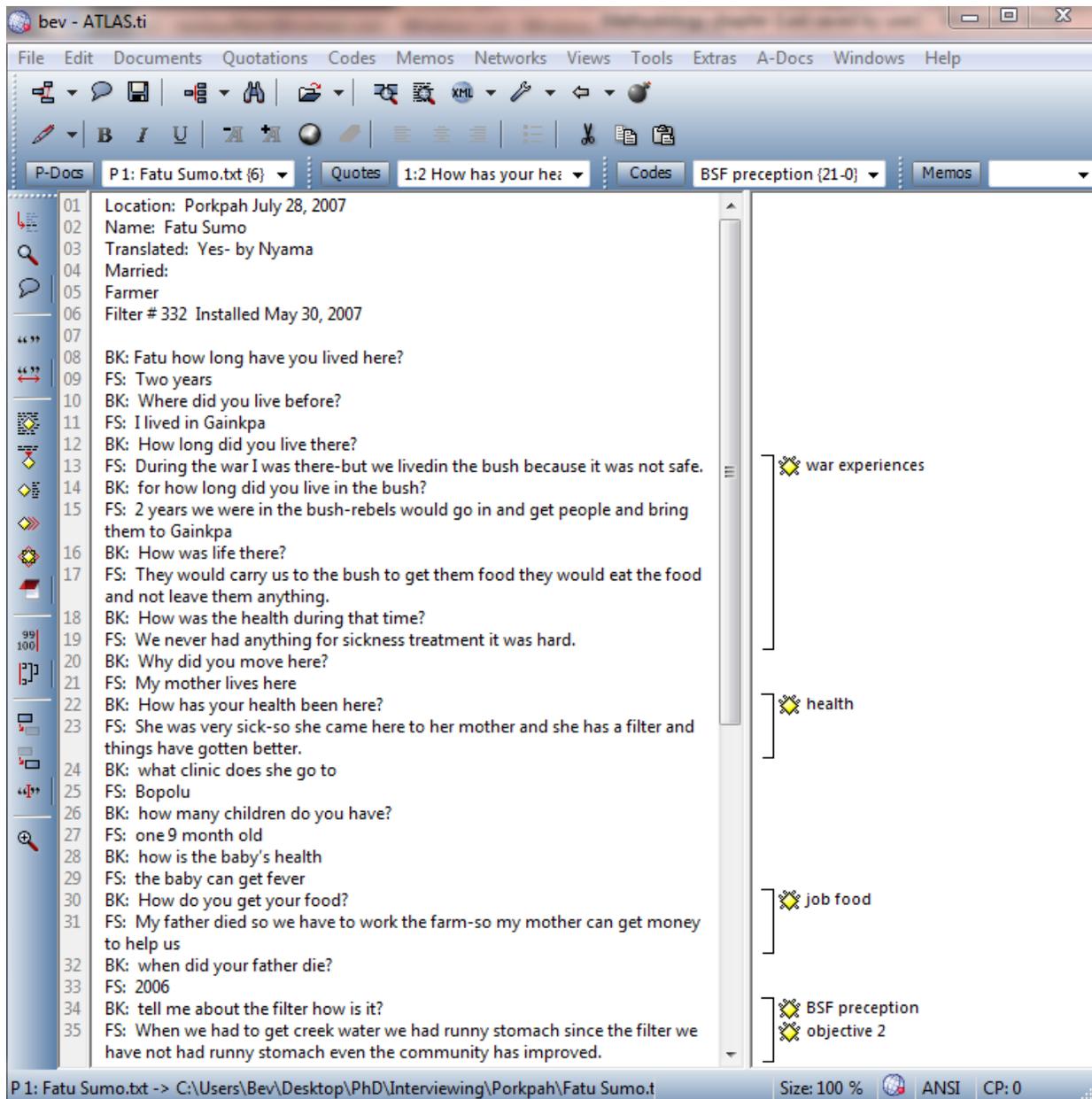
All 27 interviews were transcribed and coded using ATLAS.ti 6.1 software. At times they were transcribed right after the interview, but most often they were all collected, sorted and then transcribed. Time was taken for reflection also and listening more than once to the interview, so transcription sometimes occurred months later. The software allowed me to group interviewees' responses into themes that related to the thesis aim and objectives. I created ten codes (see below), that dealt directly with the subject matter and would allow ready accessibility to themes that could be analyzed. For example, each objective had a code and when there was a quote that pertained to an objective it was labelled accordingly. This can be seen in Figure 19. I was able to collect quotes pertaining to each objective which were then analyzed and used in the findings and discussion chapter.

The screenshot shows a software window titled "Code Manager [HU: bev]". The window contains a table with the following data:

Name	Density	Author	Created	Modified
BSF preception	0	Super	08/31/10 ...	09/02/10 ...
health	0	Super	08/31/10 ...	10/26/10 ...
job food	0	Super	08/31/10 ...	09/02/10 ...
NGO preception	0	Super	09/01/10 ...	10/26/10 ...
objective 1	0	Super	09/01/10 ...	09/02/10 ...
objective 2	0	Super	09/01/10 ...	10/26/10 ...
objective 4	0	Super	09/01/10 ...	09/02/10 ...
psycho social -re-establishing	0	Super	08/31/10 ...	10/23/10 ...
safety and security	0	Super	09/01/10 ...	10/26/10 ...
war experiences	0	Super	09/01/10 ...	10/26/10 ...

At the bottom of the window, there is a status bar with the following information: 10 Codes, No item selected, All, Name - Title.

**Figure 19: Codes Created for Themes and Organizing of Interviews**



**Figure 20: ATLAS.ti 6 Example of Coding and Transcribed Interviews**

The ATLAS.ti software proved to be the most efficient and time-saving qualitative software for this research.

## **Translation**

All of the interviews had a translator present. The local dialect is Kpelleh (pronounced “pay-lay”). Often an elder in the village was chosen to assist in translating or, if allowed, one of the BSF staff members was used. In some cases the interviewee was able to understand my Liberia English and the whole interview was carried out in English. Where interviewees did not understand my English, I used a translator, both to translate the ‘heavy’ Liberian English or to directly translate from Kpelleh to English. There were instances where the translator just answered the question or gave information without engaging the actual interviewee. When this occurred, I stopped the translator and asked him or her to repeat the question to the interviewee and wait for them to answer, reiterating that the interviewer could not answer for the respondent. There were also some cases when I understood what was being said and the translator or community member would say something different. At that point, I would quickly interject “No that is not what he/she said, they said this”. The interviewee would laugh, as would the translator, and an informal conversation would ensue regarding the “white woman’s” ability to understand what they were saying. Once this was recognized there was a freedom to ‘call out’ people who were lying. This was done in a respectful manner; I would be sure to smile and laugh to make sure they did not feel threatened or embarrassed.

As with any translation from one language to another, there is a potential for a loss of true meaning of what one is trying to say or ask. Even if the person spoke English, “Liberian English” can be difficult to understand. The interviewee’s inability to understand my English usually meant that someone had to re-word the question into Liberian English. The following is an example from an interview:

***Interviewer:*** “Tell me about your life before the war.”

***Translator (in Liberian English):*** “The woma want to know befo the war wha-you do?”

Although the question looks the same, the way it is said (usually loudly and aggressively, as is the norm in Liberian culture) makes it sound very different from the interviewer’s original question. The openness of the interview can be jeopardized by the aggressive tone taken by the translator, which may put the interviewee on the defensive. To ensure this did not happen, I

would discuss at length with the translators the tone of their voice when asking a question. I made it very clear to the interviewee that there were no right or wrong answers, but that the interviewer was just there to talk and learn more about Liberia. Ironically, Liberians are not as familiar with a softer tone and would not fully understand the question even when it was asked by the translator. The translator, in frustration, would then revert to the more culturally familiar tone of questioning. The interviewee would instantly understand and answer. It is imperative when choosing data collection methodologies that it is understood how those being interviewed communicate. The following table indicates who did the translation and their position.

**Table 9: Translators Used for Interviewing and Data Collection**

Name	Position	First Language
Bob David	Samaritan’s Purse WATSAN Coordinator based in Bopolu, where the research took place. Has worked with SP for 4 years.	English is Bob’s first language. Bassa, another tribal language in Liberia is his first tribal language, but he also knows Kpelleh very well.
Nyama	Former SP employee, as the WATSAN health and hygiene coordinator for the Bopolu area.	Nyama’s first language is English and her first tribal language is Kpelleh. She has lived in the Bopolu area the majority of her life and is from the Kpelleh tribe.
Quio Ballah	Resident of Totequellah and a community leader who assisted in the community aspect of the BSF project.	Quio is from Totoquellah and his first tribal language is Kpelleh.

### **Observation Methods**

Observation played a very important role in the collection of data. Observation throughout the research effectively assisted in meeting the objectives and the aim of the thesis. There are advantages and disadvantages to using observation as a method for collecting data. Within the context of this research, naturalistic observation proved to be an advantage because the author has been observing the context of the research for the past six years. Observation will often give a better picture of what is going on in the research arena. In essence, observation is very direct: you do not have to ask people how they are feeling or what their views are because through observation you can watch and listen to what they say (Robson, 2000). Observing allowed me to understand the context better, which gives the researcher a holistic perspective (Patton, 2002).

Through observation it was possible to see how people were interacting in a post-war context. Seeing and listening to them adjust and re-establish themselves in homes and on farms that had been destroyed and overgrown provided invaluable information relating to the research question. This information included such things as observing what people deemed important, whether it be a possession or what they spent the majority of their time doing.



**Figure 21: A typical village in rural Liberia in the Bopolu area (photo by Joni Byker)**

Another advantage of observation in the research was that it allowed the opportunity to see things that may escape awareness of the people in their own setting (Patton, 2002). The inquirer would often see and watch something that was taking place, such as someone washing dishes in dirty water. To the people, it is a regular occurrence; they were unaware of the potential danger of their actions. However, it provided a picture of how the absence of clean water and education about washing dishes in filtered water could be part of the reason for water-borne sickness in the village.

Observation can affect the situation under observation in an adverse manner (Robson, 2000). In the limitations section the facts that the author is a participant in the project, culturally from a different background and a white woman are stated. This could be seen more as reflexive sociology, where the researcher is part of the actual social world that is being researched or explained (Gilbert, 2008). In reflexivity, the researcher must have an ongoing conversation with

himself, examining what he knows and how he came to know the information (Berg, 2009). For the author, being part of the research arena for a substantial period of time, the ongoing dialog was ever present. For example, often the author would interpret field experiences and ask why and where these interpretations came from. This takes into account the influence the researcher may or may not have on what is being investigated as the investigation is going on. The author observed it was impossible to “hide” from those being observed; therefore their actions may differ from their natural behaviour due to the author’s presence. Regardless of how long the observation has been taking place, people know when they are being observed and therefore can change their actions from the norm.

There are different approaches to observation that a field worker can employ. In this case, observation was used under the naturalism principle of examining events as they occurred in the natural everyday social settings of those involved in the research (Neuman, 2006). To better understand what material things rural Liberians deem as important, one only had to *look* at what was present in their houses. Often what is in their bedroom is what is most valuable to them. To observe post-war Liberians under the naturalism principle, the method is “the observer as the participant”. Robson (2000) defines this observation method as the observer being an observer and everyone being aware of that. However, the observer then tries to establish close relationships with the group being observed and participates by asking questions about what is being observed. Patton (2002) describes this method of observation as “employing multiple and overlapping data collection strategies: being fully engaged in experiencing the setting (participation) while at the same time observing and talking with other participants about what is happening”. There were instances in which the observation was one of separation, and not participating in what was going on and other instances when the observer moved down the observation spectrum towards participation and inclusion in the events and actions taking place.

### **Observation Coding**

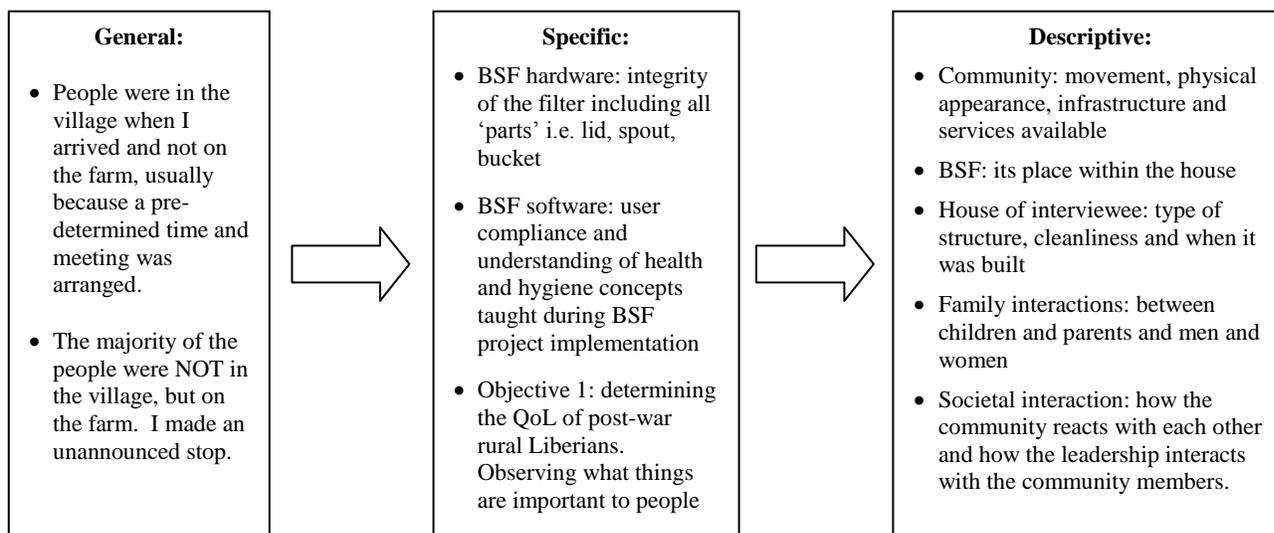
Observation was coded to distinguish how observation was used in the research but also what type of data was collected through observation. Observation was carried out as naturally as possible; this meant that on most occasions I did not actively write what I was seeing at that exact moment. Instead, as soon as I stepped out of the vehicle I would scan the village to see the overall layout and condition of the homes, community buildings and other shelters (such as

animal shelters or palava huts<sup>13</sup>). If there was something specific that I observed and deemed to be crucial or unique that pertained to the thesis, I would write it down while in the village. When I returned to the base office I would sit and write everything down that I saw, who I talked with, the condition of the houses and the filters and whatever else I observed. I would then sit and discuss with the staff what they saw and if there was anything I may have missed. As stated in chapter 2 section 2.3, my observations are those of an outsider, because I am not Liberian; that has to be taken into consideration when comparing what I 'see' with what others see. After everything was written down, a time of reflection to thoroughly review what I had observed and how the information gathered related to the thesis followed. This assisted in sifting through what information was pertinent to the thesis and what could be discarded.

Coding was used to assist in organizing the data collected in terms of what was being observed and what factors were involved in collecting it. I coded observation by developing an original coding scheme. The main premises on which the codes were established were based on the thesis aim and objectives. Robson (2000) states that the research aim along with the literature, after a time of unstructured observation along with Q<sup>2</sup> data collection, will suggest the process one wishes to use for categories or coding. Hence, the observation coding for this research was guided by the thesis aim and objectives. As well as ongoing unstructured observation, the author distinguished certain aspects of the research that needed to be observed in greater detail. The coding scheme was based on both general and specific coding that would assist in the analysis of data. Descriptive coding of the environment and context was also observed and documented to give greater insight into the research arena and the interviewees. The following figure outlines the coding scheme that was adopted.

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<sup>13</sup> Palava hut is a circular hut that has partial walls and a thatched covered roof. The palava hut is a place to meet and to discuss any issues or announcements that take place in the village. It is usually the place where I would meet the leadership of the village to explain what I was doing and ask permission to carrying out my interviews. Every village has a community palava hut.



**Figure 22: Observation Coding Scheme Used**

The importance of observation as a method of data collection in this research cannot be overestimated.

### **Summary of Qualitative Data Collection Practices**

As noted, the qualitative data collected was vital in meeting the thesis aim and answering the objectives. The ethnographic research depended on adequate qualitative methodologies to produce the data that were needed. Interviews played a large role and the information gathered from them was significant. As the interviews continued, I found consistencies between some interviewee's experiences; however, each story was unique to that person. For example, the people in the research arena all experienced the destruction of the war, but each person had a different experience in the war. The process of collecting the qualitative data took time. Organizing interviews, getting out to the communities over very bad roads, the interviewing process – all of these logistical steps took time. However, the longer I spent with the interviewees or in a community, the more data were revealed. The longer the time spent in the community or visiting with the interviewees, the deeper the relationship went. On return visits to interviewee homes, I was considered as a community member returning and not as much of an outside visitor. The return visits were not for research purposes, but for informal visits with those with whom I had established a relationship. However, if any drastic changes, such as filter

usage or a new home were observed during these visits, they were recorded in a notebook, either then or after I returned from the visit. This information was then stored in case it was needed for the thesis. These visits were anticipated with enjoyment even though it was a time of research. It should be noted that, since the research has been conducted, the requests for ‘things’ have decreased greatly. This could be because I have never made any promises to bring additional development projects.

As the research went on and data were collected, observation began to play an important role. Everything observed was reflected on in light of what the interviewee had stated either in an interview or in the surveys given. An interesting phenomenon is that the more time I had been involved in the area, the more the aspects of community life being observed have become ‘normal’. This familiarity with the culture and the people could lead to a decrease in proactive observation; however, I attempted to keep the thesis aim and objectives in mind. This left an opportunity for naturalistic open observation with no predetermined structure.

The qualitative methods allowed me to experience a window of time in the life of the interviewees. This not only yielded valuable data but also an opportunity to understand the culture and to cultivate meaningful relationships.

#### **4.4 Triangulation and Bias**

The search for truth in social research is difficult and has to take into consideration people’s perspectives, motives and bias. To help with this, triangulation is used to validate data. This will be discussed further in section 3.6.1. Bias, both acceptable and unacceptable, and its relation to the methodology practices will also be discussed in section 3.6.2. Triangulation and bias, two important details in social research, will be discussed in relation to the research and also how I dealt with them.

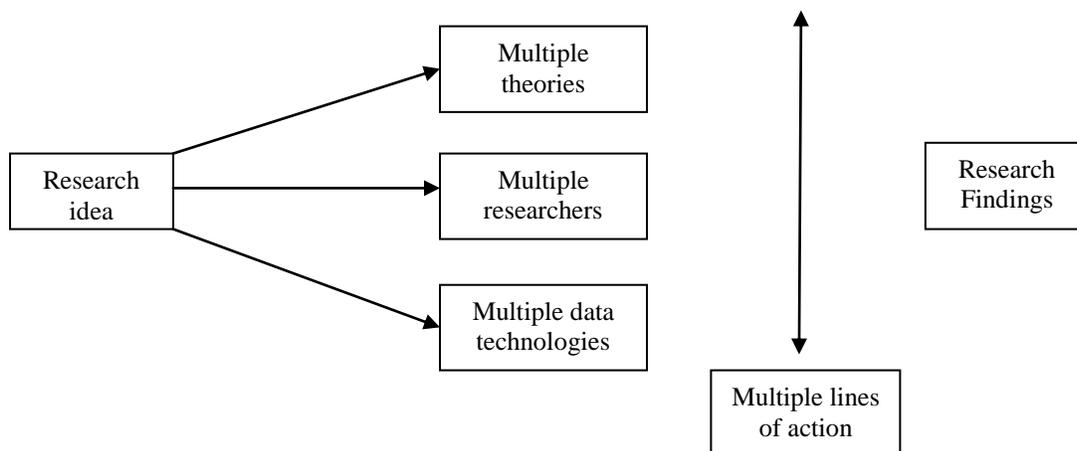
##### **4.4.1 Triangulation**

Neuman (2006) defines triangulation in social research as meaning that it is better to look at something from several different angles than to look at it in only one way. Patton (2006) adds to this by stating “The logic of triangulation is based on the premise that no single method ever adequately solves the problem of rival explanations...Studies that use only one method are more

vulnerable to errors.” It is necessary to enhance the validity further by combining methods through different forms of triangulation. Robson (2000) states that multiple methods can also be used in a complementary fashion to *enhance interpretability* (2000). Berg (2009) re-emphasizes this, stating “By combining several lines of sight, researchers obtain a better, more substantial picture of reality; a richer, more complete array of symbols and theoretical concepts; and a means of verifying many of these elements.” For example, by using Q<sup>2</sup> data collection the researcher can interpret the impact of the filter on many levels: through numerical data collection, interviews and story collecting, and observation. This is methodological triangulation, where multiple methods are used to study a single problem or question (Patton, 2002). In addition to methodological triangulation, Patton suggests three other types of triangulation (2002):

- **Data triangulation** – the use of a variety of data sources in a study
- **Investigator triangulation** – the use of several researchers or evaluators
- **Theory triangulation** – the use of multiple perspectives to interpret a single set of data.

These three types of triangulation are also illustrated by Berg (2009) as seen in the figure below, with the addition of 'multiple lines of action' that can be used in all three types of triangulation:



**Figure 23: Berg's (2009) Multiple Lines of Action in Triangulation.**

These three, along with *methodological triangulation*, were used in different degrees throughout the research.

**Table 10: Types of Triangulation and their Use in the Research.**

1. Triangulation of data/measures	Data were collected on the BSF’s effectiveness; user compliance, interviewee’s livelihood, education, and gender. (See sections 3.1.2, 3.3.3, and 3.3.4 for selection criteria). All of the data collected gave insight into the potential and actual impacts the filter was having on a household. Interviews were compared with observation, checking for consistency with what people say and with different sources such as other community members.
2. Triangulation of investigators/observers	Although the author was the primary observer and investigator, Samaritan’s Purse WATSAN staff also observed and gave their perspectives on the research. Other observers were from different organizations that are familiar with the BSF project.
3. Triangulation of methods	Both qualitative (interviews and observation) and quantitative methods (surveys) were used to collect the research data.
4. Triangulation of theory	The different types of theories used were taken from a qualitative data collection standpoint. These included ethnography, phenomenology and grounded theory. (Taken from Patton, 2002)

Triangulation gave the research data validity and countered the possible unacceptable bias by the author and subjects. Triangulation increases creditability and quality that could be distorted by using just one method or source or by a single researcher’s bias (Patton 2006).

#### **4.4.2 Bias**

Bias was a definite factor that had to be addressed in the research. As stated in Chapter 2, Contextual Review, being part of the research project brings with it strong convictions and feeling towards it. “Rather than pretend to have no biases, it makes more sense to examine your preconceptions and work out how your feelings might slant the research and then, with this understanding in mind, work to formulate questions to offset your biases” (Rubin & Rubin, 2005). There is unacceptable and acceptable bias in this type of research that play a role in

establishing results from the data, as noted in section 3.1.2. As previously stated in this section, grounded theory in its purest form is not possible, specifically in this research, due to the presence of acceptable and unacceptable bias. An acceptable bias would be the fact that I work for an INGO, am a female, white, and have a differing world view than the research subjects. The benefit of this bias could be that the interviewees want to talk to an outsider whom they believe has their interests in mind. The disadvantage of this bias is that I am white and am perceived as someone who can give people something. Being female in a male-dominant culture could also be a negative aspect; I may not be as respected as a male counterpart would be, therefore making it more difficult to gather information.

The bias that the BSF is the most effective means of household water treatment is an unacceptable bias. The desire to promote the BSF project as successful and construe data accordingly would be unacceptable bias. As stated in the introduction, this thesis was not designed as an evaluation of the BSF or the INGO implementing the BSF program but rather in terms of investigating and using a BSF project to assess the impact development projects have on the quality of life for those living in a post-war context. The positive side to this bias is that I bring experience and knowledge to the data collection. However, negatively, the research could be biased towards the technology, because the BSF is the only HWT technology with which I have worked. To compensate for this, rigorous academic study on the effectiveness of the BSF was conducted to determine if the filter had the potential to positively impact a post-war society. Also, other forms of HWT were researched, although not extensively as the research on the BSF; further research would be needed on alternate HWT technologies and their impacts on QoL. Research credibility could not be achieved if data were distorted so to serve the interest or prejudices of the INGO, the BSF project, or the researcher (Patton, 2002). The bias was recognized and I made attempt to ‘remove’ myself from the bias of working for the INGO and to counter with questions that would give truthful insight into the ‘other side’ of the story. My role in this study was a balance between personal involvement and empathic understanding against impartiality and being as objective as possible to give the research legitimacy. This is discussed in Chapter 2, section 2.3.

## 4.5 Limitations and Challenges

As with all data collection, whether it is qualitative or quantitative, there will be limitations and challenges. The research carried out for this thesis is no exception. The primary limitation was the fact that the research took place in a developing, post-war country. Although there is an upside to collecting data straight from the field and being in the geographical location of the research, there were limitations inherent to the location. Some of these were: 1) Lack of data collected by the Ministry of Health for health records in the county capital (see chapter 2 section 2.1) and 2) Lack of infrastructure to gain access to the research arena. Some limitations were mitigated, but others were too difficult to change in the available time frame. For example, Ministry of Health records are still difficult to obtain and it would take an immense amount of time to gather any accurate information that might be available. However, I was able to get to the research area regardless of the infrastructure. This was done with four-wheel drive Land Cruisers and, in the past two years, I have had access to the SP helicopter.

Some of the challenges can be broken down into the following two areas:

***Liberian Post-war/Developing Country Issues*** (See literature review for further information):

- Transient population still returning from IDP and refugee camps
- No governmental departments able to assist in research
- Attitudes (psychosocial issues) of the interviewees
- Telecommunication difficulties with Internet for research

***Liberian Culture Challenges:***

- Relational culture with different time management; interviewees unexpectedly gone from homes or did not show up
- Liberian traditional belief system of cultural issues surrounding water and sanitation issues. There is a very strong “traditional” belief system, especially in rural Liberia. See chapter 2, section 2.2.
- Liberian English and understanding the interviewer and interviewee. Liberian English has no real resemblance to what would be deemed proper English. It is a mixture of English words, derived from Liberians’ ancestors in the

southern United States and from Europe, and a variety of African languages, with unusual enunciations of words. It would be safe to say that Liberian English is closer to Creole or a distinct English dialect. Within Liberian English there are also different types, such as “street talk” the most widely used in Monrovia, the capital, or “soldier English” spoken by those least educated and with a very limited vocabulary. An example of Liberian English is provided in the translation section of this chapter. To assure accuracy in the translation, it was important that I had a good grasp of Liberian English and that clear communication between myself and the translator was established regarding the meaning of what was being said.

- Cultural aspects around a lack of privacy: Liberians will often form a large group around the person being interviewed, which increases the potential for the interviewee to not be truthful. When someone gave an answer, others would comment on it. In these cases, an elder from the village was found and the interviewer would request that he ask the community members to leave the house where the interview was taking place.

Believability of what the interviewees were telling the interviewer and not knowing whether they were deceiving or lying was a challenge. However, through triangulation and listening to many people in casual conversation, one can eliminate those stories that are exaggerated or altogether false (Rubin and Rubin, 2005). Samaritan’s Purse BSF national staff conducted some interviews when I was not present. This was only done in the later stages of the interviewing process, so that the BSF staff had witnessed numerous interviewees that I had conducted. It was postulated that SP BSF staff who had interacted with the interviewees for the past two years would gather more truthful answers than I. This was usually validated by an exchange, discussion and comparison of interview notes that I had and the BSF staff had. If there were substantial discrepancies, these were discussed as a group to ensure the information gathered was legitimate; otherwise it was discarded.

Another challenge has to do with *monochromic* North American culture. Hall (1990) defines monochronism as doing one thing (or task) at a time. Often when the interview is arranged it is

hoped that the interviewee will be focusing on that one task, namely the interview. This was not always the case. In some instances, interviewees were distracted and not focused on the questions being asked; instead they focused on the expectations they had of the NGO. Expectations were that the NGO would give them the possessions that they had before the war and which would improve their quality of life. Some of the interviewees have returned from IDP or refugee camps where they were provided with hand pumps, latrines, shelter, and non-food items (NFIs), such as pots or buckets. The problem of these expectations was handled by trying to make it clear to them that the interview was not about the NGO specifically, but about them. I would usually listen as they asked for things and then end the interview by stating in a cordial manner, “Thank you for your time and I appreciate your honesty.” This strategy worked very well and the interviewees would stand and thank me for coming. Usually a casual dialogue would ensue as I walked towards another house for interviewing or to the vehicle to leave.

The methodologies employed, and the purpose behind them, have been utilized to deliver the insights needed to answer the thesis question and meet the objectives. The research centres on society and people and how the BSF affects both. Much of the collection of meaningful, credible and truthful data was dependent on my experience. Although qualitative methodologies do not always render results that are as tangible or measurable as those from quantitative measurements, the importance of qualitative data is significant, providing insights and revealing people’s views and experiences. These insights will be described in the following results and analysis chapter.

## **5.0 FINDINGS AND DISCUSSION OF DATA**

This chapter presents the findings of the data collected and discusses these findings as they pertain to the first three objectives and thesis aim. To review, the thesis aim is: To achieve a comprehensive understanding of the impacts that a key technology such as the BioSand water filter can have on the quality of life of people in rural post-war Liberia. This chapter is organized using the first three objectives as sub-chapters, presenting the data that was collected (both quantitative and qualitative) and with a discussion section. The fourth objective deals with the insights and recommendations for INGOs and therefore will be discussed in the following chapter, chapter six. The last sub-section will summarize the findings and also revisit grounded theory to determine what, if any, ‘theory’ emerged from the data collected. The findings and discussion were combined so that the findings could be interpreted meaningfully.

As stated in Chapter 4 (Methodology), the initial 27 interviews were done in 2007/2008 to collect both quantitative and qualitative data. As the objectives and aim of the thesis became better defined, a secondary survey was performed in 2009/2010. Additional supporting observational data have been collected over a four-year time period, achievable because the researcher has worked and lived in the area for six years (and is still living in Liberia).

### **5.1 Research Findings Concerning Objective 1:**

**“Define the relevant components of the QoL for people in post-war rural Liberians.”**

To adequately measure the impacts of the BSF on the QoL of post-war rural Liberians, it was necessary to establish an appropriate list of QoL indicators for this population. As noted in Chapter 3 the QoL is unique in this context and cannot be measured appropriately by the western indicators or measurements. To reveal actual QoL indicators for rural post-war Liberians, interviews were reviewed and common themes indicating aspects of importance to quality of life were noted. A survey ranking QoL indicators was conducted (see Methodology chapter) and produced quantitative data results that will be listed in this section. First, the qualitative results from the interviews and observation will be noted, followed by a discussion section pertaining to their contribution to determining and defining the QoL for post-war rural Liberians.

### 5.1.1 Qualitative Data Results

Qualitative data were collected, documented and transcribed through interviews and observation. Interviews were analyzed using a coding system contained in the ATLAS.ti software. In this case it is providing answers to Objective No, 1: “To define the relevant components of quality of life for people in post-war rural Liberia.” The methodology of the interviewing process and coding was explained in section 4.3.4 ‘Interview coding’. The interviewee’s quotations are presented in italics and are referenced by name of interviewee and year. No interview was started unless permission was given by the interviewee.

#### *General Observations:*

In section 4.3.4 ‘Observational coding’ the methods used for collecting and coding observational data is explained. The following observation results give a contextual overview of village life, social dynamics, attitudes towards the filter and the social norms of the village. The ensuing observational results are noted below:

People spend the majority of their time on the farm, clearing it, ‘scratching’ (weeding), planting and harvesting. Therefore, if the researcher came to a village unannounced a majority (approximately 75%) of the population was not there. Older children (any child over approximately ten years old) took care of younger siblings. Older people who were too old or sick to work were the only adults in the village. The following descriptive observations were made during this time:

- Houses were locked. Even if the doors were made of flimsy wood and could easily be knocked or broken down, all the doors had small locks on them.
- Children were unsupervised. There were no parents or capable adults available and approximately 45% of the school age children (5 to 13 years) were not in school.
- Community members left before 6am and returned just before 6pm (around sunset).
- Houses were fairly neat outside. Some places had clothes drying on the ground, others had them hanging up. Among the interviewees, 80% had dish racks above the ground made of bamboo.

- Children were visibly unclean, with dirt on their faces, dirty clothes and dirty hands and feet. During a week-long visit, it was observed that many would defecate anywhere they wanted (pathways, in front of their houses, soccer field) and not wash their hands.
- Children who were able (over 5) collected water first thing in the morning and just before the adults arrived in the early evening. Most streams or open springs were no more than a 5-10 min walk for the children/women.
- Water filters were locked in the house. If the BSF was located outside on the “porch” area and the bucket that was given to them by the INGO was not there, it was assumed to be locked inside. However, approximately 65% of time the bucket was being used for something else, such as washing or retrieving water.
- Children fought frequently. The cause of the fight usually had to do with one child taking/grabbing something from another child. Yelling would ensue, along with verbal threats of beatings from each other. If the object was not returned or if it had been eaten (rice or piece of meat) the children involved would frequently begin hitting each other. The result was often one child taking a stick or other object and violently hitting the other child. The fighting stopped with one child crying. Since there is no parental supervision, the victims of the violence would sit and wail for long periods of time.
- In villages where interviewing took place there were no school structures. In some cases, for example in Small Bong Mines, the pastor taught primary-aged kids at the church, but nothing was structured.



**Figure 24: Structural damage due to the war in Liberian town (Voijama, Lofa district, March 2011-photo by Joni Byker).**

During times when adults were in the village, for example at the weekend or if a pre-arranged meeting time had been set, the following was observed:

- Men were typically at leisure, usually sitting in a common place or in front of their houses visiting with each other. However, some may be sharpening their cutlasses or fixing their farm tools.
- Approximately 75% of men owned radios. They walked around holding them close to their ears and would listen to them for many hours each day.
- Women were typically observed to be working, spreading rice, beans or ground nuts to dry on large tarpaulins on the ground, cooking, pounding rice, washing clothes or collecting water.
- Children still remained somewhat unsupervised and fought. Parents or guardians would react by yelling or employing some form of random, sporadic physical discipline.
- Babies (under approximately one year) were sitting on the ground and were frequently observed eating any food that had been dropped there; or they were being nursed.
- Interviewees 'looked' healthy; there were no noticeable skin rashes, lesions, tumours or limping. However, children did not look healthy and were observed with skin rashes (presumed to be ring worm or scabies) and protruding stomachs, usually an indicator of parasites.
- Houses were fairly clean on the outside; the compounds were swept and little debris or animal faeces were observed. Inside, belongings were kept in specific spots, but everything was very cramped and cluttered, largely due to the small amount of space. It was very dark inside and the ceilings are very low.
- Towns where interviews took place had distinct paths to a water source, often an open spring or stream and in some cases an open unprotected well, to each other's houses and to the main road.



**Figure 25: Man from Gokala village collecting water (Photo by Joni Byker-May 2006)**

- People in remote areas with no cell phone access (sometimes a three or four hour walk to a location to gain access) still had cell phones.
- Men would gather around one common area to play checkers, cards or manacle (a traditional African game).
- Animals are not penned or caged during the day. However, at night farmers trained by the INGO (SP) penned their goats and sheep.

### ***Specific Observations***

The following specific observations were made in relation to the QoL indicators listed on the survey, along with interview quotes pertaining to them:

- Safety/Security

Doors were locked when people were gone, even if they were just away from their house but still in the village. People moved freely between their homes, farms and other communities. There was not a sense of “danger” while in the villages. People did make reference to it in regards to the war, but also noted that now they “feel fine”. The following quotes from interviewees confirm this.

*Researcher (R): What else can you tell us? You feel safe?*

*SK: Yes, I thank God no war. I have my filter, I have my house. (Sam King, 2007)*

*R: You feel safe here?*

*MH: Yes*

*R: Why?*

*MH: No one giving us a hard time. Nobody disturbing me. (Morris Hayes, 2007)*

*R: So since you have come back, do you feel safer?*

*DC: Since I come back I thank God we live our normal life. Everything is fine with us. (David Cooper, 2007)*

It should be noted that immediately after the war, the UN stationed large bases in county capitals, such as Bopolu. As a result there was and still is a sense of ‘security’ even if it is only because the UN is there. After the war, men only returned to primarily re-build their homes, not because it was not safe, and then sent for their families once they had a small structure to house them.

- Job/Employment (income generation)

Daily activities and working focused around the farm. School-aged children, from around 10 years old were working on the farm instead of going to school. Schools were open and available to go to-even if it was just held in a small community building or church, however, families would usually only send one child to school and the others would work on the farm. Crops from the farm were dried and stored near or in the house. Women were constantly occupied drying, pounding, planting and storing any crops that come from the farm. Since rice is the main staple food, significant resources were used every day in pounding, sifting and cooking rice. Likewise, rice farming is vital; every other crop is secondary and may be used or sold to buy other items. Rice, however, is rarely sold, but can be used as a replacement of money to buy other commodities. Every farmer takes cash crops to the market once a week. Apart from farming, people have small shops in the village selling batteries, matches, alcohol, cookies and other non-perishable goods. Shop keepers will also have a farm where they send their wife or children to work while they mind the shop.

- Health/Hygiene

Some smaller children looked ‘unhealthy’, including having a slight orange tinge of hair and swollen bellies, which may indicate malnutrition (SP health program manager, 2010), or a running nose, cough, skin rashes and ring worm in their scalp, and were very dirty. There was

one clinic in the interview area. It was small, had limited supplies, and was administered by a “nurse” who may or may not have the proper training or qualifications to practice nursing (situation varied from location to location). In some cases the nurse was a community health worker, which is the person community members will look to for health care.

Adults “looked” healthy. However, through the interviews, they would often reveal an ailment. Women rarely washed their hands with soap before preparing food or after coming off the farm. They would wash with cold water that was in a dirty container and then dry their hands on their lapa (material wrapped around their waist) which was usually dirty. Not one child was observed washing his or her hands in any way. Throughout the data collection period or in the time the researcher has been working in this area (six years) no children were observed washing their hands, other than in specific health and hygiene education workshops.

- Education

There were no formal school structures in any of the towns except for Totequelleh, the largest town in the research area. Children walked to the nearest school, an average of one to two hours away. As a result, many parents would not send their younger children. Where there were schools, the education methods were unstructured. Classrooms, where they existed, were crowded and poorly supplied, and no one could say with certainty the time school started or ended. Children who were supposed to be in school did not have supervision and therefore no parents or elders told them to go back to school. In some cases, parents removed their children from school so that they could work on the farm. Parents recognized that education is important; however, the need to feed their family and provide for them preceded that importance. This issue is far more complex than this thesis will go into, but, the practicalities of the family needing free labour and the desire to be able to send their kids to school.

- Family

In most communities families are large and live together in a small hut (approximately 15 by 15 feet). It is difficult to determine which child belongs to which mother, since traditional marriages are often polygamous, with two or more wives for one man. Women are the main caretakers for the children and, in some cases, the husband is rarely present. Two villages were named for the families that founded them, the Dukely family and Dorley family, who founded

Dukley-la and Dorely-la, respectively. Consequently, these two villages were smaller, roughly 25-30 families, but closely knit.

*R: Who established this town? Your name is the same.*

*MD: It was my grandfather. He settled this town and he names me and this town. My father, grandfather was born here. I was born here – my brother too. He was farming nearby and he opened this place to be a village. (Momo Dorley, 2007)*

Many of the families were displaced by the war, and re-establishing their homes and farms is of great importance due to the family lineage in that area. Families pride themselves in owning land throughout generations and being able to claim it back after the war was important to them. This was evident in talking and spending time with many of the people in this area (see chapter 2 section 2.3 Research's Tacit knowledge). Comments were made on the importance of "we are together again" as noted by one villager in the research area (this was not in a formal interview).

- Home/Shelter

As mentioned above, shelters were small, generally framed by sticks which were kept together with vine. Typically, after a family framed their house, everyone in the community would assist in daubing the house with mud. During the initial interviews, the huts that were observed were poorly constructed with mud and bamboo rods, the majority of them having a traditional palm thatched roof. During this stage, there were many requests to the researcher to help build new homes or assist in providing material. However, observations of the same areas two years later indicated that 1) more people had moved back and 2) houses were being built bigger.

- Electricity/Power

As of 2011, there is no municipal power available in rural Liberia. Therefore, the only power available would be for someone who had enough money to purchase a small generator. Some people used batteries for flashlights and their radio; no solar power was observed being used. When asked, electricity was reportedly not a priority to rural Liberians; this could be because they have never had it before. Apart from generators, everything is run by batteries. Every little store sold cheap batteries, confirming that the market caters to the need for batteries as no other power is available. Access to electricity was not deemed as a top QoL priority for those

surveyed. 62.5% of the votes were ranked between the #9-11 priority (see table 12). It should be noted that municipal or any type of electrical lines had ever been established in the research area even before the war. Any power that was used came from small generators and was often used for “video clubs” for watching football matches on TV. Video clubs charge people to come and watch the matches to help pay for the TV, satellite dish, and the fuel for the generator

- Freedom of Rights

Rural Liberians seem to have the freedom of speech, religion and movement between towns or villages. Interviewees indicated that they did not have that freedom during the war. As interviewee Nancy Johnson stated:

*R: Tell me about your family and what you did during the war.*

*NJ: During the war in 2003 fled to the Belleh forest where the family slept and lived in the bush while troops went through the villages, taking children and destroying property. It was during this time that my son was killed by government troops. He was shot.*

However, now they understand that they are living in a free country. One interviewee, Momo Dorley stated:

*MD: I feel fine, because I am living in peace. I built my house in peace.*

*R: You feel safe?*

*MD: Yes, I feel fine. I can go anywhere. I can move around. I can go into the farm and it is fine.*

The only observed infringement of personal rights is associated with the traditional ‘bush society’ which transcends all other belief systems, village leaders and, in some cases, government. Young boys and girls are sent into the bush with traditional “priests” where they are initiated into adulthood (See Chapter 2 section 2.2). Girls as young as three or four are sent in for a lengthy period of time; in the research area it was up to a year. Female genital mutilation (FGM) is practiced in every bush society tribe, a young girl does not have a say whether or not she participates and there is a considerable amount of peer pressure on her and her family if she does not participate. One village observed, the majority of the girls from aged four to twenty were gone during the times interviewing took place. In a recent impact assessment done by SP (2010) one girl stated, “It is not in our control, but we would like to stop it”. However, one

young girl said, “It taught us to respect our elders and ourselves.” There are aspects of the society that are not oppressive or destructive. It has been said that young girls and boys learn respect and traditions of their culture. Girls do not have the freedom to leave and the researcher did not have the freedom to go and visit them in the bush society, also called the secret society, due to its lack of accessibility to the general public. Since that first observation, the researcher has observed many more villages in which this has taken place, in some places girls die due to infection or bleeding as a consequence of FGM. Although this was the only area that was observed where ‘freedom of rights’ has been compromised, the bush society was held in high regard. People would forgo an opportunity to learn about health and hygiene and instead be forced by family to go to the bush (see case study one in Chapter 3 and section 2).

- Infrastructure

Roads and bridges were and still are being constructed mainly by INGOs. However, there is an intricate network of bush trails that everyone uses. Therefore, although village to market roads would be an asset, people use the well-known bush trails to move from place to place. The researcher observed for many hours in one village people coming and going from bush trails that connected them to a ‘hub’ village where the market was situated. Due to the amount of rain in Liberia and the lack of resources for road repair in the country, United Nations engineers from Pakistan rebuilt roads and bridges for the first few years after the war. Recently in the research area, it has been observed that the government has initiated road repair around some of the bigger communities. Other infrastructure improvements have been implemented by INGOs, such as ‘quick impact’ UN projects renovating schools and clinics. None of these projects were near the research area.

- Environment

It was observed that the environment is not viewed as something to be protected. Garbage is discarded wherever it is convenient, with little regard to how it affects the natural environment. There is no system of waste disposal or recycling in rural Liberia; therefore plastic bags, bottles, cans and other non-degradable garbage littered the villages. Farmers slash and burn to clear for crops; however, farmers do have an understanding that the renewability of their land is important. Consequently, farmers rotated their crops to yield the maximum harvest but also give the land time to restore the needed nutrients for future crops. The researcher observed crop

rotation and experienced firsthand working on some farms and talking with the farmers about Liberian farming practices. It was very evident through observation that there is a lack of understanding of what it means to be stewards of the natural environment.

Open defecation practices were frequently observed. Faeces were observed throughout the village, near streams and on foot paths. Rain runoff was observed to wash faeces into the streams, which are typically the source of drinking water in the villages. During an observation carried out in Totequelleh village, a child defecated in the stream while other children were bathing in it. The researcher then observed another child approximately ten feet downstream come and collect water in a bucket. The child carried the bucket back up to the village and the water was placed in the cooking area where the mother used it to wash the rice.



**Figure 26: Water source (unprotected, hand dug well) in Bejah town Gbarma district (April 2008)**

### *Summary of Observations*

Observing the research arena for the past six years has yielded a great deal of insight. As discussed above, the lack of basic infrastructure (houses, schools, clinics or services) is evident. The destruction and rebuilding are stark reminders of the recent conflict. Observation validated the fact that the majority of rural Liberians depend solely on farming for their food and for

selling to make money to buy other goods such as batteries, matches, soap, washing tubs, and other simple household items. Interviews validated this:

*R: What do you do for money?*

*NJ: We can do farm, but I have not burnt yet. We can grow pepper, okra, corn and rice.*

*R: Do you sell your crops?*

*NJ: I can take my rice at harvest and use it to buy salt and soap. (Nancy Johnson, 2007)*

*R: What do you do for a living?*

*OB: I have farm and I grow rice and veg. I take the veg to market and keep the rice. (Obreta Blanch, 2007)*

*R: What do you do for money?*

*JK: I farm rice-pepper and bitterball.*

*R: Do you keep it all?*

*JK: I can keep some then I can sell the rest to Monrovia. (Jack Kollie, 2007)*

*R: Where do you work now?*

*T (Translator): He learn how to build hand pumps, but right now he is a farmer.*

*R: What do you grow?*

*T: Pumpkin, rice, bitterball, pepper, cassava*

*R: Does he sell it or keep it?*

*T: He is growing rice from rice seed that he got from SP. (Momo Sumo, 2007).*

In the case of Momo Sumo he had been trained in taking care of hand pumps but was now living in a town that did not have one. He now had to rely on his farming to make a living.

Similarly a farming calendar indicates that farming is an all-year activity, thus taking up much of rural Liberians' time.

**Table 11: Farming Calendar for the Research Area**

Activities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Rainy Season												
Brush												
Fell												
Burn												
Scratch/plant												
Weed												
Drive birds												
Fence												
Harvest												
Women's farming												
Men's farming												

Section taken from Samaritan’s Purse Liberia Impact Assessment p.24

### 5.1.2 Quantitative Results

Quantitative data for objective No. 1 were derived from a QoL survey that was initiated after the initial interview schedule was performed. The quantitative data collected served to fill the gap left by the first interview schedule, specifically pertaining to the QoL indicators for post-war rural Liberians. To validate the QoL indicators in the survey, a section titled “Development Desires” was included. The results of the ranking of the development desires will be discussed in Section 5.1.2.3.

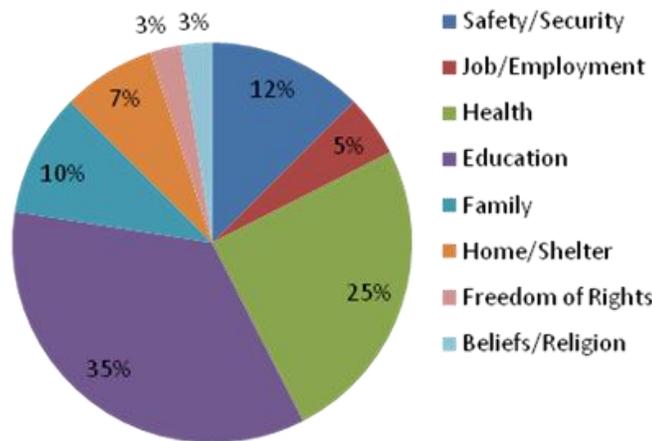
#### 5.1.2.1 Quality of Life Questionnaire Results

Forty interviewees were asked to rank a list of 40 QoL indicators. The results are presented in Table 12. The data in each cell indicate how many interviewees ranked each item on the list, from most important to least important. For example, 14 individuals ranked education as their highest priority while only two indicated that income generation was the highest priority for their QoL.

**Table 12: QoL Indicators, Rankings and Number of Votes. n=40.**

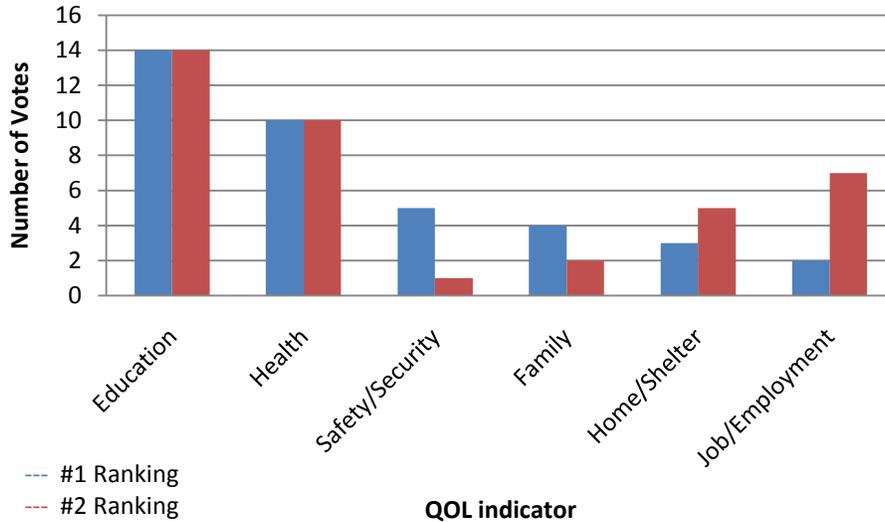
Rankings	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	N=
<b>QOL indicators</b>												
Education	14	14	2	3	2	1	1	3				40
Health	10	10	9	4	3	1	2			1		40
Safety/Security	5	1	5	4	8	4	4	3	2	2	2	40
Family	4	2	4	7	6	3	3	3	5	1	2	40
Home/Shelter	3	5	4	4	4	7	9	2	1	1		40
Job/Employment	2	7	9	10	2	3	1	2	1	1	2	40
Beliefs/Religion	1			1	1	6	3	6	5	14	3	40
Freedom of Rights	1		2	5	8	7	3	7	3	1	3	40
Electricity/power			2	1	2	2	3	5	10	6	9	40
Environment		2	2	1	1	3	4	5	5	6	11	40
Infrastructure			1		3	3	7	4	9	6	7	40

The QoL survey covered many aspects of life for rural post-war Liberians. Economic, psychosocial, spiritual, relational, intellectual, personal and communal infrastructure and environmental issues were all mentioned in the survey. Figure 27 indicates the percentage of each QoL indicator that received a number one rank in the survey.



**Figure 27: Percentage of QoL Indicators with Highest Rank (vote n=40)**

Education, health, safety/security, family and shelter appeared in most people’s number one and two rankings in the survey.

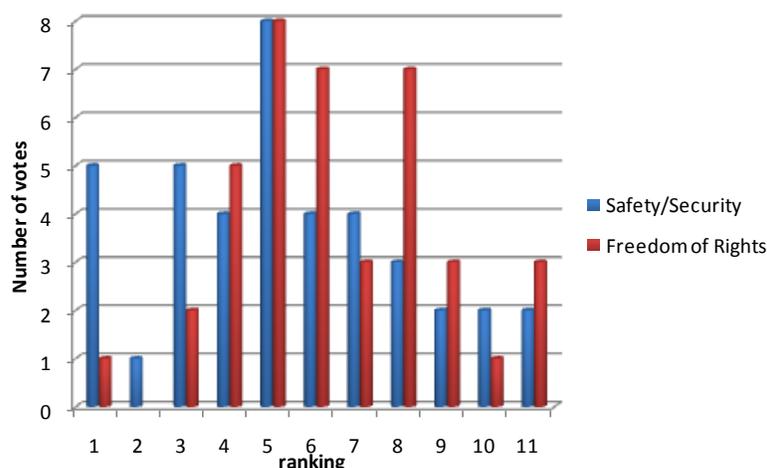


**Figure 28: Top Six QoL Indicators Receiving No. 1 and No. 2 Ranking Votes. n=40**

As shown in the above figure, 97.5% of the number one rankings are represented in these five QoL areas with education and health receiving 35% and 25% number one ranking votes respectively. Additionally, 97.5% of the number two rankings are also represented by these five QoL indicators.

In the context of a post-war society, safety/security and freedom of rights were assumed to be important to individuals. However, as shown in Figure 29, safety and security received a few number one votes; the majority of its votes were ranked between numbers three and seven, with a large number of number sixth place rankings. In contrast, freedom of rights received no first ranking votes but received the majority of middle votes (between ranking #4-#8).

Freedom of rights received eight number five rankings, the same number and ranking as safety and security. Although they were not of primary importance, both were consistently voted for in middle rankings of five or six (see Table 12).



**Figure 29: Number of Votes for Each Ranking of QoL Indicators Safety/Security and Freedom of Rights (n=40).**

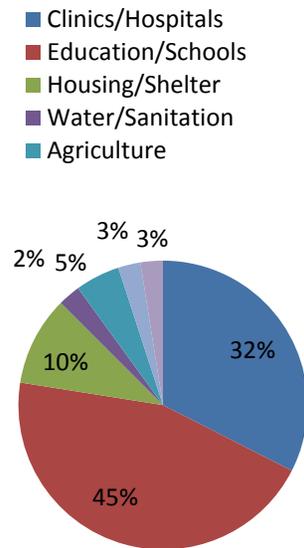
#### 5.1.2.2 Development Desires Questionnaire Results

The second aspect of the survey contained rankings of ‘development desires’. Whereas the QoL deals with the individual and what s/he deems important, development desires are communal in nature, what would help the community as a whole not them individually. In other words, what development projects would respondents want to request that an INGO help with in their community. As with QoL, the development desires indicators cover all aspects of development sectors and programs. The results of the development desires survey are listed below.

**Table 13: Development Desires list, Rankings and Votes, n=40**

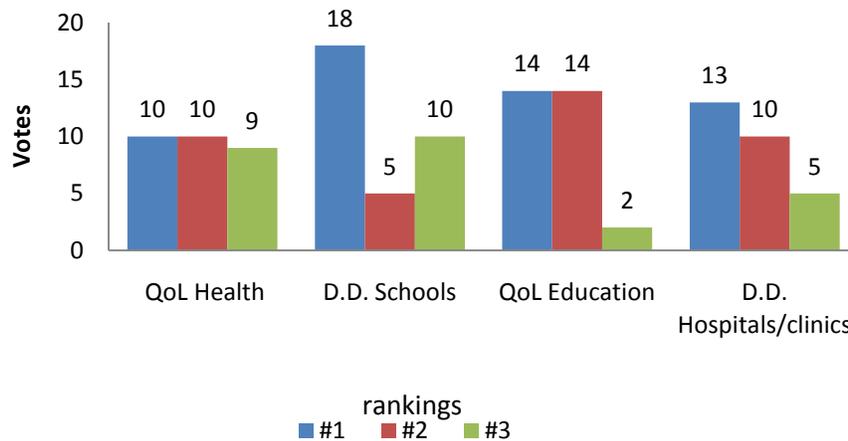
Rankings	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	N=
<b>QOL indicators</b>												
Education	14	14	2	3	2	1	1	3				40
Health	10	10	9	4	3	1	2			1		40
Safety/Security	5	1	5	4	8	4	4	3	2	2	2	40
Family	4	2	4	7	6	3	3	3	5	1	2	40
Home/Shelter	3	5	4	4	4	7	9	2	1	1		40
Job/Employment	2	7	9	10	2	3	1	2	1	1	2	40
Beliefs/Religion	1			1	1	6	3	6	5	14	3	40
Freedom of Rights	1		2	5	8	7	3	7	3	1	3	40
Electricity/power			2	1	2	2	3	5	10	6	9	40
Environment		2	2	1	1	3	4	5	5	6	11	40
Infrastructure			1		3	3	7	4	9	6	7	40

Similar to the QoL survey, education and health dominate the number one rankings. The graph (Fig. 14) provides a breakdown of the number one votes for development desires.



**Figure 30: Development Desires with Most No. 1 Ranking Votes n=40.**

Educational buildings and health infrastructures comprised 77% of the total number one votes, confirming the importance of the QoL indicators of education and health to individuals. Part of the rationale in surveying development desires was to verify that, if an interviewee voted ‘health’ as their top QoL indicator, would they also vote for a clinic or hospital as their development desire and make that correlation that to improve their individual health they would need community-level health services. Figure 31 illustrates the correlation between the top two QoL indicators and the top two development desires (D.D.):



**Figure 31: Correlation between the Top Two QoL Indicators and Top Two Development Desires n=40.**

The graph above indicates that 29 individuals ranked health as their first, second and third priorities and 28 individuals ranked hospital/clinics as their one, two or three priorities. The majority of these (approx. 75%) votes were the same people. This shows the correlation that individuals have made between the QoL indicators and development desires. Educational QoL and development desires are also close, with QoL votes numbering 30 and development desire for schools receiving 33 votes.

### 5.1.3 Discussion of Results

The results from the data collected pertaining to objective No. 1 demonstrates that the main QoL indicators are mostly education and health. The initial interview survey conducted in 2007 and early 2008, revealed QoL indicators such as school infrastructure, shelter, health infrastructure, family and safety and security. As noted below, the mention of a getting a new school building was primarily due to the fact that the children had to walk a long distance to school and it was “unsafe”.

*JS: For me, I would really like for the NGO with schools. The kids who are small can't walk too far and this is our request. (James Kollie, 2007)*

*DC: For me, just me, there is no school here. The distance to here to Bopolu is far, so the small children four and five can't make it. So we need a school here. This one of the things giving us a problem. (David Cooper, 2007)*

Even though a school building was requested, teachers and school supplies were not mentioned, the request focused on the school building itself. The re-building of the structure itself which represented a restoration was significant.

In practice, farming took precedence over education as children were expected to work on the farm instead of going to school. This validated that the education itself was not as important as the educational structure. Similarly, the health QoL indicator and the development desire of infrastructures in clinics and hospitals. Health was important but not enough to prevent sickness caused by open defecation, cooking indoors, or letting children eat food off the ground. This could be due to the lack of understanding of health and hygiene education- a level of “not knowing” that the aforementioned practices are not healthy. However, the desire to have or re-establish a clinic or hospital to go to when you did get sick was important. Developmentally, it could be said that for post-war rural Liberians the image of having something, such as a school building, wells or clinics was more important than actually using them for the improvement of their QoL.

Housing or shelter is another top QoL indicator for post-war Liberians. Many returned to burnt and destroyed houses and had to live in make-shift huts until they could save enough money to build a suitable place for their family. To make money re-establishing their abandoned farm was necessary. It was logical that the interviewees would request for NGOs to help them with ‘housing’ and ‘shelter’ as it would assist in re-establishing their home.

The secondary survey ranking QoL indicators and development desires, was conducted in 2009 and early 2010. The QoL indicators with the most number one votes were education and health with safety and security finishing third with 12% of the number one votes. Education as a priority QoL indicator is understandable for rural Liberians. However, it seems in this post-war context it has to do with the opportunity to go to school, not the education itself. During the war the opportunity to go to school was eliminated, after the war there is/was not the infrastructure,

teachers, or textbooks, to make schooling available. Parallel to their personal homes and possessions being taken away from them, so was the opportunity for their children to go to school. Before the war children had access and opportunity to go to school.

There was a 'gap' between qualitative data through observation, interviews, and the quantitative results in the area of the job QoL and the agriculture development desire. Out of 27 initial interviewees 25 of the 27 relied on farming for food and for income generation. Of the two women that did not farm, one was too old, and the other owned a small shop near the main road, however she did have a small 'garden' where she grew peppers, bitter ball, and other smaller crops that could be sold in the market. With 92.5% of the interviewees being farmers, it was expected that they would rank QoL indicator jobs/employment (how they buy or get food) and development desire of agricultural programs a lot higher than what they did.

Jobs did receive 17.5% of the second ranking and increased to 22.5% of total third rankings, and 25% of the total amount of fourth ranking vote. Income generation (Jobs/Employment) received 70% of its votes in the top four rankings, however, it was expected that after coming out of war and having literally nothing economically, rural Liberians would have ranked this QoL indicator with many more votes for number one or two rankings. Coupled with this, was the observation that Liberian women account for 53% of agricultural labour, 60% of production, 50% of agro-processing, and 80% of trading activities in rural areas (IFAD, World Bank, FAO, and Ministry of Agriculture, 2007), do not consider farming a 'job' per say, but more of a way of life to survive.

The other notable QoL indicator with 40% of votes in No.3 to No. 5 ranking was family. Understandably, many families were separated during the war, and now families wanted to once again "re-establish" their family unit back to their families' land. In the rural areas, land ownership is based on what family has owned the land over time. When I asked how do they know whose land is whose, the reply was often "We just know, that family has always had that land". Children were largely unsupervised, made to work at a very young age, and some even left to Monrovia or Bopolu for school. It should be noted the researcher as a westerner observed family dynamics differently than a rural Liberian. Consequently, the quantitative data retrieved

and observation may be contradictory. The researcher's bias towards what was acceptable through a western world view and how rural Liberians viewed family needed to be recognized during the data collection. An unacceptable bias would be to judge what was deemed as 'different' family from the researchers own western view. Family is important to rural post-war Liberians for their own family's reasons. An acceptable bias, is a basic understanding that rural post-war Liberians view the family different than I do, and not to let this bias hinder the data collection process or the analysis of the data.

The psychosocial aspects of 're-establishing' and 're-building' after the war were revealed as an underlying motivator for the QoL indicators chosen as highest priority. Interviewees consistently asked the researcher to help them with their housing, and could be observed building and renovating homes at every visit. From reflection upon the interviews, observation and casual discussions with rural Liberians, emphasises was on "getting back to what it used to be" as most important. Part of re-establishing their "community" is the re-building of houses, schools and farms, and possessing objects they used to own. For example, a lady from Small Bong Mines was adamant that SP replace the shoes that she had lost during the war. Liberians United for Reconciliation and Democracy (LURD) forces had taken her shoes away and destroyed her house, leaving her reduced to living in a small mud and stick house. She made it very clear that she was once a prominent lady in the village. Now all she wanted were those things that gave her status and, in a way, dignity – her shoes. Her name is not given and the following quote was translated (because of the translator, the quote is not in the first person):

*R: Anything else she can tell me about her?*

*Translator: She is explaining that she is asking the NGO to be helping because everything that she had before the war is gone. She wants the NGO to help her because she can feel discouraged. Some things they can give her that she had before the war. (Lady in Small Bong Mines, 2007)*

The noticeable aspect of this quote is the feeling of 'discouragement' because she has lost everything she had before. The difficulty in regaining their previous living status leaves people feeling discouraged, the body language of this woman, the look on her face, her eyes, expressed all of these feelings.

Whether it is in re-establishing the farm that has been in the family for generations, a home where their family can safely live, personal possessions, or basic yet vital institutional buildings, these QoL indicators begin with a deep desire to re-establish, rebuild, and return to ‘how things used to be before the war’.

The following conversation relates to the status of Dukley-la village when residents returned after the war:

*R: What did the town look like?*

*PI: The place was bad up. The bush was everywhere; we had to get people to cut it. It was bad up*

*R: The town had been destroyed?*

*PI: Yes*

*R: Who destroyed it?*

*PI: The town had been destroyed by government soldiers. We were here when they started.*

*R: How long did it take for the people to come back?*

*PI: A very long time. When we left here in 2001 in was a good four or five years before we could come back. (Pastor Isaac Dukley, 2007)*

The results from the data collected to answer Objective #1 –“To define the relevant components of quality of life for rural post-war Liberians” has indicated that infrastructure of institutional buildings is important, along with the option of receiving education and health services.

Destruction from the war left people with nothing and re-building has taken a long time. This will be further discussed in Chapter 6 section 6.1, to link the findings with the current literature and summarize the findings of this objective. The implications of this being that communities do not have a place to go when they are sick or a place for their children to go to school. How the BSF potentially and realistically impact these QoL indicators will be addressed in the following sub-chapters.

## **5.2 Research Findings Concerning Objective No. 2:**

### **“Identify the potential impacts of the BSF on the QoL of post-war rural Liberians.”**

The potential impacts of the BSF on QoL are based on many factors. This section will focus on the potential impacts the BSF has, including how people’s perception and knowledge of the BSF contributes to these potential impacts.

The qualitative results will focus on the interviews of BSF owners and observational methods and as before were coded. Quantitative data collected covered two areas: 1) water testing to test the technology's effectiveness and 2) the results of the BSF questionnaire administered before every interview. The discussion section will combine all the data noted to assist in identifying the potential impacts the BSF may or may not have on the QoL indicators, (as per the question stated in the aforementioned sub-chapter) specifically, jobs/farming, education, health, and safety and security.

### **5.2.1 Qualitative Results**

Qualitative data used to address the potential of the BSF filter on QoL was gathered from interviews, specifically questions that focus on attitudes toward the BSF. Questions pertaining to what interviewees thought of the filter or how they felt about it were asked.

*R: Tell me about your filter.*

*JK: It is very, very, very helpful*

*R: How so?*

*JK: The filter can be helping us. We draw the water from the creek. We can filter the water and it can be clean and we have no runny stomach.*

*R: Is the filter important to you?*

*JK: Yes*

*R: Why?*

*JK: Because we can experience stomach sickness and it can help us with that. (Jack Kollie, 2007)*

*R: Tell me about the filter, how is it?*

*FS: When we had to get creek water we had runny stomach. Since the filter we have not had runny stomach. Even the community has improved. (Fatu Sumo, 2007)*

*R: How long have you had your filter?*

*OB: Five months*

*R: How do you like it?*

*OB: It is good for us from the beginning. We have had no safe water and we have to go down to the creek to get it. The sickness we had, it is going down so we are thankful to the organization SP for helping us. And we can even cook with it.*

*R: So you have noticed a difference before the filter and after the filter?*

*OB: Yes. Before the filter, excuse me for saying, but we can would drink from the creek and get water poop and it would make our stomach run all the time. But now you can take bath with it and wash your clothes and it is a great thing. (Obreta Blanch, 2007)*

*R: What do you think of the filter and how do you use it?*

*T: She likes the filter. Before the filter she had the filter, she would take bath in the creek water and her skin would itch. But now she uses the filtered water and her skin does not itch. She uses it to wash her dishes. (Bendu Fahn, translated)*

Interviewees had an understanding of the filters potential, and how it could help them. They also made reference that by using the BSF it would rid them of ‘runny tummy’, which is what Liberians call diarrhoea. Thus, the potential of the BSF seems to be understood. However, as will be seen in section 4.3, knowledge of the potential impacts does not equate to practice and actual impacts. The knowledge-practice gap will be discussed again in Section 4.3 and 4.4.

Observational data collected revealed different results than what was said by the interviewees. Over the four years of data collection, the research area was visited on a regular basis by the researcher and SP BSF staff. The time period between visits ranged from two weeks to four months with the exception to carry out following up on the BSF program and to observe water practices and uses. Observations have been coded specifically for: 1) BSF and 2) health and hygiene behaviour.

There were 27 BSF observed in six villages during the research period from 2006-2010. The following observations were made:

**BSF: n=27**

- 93% of the effluent containers were present, others were ‘missing’
- 25% of the filters were only being used sporadically (Only being used once a day or beneficiaries would leave for a week or so for different reasons).
- Approximately 85% of the filter spouts were dirty and were in great need of being cleaned.
- 26% of the filters were low in sand inside the filter, including two that had no standing head water in the filter.

- One filter had poor ‘integrity’, indicating cracks or it had been moved.
- One filter did not have its lid.
- One filter had an unacceptable outward appearance, meaning it was not clean and had food contaminants near it or in it.

All of the interviewees noted that they ‘use’ the filter every day. From observation this was not the case. Specifically, filters with no standing head water and low sand in the filter, which indicates that water has not been put through the filter for regular use. The head water begins to evaporate and if a filter is not used for a long period of time, the filter can ‘dry out’. Low sand is also an indicator that the interviewee has washed the sand too much, however, they do have replacement sand that they can install to make up the sand lost in washing. When the researcher questioned the interviewee about how often the filter was used, the interviewee would often lie, saying they use it every day. However, upon examination of the filter by the researcher it was apparent that the filter had not been used.

#### **Health/Hygiene Practices with BSF Water:**

- Unsupervised children still were drinking water from a contaminated water source.
- No observation was made of interviewees washing their hands with the BSF water.
- Observation was made of people drinking the water; however, the container they used to drink out of was often dirty.
- Spouts and lids were only washed when interviewees knew the researcher was coming or present.
- No observation was made of interviewees using the BSF water to wash their children or themselves.
- No observation was made of the interviewees using the BSF water to wash their dishes.

The observations made have remained overall consistent over the past four years. Even though the interviewees understand and even verbalize the benefits to the filters and how they use it, it is evident that there is a gap between knowing and doing. Also, it seems that to appease the researcher interviewees are not telling the truth. This will be further discussed in the conclusion chapter.

### 5.2.2 Quantitative Results

The quantitative results are divided into two areas, the first covering the water testing results of the BSF and the second was the BSF follow-up questionnaire. For something to have potential impact it is imperative that it works. Testing the filter indicates whether the technology is doing what it was made to do. If it is effective then it could be said that the technology on its own works and therefore has the potential to impact the users of it. In other words, if the filter did not work and did not remove harmful pathogens, the potential impacts of the filter on health would be limited. Therefore, water testing was conducted on seven filters to test whether the BSF technology removes harmful pathogens; leaving no doubt that the BSF technology has the potential to impact the QoL of rural post-war Liberians.

Water testing was carried out on seven filters, throughout the research arena. Criteria on how these filters were chosen are noted in the methodology chapter in the water testing section. As stated in the methodology chapter the water was tested for thermo-tolerant coliforms (TTC) which is an indicator of faecal matter in water (Carter, et al. 2010). Data collected in the initial BSF questionnaire found that 83% of the interviewees retrieved their water from an open stream, with the remaining 17% retrieving their water from an open shallow well. The water source that was tested came from the same open stream used by the interviewees. With an average of 98% removal of *E. coli* and 95% of total coliforms, (see table 14) the BSF was effective in removing harmful pathogens. Even the filters that were not used consistently were effective in removing pathogens. This was demonstrated in filter BSF SP/TF filter #43<sup>14</sup>; this filter had been with the family for approximately one year. Upon observation it was obvious that the filter had not been used. There were food items piled in and on the filter, the effluent bucket was gone, there were farming tools leaning against it, and other household items littered the filter area. The filter spout was black with dirt, grease and other grime. The water source was tested and then the effluent water was tested.

Even though the filter had not been used for a long period of time (it was estimated at one month), user compliance and maintenance was low, and there were numerous contaminates near it, the filter removed 100% of the *e.coli* and 98.3% total coliforms. From the same village an

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<sup>14</sup> Samaritan's Purse International Relief regional water manager trained Tearfund personnel in the BSF technology to assist in the implementation of a Tearfund DfID-funded water project in 2007-2008.

additional filter , SP #319, which was drastically neglected and in worse condition than SP/TF #43, had a removal rate of 83.3% e.coli and 85.8% of total coliforms.

**Table 14: Influent, effluent and removal rates of n=7 filters tested.**

Filter Number and Age	Influent			Effluent			% Removal	
	Turbidity NTU	Average <i>E. coli</i> Colonies/ 100ml	Average Total Coliforms	Turbidity NTU	Average <i>E. coli</i> Colonies	Average Total Coliforms	% <i>E. coli</i> Removal	% Total Coliforms Removed
230 - 3 years old	3.61	117	5250	0.667	>1	48	99.5%	99.10%
218 - 3 years old	4.04	315	5095	0.667	0	273	100%	95.90%
210 - 2.5 years old	8.84	171	3570	0.275	0	73	100%	98.50%
318 - 3.5 years old	2.04	205	4625	0.830	0	293	100%	93.70%
132 - 3.5 years old	2.04	205	4625	0.260	0	371	100%	92.0%
43 - 1 year old*	12.2	550	30,400	8.52	0	62	100%	98.30%
319 - 1 year old**	12.2	150	6410	8.1	25	909	83.30%	85.80%

*\*Filter No. 43 was noted as not being used consistently through the past year.*

*\*\* Filter No. 319 was noted as not being used (at all or not consistently) in the past year and was surrounded by vector contaminates.*

The influent water sources were open streams. Women typically collect the water first thing in the morning and then again when they returned from the farm in the evening. The containers used to collect water were very dirty, however of the filters observed they had effluent water containers in place and clean. The filters that were tested that had not been used did not have their effluent containers present and were using an alternate container that was not deemed clean. These factors affect the overall quality of the water. Although the WHO standards are 0 TTC per 100ml (WHO Guidelines for Drinking water, 2006), testing the two neglected, poorly taken care of filters provided evidenced that the filter in dire circumstances could still perform. Establishing the effectiveness of the BSF now gave the researcher the freedom to explore the *potential* impacts and the magnitudes on the QoL indicators.

The second area of quantitative data results were collected from the BSF questionnaire administered before an interview commenced. The questionnaire focused on the perception and care that the interviewees have for the filter. The three main areas that interviewees were questioned on are 1) BSF water usage, 2) user compliance, 3) and health perception. These three

areas were used in determining the potential impacts of the BSF and to correlate the degree to which the interviewee's answers match observed use of the BSF.

- BSF water usage (drinking, washing, and cleaning)

The potential impacts of the BSF on specifically the QoL indicator health can only be realized if the BSF effluent water is being used for everyday water usage. The more it is used the greater the potential for the BSF to impact interviewees' health. The following quotes break down how interviewees use the BSF effluent water:

*R: What do you use the water for?*

*MB: Drink and to wash. (Musu Banja, 2007)*

*R: Tell me about the filter.*

*SF: It is fine. I can use it for drinking. It is good; everyone is healthier. We can take bath with it and wash with it. (Steven Fahn, 2007)*

Out of the 27 interviewees 33% of them use the water mainly for drinking, followed by cooking and washing their food before cooking. Washing their hands was the lowest; however, washing hands is not a natural behaviour for most rural Liberians.

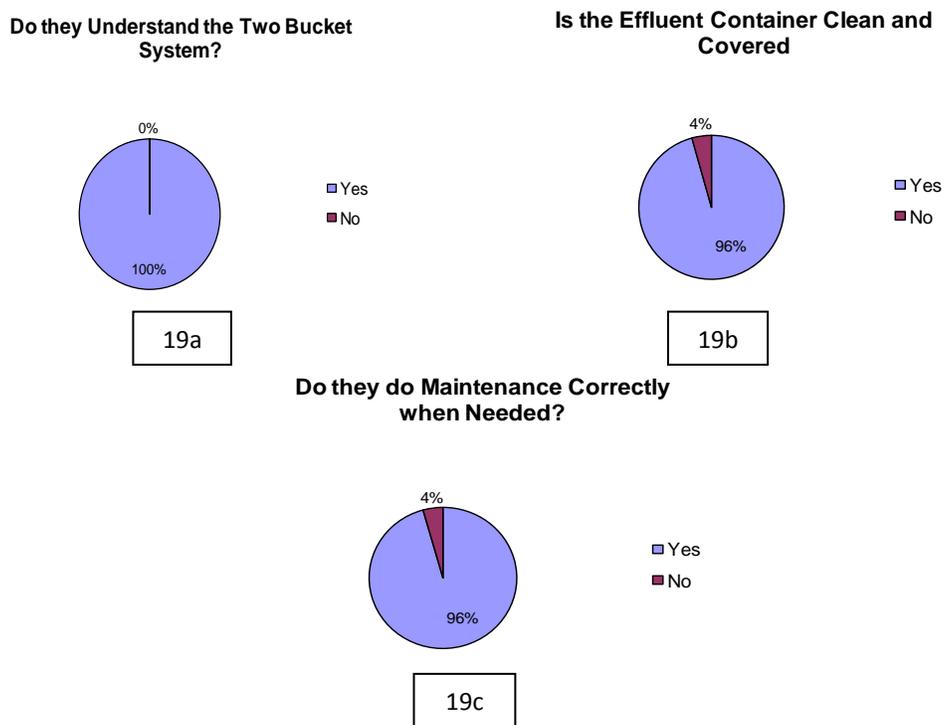
*R: What does she use the filtered water for?*

*WJ: Cooking, cleaning the children and drinking. (Watta Jalleh, 2007)*

All the interviewees said they used filter water for the above mentioned activities. However, saying that they used it and actually observing them using it were two different things. This is addressed in the section 5.2.3.

- User Compliance

User compliance indicates how the interviewees care for the filter and adhere to the rules of filter maintenance. There were three main areas analyzed under user compliance. They were 1) Is the effluent bucket (which is given to the BSF owners by the INGO) in its place under the filter spout 2) Do they understand how to maintain the filter if the flow rate slows down and 3) Do they understand the two bucket system, one bucket to collect water and the other bucket, with a lid, to store filtered water. Indicating whether or not BSF owners understand the importance of these three areas assists in knowing if they understand the BSF technology and its potential when these are done properly. The following data was collected from these three areas:



**Figure 32: User Compliance Observation and Understanding. n=27**

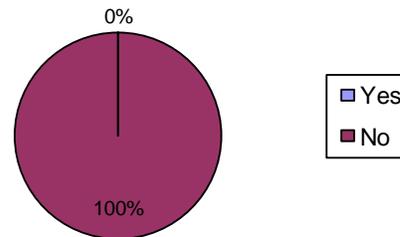
These results from the graph (19b) on the container were collected by pure observation upon entering where the filter was situated. Graph (19c) was done in two methods 1) asking them if they knew when to do maintenance and 2) having them demonstrate how they did maintenance. Graph 19a results were collected by asking them to explain the two bucket system. All of above user compliance practices were taught in the initial education given to the BSF owners, and was also re-emphasized in follow up education done after one month, six months, and one year. Yet again, what was said considering user compliance and what was actually observed did not always align. Section 5.2.3 will expand on this.

- Hygiene Perception

Interviewees were asked how the BSF has impacted their health. This of course is their *perception* of how the BSF has impacted them and not the actual impact. Interviewee's perception on how the BSF impacts their health plays a part in their understanding and knowledge which in turn affects the potential of the BSF. From the data collected 92.5% of the interviewees testified that their *perceived health* has improved since obtaining the filter. As seen

from the graph below everyone interviewed said they had not experienced watery diarrhoea in the last two weeks, this includes their family:

**Anyone with Watery Diarrhea in the Past Two Weeks?**



**Figure 33: Percentage of Interviewees with or without Diarrhoea in the Past Two Weeks. n=27.**

As noted health is one of the two leading QoL indicators for post-war rural Liberians. With respect to the QoL indicators, the BSF has the greatest potential to impact a person’s health. The magnitude of the BSF impacting a family’s health could cross into many aspects of rural Liberian life. An unhealthy individual, community, and nation can suffer developmentally which could leave them in a cycle of poverty. “It is notable that the populations of many of the poorest countries in the world also suffer from the greatest degree of poor health” (Cole & Neumayer, 2006).

**5.2.3 Discussions of Results**

The potential impacts of the BSF on post-war rural Liberians QoL are connected with the knowledge that the interviewees have about the filter and what it can do. Interviews demonstrated people’s understanding of what the filter does and how they perceived it has changed their health. Although health is the most logical potential impact, psychosocial reactions to receiving a filter were revealed. These were seen in the areas of ownership, sense of belonging, but also in the areas of INGO dependence which can be a negative impact. Thus, *potential* impacts and their magnitudes on the QoL of rural post-war Liberians cover many areas. Combining the qualitative and quantitative results, the potential impacts of the BSF become apparent.

Interviewees understand that the filter is providing clean water; they may not know exactly how the filter is doing it but they have a degree of comprehension that water that was once bad for them is now good for them. They have received the software knowledge concerning the filter; however, they are now in the position to choose whether to use the hardware (filter) and the software (knowledge) to potentially impact their QoL.

However, the potential impacts that have evolved from this process are complex in their own way. Listed below are the potential impacts the BSF may or may not have on the QoL, as listed mentioned in section 5.1.3, of post-war rural Liberians.

- Health

The most obvious potential impact concerns health. The filter project was implemented to assist in making sure people do not get sick from drinking contaminated water. As health was one of the top QoL indicators noted for post-war Liberians, the BSF could have a significant positive impact on rural post-war Liberians. In the data presented 92.5% of the interviewees stated that they had ‘seen’ or perceived an improvement in their health in the time since they had received a BSF. From the data presented, the BSF has impact the QoL indicator of health in a positive manner. Healthier people, who no longer suffer from water borne diseases, will not have to visit the clinic and hospital as frequently thus, not putting as much stress on the rural medical system. A healthier rural society in turn affects the economy, education, and the overall development of communities.

- Job/Employment (income generation)

This QoL indicator encompasses any means in which people earn an income or what they do to sustain themselves. As stated, for rural Liberians farming is the principal means of food and income. The BSF has no direct influence on farming; however, it has a strong indirect impact. If people are healthy, then they are more productive and have the ability to farm. As noted by Cole and Neumayer “...adults often survive the effects of water borne diseases but their labour productivity becomes severely impaired both during and after the period of disease” (2006). Therefore, if people are healthy they have the ability to earn income or grow food for their families.

- Education

The BSF potential impact on the QoL indicator of education is similar to the aforementioned job/employment QoL indicator. Healthy children, who are not suffering from water borne diseases, have the potential to spend more hours in school. Parents not having to spend what little income they have on medical treatment can use that money for school fees. Nevertheless, the correlation has to do with the potential impact the BSF has on health not on education. Cole and Neumeyer, (2006) also state:” Human capital accumulation may also be adversely affected by poor health due to the higher levels of school absenteeism amongst those suffering from illness”.

The QoL indicator that has the largest potential to be impacted by the BSF is health. Health could be seen as an actual impact as many interviewees testified to no longer having skin issues, diarrhoea, or other water borne disease. The problem with this is that there are very little medical records that document the improvement to health is directly affiliated with the BSF. This requires further study that would specifically look at any correlation between BSF usage and the direct improvement of health because of that usage. This was evident in a meeting in which an SP program manager for orphans and vulnerable children (OVC) met with the Ministry of Health (MOH) officials. When asked for statistics regarding a certain health indicator for the program, the MOH staff indicated that the Ministry did not have current or reliable statistics and, in fact, they asked SP to establish their baseline health statistics. Further challenges occur in the area of health facilities and care where inadequately trained medical personnel do not keep reliable records that could be compared over time. During the time of research, clinics were still being re-built and re-staffed. The Ministry of Health, with funding from USAID, and assistance from INGOs have implemented a ‘Re-building of basic health services’. This includes training and new infrastructures such as wells for clinics.

In spite of this the substantial challenge remains with the cultural understanding of the issue. As stated in many of the interviews, rural Liberians have lived with diarrhoea so long that they do not see it as a reason to go to seek medical attention for it or to change their water usage behaviours. In informal discussions, many stated that “we just live with it” (also see chapter 2 section 2). Therefore, it would be complex and challenging to obtain the actual impacts of the

BSF on health for post-war rural Liberians as there are too many factors that come into play that have the potential to skew the data.

- Psychosocial

All of these potential psychosocial impacts are a direct response to the war and play a role in re-establishing the lives of post-war rural Liberians. Once lives are re-established QoL indicators start to emerge such as health, education, and jobs. All of these things are not achievable if post-war Liberians do not have the opportunity to re-establish. As indicated in the previous section, the psychosocial aspects of the post-war environment seem to motivate people's QoL indicator choices. The potential psychosocial impacts of the BSF centre around two areas: Ownership and INGO dependence. Potentially the BSF could have its biggest impact on QoL by first impacting the psychosocial issues left by war. It could provide the sense of ownership and of belonging to an INGO project which makes the beneficiary feel important again. Having something to put into their houses, to re-establish their home can also impact people in a positive way. The BSF is a form of household water treatment; therefore, it is necessary to have a house that can contain a filter before receiving one. It is individually owned, the owners are solely responsible for it and its care.

However, if a house never had a BSF to begin with –is it just another development project that people have knowledge of its potential but do not have the practical application to make the connection to actual impacts. This can then lead to INGO dependence and requests for more development projects.

From this section the intended potential impacts of a BSF project present themselves. The intended impact for the BSF centres on health. If a person is healthy there are indirect impacts on working, education and overall social capital, these have been noted in the introduction and will be again in chapter 7. There are some potential impacts that were unintended results of the BSF project and these are predominately in the area of psychosocial issues. This too will be discussed in further detail in the next section and in chapter 7.

### **5.3 Research Findings Concerning Objective No. 3: “Identify the actual impacts of the BSF on the QoL of post-war rural Liberians.”**

Out of the four objectives, this objective has proven to be the most difficult to answer. Section 4.2 identified the potential impacts, but it was also revealed that the potential impacts are the knowledge of what the BSF can do both hardware and the software component. The *actual* impacts could be seen as the practical phase of the BSF, in other words, the actual QoL impacts of the BSF can only be realized if the practical portion such as user compliance, using the filtered water for all hygiene needs, and general maintenance of the filter are applied. Thus, the difference between the potential impacts and the actual impacts is the gap between knowledge and practice. This is not to say that there are not some actual impacts of the BSF such as psychosocial aspect of ownership, however, they may be difficult to measure. The data for this objective was collected in a similar manner, quantitatively and qualitatively, for this section they will be presented together.

#### **5.3.1 Identifying the Actual Results**

The actual results of the BSF on post-war Liberians QoL, was difficult to identify and measure. Unlike the potential impacts, the actual impacts rely on the user compliance and the interviewees understanding of the BSF project. Therefore the actual impacts manifested themselves in the diverse post-war psychosocial realm. Two distinct *actual impacts* materialized as data was analyzed, they were *ownership* and *INGO dependence*.

- Ownership

At the commencement of the BSF project, beneficiaries were eager to be part of the program and participate in the necessary requirements. As stated, all the interviewees had their homes, farms, and communities destroyed in some way during the war. Upon returning, they owned very little, some of them owned nothing. Re-establishing meant starting the process of owning things again. INGOs assisted by providing opportunities to be part of programs (i.e. health, agriculture, food security, etc), beginning the progression of owning things again. Throughout data collection it became very clear that primary impact had to do with owning the BSF. The actual effectiveness of the filter in cleaning their water became secondary.

As noted, the filter was usually in the most important room of the house, in most cases there were only one or two rooms in the house. The filter was usually in the same room as the bed and where their possessions were kept. This room was always locked if the interviewee was not present. The other room was usually a small entrance room where guests could sit or where kitchen supplies were kept. Therefore, if any of his family members wanted to use it or get clean drinking water from the water container they had to find the key. Security has a direct correlation with ownership in this case. Things that are owned are protected and locked, more because they are ‘mine’ than because of the importance of what the item may be used for.

In cases where beneficiaries are not using their BSF or are using it incorrectly, they were notified by the implementing INGO, that the filter will be taken away and give to another household. The understanding of this is not fully realized until the INGO comes and actually takes the filter out of the house and loads it into the back of a truck. The loss of what they had or owned brings a sense of remorse and desperation to keep the filter. Again, the desire to keep the filter does not have to do with the fact it can provide clean water. It does have to do with the fact that something given to them, that they owned, was now taken away from them. The SP WATSAN program manager stated, after having to remove a filter form a house:

*“To a beneficiary, the worst thing you can do is take something away from them – in this case the BSF. They (beneficiaries) will do anything, including lying, to keep it; however, when they finally realize the BSF is been taken away they are extremely distraught. I (WATSAN PM) have witnessed this and it causes a lot of commotion in the community.”* (Taya Raine, Personal Communication)

Apart from the absence of violence, this action is similar to their experiences in the war. During the war their items were taken by force or destroyed in front of them. The action of taking away the filter often caused panic, desperation, crying and begging the WATSAN staff not to take the filter.

- INGO Perception

INGO dependence is a challenge for all INGOs in complex humanitarian development projects. As noted in the previous sub-chapter one of the potential negative impacts of the BSF on the QoL was INGO dependence. When they were questioned if INGOs should leave Liberia, all the interviewees said “no.” When questioned further on why INGOs should not leave, the responses once again exposed the need for more help, in the form of better housing, schools, clinics, and roads. In one case, an interviewee requested that the INGO build them a hand pump even though they had a filter and their water source was not further than a three to five minute walk.

*R: Anything else you would like to tell me about you or the town?*

*JS: We suffer from hand pump, the one that is here. NRC, they dug two holes and there was no water. The water business is very difficult for us. For me personally I want to continue my education and there is no way for me since the war. I can't get the money to support my family and my schooling. (James Small, 2007)*

*R: How is life here now?*

*DC: For me, just me, there is no school here. The distance to here to Bopolu is far, so the small children four and five can't made it. So we need a school here. This one of the things giving us a problem.*

*R: Anything else you would like to tell us?*

*DC: The only thing is I want you people to help us, I and the family, to build a little area for us. The war carry it down and there was no place, so we have this small place for now. But if you can assist us. (David Cooper, 2007)*

INGO dependence is difficult to measure and is often exposed by beneficiary's attitude to keep asking for things without looking how they can better their situation. In some cases the interviewees shared stories of how some INGOs had mislead and/or took advantage of the community. This caused a justified distrust in INGO, including the implementing BSF INGO. The following discussion took place in Porkpah where dependency was not so much the issue as the distrust that people had towards INGO's and their perception towards them.

*R: Have there been any other NGOs in the area or in this village?*

*OB: Just SP; they gave us animals to raise. Also they helped with seed rice.*

*R: So many NGO's have come here?*

*OB: Well, some have come through here and they have made empty promises. They tell us they are going to do well or do this or do that and nothing is done. We have no latrine, nothing at all – all those things.*

*R: Do you think NGOs should stay in Liberia?*

*OB: Yes – but they are not catering to the community. They go and get the funds from the people and they do it on their own. They lie to the community. They lie to the people. They do nothing in certain area. They go and they are black. They will do nothing for you. If you give them money they may do something little for you, but they just take your name and go and do their business. But the whole community now, if they take our name and then do nothing we don't want them. Just go; it is too much for us now.*

*R: Are all NGOs like that?*

*OB: No not all are like. SP has made our life different. They are not like that. They gave us drinking water – with the biosand something – then they gave us sheep. Many NGOs came and said they would build latrine but they did nothing. SP did something. We had to pay money to some NGOs just to help us. We are suffering, then they demand from us and then they just go. (Obreta Blanch, 2007)*

One of the psychosocial effects of the war is a sense of distrust. Having an INGO make promises and not fulfil them aggravates this. Dependency was not the issue for the people of Porkpah; being able to trust the BSF implementing INGO was.

How does INGO dependence impact the QoL indicators that emerged from objective one? Again, it can be linked to the psychosocial aspects of post war. The need to re-establish and get things back to their pre-war conditions is so great that INGO's are viewed as agents who can expedite the process. The younger generation of Liberians have been comfortable with INGO's taking the initiative to help in the midst of the war and this attitude has continued on long after the war has ended.

### **5.3.2 Discussion of Results**

From the data presented above it could be perceived that there are no *actual* impacts on the QoL of post-war Liberians that were measured and proven as a direct result of owning a BSF. Although interviewees stated that they no longer experience diarrhoea, there are many other factors that could be contributing to including an increase of hand washing, using a latrine or the use of the BSF. Looking deeper into the post-war context in which the BSF has been introduced the *actual* impacts may be only found at the psychosocial level. This has been stated in the realm of ownership and INGO dependence. Whereas during the war everything was taken from

people, rural post-war Liberians who are part of the BSF program now have the opportunity to own something. It could be argued that in a context such as this that any opportunity to be given something or part of something would have been important. Although there are requirements for receiving a filter, such as constructing a dish rack and clothes line and attending three sessions of health and hygiene training, recipients may perceive the BSF as a 'gift'. Therefore, a side effect of a BSF project is that rural post-war Liberians could be dependency on INGOs to rebuild instead of changing their behaviours to assist themselves.

In this research it became evident that there was a knowledge and practice gap. This is not unique in most development projects. The beneficiary has been given something-whether it is hardware such as new farming tools or software as in health and hygiene training, but unless the beneficiary uses the knowledge properly they will not improve their condition. The BSF is a combination of hardware, the actual filter structure, and software, through health and hygiene education. The responsibility of using both the hardware and software is in the hands of the beneficiary. The research has illustrated that even though people can tell the researcher the benefits of the BSF, if they choose to not use it, or misuse it, those benefits can be limited. An unused filter of course does not supply clean water for a family, if it is misused or used to store food it can compromise the integrity of the filter. All of these factors can limit the benefits of the filter.

The psychosocial needs of people need to be assessed just as the physical needs are before an intervention is introduced. Understanding the psychosocial level and why people choose certain things to be more important than others can help in the project planning of a WASH or any development project. An example of understanding the trauma and posttraumatic stress of communities can be found in a recent study, specifically done in Nimba County in Liberia. Although Nimba County is not in the research area, it gives a good insight on importance of understanding the psychosocial 'temperature' of a village before development interventions take place. In the case of this study it was concluded that the characteristics of communities and individuals may be important determinants of posttraumatic stress in low-income countries, such as Liberia that are recovering from post conflict (Galea et al., 2010). This is an example of additional information that can aid development practitioner before they begin implementation.

As stated in the previous sub-chapter the fact that the BSF was not part of rural pre-war society its importance may be diminished compared to objects that were present and then destroyed, such as their houses. This was recently proven in a BSF follow up visit to a community just outside of the research arena. Upon arrival to the BSF owner's house, the SP WATSAN program manager observed that there was no sand present in the filter. When asked numerous times what happened to the sand, it was found out that the beneficiary had taken the sand out of the filter and used to in the plaster for the floor for their house (Oct. 27, 2010). For this beneficiary, the sand in the filter, which is critical to making the filter produce potable water, was more valuable being used for the floor for rebuilding their house that was destroyed during the war. This could illustrate that one of the QoL indicators for this person is shelter maybe more so than even the option of having clean water. However, maybe this beneficiary's knowledge practice gap so that they still do not understand the importance and potential clean water can have for them, which may indicate more time and education is needed. However, it should be noted that the whole community was lacking in their BSF use and may lose their filters as a result. Thus, the actual impact of this filter is the fact that it helped re-build this beneficiary's house, the need to re-establish, and the desire for housing, trumped the potential of a healthy family.

How INGO's can become better prepared for issues like the aforementioned will be discussed in further detail in the following recommendations chapter as it is pertains to Objective No. 4 in the thesis.

#### **5.4 Summary of Results**

The data collected has provided information for the four objectives pertaining to the thesis. A summary of the information is listed below:

**Objective No.1:** "To define the relevant components of the QoL for post-war Liberians."

Motivated by psychosocial desires to "re-establish", to own something, to belong, and to re-build, QoL indicators chosen by post-war rural Liberian centred on this theme. They are:

- Health: The desire for health infrastructures such as clinics and hospitals. This was more important to them than their actual health. If their own physical health was important they would have better health and hygiene practices and use the BSF consistently. This is supported by the fact that owners could explain the health benefits of using the BSF and good hygiene but often were not using the BSF or practicing good hygiene.
- Education: The desire for school buildings closer to their town.
- Job/Employment: Although it did not receive as many number one votes as health and education, through observation and interviews it was very evident that work on the farm takes precedence over everything else.
- Safety and Security: Receiving most of the “middle” votes together with information gathered through the interviews (especially during the initial data collection in 2007), post-war rural Liberians understand that to achieve the aforementioned QoL indicators they must have a safe and secure environment to do so.
- Family: The loss of family members or the separation for long periods of time during the war has devastated many families. Understandably, establishing their family ‘unit’ is important in a post-war context.
- Other QoL indicators were not as substantially highly rated. The only ‘other’ that was requested was a cell phone-this was seen as a ‘request’ and not a serious QoL indicator. For that person it was more about asking for whatever they wanted to a white woman and it was evident that there was not much thought to the request.

**Objective No. 2:** “Identify the potential impacts of the BSF on the QoL of post-war rural Liberians.”

Of the QoL indicators listed, the biggest potential impacts with the greatest magnitude to positively impact post-war rural Liberians were:

- Health: The potential impact of the BSF lies in the users knowledge of what the filter does and how it can impact their health.
- Psychosocial: There are two areas the BSF potentially impacts.
  - Ownership and a sense of belonging to something, like a BSF program. There is an opportunity for the beneficiary to own a filter if the requirements are met, however, this is reliant on the beneficiaries desire and choice to be part of the

program. This, they still have to make a decision to own or be part of the something.

- INGO dependence as rural post-war Liberians see INGO as an agent that can assist them in quickly re-establishing their lives to what it used to be. Potentially, beneficiaries can continue to request for different projects or ‘things’ and become increasingly dependent on the INGO to assist them instead of them taking the initiative or putting pressure on the local government to meet their needs.

**Objective No. 3:** “Identify the actual impacts of the BSF on the QoL of post-war rural Liberians.”

There were no *actual* measurable impacts on the QoL indicators listed in the results of objective one. However, there were psychosocial impacts which were the same as the potential impacts:

- Ownership: This could only be observationally measured when the INGO threatened to take the filter away due to misuse and neglect. It could also be observed through where the filter was placed in the home-and the importance of protecting it.
- INGO dependence: This was measured by the requests made to the researcher for more help.

There could have been further health actual impacts if interviewees had decreased the knowledge-practice gap, by making better water and health decisions. The reasons for this gap ranged from lack of educational knowledge of the spread of disease to a lack of motivation to change coupled with an expectation the INGOs should do everything. During the research I experienced both of these realities in different villages. In the first case, simple WASH educational drawings on the how diseases spreads through water or open defecation (similar to the ‘F’ diagram of anal to oral diseases) were shown to the people. When the WASH facilitator asked people if they had seen people defecating in the stream and then collecting water from the same stream everyone responded “Yes!” It had never been explained to the community the relation of faecal matter, how it uses water as a carrier and then how that ends up being ingested by people.

An example of a lack of motivation to change I experienced in a completely different village that was deep in the Bokumu jungle approximately 50km from the research area. The only way to access this village was by helicopter and the only way for community members to get out and in of the village was through bush trails-it was very isolated. I was in this village to assist in the chopper ‘sling loading’ of WASH supplies to start a UNICEF funded WASH program. I was approached by a younger man (mid 20’s) and was aggressively asked to send SP staff in to build a well. The program was not designed for SP staff to construct the entire well; it was a community led project in which the community supplied the labour force. After this was explained to him, he stated that he did not want to dig a well and wanted clean water right now. I instructed him on how to boil his water until the well was built to help with the water quality. Again, he was very dissatisfied with my response and said he does not have anyone to do that for him and that he did not want to build a fire and have to wait. I explained that it was his choice and he could either take the time and effort (which was very little as I also gave him the option of paying a small boy to do this for him) to build a fire and wait for the clean water or drink dirty water and get sick. He looked at me and stated as he drank a cup of obviously dirty water, “Fine, if you will not help me now I choose to be sick!”

In the first case it was due to lack of educational opportunity or understanding that kept the community from recognizing that their water and hygiene practices were jeopardizing their health. In the last case, the knowledge was there but the motivation to make a positive change in his water behaviours was not. Unfortunately, he refused to recognize his role and responsibility in his own health, instead he focused on what I was not doing for him and I felt that I was being blamed for his plight.

### **5.5 Grounded Theory Revisited**

As noted in the Methodology chapter this type of research lends itself to grounded theory, in which theories are created from the data. It was also stated that in this research there was not a “ground zero” as the research was being built off the researcher’s world view. Upon reflection of both quantitative and qualitative data the primary theme that emerged, which has been mentioned in this chapter extensively, was that of re-establishing what was before the war. Re-

establishment meant infrastructure as well as safety and security and every other aspect of pre-war rural Liberian life.

Concerning the BSF and the thesis aim, the themes that emerged focused on beneficiaries rather than the BSF. It was very clear that the already mentioned knowledge and practice gap was large and obvious by the researcher. Human behaviour and choices in the matter of the BSF, or user compliance, played a vital role in the research findings. This theme was constant, always present in the form of a decision by the interviewee to either use the filter as taught or not use the filter. Although the filter was important to the owner, it manifested that importance through ownership, not in the fact that it produced clean water. Thus, the knowledge and practice gap remained.

From these themes mentioned a theory has emerged. The BSF was never part of pre-war rural Liberia and therefore the importance to 're-establish' ownership or usage of it in post-war rural Liberia was low. It is imperative to understand that this is relative only to the research that has been carried out. However, for INGOs it is a point to consider in implementing post-war development projects.

Included with this, I would also add a theory that QoL indicators are dependent on the context or the experiences that people go through. Therefore, QoL are personal to individuals and on a communal level, to a community. This will be further discussed in chapter seven.

The aim of the thesis is "*Towards a Comprehensive Understanding of the Impacts of the BioSandWater Filter on the Quality of Life for Post-War Rural Liberians.*" In this chapter the data collected and presented has given insights on the QoL indicators for rural post-war Liberians. Additionally, it has exposed the psychosocial issues that have possibly motivated the QoL indicators chosen by rural post-war Liberians. It has also revealed the potential the BSF has in improving QoL for post-war rural Liberians. The last chapter will focus on objective four along with concluding statements of the thesis.

## 6.0 RECOMMENDATIONS

This last chapter will focus on Objective 4, outlining recommendations for INGOs pertaining to development interventions such as the BSF. It will also list the areas of future work that have come out of this research and finally it will present concluding remarks.

### 6.1 Research Findings Concerning Objective No. 4:

It has already been stated that the BSF was used as a lens to other low cost forms of development technology that can and are being used in a post-war context. Thus, even though the objective states the BSF, these recommendations are not exclusively for the BSF but for any post-war intervention that includes some form of development technology. To review, objective four is:

**“To translate insights gained from the research into recommendations that will help to maximize the impact of the BSF in a post-war context.”**

Having established the QoL indicators for post-war Liberians, the potential impacts the BioSand filter and the actual impacts, the last objective pertains to insights and recommendations for INGOs to maximize the actual impacts of the BSF. From the data discussed concerning the first three objectives, three main points of insight and recommendations surfaced. The first concerns INGO’s need to better understand post-war contexts and how the psychosocial aspects of war affect people’s QoL indicators in their area. The second insight/recommendation concerns establishing QoL indicators to investigate in depth what is important to the people participating in a BSF project. The last, and most important, insight/recommendation focuses on the BSF and how to best achieve actual impacts from it in a post-war context, in light of the previous two insights. These insights are not only for Samaritan’s Purse, the organization studied, but for any INGO implementing a BSF project in a post-war setting. However, as stated in the introduction, these conclusions and recommendations are solely the insights of the researcher and not those of SP.

- **Understanding post-war context and psychosocial effects of conflict in the project area.**

Section 2.1 in the literature review addresses the issues pertaining to post-war development, one of which being the effect it has on people and communities. “Unlike disasters, complex emergencies (such as civil war) have a singular ability to erode or destroy the cultural, civil, political and economic integrity” (Duffield, 2005). It has a negative effect on human capital, the physical capital of a country, financial, political and social capital-every aspect of society is damaged (Cutler et al, 2007). An understanding of what constituted restoring “normal life”, or the sense of re-establishing what life was like before the war, played a large role in the selection of QoL indicators for post-war Liberians. Indicators such as the restoration of farms, homes, schools and clinics were of particular importance as steps to re-building lives, communities and the nation. For this reason it is imperative that INGOs (such as SP) approach development projects, such as the BSF program, with a keen understanding of the post-war context in which they are working.

A recommendation to assist INGOs with this would be to conduct a preliminary psychosocial assessment of communities before implementation of a project. In his book, *Trauma Rehabilitation after War and Conflict*, Martz (2010) introduces the “trauma membrane”, which he defines as the interpersonal protection that individuals (e.g. family and friends) provide. He goes on to state “It is important to understand that after armed conflicts and war, communities’ physical and social infrastructures may be destroyed or damaged, consequently decreasing the naturally-occurring processes of a protective, interpersonal “trauma membrane” to individuals (Martz, 2010). Without mechanisms in place to help with healing, INGOs may find beneficiaries misunderstood and that working with them is a challenge, this is explained in chapter 3 section 3.1, under the psychosocial impacts of a post war environment. Important tasks of psychosocial reconstruction include healing wound of war; the social integration of former soldiers; fear reduction; forgiveness and reconciliation and the reestablishment of normal pattern and routines among a community (Wagner et al., 2001).

By conducting a preliminary assessment of individuals’ and communities’ experience during conflict, support systems could be included in a development project, such as a BSF project. Much like the action plan outlined by Ager (2004) and van Ommerman (2005) in the literature review an INGO could integrate a trauma response plan into their existing programming. Every

conflict has its uniqueness and therefore, trauma rehabilitation of a project area would need further study for the specific context (see section 8.2 future work).

Both qualitative and quantitative data collected from such a preliminary assessment would give a better understanding of the people and community, which could then be incorporated into the design of a BSF program. Areas covered would be:

- What was the degree of infrastructure damage for individuals and the community? For example, how many houses were destroyed and which community buildings, such as schools and clinics, are still standing?
- Where did the people from the community go during the war? Did they run to the bush and live there for the whole time, did they go to a city to an IDP camp, or did they flee the country and become refugees in neighbouring countries?
- Did they suffer any loss of family members? If so, how?
- What was their life like before and during the war, and what is it like now?
- What armed forces came through the village?
- When did they return to their village and why?
- What cultural traditions ceased because of the war? Have they recommenced with the end of the war? If not, why?
- What did people do for water before the war?

These are just examples of the questions that could be asked to gather as much information as possible about the individuals and community, to aid in establishing a framework for the INGOs to work in. Below are examples of some of the responses to these types of questions:

*R: Your husband, where is he?*

*MB: He died during the war*

*R: What war? What year?*

*MB: He was in the bush and he died in 2001. He died of some sickness. (Musu Banja, 2007)*

*R: Tell me about your family and what you did during the war.*

*NJ: During the war in 2003 fled to the Belleh forest, where the family slept and lived in the bush while troops went through the villages, taking children and destroying property. It was during this time that her son was killed by government troops; he was shot. In 2003 they left and went*

*to Bong Mines. During this time it was very difficult to get food and water. I came back where my mother lives. (Nancy Johnson, 2007)*

*R: I would just like to know about you and your time at Small Bong Mines.*

*JK: I left from here to go to Monrovia to Bong Country and stayed there for three months. Things there were hard. The war drove us, LURD drove us and were chasing us and behind us. Look at me, I am an old man! We went to Sinkor until WW3 then we left for here. We came back after ceasefire and we went to the camp until 2003. Then the intern government. Then we came back to here and everything was bushes and we started building our houses. (Jack Kollie, 2007)*

It is important to see that there are no questions about a specific BSF project. However, a question about what they did for water before the war may help in understanding the water technology that was present. As stated previously, the fact that none of the interviewee villages had a BSF before could play a part in the knowledge and practice gap. Interviewees asked for only those things they had previously owned individually or had as a community. If a community had a BSF before the war and it was destroyed during the war, maybe they would have a better understanding of the potential impact the BSF could have on their life.

The questions asked in a post-war assessment have the potential to better prepare an INGO for implementation of a BSF project or any development program. As stated in chapter 3 section 3.1, Gilbert (2005), Ager (2004) and Van Ommerman (2005) alluded to the fact that not many INGOs have the tools to prepare for traumatized beneficiaries. Often in complex humanitarian emergencies, the physical needs are so great and often over shadow the trauma that has been experienced by the victims. INGOs, funded by large external donors need to facilitate the needs of the physical first and in most cases do not have the time or resources to put into practice the action plans stated by Ager and Van Ommerman (see chapter 3 section 3.1). However, if it is not done the receptiveness or sustainability of an intervention could be compromised due to unseen psychological needs. The media and donor pressure for INGOs to ‘do something’ or meet targets supersedes other needs that may be present but not known. The information gathered would give implementers a better understanding of what motivates beneficiaries and more importantly start the relationship process. This would be coupled with the next section, a QoL survey.

- **QoL Survey Before Implementation**

Following soon after the preliminary psychosocial assessment, a QoL survey should be conducted to further enhance the understanding of what is important, and why, to those beneficiaries involved in a development project. Tapping into the motives behind behaviours and choices would improve a practitioner’s ability to plan a project and gain a better understanding of the intended and unintended impacts that may result. This could ensure that the BSF has the opportunity to have actual impacts on the QoL indicators given by the beneficiaries.

Simplifying the QoL indicators and not measuring them just by GNP or life expectancy, but by what people consider being important to them and what indicators make them feel that their quality of life is good would be the goal of this survey. Edewor (2004) explains this saying, “The conventional measure of quality of life is defined in material quantitative terms, for example Gross Domestic Product (GDP). A perennial perspective is that there are three facets of quality of life for complete human fulfilment: material, intellectual and spiritual. An ideal measurement of quality of life should be dynamic in the sense that it should be indicative of potential development (Edewor, p.63).

Once these were established, practitioners could incorporate the indicated areas of importance within a BSF project. Insights from the survey could be incorporated into a log frame that reflects the psychosocial assessment and the QoL indicators chosen.

**Table 15: Proposed Log frame of a WASH project including pre-intervention and QoL survey (bolded section incorporating the new recommendations)**

Objectives	Measurable Indicators	Means of Verification	Important Assumptions
<b>Goal:</b> 20 communities in western Liberia experience physical, <b>mental, economical and spiritual</b> transformation by 2013, including 50% increase in access to safe water and sanitation by 2013 (Millennium Development Goal 7 and Liberia Poverty Reduction Strategy)	1) Potable water access for rural Liberians increases by 20% by 2013. 2) Sanitation access for rural Liberian increase by 30% by 2013. <b>3) 100% returned population</b> <b>4) 90% of communities counselled for PTSD by 2013.</b>	UN statistics & Liberian Government Statistics  <b>Pre-intervention and QoL community survey statistics</b>	That the Statistics will be gathered and be accurate.  <b>People will want to share their experiences and what they deem as a QoL indicator</b>

<p><b>Purpose:</b> Improved overall health and wellness to # beneficiaries through improves water &amp; sanitation access.</p> <p>To provide sustainable access to safe drinking water, sanitation, and hygiene education to SPL targeted <b>communities by 2012 to positively impact the determined QoL indicators</b></p> <p><b>To provide support and tools for post-war recovery</b></p>	<p>1) 80% of beneficiaries diarrhoea free within 24 months. 2) Average number of days worked a year increased 75% 3) Average incomes increase by 30% per year due to less work days lost. 4) Average school attendance up by 50% over 12 months. 5) # beneficiaries practicing proper health and hygiene practices and user compliance within 24 months. 6) <b># of support groups formed within 12months</b> 7) <b>Number of QoL indicators improving</b></p>	<p>1) Overall perceived health 1) Health stats form local clinics 2&amp;3) Questionnaire, Community Mapping and Focus Group results 4) School attendance lists 5) M&amp;E results 6) <b>Focus group attendance</b> 7) <b>QoL questionnaire</b></p>	<p>-User compliance of the latrines and filters will be high. -Health stats will be available. -M&amp;E will be of good standard. -Schools give good standard education and attendance lists are taken <b>-People will be honest about their recovery and improvements of QoL</b></p>
<p><b>Outputs:</b> 1) Trained WASH staff in new project areas (QoL) 2) Adequate Hygiene &amp; health education for all beneficiaries 3) Clean water provided through point-of-use to x # of people. 4) # people provided with adequate sanitation.</p> <p><b>5) # of people provided with trauma counselling.</b></p> <p><b>6)# of people with improved QoL</b></p>	<p>1) BSF staff complete training in first 3 months. All BSF staff is re-trained annually. 2) 85-100% of beneficiaries trained in Hygiene and Health within 24 months. 3) 1,500 filters constructed within 24 months- 85% of beneficiaries using the filters properly within 24 months. 4) # of latrines build and 85% of people using the latrines. 5) <b>85% of beneficiaries participating reconciliation and trauma rehab groups</b> 6) <b>75% of beneficiaries with noticeable improved QoL</b></p>	<p>1) Training attendance lists &amp; knowledge test results. 2) Training attendance lists &amp; knowledge test results. 3a) Observation in the communities. 3b) User compliance surveys. 4a) Observed in the communities. 5) <b>Attendance sheets of counselling sessions.</b> 6) <b>Observation in the communities and QoL questionnaire.</b></p>	<p>-Appropriate staff can be found with skills -People can read -Supplies can be procured in Liberia and access to project areas not hampered by unseasonable rains, poor roads, etc. <b>-People want to participate in the counselling</b></p>
<p><b>Activities:-</b>Liaise with local leaders and community members. <b>1) Find and train staff in WASH and action plan for trauma recovery</b></p> <p><b>2a) Train beneficiaries/support of beneficiaries.</b></p> <p>3a) Procure materials. 3b) Construct hardware 3c) Support to beneficiaries</p> <p><b>4a) Follow-up questionnaire</b></p>	<p><b>1) 100% staff trained</b> <b>2) 85% of beneficiaries trained</b> 3) Budget breakdown of supply lists 3b) receipts of purchased supplies and number of WASH hardware solutions <b>4) 85% beneficiaries participate in questionnaire</b></p>	<p>-Total budget spent and accounted for at the end of the project. -Financial reports. -Visible WASH solutions constructed <b>- Number of questionnaires filled out</b> <b>-Attendance sheet of focus groups</b></p>	<p>-Weather remains good and doesn't impede activities. -Security remains good and doesn't deteriorate. -Prices of commodities remain constant. <b>-Community and workers are willing.</b></p>

Just as the hardware and software of a WASH project has activities, outputs, means of verification, measureable indicators and important assumption so would the aspects of psychosocial of the beneficiaries and the impact the WASH project was having on the QoL. The important point for the INGO is to remember that the beneficiaries are the ones who are contributing the essential information for the implementation of the project. The INGO should respond to the information by specifically catering the project on the basis of the information individuals presented in the assessment and survey.

- **Maximizing the Actual Positive Impacts of the BSF in a Post-War Rural Context.**

Although the BSF was a lens for this research, this section will illustrate how an INGO could maximize the positive impacts of a project that centred on low forms of development technology in a post-war context. Therefore, I will use the BSF as an example to indicate what better practices could be used in a project to maximize impact.

The actual positive impacts of the BSF on post-war rural Liberians have proven to be psychosocial in nature. This has been documented in the previous sections of this chapter. Therefore, to maximize these impacts implementation and impact measurement of the project needs to be done accordingly. The gap between the knowledge the beneficiary has about the BSF has and the actual practice of using the BSF properly needs to be decreased. When implementing and measuring the impact the BSF is having on a post-war rural community like those found in Liberia, it is necessary to include the following:

- **Focus on psychosocial issues and how they impact/motivate the decision process of making the right choices pertaining to hardware and software of the BSF.**

“ Disruption to normal living conditions due to warfare and its after effects is on a scale that is generally not understood” (Rihani, 2002). Nowhere is this more evident than in post-war Liberia. The psychosocial effects of the war are still being realized and would need further study to understand fully how they have affected the development of post-war Liberia. This is a specific challenge for a BSF program. For there to be actual impacts, the filter must be used as prescribed, and the beneficiaries hold the power of choice – to use the filter properly or not. The researcher has seen different type of SP BSF projects, all of which have had different results, which is to be expected due to the different contexts that each project is implemented in. It can be said with confidence that the overall project “package” of hardware and software is presented well, using contextual teaching methods and fluidity to adapt to different circumstances. SP has presented in water forums that have affirmed the hardware and software quality and delivery that is given to each project. (A full hardware and software package will be added to the appendix in the BSF manual).

BSF projects need to use the information gained through the aforementioned assessment and survey, incorporating it into their software and hardware training. For example, if it is concluded that post-war rural Liberians' actions are motivated by the need to re-establish their lives, a community work day to assist BSF beneficiaries to rebuild their homes could prove beneficial. INGOs would not have to supply building materials but instead have their staff volunteer to help by spending a day out of the week doing whatever was needed to build a new home for the beneficiary. This participation may encourage beneficiaries to be more responsive to working with the INGO when it comes time to assist in building their filter or attend health and hygiene classes. In this way, relationships of trust could be formed which would be very influential in the success of a BSF project.

*“It seems that those communities that we spent more time in and had established strong relationships with leaders and the beneficiaries, those filters are still being maintained and working.”* (Taya Raine, Personal Communication)

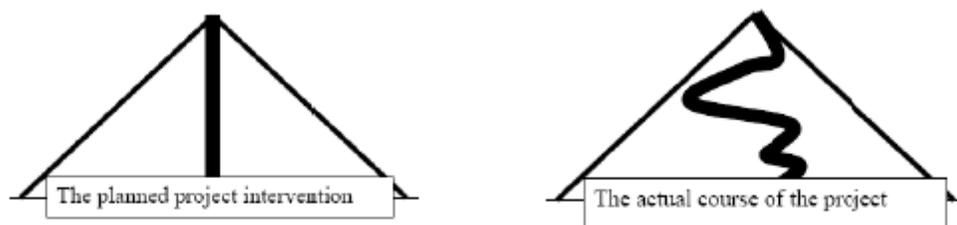
The data demonstrated that interviewees who had received the BSF hardware/software knowledge had an understanding of the importance of the filter. They even went as far to say how it has helped their community and them individually. When asked, “What is life like here now?” one community leader stated:

*“It is much better than before. Before we were suffering, like water. And later on we saw SP and they had filter and since then we have been fine. The water we were using before was giving us a hard time; the children were suffering. That filter has been helping us a lot. There is no more stomach running. We get our water we put it in the filter like you people taught us to do, even have to clean it up when we cannot get the amount of water fully.”* (Pastor Isaac Dukley, 2007)

In spite of this, the actual user compliance and practical use of the filter that were observed were low. For some reason, the interviewees have chosen not to use their filters to full capacity. It is difficult to pinpoint why, although the researcher would suggest that this could be related to the aforementioned psychosocial issues and the choices people have made. Since the BSF was not present before the war, it might not be perceived as being as important as re-establishing a house, school, farm or clinic. A recent visit to Pastor Isaac Dukley's house revealed that he is not using his filter as regularly as he should. The bucket he was given for the effluent water was nowhere to be found, the spout was unclean and the water level in the filter was low, indicating little use.

Three years ago he stated that the filter had helped them a lot and that there was no more “runny tummy” since it was installed. Words and actions do not line up; this was the case for most villages investigated.

A post-war context with all its complexities can steer a project off course at any time. INGOs must constantly remind their staff to remain fluid, ready for any change that may occur when implementing a BSF project. This is supported by the following diagram from Garandea (2009). Illustrating the difference between the INGOs planned approach for the implementation of a development intervention and the actual course of the project.



**Figure 34: How a straight intervention adapts to a dynamic environment (Shouten, 2007) taken from Garandea (2009).**

Figure 34 demonstrates how the events, context, culture force a project to adapt its course when it is being implemented in a dynamic or complex environment such as post-war. The actual course of a project can be altered and influenced by external factors that then can lead to unintended impacts. This will be addressed again in the next chapter in the new logical framework section 7.2.

To review, there are three distinct insights and recommendations that have surfaced from this research. They are:

- Understanding post-war context and psychosocial effects of conflict in the project area is vital. This can be achieved through post-war assessment that is tailored to the project area.
- A QoL survey should be conducted before implementation, to understand, through data collection, what is important to the project target group.
- To maximize the actual positive impacts of the BSF in a post-war rural context, one must:
  - Close the gap between knowledge and practice among beneficiaries

- Focus on psychosocial issues and how they impact/motivate the decision process in making the right choices pertaining to hardware and software of the BSF. This can be achieved by:
  - Making the connection between psychosocial issues and behavioural change.
  - Establishing strong relationships with the project group, which means spending time with the people.

Another important but sometimes forgotten recommendation for INGOs implementing a water intervention is the inclusion of the people involved. Women, who are the main collectors and caretakers of water for their families are often marginalized in many less developed countries and therefore are not included in the decision making for new or improved water solutions. Inclusion in the decision-making process is the next stage after listening to those that will be directly affected by the development intervention. Edwards and Hulme (1996) reiterates this again stating, “necessary behaviour and attitudes include outsiders (INGOs) sitting down, listening and learning; relaxing not rushing.” For example, there are many different water interventions that can be implemented by INGOs. To take it a step further the poor (those INGOs are targeting for aid/development); they produce their own development, not INGOs. Development is a process where people individually and collectively realize their potentials and in doing so becomes active protagonists in creating their own history (Fowler, 1997).

As stated in the literature review, the technology needs to be sustainable, appropriate and effective, and the cost of the project must be measured. It is important to ensure that the community is involved in all aspects of selecting and implementing WASH design options. This is an example of what an INGO could do to involve a community and individuals. However, for this process to be effective, the INGO would have to take the time to consider all the water intervention options that are available to communities and individuals. Before the WASH design option is chosen, the community needs to buy in to the project and show commitment, not only by participating in the project but also by indicating that they are “*choosing*” to improve their current WASH situation. It is proposed that the project staff should ask the community to sign a memorandum of understanding (MOU), which will outline the following:

- If there is no road access, is the community willing to brush a path or even build a road and/or bridge to move supplies in?
- Will they be able to provide a warehouse to store the materials, tools and supplies for the project?
- Will they provide accommodation for the technicians if needed?
- What materials (sand, gravel, backfill) can the community provide and when?
- Will the community be willing to contribute labour to the project?
- Can the community assist in making a schedule, respecting the farming seasons, when labour will be available?

In return, the implementing [INGO] will supply technical leadership, and assistance to the community development committee (or whatever committee is in place, such as a WASH committee or the community health team). The community will also receive a certification of completion after the project is completed and the requirements agreed upon have been met, whether it is at the community or household level. (Taken from Technical Options for Community WASH, 2009. (See appendix WASH technical interventions).

These recommendations are not inclusive to implementing INGOs; donors must also participate and be aware of the complexities that are present in post-war implementation. Donors need to give INGOs more time to establish relationships with the beneficiary to increase chances of project sustainability. They must realize that project implementation to a certain extent must be fluid and able to adapt to the unpredictable and predictable influences it may encounter during the time line of a project. And they must be willing to accept that QoL indicators may be difficult to measure and to again take the time to find out what these are for the people involved. These aspects will be further discussed in the following chapter as new insights for international development practices and academic understanding.

## 7.0 NEW INSIGHTS AND DISCUSSION FROM THE RESEARCH

Chapter seven consists of a discussion of the new insights that the research has brought forth and a review of the literature in light of the research results. It will also illustrate a new logical frame conceived from the data results that answer the questions of impact from chapter one.

Limitations and constraints that took place during the six years of research and writing will also be addressed.

### 7.1 Research Overview

**The aim:** To achieve a comprehensive understanding of the impacts that a key technology such as the BioSand water filter can have on the quality of life of people in rural post-war Liberia.

**The objectives are:**

*Objective 1:* To define the relevant components of quality of life for people in post-war rural Liberia. This was achieved in section 5.1

*Objective 2:* To identify the *potential* impacts of the BioSand water filter on the quality of life of post-war Liberians. Achieved in section 5.2.3

*Objective 3:* To identify the *actual* impacts of the BioSand water filter on the quality of life of post-war rural Liberians. Achieved in section 5.3.1

*Objectives 4:* To translate insights gained from the research into recommendations that will help to maximize the impact of the BSF in a post-war context. This will be addressed in the last chapter.

In Chapter 1, a logical framework was introduced to set the course for what the thesis was attempting to establish, which was to investigate the impacts that a low-technology development intervention could have in a post-war context. The BSF was used as a lens to demonstrate the possible spectrum of impacts that went beyond those intended, thus showing a larger impact that was expected.

To review, the logical framework stated the problem, which justified the intervention – in this case the BSF. The logical framework proceeded to present the flow of hardware and software implementation leading to a spectrum of impacts that could emerge from the intervention. These impacts were then distinguished as quality of life indicators and as intended and unintended project impact. All of this took place in the context of post-war Liberia and its culture, which could be barriers to the implementation process. This is shown in Chapter 1, Figure 2 – Logical Framework. Emerging from the framework were specific areas that needed to be investigated; these were stated in objectives 1-3. The new insights derived from the objectives aided in answering the overall thesis aim and forming a new logical framework. The insights achieved have implications both for academic understanding and for development practice (INGOs, donors and practitioners); these are explained and highlighted throughout this chapter. In addition, a new logical framework reflecting the results of the objectives will be demonstrated and explained.

## **7.2 Discussion and New Insights from Findings**

### **7.2.1 Discussion and New Insights into Objective 1**

Objective one focused on the need to establish and understand what quality of life (QoL) components were important to post-war rural Liberians. Ideally, development interventions should improve people's QoL. As noted in the introduction, one of the driving forces of this research was to find out if low technology development interventions, specifically the BSF, could improve and actually were improving the life of rural Liberians in the context of a post-war society. If the research had only focused on the health impacts of the BSF on rural Liberians it would have neglected the other, non-tangible, impacts that the filter could have. By implicating all aspects of life, as defined below by Glatzer, into QoL I could get a better idea of the BSF's impact holistically. It was imperative to investigate what the adequate QoL indicators and measurements were for this study. The reason was to distinguish whether the spectrum of impacts that the BSF produced included the QoL indicators specified in the QoL survey, thus showing that the BSF did have an impact on the QoL of post-war rural Liberians. Understanding these impacts is the aim of the thesis.

The unique aspect of this research had to do with the post-conflict context. The civil war left Liberia with a collapsed economy, infrastructure, government systems, and a traumatized society

(Chapter 3 section 3.1). Because of this context the conventional QoL indicators and measurements could not be used. Civil war has immense economical repercussions; a civil conflict lasting just five years reduces the average growth rate by more than two percent (Hoeffler et al., 2003). Thus the use of HDI or PQLI for QoL indicators or measurement would not have been adequate for Liberia, which had endured a 14 year civil war (reducing annual growth by approximately 5%). The HDI uses life expectancy as a QoL indicator, which after a war is naturally going to be very low. Health services have been destroyed and the capacity to care for the sick is drastically reduced. In Liberia life expectancy was 49 in 1990, dipped to 39 in 2004 (right after the war) and has increased to 59 in 2009 (UNICEF, 2010, accessed 2011). These statistics show that the conflict impacted the HDI indicators, which are just one aspect of the QoL for post-war Liberians. Therefore, measuring development success by using an increase in life expectancy or GNP would just reflect partial aspects of people's overall lives. The criteria for a project's success should include all aspects of life and a wider spectrum of intended and unintended impacts. If a development intervention aims to reduce the occurrence of diarrhoea in children under five, its success could also include the emotional satisfaction of the parents whose child will no longer be vulnerable to waterborne diseases.

Coupled with the aforementioned factors is the role and impact that psychosocial trauma plays on society. Examples of psychosocial consequences of war can be found in Afghanistan where, in a recent study of 799 respondents, 42.2% were found to suffer from post-traumatic stress disorder (PTSD) (Lakshminarayana et al., 2006). Other examples include not only conflicts that are recent and present but also past civil conflicts such as in Cambodia and Rwanda (Lakshminarayana et al., 2006). Because of these contextual factors and the necessity to understand whether a low-technology intervention such as the BSF can impact a society, new QoL indicators were needed and conceived. An original QoL survey encompassing all facets of life was conceived and administered. Glatzer (2004) states that QoL needs to include the 'four spheres' of life – material, social, personal development and societal, I agree with this and would argue that, in conventional QoL measurements, these spheres and what they entail are not fully realized or taken into consideration. As a result, there is a gap between what is being measured as a QoL indicator in the conventional sense (mainly economic and health) and the reality of QoL to an individual.

*Because of this research, I would propose not using conventional QoL indicators to measure QoL in developing countries that are recovering from conflict.* As stated, conventional QoL indicators and measurements do not take into consideration the impacts that conflict may have had on individuals and communities. It is critical for INGO practitioners to understand that conflict adds a new element that must be considered when discussing the needs of individuals and communities.

Once it was established that a new paradigm on QoL was needed, as stated above, the QoL survey was conceived and was ready to be tested in the field. The findings for Objective 1 centred around two main areas, education and health, as illustrated in Table 12 in section 5.1.2.1. However, it was the tangible aspects of health and education that were desired: school buildings and the clinic structures. In part, this revealed that having the structures rebuilt aided in the psychosocial healing of ‘re-establishing’ what once was in the community. An example illustrating this and concerning the BSF took place in a village in the vicinity of the research area. During a follow-up visit, the SP WASH program manager noticed an emptied filter outside an elderly lady’s house. Upon questioning her about the filter and why it was outside, she proceeded to first lie and say she was using it, although it was visibly obvious that she was not. Questioning continued and she stated that others had told her not to use it. Finally, she confessed that she had taken the media (sand, support gravel and under drain gravel) out of the filter to mix with cement to fix the destroyed floor in her house. The obvious question is why someone would destroy and not use something that has the potential to improve her health. My interpretation of this lady’s actions would be that having a filter was important to her in the sense that she acquired something from an INGO that made her feel part of a community project and that she was told was good for her. However, the need to re-establish her home that was destroyed during the war was stronger still.

I would suggest that QoL indicators are very personal, varying from person to person, and should be treated as such. For example, INGOs should find out first what is important to a beneficiary, not what they want or even what they need, but instead what they hope for, for their future or their children’s future. For the lady mentioned above, the status that having her own house re-

built is what made her happy, not the filter. The hopes of those being helped need to be identified early in a project cycle. This would have to be balance between short-term needs, such as clean water, and long-term aspirations, such as wanting education to be available for their children. Additionally, it is important for INGOs to establish differences in QoL aspirations between individuals and the community.

What INGOs often fail to consider is that communities have survived and have patterns that are part of its past and future (Myers, 1999). The QoL for the community includes these patterns and survival strategies. For example, in this research the communities' survival is closely linked to their agricultural livelihood. Therefore, for survival, it is a priority for all members of the family to work on the farm, even if that means not going to school. This was observed and indicated in the research. The same can be said regarding the importance of the community's world view through the bush society and African traditional religion. Girls and boys initiation through the bush society was a community pattern and re-establishing this pattern is important to most communities. Myers (1999) also states that INGOs need to see the world as the community sees it, to see what the community considers as important and what they value. The importance and value of the bush society is an example of this. This was indicated in Chapter 2, section 2, through illustrations of participants believing that going into the bush for their initiation was more important than a literacy class or WASH education.

### **7.2.2 Discussion and New Findings for Objective 2 & 3**

Objective two and three pertained to what potential and actual impacts the BSF had on the QoL indicators that were designated in the QoL survey. As revealed in the literature review, there have been many studies and evaluations conducted on the BSF. The bulk of the studies have illustrated the *effectiveness* of the BSF as a household water treatment alternative that can supply clean and safe water. Studies and evaluations by MSc and PhD students, along with leading epidemiologists, have been carried out all over the world to test BSF performance. Section 3.3.2, Table 2 displays seven respected evaluations of the BSF and its effectiveness, with the BSF exhibiting high levels of removal rates of *E. coli* and other coliforms. The testing that was performed on seven filters in the research area proved this to be true. However, there has been limited research on how the filter can impact the QoL of an individual personally or a society communally, beyond the obvious potential health impact.

It should also be noted that the studies and evaluations shown in Chapter 3, Table 2 were carried out in non-post-conflict countries. As noted, in this study the BSF was used as a lens to indicate how low-tech forms of development can or cannot impact the QoL in a post-conflict setting. Reflecting on the work of others, I would conclude that their studies do not take into consideration the context where the filter is being introduced. This also could be true of other forms of development technology. ***Resulting from the research conducted for this thesis, it could be argued that low-tech forms of development interventions, regardless of their intention, may not adequately address the context into which they are being introduced and thus may not have the desired intended impact.***

Donors have the power to influence whether or not INGOs receive resources (Jordan & Van Tuijl, 2006). As a result, donors put pressure on INGOs to meet targets in a certain amount of time and dominate the relationship between implementer and donor (Edwards & Hulme, 1996). With these pressures, INGOs are rushed and the time taken to establish relationships and understand the context is limited. Consequently, the beneficiaries may not be adequately involved in the decision-making process of the development project (Edwards & Hulme, 1996).

I would agree with these authors that the power does lay with the donor. However, I believe that INGOs need to be assertive in educating the donors about the factors that help a project to be successful. Explaining to donors the extra challenges that are present in a post-conflict project area is essential. This, of course, raises the question “What are the components of a successful project such as the BSF?” In Table 15 in the preceding chapter there is an example of a log frame incorporating the recommendations, to illustrate how to integrate success indicators that go beyond the ‘normal’ indicators in a project cycle.

Conflict causes physical and mental disabilities and also results in a breakdown of the natural social network of family, community and state. The Chronic Poverty Research Centre gives a theoretical example of how conflict impacts poverty which can last for generations (Culter et al., 2007).

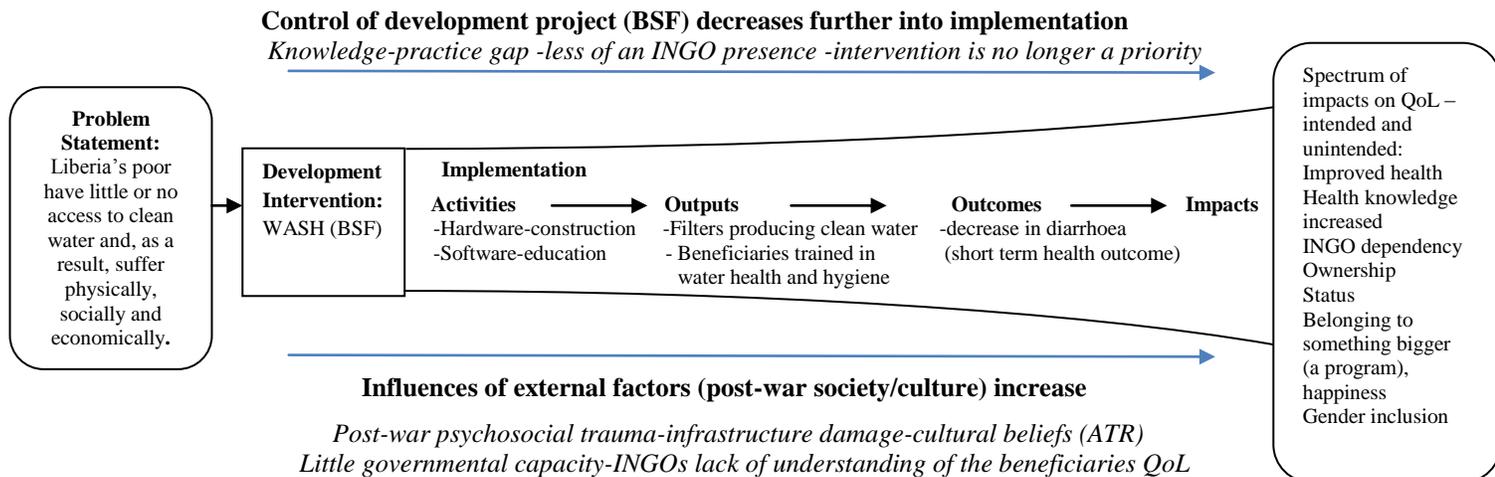
*Conflict → Damage → Transitory poverty → Intergenerational poverty*  
*Conflict → Damage → Chronic poverty → Intergenerational poverty*

**Figure 35: The ripple effect that conflict can have on poverty (Cutler et al., 2007).**

There are two key aspects of the above figure that I would like to stress. First is that, in both cases, conflict leads to damage which then leads to poverty, whether it be transitory or chronic. In the context of Liberia, it may be too soon after the civil war to foretell the final impact that the 14 years of conflict has had. However, from observation, Liberia, specifically in the rural regions, suffers from transitory poverty. INGOs can play a very important role in stopping poverty after the transitional phase, so that it does not evolve into intergenerational poverty. This can be done through understanding the context and what projects are best to implement to empower people and impede the threat of intergenerational poverty. I state this to re-emphasize the necessity for INGOs to understand the context, specifically in a post-war setting, before they implement a low-tech development project.

### 7.2.3 New Logical Framework

From the data obtained through the research, the logical framework from Chapter 1 was adjusted to indicate a realistic view of the impacts the BSF had on post war rural Liberians.



**Figure 36: New logical framework in light of the research collected.**

As stated in the introduction, one of the main driving forces behind this research was the need to understand whether or not low-tech development activities, can impact the QoL for people in a rural post-war context. Supplementary to this was the investigation into the impacts that are

unknown and go beyond the intended impacts that the INGO states in its implementation plan. Omnipresent in all of this was the context, the unique and challenging context of post war. It is from this platform that the research launched into collecting data and deciphering them. The new logical framework results from the data collected and reflection on what that data were saying in light of the research aim.

This logical framework illustrates that as a program begins the implementation process, external influences increase and can become barriers to the intended/unintended impacts and may potentially generate new unintended impacts. At the same time, the INGO's control over a project decreases as the project matures due to increasing and uncontrollable external influences. An INGO can control the output of a project, for example the number of filters built, this is the narrow part of the logical framework-the areas that the INGO is expected to control and deliver on. However, its control is reduced in the outcomes and impacts phases. An INGO cannot control the effects of external influences and factors, thus the controllable impacts are narrow (the straight, narrow section of the logical framework) and the uncontrollable intended and unintended impacts are much wider (the mouth of the logical framework). An example from this research is the influence that the bush society has on beneficiaries. The pressure and influence to participate in the bush society supersedes that of attending WASH education and workshops, which can reduce the impact of the intervention. The external influence of the bush society is completely out of the control of the INGO (as in case study in Chapter 2) and therefore the INGO is subject to the priorities of the culture.

The series of implementation steps is the same as noted in Figure 1 (Garandeau, 2009), which is a standard chain of development. However, as stated in the introduction, INGOs do not take into consideration the influences of the context and their repercussion. Going into this research, I expected that the spectrum of potential and actual results would centre on the decrease in diarrhoea and the improved overall health of the beneficiaries. IN essence the narrow section of the logical framework would continue and end narrow. However, it became evident that, due to the lack of baseline data and low capacity of the health system because of the war, this would be impossible to measure. Although the purpose of the intervention is to improve the QoL by providing, in this case, clean water, the unintended impacts, often not measured, are the

dominant impacts that emerge. The spectrum of impacts did focus on health but also included the psychosocial elements of belonging, ownership and re-establishing what once was. These wider impacts are to a point uncontrollable for an INGO to predict, however, I do believe that practitioners can be aware of what “could happen” instead of focusing solely on the narrow intended impacts.

It was judged that the BSF had the potential to impact the QoL indicators, but only if properly used. Interviewees perceived that their health had improved; however, this proved too difficult to measure due to other factors that influence health and the lack of available baseline data (see Chapter 2, section 2.1). Observational results also proved that there was a gap in what people perceived and what was actually taking place in terms of user compliance. As with most health behavioural change driven projects, the knowledge and practice gap was large. The reasons for the gap could be numerous, as the health belief model hypothesizes that health-related actions or behavioural changes depend on three factors (Rosenstock et al., 1988):

- The existence of sufficient motivation (or health concern) to make health issues salient.
- The belief that one is susceptible or vulnerable to a serious health problem – or that there is a perceived health threat.
- The belief that following a particular health recommendation would be beneficial in reducing the perceived threat and at a subjectively-acceptable cost (not restricted to financial cost but to perceived barriers that must be overcome in order to follow the health recommendation.)

The health belief model raises some interesting points pertaining to this thesis. For example, reflecting back to Chapter 2, section 2.2, the view that most rural Liberians have about their health or health-related issues has to do with their belief system. The example was given that people believe their ancestors have provided them with the river to drink from. This goes against the second point of the health belief model: Rural Liberians do not believe they are susceptible or vulnerable to waterborne diseases because the water is a gift from their ancestors. Additionally, if aspects of the germ theory are not taught in the educational system, how will people know

there are health threats all around them? This is an area that would need further study; the point in this thesis was to demonstrate some of the factors related to the knowledge-practice gap.

The knowledge-practice gap was and is one of factors that decrease the INGOs control of a project (see Figure 36 above). The other aspect of decreased control over the project is that it is no longer a priority. Evidence of this comes from casual conversations with beneficiaries about why they do not take their filter water with them in a clean container to drink while working on the farm. Their response were often, “It is too heavy” or “I do not have time” (key informant, 2010). Observation contradicted this; often families were seen going to the farm in the morning with large pots of food for the day, large pieces of wood for fire and supplies for work, many of them heavier than a small water container and all being carried on their heads. I believe that, to some degree, the priority of having access to clean water decreased along with the priority of changing their water practices/behaviours.

The results indicate that there are *no* actual measureable health impacts and there were more unintended development impacts than intended ones. In spite of the wider set of unpredictable impacts, they were not all negative. At the beginning of the research, I expected this, intuitively from experience had observed some of these unintended impacts such as ownership, status, needing to belong. It was evident when I first starting working in Liberia in 2005, that ownership of the BSF and how that affected the psychosocial state of a person was very important. The psychosocial trauma endured during the war manifested itself throughout the research. It was evident in the desires to belong to a program, own something and re-establish what was before the war. These psychosocial side effects of the war were strong influences on the impacts of the WASH intervention. This was illustrated by the lady who used the filter to rebuild her house and the reaction of beneficiaries when threatened with the removal of their unused filter. Belonging to the BSF program was important to the beneficiaries because of the status that came from being part of the program. What is interesting and noteworthy is that impacts such as those mentioned were not indicated as QoL indicators or measurements. Data from the QoL survey revealed that it was the tangible that was important, not details such as ownership, happiness, restoration or status. The question could be asked, “Should these things be added in to the QoL realm of measurements and, if so, how should they be measured?”

Interviewees often stated that they are ‘happy’ or ‘we are happy’ now that we have the filter, even if they were not using it to its full capacity. This could be an area of further study: How INGOs can incorporate these difficult or not normally measured yet salient indicators that can positively impact people’s lives. There are surveys concerning people’s ‘happiness’ that could be adapted for the context and used as a starting point for INGOs. Again, further study could be done in this area. Furthermore, educating donors that these measurements are important and possible ‘success’ indicators of a project should be encouraged.

An academic insight into QoL indicators and measurements in the context of post-war development is also an area that has emerged and another area of future study. As noted in Chapter 5, section 5.3.1, one of the negative or counteractive impacts of development projects is INGO dependency. Again, due to contextual influences, the natural reaction of many interviewees is to ask for more and to depend on INGOs to fulfil all of their current needs. INGOs work to decrease dependency; however, in a post-war context beneficiaries are desperate to rebuild and see INGOs as the quickest way to help them. Furthermore, as the new logical framework indicates, one of the many external factors that influence the project is the lack of governmental capacity. This is also stated in the literature review in section 3.1 under “Governance”. With this lack of government capacity, beneficiaries rely on INGOs to fill that gap; therefore, instead of asking the Ministry of Health to rebuild a clinic, people will ask an INGO. The INGO can do it more quickly and, in most cases, corruption will not inhibit the process.

The other element of this study was the beginnings of *a theory that people are primarily concerned with replacing what was originally taken or destroyed during the war*. In this research, the BSF was not present in pre-war Liberia and therefore its importance seemed limited, except when there was a threat of it been taken away for unacceptable user compliance. This was not found obviously stated in post-conflict literature. There was mention on the desire to rebuild and re-establish, but nothing as specific as not recognizing the importance of technology that could have considerable impact on their QoL because it was not present before the conflict. The strong desire to restore what once was and what was once possessed was evident throughout the research. This was mentioned throughout the research, particularly in

terms of rebuilding the tangible such as schools, clinics and houses. Much like the results for Objective 1, and the desire for tangible school and health buildings, the filter was the tangible, desired item, rather the clean water that it provided.

### **7.3 Limitations and Constraints**

One of the main limitation and constraints that endured throughout the research was the context and environment in which it took place. As stated in the contextual review and the methodology, I lived in Liberia for the entire research period. Although that can also be seen as an advantage, for this section I will explain the limitations and constraints it caused.

In Chapter 2, section 2.1, the environment in which this research took place was stated clearly. It would have given the thesis more depth and insight if there had been health statistics available in 2006 to carry out a baseline survey of the research area before the research began. This would have given me a starting point and provided evidence of how the BSF impacts health. However, with few resources and no reliable statistics available my capacity was limited.

Another limitation was the difficulty in measuring feelings or emotions. Measuring ‘ownership’ or ‘psychosocial impacts’ that a development technology may or may not have on a person and community is difficult. I recognize now that there are tools available to assist in this, but I was not equipped at the time to deal with these unexpected developments and results. Combined with this is the difficulty of measuring factors related to a culture that is not your own. Consequently, my ability to make assumptions or decipher what was being observed and said was limited. For example if I had been in my own Canadian culture, I may have been able to anticipate, assume or interpret the actions of people that were providing something of importance. I would have been familiar with their reactions – how they talked about or treated something – because they would have been closer to my own reactions. On the contrary, in a very different culture from my own I was limited, even after working and living in Liberia for the past seven years, in deciphering actions or words.

The other significant constraints and limitations are similar to those that have been discussed in the methodology chapter regarding the logistics of being able to get out to remote areas over

rough roads and the overall lack of infrastructure (such as the Internet) during the research period. There was also the limitation of interest. This research was very important to me; however, that does not mean it was important to anyone else, including the interviewees. Being constrained by things such as tardiness, disorganization and corruption was often frustrating and hampered data collection. Conducting research in a post-war context with a traumatized population and with little or no resources was definitely constraining.

## **8.0 FUTURE WORK AND CONCLUSION**

### **Future Work 8.1**

There are definitely areas of future work that stemmed from this research. Some of these require further research to improve our understanding of the complex systems in which development projects operate, this would be done at the academic level at the leadership level of INGOs. Others require advocacy approaches with donors and improvements in processes and procedures within INGOs, these would be the responsibility of INGO agencies and the development practitioners working for them:

- An investigation into the impacts the secret societies or traditional belief systems have in development implementation.
- Engaging and educating major external donors, such as the UN and EU in the impacts war can have on the implementation of development projects.
- Critically addressing the reality of targets that are expected by donors for INGOs to meet in post-war countries and how success is measured for projects
- Investigating the culture of corruption in post-war failed states and its full impact on INGOs (As stated in Literature review in Governance section).
- Establishing a fluid and flexible measurement of quality of life that is dependent on the context and the society being measured.
- New and innovative ways of implementing the BSF or other forms of development technology in post-war societies.

The above list is just few examples of the future work and studies that could be carried out that this research has uncovered.

### **8.2 Conclusion**

In the introduction of this thesis, the global challenge of access to safe water in the context of a post-war society was presented. To illustrate this challenge further, the post-war country of Liberia and its rural water issues were examined. The research started with a simple question

that I had, “Can a simple low form of development technology, such as the BSF, help people suffering from both war and lack of safe water?”

From this, a simple logical framework outlined the problem, intervention and the linear process of implementation towards a possible spectrum of impacts. Intuition and instinct, form experience and observation, led me to believe that these spectrum of impacts were present but not formalized as an intended development impact. The journey to further comprehend what impacts may be conceived by a development project was not an easy one. The answer to the initial aforementioned question lay in many different areas, ranging from what the quality of life is for rural post-war Liberians, to the psychosocial issues that each individual has due to their war experience, the role of traditional cultural beliefs, how INGOs implement their projects and what dictates a successful project for the beneficiary, INGO and donor.

From the research and the new logical framework a number of new academic insights and development implications surfaced. The thesis investigated what is already present in the area of QoL, INGO implementation of low forms of development technology, psychosocial impacts of conflict and took the research further to the specific context of post-war Liberia. Academic insights that I believe came from the research are:

- As illustrated in the new logical framework a new and alternate way of development from previous narrow conceptualisations of impact. In this case a new representation of implementation-impact relationships in a post-war context such as Liberia
- Distinctive new alternate QoL indicators and measurements in post-war developing countries.
- Significant insights into testing and improving psychosocial treatments for post-war victims in developing countries (specifically civil conflict)
- New knowledge concerning the impacts and influences of African Tradition religion on health practices and development projects in Liberia.

The implications of this research for development practitioners are (as per recommendations chapter 6):

- Investigating alternative success indicators for projects that include QoL as per discovered through a pre-intervention QoL survey (Chapter 6).
- In a post-war context, investigate the history of the area that the development project will take place through a post-war fact finding exercise before implementation takes place (Chapter 6).
- Establish strong, trusting relationships by investing more time with beneficiaries. This could potentially assist in decreasing the knowledge practice gap. More time spent learning about belief systems and their view of health, sharing educational material regards the spread of disease.
- Reconsider the success indicators of a project to include QoL indicators such as ownership, belonging and beneficiary satisfaction.
- Communicate with donors the necessity to consider alternate implementation practices, as the ones recommended in chapter 6 and in this section, so to increase the impact of the project and donor satisfaction.

After much reflection on all of these points, my time working and living in Liberia and the experience of this research over the past six years I can say with some confidence that the most important thing is taking the time to listen to the community and individuals. Listening, not just hearing, and to try to fully understand where they are coming from and what they are hoping for. This statement from “Voices of the Poor” was made by an impoverished man from Guatemala, *“At last those above will hear us. Before now, no one ever asked us what we think.”*(Narayan et al., 2000).

By putting into practice the recommendations that have come from this research and academically deepening the study of the areas mentioned, I believe both donors and INGOs have a starting point to make their post-war development projects have a larger and longer-lasting spectrum of positive impacts, for the victims of post-war.

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