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Integrating Rural Cambodian Villagers' Perspectives into Monitoring and Evaluation Protocols for
an NGO's Water and Sanitation Program

by

Elizabeth Churchill

A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Arts
Department of Applied Anthropology
College of Arts and Sciences
University of South Florida

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Keywords: water sanitation, monitoring and evaluation, Cambodia, gender, health

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NOTE TO THE READER

Bridges Across Borders (BAB) has given verbal permission for use of its name in this thesis. No employees, nor villager's names are included in this thesis to protect their privacy.

DEDICATION

This thesis is dedicated to all of the women in Cambodia and across the world who sacrifice daily for the health and future of their families.

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I would like to acknowledge first my family has supported my “bold” undertakings in remote villages in Africa to Southeast Asia and Grammie and mother, whose selfless acts have inspired me and my father, whose sagacity, enduring patience and support have reinforced my desire to work in the field of international health and development. Without them, as examples and mentors, this thesis never would have been written.

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Khmer grandmother, who patiently taught me Khmer and watched me both falter and succeed with a smile. In conclusion, I would like to extend my heart and respect to the women of Chamcar Bei and Cambodia, who gather and manage water, provide and prepare food as well as take responsibility for their families' health. As a result, they often sacrifice their own future and education. They continually remind me of how blessed I am to have the opportunity and ability to write this thesis, but also remind me how much more I have to learn.

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INTEGRATING RURAL CAMBODIAN VILLAGERS PERSPECTIVES INTO MONITORING AND EVALUATION PROTOCOLS FOR AN NGO'S WATER AND SANITATION PROGRAM

ELIZABETH CHURCHILL

ABSTRACT

Bridges Across Borders (BAB), a non-governmental organization (NGO) in Cambodia, directs diverse and complementary projects to improve the lives of Cambodians living in poverty. The Hand In Hand project (HIH) is one of these projects, implemented in the rural community of Chamcar Bei. This project started in 2006 and is designed to be completely sustained by the villagers after 5 years. One of the four components of HIH is a health component, whose goal is to improve the health of the community. In 2007 and 2008, through these health initiatives, BAB provided the community with 280 ceramic water filters, 20 wells and 10 latrines. BAB agreed to host an internship that would allow me to monitor and evaluate these water and sanitation initiatives. My internship responsibilities included providing advice on future Monitoring and Evaluation (ME) protocols as well as community and organizational identified indicators to gauge the progress of the initiatives. In addition, these protocols were to be gender sensitive and able to be sustained by the community.

For the internship I conducted ethnographic interviews with members of BAB and with members of the community regarding the water initiatives objectives, potential impacts as well as guidance on future initiatives and ME protocols, including indicators to gauge programmatic progress. Cultural explanatory models of disease, traditional therapies and gendered nuances related to water procurement and management were also explored to inform program development. Focus groups and 90 household surveys were used to triangulate data. Findings revealed that organization and community perceived benefits of the technologies, while not in complete congruence, did overlap, allowing for the recommendation of mutually informed ME indicators. In addition, both the community and organization identified salient program and ME

issues and proffered solutions. Community ownership and education were not integral components of past initiatives. This compromised sustainability and the community's commitment as well as belief in their ability to care for the technologies. However, the motivation of some community members to acquire ME skills and recognition by the organization of past programmatic errors have paved the way for future community driven, informed and sustained ME protocols.

CHAPTER 1

INTRODUCTION

This introduction will outline the global as well as national significance of this internship, its research methodology and its context and objectives. The primary intention of this internship experience is to design monitoring and evaluation (ME) protocols for a non-governmental organization's (NGO) water and sanitation initiatives; therefore, ME will be woven throughout the various topics addressed in this introduction. The research does not apply a theoretical framework but is rather descriptive and exploratory in nature. After situating the internship in its organization and regional settings, the research framework will then expand to discuss global water disparities and health impacts. These global issues will then be considered in the context of Cambodia by highlighting the nation's history and current social as well as water and sanitation indicators. The intersection of gender and water related inequities, internationally and in Cambodia in particular, will be described and is further augmented by anthropological insights. It is hoped that the thesis will make some anthropological contributions to the understanding of and solutions to global water disparities as well as perspectives related to international water and sanitation protocols. In closing, the research objectives and a synopsis of the introduction's content will be presented.

Internship Environment

Bridges Across Borders (BAB)

Bridges Across Borders Southeast Asia (BABSEA) is an international non-governmental organization (NGO) formed in 2003 to address the root causes of violence, teach peace and dissipate hate. The organization operates throughout Southeast Asia and was founded by Bruce Lasky, a lawyer from Florida who has extensive legal experience throughout Southeast Asia.

David Preg, a fellow Floridian and founder of Bridge Across Borders Southeast Asia (BABSEA), received his Master's degree in Theory and Human Rights from the University of Essex. Lasky and Preg wanted to address the root problems of violence and believed the best way to accomplish this was to link people across borders which serves as the source of the organizational name (Bridges Across Borders 2009).

Preg was the driving force behind BABSEA's program initiatives in Cambodia. He was inspired by his deceased father, a man who was fervently opposed to the Vietnam War and counseled Vietnam draftees. His father motivated him to study the war and he became aware of consequences of US actions in Vietnam on Cambodia. Preg was also the director BAB's Cambodia (BAB-C) projects and his visions laid the groundwork for many of the organization's programs. Initially these programs consisted of immunizing and providing educational opportunities for children who dug through refuse sites for sustenance near Phnom Penh. Six years later, BAB performs a myriad of diverse and complementary programs throughout Cambodia (Bridges Across Borders 2009).

The services provided by BAB involve a wide range of projects including human rights training. BAB employs legal interns to facilitate the understanding of land ownership and deforestation, pervasive issues confronting many Cambodian communities (United Nations 2008). BAB owns and operates a facility teaching English, Khmer and computer education in Phnom Penh for youth in the slums: coupling English and Khmer language education with breakdancing taught by a Cambodian US deportee (Mydans 2008). In addition, there are a variety of community based projects in Kep Krong Province and Takeo Provinces, which work to create sustainable livelihoods through capacity building for villagers. The primary objective of these programs is to eradicate poverty (Bridges Across Borders 2009).

Internship Selection and Responsibilities

After e-mailing numerous Cambodian NGOs whose missions and vision corresponded with my own, I found BAB to be the most responsive. In March of 2008, the co-founder, David Preg expressed interest in accommodating my research of water and sanitation and investigating gender complementary strategies. He proposed utilizing my educational background by

facilitating an internship with an ongoing community development project entitled “the Hand in Hand project (HIH)” in rural Chamcar Bei, a project first initiated in September 2006. If the HIH pilot were to prove successful, it was intended that the project would be launched in other rural villages throughout Cambodia. The project was funded by businesses of Knai Bang Chatt resort and the Belgian foundation Friends of Rainbow Schools located in the nearby tourist destination of Kep, Cambodia (Bridges Across Borders 2008).

David Preg asked that I help “improve our monitoring and evaluation of our water and sanitation initiatives” in the context of their program Hand In Hand (HIH) (David Preg personal communication, March 15, 2008). These initiatives served as an auxiliary to the HIH project’s third objective, improved health services, and included 20 wells and 10 latrines built in 2007 as well as 280 water filters. The water and sanitation project was under the authority of Sil Sineng, who informed me that “there are no clear indicators developed to monitor the project implementation included in water and sanitation activities” (Sil Sineng personal communication, April 21, 2008). The goal of my internship was to follow up with the beneficiaries who had received water filters, wells and bathrooms from the project and determine simple indicators, or variables with which to measure the progress of the initiatives, which were to be community conceived and sustained. However, for reasons to be explored more fully later, this proved to be a difficult task. Furthermore, I sought to incorporate local beliefs and gender complementary solutions into BAB’s program initiatives to buttress the community centered as well as gender empowerment efforts of BAB and explore my own research interests in increasing local level influence and women’s decision making power in international water sanitation strategies (Bridges Across Borders 2007). In the summer of 2008, prior to beginning this internship, I attended a 2 month intensive Khmer language training at the South East Asian Summer Study Institute (SEASSI) at University of Madison-Wisconsin. From my prior experience in Ghana, I understood the importance of being able to communicate in the local language. This six month internship spanned from from November 2008 to May 2009 or 6 months, and alternated between the town of Kep and the village of Chamcar Bei depending upon the nature of the work.

Location

Kep

Kep, the largest city in a province of approximately 35,000 people, is a peaceful fishing town where affluent Cambodians and foreign tourists flock to picnic, feast on crab and relax (Wren 2009:11; CSES 2004). Kep was originally the headquarters of BAB's HIH project because power and internet were more often available than in the village of Chamcar Bei. However, half way through the internship, the office was moved to the village level to conserve resources and ease the implementation process by bringing the organization closer to the project. The move allowed for a closer organizational relationship with the community.

Chamcar Bei

Chamcar Bei is a large village with over 602 families or 2829 people, spread out over three regions: Chamcar Jak, Antung Saw, and Chamcar Bei (Chief of Chamcar Bei Village personal communication, January 15, 2009). BAB has 2 centers in Chamcar Bei, the Community Learning Center (CLC), and the Community Vocational Training Center (CVTC); the latter being donated by the United Nations Education, Scientific, and Cultural Organization (UNESCO). BAB had constructed a "red house" to accommodate volunteers, and this was my primary residence for the first four months of the internship (Bridges Across Borders 2009). The lodging was removed from the village, had power for two hours a night and no running water, but a beautiful view and spectacular sunsets. In March 2009, due to high rates charged by the organization for this accommodation and the challenge of integrating into the community at large, I rented a room in a local family's house near the village market. While finalizing thesis research and analysis, I divided my time equally between rented rooms in the village and Kep, where I lived alone, depending on the availability of power.

Global Impact of Water Disparities

The majority of the world's population lacks daily access to potable drinking water (WHO 2004b). The scarcity of potable water is primarily responsible for the prevalence of many health conditions including diarrhea. The interrelationships between lack of water access and sanitation

and access to education, transportation, and opportunity are becoming increasingly realized (Treitler and Midgett 2007; Whiteford and Whiteford 2005). Each year, diarrheal diseases kills 1.8 million people, a majority of whom are under 5 years old, infecting over a billion people with water-borne pathogens and thereby increasing their susceptibility to some of the world's top killers: tuberculosis, AIDS and malaria (WHO 2004b). This makes a seemingly innocuous disease the third highest cause of illnesses and death worldwide (WHO 2004b). Diarrhea is merely a symptom of lack of access to potable water and sanitary facilities. Therefore, understanding and addressing the underpinnings and multiple implications of this disease are crucial to mitigating its global impact.

A convergence of global forces including pollution, population growth and climatic changes compromise our world's diminishing supply of potable water (McMichael, Woodruff, and Hales 2006). Predictions of population growth in 1996 made by the United Nations estimate that by 2050 the world will have a population of 9.4 billion people, forcing 1 billion people or 11% of the world's population to confront "water scarcity"¹ (De Villiers 2000; WHO 2007). However, in 2007 the World Health Organization claimed 4 out of 10 people are already faced with water scarcity, and furthermore by 2025, 2 billion will contend with "absolute water shortage", and will fall far below the yearly water requirements for daily living (De Villiers 2000:79; WHO 2007). Monitoring and evaluating the geopolitical and anthropogenic consequences of this lack of water access and sanitation will require the increased attention of national and international public health officials to contend with the confluence of dwindling water resources and explosive population growth (De Villiers 2000; Whiteford and Whiteford 2005).

Cambodia and Water

A little over forty years ago the United States initiated a massive bombing campaign in Cambodia, dropping the equivalent of 43 Hiroshima-sized bombs on the country (Owen and Kiernan 2006:66). This ignited an internal conflict which led in part to a subsequent tragedy: a

¹ Water scarcity is defined as living below the human health and hygiene requirement of 500 cubic meters per year (WHO 2007)

genocide resulting in the deaths of between 1.5 and 2 million people or 20% of the Cambodian population (Public Broadcasting System 2002; Kamm 1998). All the national institutions or symbols of imperialism were banned; educational, medical and social institutions were eviscerated, literature burned and the educated killed. Today, the vestiges of this social upheaval remain and while rebuilding the nation has begun, endemic corruption has prevented resources from flowing to the rural populace which comprises 80% of the Cambodian population (Central Intelligence Agency 2008b). These inequities are further evident in the social and water related indicators of the nation (Chatterjee 2005; Kopitiopoulos 2005).

Cambodia is an archetype of the impending global threat of lack of accessible and clean water. The maternal mortality rate of 427 per 100,000, is the second highest in Asia, and its magnitude becomes more apparent when compared with the United States, whose maternal mortality rate is 13 in 100,000² (Central Intelligence Agency 2008a). The elevated rates of infant and maternal mortality in Cambodia are attributed to the inability to access clean water sources, poor sanitation and lack of access to basic health care services, a struggle plaguing many nations across the world (Chatterjee 2005; Kopitopoulos 2005). A 2004 WHO report found only 39.60% of the rural population of Cambodia had access to an improved water source and only 16.40% improved sanitation. This is compared to the urban areas where 72% had access to improved water and 55.40% improved sanitation (WHO 2004:3). In Cambodia, 1 in 9 children die from diarrheal related causes before their 5th birth day and 1 in 5 women die from pregnancy related causes (Population Reference Bureau 2003; Population Reference Bureau 2004). And the maternal mortality rate continues to rise (Chatterjee 2005). Cambodia is in dire need of a consolidated effort to ameliorate the situation but it must provide less disjointed initiatives at the local, organizational and governmental level if it hopes to be successful (Cambodian Ministry of Health 2008).

² Its highest in two decades (Stobbe 2007:1)

Cambodia, Water and Gender

Lack of access and mounting global threats to water sources increase responsibilities associated with water procurement and management. Women are the primary procurers and managers of water as well as caretakers of the ill (Watts 2004; Werner 2007; CDC Foundation 2004). Therefore, the responsibility for decreasing the morbidity and mortality caused by lack of access to potable water may disproportionately impact women. A majority of household tasks related to water-related chores and the illness caused by water related diseases fall to women (Watts 2004; Whiteford 1997; UNESCO 2004). Women are then forced to keep their children at home to assist in the procurement of water. In rhythm with societal expectations, it is primarily the girls who stay home, further perpetuating a cycle of educational inequality between boys and girls as girls are unable to complete their education (UNICEF 2007). These global water threats, many times amplified by social and cultural expectations, increasingly impinge upon the autonomy of women and future of girls in Lesser Developed Countries (LDC) like Cambodia (Kopitopoulos 2005; UNESCO 2004).

The correlation between Cambodia's lack of access to water and the infant mortality rate has already been recognized, but its impact on the exorbitant maternal mortality rates has yet to be explored and begs further investigation (Kopitopoulos 2005:11; UNESCO 2004; Chatterjee 2005; Gil-Gonzalez et al. 2006). A 2006 WHO bulletin reported the cause of the nation's exorbitant maternal mortality, "must be understood as a whole" and lacking in the research is the "political and cultural" context under which these mortality rates exist (Gil-González, et al. 2006:907). A holistic, ethnographic understanding of the rural villages' local practices, lifestyles and perceptions of health, as well as access to water is essential in assisting the community. These cultural practices and social ideals should be considered in health policy and implemented in strategies to combat not only gender inequities and water-borne diseases, but also malaria and HIV/AIDS as rural youth increasingly migrate to the city (WHO 2006:34; Werner 2007). A focus on water availability is also critical as women and children across our planet spend 200 million hours a day fetching water and are therefore unable to access services or acquire education to better themselves and their communities (Mercy Corps 2009). This is of critical importance as

education is one of the few methods directly correlated to a reduction in population growth (Siniscalco 2000).

Anthropologists have documented water access and sanitation's impact on gender equity, from cultural explanatory models of disease to society's gendered divisions of labor, and most recently, governmental policies' commoditizing water (Whiteford and Whiteford 2005). These varied factors converge, elevating the threats to female autonomy and future opportunity. Water and sanitation program initiatives including ME, especially those intended to be carried out sustainably by the community, need to be planned with cognizance of the increasingly onerous roles of and difficult choices made by women (Kendall 2005; Whiteford and Whiteford 2005).

Anthropology, Cambodia and Water

The anthropological research in Cambodia has addressed the nation's violent past, including the genocide, somatic memory, religion and environmental degradation (Carlisle 2008; Ezzati, Utzinger, Cairncross, Cohen, and Singer 2005; Hinton 2005). Anthropologists have yet to research health and development in Cambodia including explanatory models of disease related to water and sanitation. Globally, anthropologists have underscored the importance, and also neglect, of monitoring and evaluating water and sanitation initiatives (Johnston 2005). However, there is a deficiency of research examining monitoring and evaluation efforts related to water and sanitation at the local and organizational level. Anthropologists have highlighted the urgency of exploring the human implications of larger processes on water resources, including unfettered globalization which increasingly foments privatization and commoditization (Whiteford and Whiteford 2005). However, this broad lens often misses the influence local political, cultural and historical trajectories have on nations such as Cambodia and how important local attitudes and practices are to the development of sustainable water and sanitation programs (Whiteford 1997).

Cambodia's water initiatives, like many in other LDCs', mirror international water sanitation agendas and the Millennium Development Goals (MDG). These sanguine goals intend to halve the proportion of people without sustainable access to safe drinking water by 2015 (Royal Government of Cambodia 2005). This situates monitoring and evaluation of water and

sanitation initiatives at the nexus of gauging the success or failure of the MDG. Nevertheless, the utility of recent UN monitoring protocols such as the Joint Monitoring Program (JMP) are questioned by the UN and NGOs alike, as they preclude participatory processes (International Water and Sanitation Centre (IRC) 2004; UN-Water Task Force on Monitoring 2006). To address these monitoring deficiencies, the UN is increasing community oriented strategies such as Monitoring Participatory Assessment (MPA) (IRC International Water and Sanitation Centre 2004; UN-Water Task Force on Monitoring 2006). Still, anthropological research has revealed that some United Nation initiatives which seek to “empower” communities through participatory processes can, in actuality, shift the water responsibilities to already impoverished communities and especially women in these communities (Whiteford and Whiteford 2005). This has the effect of absolving the government of responsibility, thereby amplifying rather than ameliorating inequities (Ferguson 2005). Therefore, it is critical to begin exploring ways to design sustainable projects that do not overly burden communities already struggling with poverty. Furthermore, program initiatives and monitoring protocols should consider the interests and expectations of local communities, rather than serve purely organizational or political interests (Johnston 2005).

Pollution, climatic changes, and population growth increasingly impinge on the availability of water, expediting its commodization (McMichael et al. 2006; Whiteford and Whiteford 2005). The global community must recognize waters’ intrinsic value and attend to water conservation *for all* (Kendall 2005). It is with this awareness that anthropologists have applied their perspective to inform water and sanitation initiatives from the local to the global level (Green 1986; Burghart 1996; Whiteford and Whiteford 2005). Integrating the anthropological perspective into program evaluation and monitoring procedures can lead to solutions as well as identify salient challenges in addressing the impending threats to global water sources and the populations they sustain (Nolan 2002, Green 1986; Schensul and Schensul 1990; LeCompte and Goetz 1982; Ervin 2005). Furthermore, water access and sanitation can serve as a prism through which to examine the global inequalities which are inextricably linked to poverty and obstruct access to education, services and opportunity, the roads out of impoverishment (Rylko-Bauer et al. in press;n.d.).

Research Objectives, Intentions and Theory

This research experience sought to explore these global issues in a Cambodian village under the direction of BAB and investigated the local and organizational challenges and opportunities in designing a locally informed and sustained water and sanitation monitoring and evaluation program. It focused on integrating community feedback into monitoring and evaluation indicators in the design of future program initiatives and examined the feasibility and challenges of creating gender equitable initiatives to be sustained at the community level. This research does not apply a theoretical framework due to the descriptive and exploratory nature of the internship research.

Summary

The larger global community must unite to address the urgency of global water disparities and water related diseases. Cambodia may be representative of these larger international water disparities (UNICEF and WHO 2003; Kopitopoulos 2005). The nation's exorbitant and unyielding rates of maternal mortality further require an investigation into the intersections of water and gender related disparities (UNESCO 2004; Chatterjee 2005; Gil Gonzalez et al. 2006). As international, national and NGOs embrace participatory processes and empower communities, the impacts of moving these processes to the local level should be examined (Whiteford and Whiteford 2005). Anthropologists have revealed that moving program initiatives to the local level can result in overburdening already vulnerable populations, especially women (Whiteford and Whiteford; Ferguson 2005; Manderson and Huang 2005). It is in the global community's interest to determine the strengths and deficiencies of water and sanitation monitoring programs and to allow for modification of programs and processes for the benefit of *all*, not simply the privileged. Sustainable and humane methodologies are needed, but simple solutions are not likely to be found (Nachter and Hickey 2002; Aswani and Weiant 2004). Therefore, this internship explored the feasibility and challenges of creating such initiatives while working at the organization and local level. More efficient and effective water and sanitation Monitoring and Evaluation (ME) programs will be indispensable if the world is to meet the goal of providing a majority of people in

Lesser Developed Countries (LDC) with access to potable and accessible water, all the while recognizing that water is a "*finite*" rather "*infinite*" resource (Kendall 2005:109).

CHAPTER 2

FIELDWORK SETTINGS

The following chapter will briefly contextualize the internship project in Cambodia by highlighting topics such as the historical, geographical and demographic milieu of the area and augmented by an examination of gender at the national and provincial levels. At the provincial level of Kep Krong Province, the research sites are introduced, touching on demographics and then delving into health research performed in the region by the Centre for International Health (CIH), a branch of the University of Toronto. CIH facilitates student research in the region for several months out of the year. General health, water and sanitation and women and children's health research in the province are presented from these findings. Secondly, a more detailed internship's specific project, Hand In Hand (HIH) are introduced at the organizational level and followed by a history of Chamcar Bei, the research environment, concluding with a discussion of monitoring and evaluating responsibilities.

Cambodia

This section discusses the national setting of the fieldwork beginning with a brief review of the nation's history, while also focusing most particularly on the recent genocide and its enduring consequences. While these events are rarely discussed in Cambodian society today they have created and continue to impact Cambodians' current circumstances. National characteristics and intersections between various topics including geography, demography, and economics are highlighted. Finally, national health and gender related statistics of the country are provided.

Cambodia Historical Overview

Cambodians consider themselves to be Khmers or descendents of the Angkor Empire which at one time reigned over most of Southeast Asia attaining the pinnacle of its success from the 10th to the 13th centuries (Chandler 2008). During the Angkor Empire's supremacy, the magnificent temple complex of Angkor Watt was erected (Kamm 1998; Chandler 2008). However, Cambodia's sovereignty was continually threatened by Thailand and Vietnam who militarily squeezed and weakened Cambodia with invasions and occupations of portions of the country. The French took power in 1863, with permission from the Khmer king, and Cambodia became a part of French Indochina in 1887. During WWI, Cambodia was occupied by Japan, and then returned to the French, who relinquished control of Cambodia in 1953 and peacefully granted independence under Prince Sihanouk (Kamm 1998; Chandler 2008).

Independence, however, did not provide stability as the conflict in Vietnam attenuated the already unsteady foundation of the nation. During the Vietnam War (1959-1975) the United States dropped millions of tons of bombs on the neutral nation to interrupt the resupply of the Viet Cong and North Vietnamese forces which were attacking U.S. forces in South Vietnam and using Cambodian borders regions as a sanctuary (Owen and Kiernan 2006). These air raids resulted in unprecedented costs to the Cambodian people as the US dropped 540,000 tons of bombs on Cambodia killing from 150,000 to 500,000 civilians and decimating farmlands, invaluable to a primarily agrarian subsistence base (Public Broadcasting System 2002; Owen and Kiernan 2006).

Incompetent and corrupt puppet officials inserted by the United States, most specifically Lol Nol, further alienated the predominately rural populace (Kamm 1998; Chandler 2008). These attacks and the corruption of national officials fomented dissent and resulted in support for a communist insurgency headed by Pol Pot, called the Khmer Rouge, in 1975. The Khmer Rouge's reign resulted in four years of guerilla warfare, fueling unbridled genocide and resulted in deaths of 1.7 million to 3 million people or a quarter of the population (Public Broadcasting System 2002; Kamm 1998; Becker 1986; Chandler 2008). Many of died of starvation, exhaustion or torture. Vietnam intervened and on January 7th, 1979 and the Vietnamese army officially drove the Khmer

Rouge from the capital, Phnom Penh (Kamm 1998; Becker 1986). However, residual conflict persisted in the region throughout the 1980s, as the Vietnamese labored to eliminate the remaining Khmer Rouge strongholds (Becker 1986; Kamm 1998). There was much movement and unrest as families frantically sought to locate their remaining family members. International aid was blocked during this time, preventing the relief of the battered populace (Kamm 1998).

In 1991, the United Nations Transitional Authority in Cambodia (UNTAC) oversaw a ceasefire and supervised free elections which were held in May of 1993 (Chandler 2008). At the same time, over 350,000 Cambodians in Thailand refugee camps were repatriated. Prince Sihanouk, the former prince of the nation, was elected King under a constitutional monarchy. Today Cambodia's government is a democracy comprised of multiple parties and remains a constitutional monarchy with an elected government (Central Intelligence Agency 2008b). Unfortunately, remnants of the conflict such as millions of landmines still haunt the landscape, continuing to maim and kill Cambodians (BBC News Channel 2008b; Chandler 2008). The impact of decimated social institutions and the massacre of a large portion of the educated population further frustrated the nation's efforts to better the situation of the majority of the population, 80% of which live in rural areas (Central Intelligence Agency 2008b). Currently, Cambodia is one of the poorest and increasingly unequal countries in the world, relying heavily upon foreign aid and suffering from endemic corruption (Central Intelligence Agency 2008b).

Cambodia's Geography, Demographics, and Economics

Cambodia is slightly smaller than the state of Oklahoma with a total land area of 181,040 square kilometers. The Southeast Asian nation is juxtaposed between Thailand, Vietnam and Laos, and has a substantial shoreline on the Gulf of Thailand. A large inland lake, Tonle Sap, provides irrigation for the plentitude of rice patties, rice being the primary subsistence base of Cambodia as does the Mekong River which runs throughout Cambodia to Vietnam and the South China Sea. The landscape is covered with trees, although this is changing as illegal logging is rapidly depleting this resource base (Central Intelligence Agency 2008b).

The first socioeconomic and demographic surveys in Cambodia were implemented by the Cambodia National Institute of Statistics in 2004 (Cambodian Socioeconomic Survey (CSES))

and 2005 (Demographic Health Survey (DHS)) (National Institute of Statistics (CSES) 2004; National Institute of Statistics (DHS) 2005)). The total population was determined to be 14,241,640 with 95% of the population speaking the Khmer language (CSES 2004). Literacy Rates show 84.7% of males and 64.1% of female population as literate, defined as those “15 and over who can read and write” (CSES 2004). Forty-three percent of women over 25 have received little (not completed first grade) or no education contrasted to equivalent male figure of 20%. Additionally, women complete an average of 2.8 years of schooling compared to male rates of 4.8 years (CSES 2004). The educational situation remains deplorable due lack of funding generally, but especially chronically underpaid teachers. These factors, combined with lack of opportunity and poverty result in less than half of all children going beyond the fifth grade (Encyclopædia Britannica Online 2008).

The majority or 70% of Cambodians rely on agriculture or rice for subsistence. Paradoxically the economic realities of the nation increasingly discourage farming, as the most lucrative employment opportunities are in the city (Food and Agriculture Department of the United Nations 2008). This feeds the growing inequities of the nation (BBC News Channel 2008; Kheng Samvada and Kuy Huot 2004). Cambodia has a bustling garment and expanding tourist industry which has resulted in remarkable economic growth: the garment industry grew by 8% in 2007 and 80% of Cambodians exports are in textiles (BBC News Channel 2008; Business in Asia 2008). In 2005, oil and natural gas were found in the waters of Cambodia but the future benefit of these resources to the majority of the population remains dubious given the widespread corruption in the political and economic systems (Central Intelligence Agency 2008b). Illegal logging is decimating the environment, contributing to erosion and flooding while land grabbing is an increasingly common phenomenon fostered by a corrupt legal system consistently favoring elite economic priorities over human and economic rights (BBC News Channel 2008). The future economic challenge of Cambodia will be to confront the demographic imbalance as 50% of the population is less than 21 years old and there are no social institutions in place to secure them a promising future (Central Intelligence Agency 2008b; Encyclopædia Britannica Online 2008). The rural populace or 80% of the total population continues to suffer from lack of education, poverty

and an “almost total lack of basic infrastructure” (BBC News Channel 2008; Central Intelligence Agency 2008b; Encyclopædia Britannica Online 2008).

Women and Children Health Indicators and Gender Roles

The health challenges of the nation are most evident in the health indicators related to women and children. These accentuate the nations’ gender as well as economic inequities especially when contrasted to More Developed Countries (MDC) such as the United States. As of 2006 the leading causes of death in the nation were HIV, tuberculosis and diarrheal disease (World Health Organization 2006). The life expectancy of Cambodians is on average 62, with men living to 60, and women to 64 years of age (United States 78), while the infant mortality rate is 57 per 1,000 births (United States 6.3 per 1,000), the maternal mortality rate is at 472 per 100,000 (United States 13 per 100,000: highest in over 2 decades) (BBC News Channel 2008; Central Intelligence Agency 2008a; Central Intelligence Agency 2008b). In Cambodia, 9% of children die before their first birthday and 14% before their 5th birthday (UNICEF 2005). While 1 in 5 women die of pregnancy related causes (; Population Reference Bureau 2003: Population Reference Bureau 2004; USAID 2006). As mentioned in the introduction, Cambodia has successfully lowered the infant mortality rate but the maternal mortality rate continues to rise (Chatterjee 2005; Kopitopoulos 2005). One health implication of the genocide is that mothers whose growth was stunted as a result of inadequate food consumption are now more likely to give birth to low birth-weight babies, perpetuating the struggle from one generation to the next (World Bank 2006; Wren 2009). This further complicates the high rates of stunted growth experienced by 45% of Cambodian children caused by malnutrition (USAID 2006; World Bank 2006).

A gender disparity in survival of the genocide forced many women to contend with agricultural as well as technical and industrial responsibilities previously handled by men, a much larger percentage of whom were victims of the Khmer Rouge (Huguet 1992; Ebihara and Ledgerwood 2002). This resulted in a “gender imbalanced” society: in 1980, after the genocide, there were approximately 75 men for every 100 women (Wren 2009:20; Huguet 1992:2). While the ratios have since leveled currently at 1.04 male for every 1 female, the industrial opportunities

have increased for men, leaving women to shoulder the burden of agricultural, a less lucrative business which offers few possibilities for economic, social or intellectual advancement (Central Intelligence Agency 2008b; Wren 2009:20). The export sector, including a burgeoning garment industry provides more financial stability and does provide income to some women. However, societal ideals that woman should stay in home and care for family persists, preventing many from migrating to cities where there is more educational and economic opportunity (Ebihara and Ledgerwood 2002).

Fifty-three percent of women compared to 32% of men are employed, with men averaging 50% more pay than women (Asian Development Bank 2009). Seventy-percent of the population are farmers, an occupation divided equally among men and women, however rural women remain responsible for 80% of food production (Kheng and Huot 2004:3; Food and Agriculture Department of the United Nations 2008). Women own on average half as much land as men and only 28% can sell an asset without their husband's permission (DHS 2005). In Cambodia, the majority of women (52%) do not participate at all in the choice of their husbands as marital choice is traditionally determined by parents and family members. Instead, the decision is made jointly with her family members or solely by the husband and his family (DHS 2005). Women's roles in Cambodia remain in the home rather than schools and while remaining a large part of the agricultural sector, they still contend with all familial responsibilities and hold few political positions of power (UNIFEM 2004).

Kep Krong Province

This section describes the fieldwork setting at the provincial level. As mentioned above, a number of research projects have recently been performed in Kep Krong Province by graduate students from the Center for International Health (CIH), a branch of University of Toronto. This allowed for the consideration of health research specific to Kep Krong Province and Chamcar Bei, the site of this thesis research, by drawing from tertiary or governmental level sources as well as the research projects of the CIH's students.

Kep Krong Province Geography

The location of this research was Kep Krong province, a largely rural province on the southern coast of Cambodia near Vietnam. In 2004 the population was 35,000, with 75% of the population classified as poor (CSES 2004). The province is divided into five communes and 16 villages. The province also houses three health centers (Okrasa, Pong Tuek, and Angkoul) and a hospital in Kep, a seaside village and provincial capital (Wren 2009:11). The villages are spread out and there is a chronic lack of utilization of the health center, which is common throughout Cambodia (Bowles 2005).

General Health Summary and Challenges of Kep Krong Province and Chamcar Bei

A report by Mark Braidwood (2008) summarizes all of the CIH research performed over the past four years. Braidwood synopsis of the leading causes of mortality in the region are tuberculosis, malaria, Acute Respiratory Infections (ARI) and motor vehicle accidents. Morbidity is most commonly related to ARI, diarrhea and malaria (Braidwood 2008). These diverge from the national leading causes of mortality of HIV, tuberculosis and diarrheal disease, perhaps signifying differential regional challenges or reporting methodologies (Braidwood 2008). Nevertheless, the health challenges of Kep Krong parallel that of the nation and include chronic underutilization of the nearest health center. This underutilization has been attributed to multiplicity of factors including lack of transportation as well as trust in the facilities although advancement of these areas is occurring slowly (Bowles 2005; van de Put 1992).

Pong Teuk health center, nearest to the research village of Chamcar Bei, serves approximately 8,850 people in five villages, seeing approximately 40 to 50 people a day. This facility operates on minimal resources which include a well as a water source, but lacks power (Head of health center personal communication, January 3, 2009). The official hours of Pong Teuk are from 8 to 11 am and 2 to 5 pm, however, staff are often absent even during these hours and the health staff commonly supplements their incomes through private practice (Centre for International Health(CIH) 2006;Kunthy Ok personal communication, February 27, 2009; van de Put 1992). While the center had labor and delivery services in 2006 there were no deliveries performed in the Pong Teuk health center, attributed to the lack of trust in the facilities and staff,

costs, distances, as well as traditional practices of birthing in the home (CIH 2006). However, deliveries have risen to an average of 6 births per month in the past two years due to governmental initiatives to reimburse traditional birth attendants (TBA) and community members to transport women to the health center (Kep Krong Provincial Public Health Department personal communication, April 21, 2009). However, the low rates of usage are attributed to lack of reliable hours of operations, trust, transportation and inadequate delivery equipment (Bowles 2005; CIH 2006).

Ben Bowles (2005) explored this lack of health center utilization by surveying 150 rural residents in Kep Krong (Bowles 2005). Bowles' findings revealed that the local belief in the skill levels of various institutions favored pharmacies and private clinics over the health centers by a wide margin, due to assumed levels of skills maintained by the various medical modalities. In Bowles' survey 61% of people believed the pharmacy possessed more skill than the health center and 62% believed the private physicians had more skill than the local health center (Bowles 2005:9). In addition, at the research site of Chamcar Bei, the utilization of local pharmacies rather than health center is the norm and the head of the local health center (Pong Tuek), is also the owner of the local pharmacy (Department of Planning and Health Information 2008). Today public and private health establishments in Cambodia lack explicit boundaries, a problem prevalent since the reintroduction of the public health system in the 1990s. These practices continue to be linked to the inadequate salaries of the health center staff (Bowles 2005; van de Put 1992).

Distances to, lack of resources and local trust in health centers, contributes to the exorbitant maternal child mortality rates in the nation (Department of Planning and Health Information 2008; Chatterjee 2005). In Cambodia, half of women still give birth in the home and a large percentage of these births are with a traditional birth attendant (TBA) (Department of Planning and Health Information 2008; DHS 2005). While the Operational District of Kep (OD) has provided training and equipment to the TBAs, this has created some controversy in the district, as the TBAs perceive the training as endorsing them to perform births in the villages while the OD, health departments and NGOs want to encourage deliveries to be performed in the health center (Kunthy Ok personal communication, April 3, 2009). Birthing in the village is made

more difficult and perilous by lack of access to safe water but even the local health centers lack a piped water system, complicating water accessible and sanitation during delivery.

Water Borne Illness

In Kep Krong province, studies performed by Cynthia Pun (2005) as well as Phillips (2007) reviewed both the human and scientific dimensions of water and sanitation in the province. Pun, an engineering student, expounds upon the human implications of the lack of sanitation. Pun surveyed 200 villagers from a variety of Kep Krong villages and exposed the significance of water borne illness in the region. The results suggest 15-30% of respondents believed that they currently had a disease related to water (Pun 2005:11). Various knowledge gaps were identified. For example, in Chamcar Bei some families believed that finding blood in the stools was not grounds for seeking medical attention. Thirty-four percent of respondents could not identify signs of dehydration (Pun 2005:13). Many people went to great expense to cure the disease by swallowing or injecting medicines to relieve diarrhea.³ Most families acknowledged the importance of boiling water for 15 minutes prior to consumption. Nevertheless, families admitted to not boiling for the recommended time period despite having this knowledge, a finding consistent with past anthropological research to be discussed in the following literature review (Burghart 1997). Not treating water, which included boiling, filtering or chemically treating water prior to consumption, was also revealed as a salient issue in Chamcar Bei (Centre for International Health 2009). A 2008 survey of 156 Chamcar Bei community members revealed that 50.7% of families admitted to *not treating* their water prior to consumption (Centre for International Health (CIH) 2009:4).

As with most studies, Pun's was not without flaws. Lack of randomization and the clarity of the definition of diarrhea was a recurring issue and translation difficulties influenced the findings of the study. Still, pharmacies were recognized as the predominant source of care for water related illness, reaffirming the past twenty years of research in the region (Bowles 2005;

³ Injecting medicines is widely accepted and assumed to be the "strongest", but also most expensive therapy (van de Put 1992)

van de Put 1992). Pun also notes that water technologies in the region, most specifically wells, were vulnerable to contamination and lacked materials such as well covers. Further the implementation of sanitary practices such as using the same bucket for withdrawal of water from the well, which could mitigate bacteria from entering the source, was not always practiced. In conclusion, Pun emphasizes the important of education on oral rehydration salt (ORS) (Pun 2005:25). Pun recommends targeting women with education, as they are the primary procurers and managers of water as well as conducting a study directed at the quality and contamination of wells. Investigation into the introduction of rainwater harvesting was requested, as lack of adequate storage was a recurring theme.

In response to Pun's recommendations, Phillips studied the quality and situation of wells in Kep Krong as well as Chamcar Bei. Phillip's data revealed that 78% of wells in the Kep Krong Province were found to have E. coli levels exceeding the WHO's standard (Phillips 2007:4). In one community, levels of arsenic were at 60% and Pun's recommendation for rainwater catchment systems was reaffirmed (Phillips 2007:15). The above arsenic cluster was not in Chamcar Bei, however results from a study of 22 wells in Chamcar Bei, a majority of which were provided by Bridges Across Borders (BAB), revealed that approximately 86% of the wells were contaminated with E.Coli (Phillips 2007:15). However, only 1 or 4.5% (n=1) of the 22 wells exceeded the national standard of contamination of 50 mg/L and 13.6% met or exceeded the WHO standard of 10 mg/L (Phillips 2007:15).

Women and Children's Rights and Health

The Demographic Health Survey (DHS) implemented in 2005 provides a glimpse of the status of women in Kep Krong Province (DHS 2005). These statistics suggest women's lack of status and decision making power in the Province. In Krong Kep, most women (70%) rely on the advice and assistance of others to chose their husbands while less than 2% of women make the decision themselves (DHS 2005). While 74% of women own at least one asset individually or jointly with their husband, only 10% can sell it without permission of their husband (DHS 2005). In contrast, almost all married women with children (97%) have full decision making powers with regard to their child's health and schooling and full responsibility for implementation of choices,

an often arduous task (DHS 2005). Fifty-six -percent agreed it was better to educate their sons than daughters (DHS 2005). Half of all women agreed all important except for those involving health and education of children decisions should be made by men other than those involving health and education of children and 98% agreed that men should not help with household chores (DHS 2005). Domestic violence is commonly experienced but remains a taboo subject in Cambodia. The reported rate in Kep Krong was found to be 7% by the DHS, and linkages between domestic violence and poor reproductive health have been already been identified in Cambodia (DHS 2005; Kishor and Johnson 2006).

Maternal and neonatal mortality is a critical concern of the region as revealed by a study in Kep Krong province by Amith Kalaichandran and David Zakus (2007). The latter, also the director of CIH, interviewed 300 women over a year period and discovered the maternal mortality rate was 956/100,000, or twice that of the current national maternal mortality of 437 per 100,000, underscoring the magnitude of these issues in the region (Kalaichandran and Zakus 2007:1). This exceedingly high rate is attributed to the lack of utilization of health centers: 82.5% of women in Kep Krong Province still gave birth in the home in 2005 (DHS 2005). As part of a recent thesis by Hilary Wren (2009) on breastfeeding in the region, surveys revealed that 60% of women in Kep Krong Province still gave birth in the home; 32% with a traditional birth attendant (TBA) and 36% with a midwife, 23% in private clinics, and only 2.3% at the health center (Wren 2009:94). In addition, unsafe abortions as well as a variety of other obstetric complications are widespread in the province (Kalaichandran and Zakus 2007). While programs exist that encourage TBAs to take women to the health center by compensating them for every birth mother they transport to the health center, the transition from birth at home to delivery at the health center is occurring very slowly (Wren 2009). The slowness of the transition is influenced by a lack of trust in the abilities of the staff, as well as a lack of resources, including lack of clean and accessible water during the birthing process.

The Hand In Hand Project and Chamcar Bei

The following will describe the Bridges Across Borders's (BAB) program and its Hand in Hand Project (HIH) as implemented in the village of Chamcar Bei. The HIH's foundations as well as guiding principles of the projects' objectives and goals will be presented. This section will also include the history of Chamcar Bei village, as detailed by the BAB website

The Hand in Hand (HIH) Project

The Hand In Hand (HIH) project is focused on one rather large village, Chamcar Bei. There are three features underpinning and guiding HIH project : 1) *time-bound-* expecting tangible results in five years, 2) *integrated-* targeted at addressing the roots of poverty by raising family income and addressing poverty at multiple levels, and 3) *community based-* the project would be married to the community expressed needs. Furthermore, the projects' intentions are stated to be aligned with the United Nation's Millennium Development Goals (MDG) set to be achieved by 2015 (Bridges Across Borders 2007).

BAB aims to integrate local initiatives into sustainable development and create a community driven agenda. This agenda was compiled after a participatory learning assessment (PLA) attended by 30 community members in September of 2006 and monitoring and evaluation (ME) protocols were allegedly integrated into the development plan. These ME processes were informed by the PLA which lasted from September 9th through 13th in 2006 involving sixty community members, including the village and commune chiefs and council (Bridges Across Borders 2006). The assessment utilized participatory data collection methodologies and cooperative games to facilitate interpretation of the villagers' local realities and initiate the process of building trust. The preliminary findings were synchronized during two community development planning workshops which included the project staff and other parties who were assigned responsibility for monitoring the project (Bridges Across Borders 2006).

History of Chamcar Bei

The village of Chamcar Bei has a short, vibrant and violent history. According to the community profile provided by Bridges Across Borders, in the 1960s, before Prince Sihanouk's reign, Chamcar Bei, a dense jungle area surrounded by the Phnom Voar mountain ranges, was

uninhabited. Based on an oral history from a 70 year old community member, in 1960, three Chinese families came to the region and prepared three plots of land to plant and harvest peppercorn bushes. The village name of Chamcar Bei translates into three farms (Bridges Across Borders 2009).

During the 1970s, the United States heavily bombed the area and it became a Khmer Rouge stronghold and remained so even after the Vietnamese invaded in 1978 and drove Pol Pot's Khmer Rouge from Phnom Penh. It remained a stronghold of the Khmer Rouge until the early 1990s. Due to the Khmer Rouge presence in the area, it was heavily mined and became a battlefield between the Khmer Rouge and government forces until 1994 when a ceasefire was agreed upon and the Khmer Rouge cadre defected to the government. The government then began to develop the area by clearing mines and reintegrating the Khmer Rouge back into Cambodian society. Chamcar Bei was the last village in the area to be reformed due to the persistence of fighting in the region (Bridges Across Borders 2009).

One hundred Khmer Rouge families were provided agricultural and residential land as an inducement to come out of the mountains and surrender their arms. However, food security was low and the jungle environment made the prevalence of malaria high. In 1994 many humanitarian aid organizations came to assist these newly integrated families by providing food and basic physical infrastructure including schools, roads and a large water reservoir, some of which still remain today. Decades after these interventions food security and the rates of malaria have declined. However, Chamcar Bei residents still have high rates of unemployment. Chamcar Bei remain relatively poor with high rates of illiteracy when contrasted to the rest of Kep Krong Province (Bridges Across Borders 2009). During my internship, in early 2009, the area has become its own commune (*khums*), one of seven administrative entities representing the Kep Krong Province. The Chamcar Bei commune was then divided into three *phums*, or smaller administrative districts within the commune called Antung Saw, Chamcar Jak, and Chamcar Bei (Wren 2009; van de Put 1992).

Summary

Cambodia continues to struggle with the consequences of the war which disproportionately affects the rural populace, the vast majority of the population. The residual impact of social institutions decimated decades ago presents Cambodia with a myriad of challenges, one of the most difficult being a very young population without the requisite social institutions in place to secure them a brighter future.

Current health indicators in Kep Krong Province reveal a surfeit of health issues. One of the most shocking is the extreme rate of maternal mortality, underscoring the provincial significance of the issue. Research in the province and Chamcar Bei also reveal that contaminated water sources and water related diseases impinge upon the health of communities. This is caused by a convergence of inadequate accessible and potable water as well as Chamcar Bei villager's lack of water treatment.

The HIH project, the host project of this internship, sought to empower villagers in the village of Chamcar Bei through four interrelated components: education, livelihoods, health, and sustainability. The goal of HIH was to have the community sustain program activities after five years.

Chamcar Bei, a large village with an intriguing history and current population composed of both Khmer Rouge soldiers and survivors of the genocide, hosted the HIH project and internship. The population overwhelmingly subsists on agricultural activities, and has benefited from past developmental efforts due to the Khmer Rouge presence in the region. However, poverty, illiteracy and poor health continue to plague the population.

The following chapter will review the literature related to the global impacts of lack of access to potable water and sanitation including the anthropological contributions to this discourse. In addition, past monitoring and evaluation experiences, related to water and anthropology will be discussed as well as the past research demonstrating the linkages between women, water, and health.

CHAPTER 3

LITERATURE REVIEW

This chapter will review the literature pertinent to water access and sanitation in general, and in Cambodia in particular, and the international and anthropological efforts dedicated to developing monitoring and evaluation of water protocols. The first section will discuss public health in Cambodia, most specifically the linkages between water and women and children's health, water related diseases and water and sanitation initiatives in Cambodia. The second section will focus on the anthropological contributions and will be divided into water and cultural models of health, water and gender, globalization and theories related to global health. Finally, International and anthropological monitoring and evaluation perspectives and strategies will be presented, followed by concluding remarks.

Water and Sanitation in Cambodia

"We shall not finally defeat AIDS, tuberculosis, malaria, or any of the other infectious diseases that plague the developing world until we have also won the battle for safe drinking water, sanitation and basic health care" (UNESCO 2004).

Cambodia continues to contend with the vestiges of the past: Vietnam war bombings, genocide and endemic political malfeasance have all undercut the ability to provide clean water for all, especially the rural population or 84% of the nation (USAID 2006). Cambodia is an archetype of larger global water disparities with less than 30% of the rural population having access to potable water and only 17% to sanitary facilities, while 72% of the urban population have access to improved water and 55.40% improved sanitation (WHO 2004a:3). These statistics put the poverty of the Cambodian in context: in 2005 annual average per capita income was estimated at \$430 and "35% of the population still lived under the poverty line of US\$ 0.46-0.63 income per day" (Department of Planning and Health Information 2008:11). A majority of the

impoverished live in rural areas which consist of 90% of the country's poor (United Nations Population Fund 2000). Given these conditions a majority of the Cambodian people lack the basic necessities of life, such as water and food, rendering access health services or educational enhancement problematic.

Maternal Child Health and Water in Cambodia

Of Cambodia's predominately rural populace, women and children bear the largest burden, as Cambodia consistently has the highest infant and maternal mortality rates in Asia (USAID 2006). Many of these deaths are due to the inability to access clean water sources, poor sanitation and lack of access to basic health care services (Chatterjee 2005). As the maternal mortality rate continues to highlight the intrinsic connection between access to water, and women and children's health begs inquiry.

According to WHO, in 2004 the health policy goals of Cambodia were to "reduce infant, child and maternal mortality, improve the nutritional status of children and women, reduce the total fertility rate...and produce a more efficient and effective health system"(WHO 2004:6). Clean and adequate water is the foundation of the health of a community. The treatment, quality and availability of water contribute to the rates of malaria, diarrheal disease and malnutrition all of which are synergistically related (Werner 2007). Women bear the responsibility of caring for those inflicted with these diseases and in rural regions of Cambodia reproductive health is already attenuated: while the urban population rate has not grown, the rural population growth rate in Cambodia continues to rise (UNESCO 2004; WHO 2006). All of these factors inflate the already high infant and maternal mortality rates of the nation which are further exacerbated by the lack of accessible and quality services. As previously discussed, 68% percent of women still give birth in the home, far from hospitals or trained attendants (DHS 2005). While non-governmental organizations (NGO) and development agencies have reduced infant mortality, the maternal mortality continues to rise (Chatterjee 2005). One in eight children will die before their fifth birthday and 1 in 10 before their first birthday, while 1 in 5 women will die from pregnancy related causes (National Institute of Statistics of Cambodia 2005; USAID 2006; Population Reference Bureau 2003).

A focus on water availability is also critical as women across our planet spend 200 million hours a day fetching water and are therefore unable to access health services or acquire education to better themselves and their communities (Mercy Corps 2009). Education is also one of the few methods directly correlated to a reduction in population growth and in Cambodia only an estimated 64% of the women are literate (Central Intelligence Agency 2008b). Finally, environmental degradation and climatological changes increasingly compromise local water sources, impinging on the ability of communities' to procure basic life necessities, a situation which disproportionately impacts women (McMichael et al. 2006; WHO 2007). These factors impede access to education and healthcare as they struggle to survive, living hand to mouth. A 2006 WHO bulletin reported the cause of maternal mortality, "must be understood as a whole" and lacking in the research is the "political and cultural" context under which these mortality rates exist (Gil-Gonzalez et al. 2006:34). These cultural practices and the political realities of Cambodia should be considered in monitoring and evaluation procedures as well as international health policies and implemented in strategies which address not only water access and diseases, but also larger structural deficiencies and abuses (Gil Gonzalez et al. 2006; Farmer 2005)

Water, Disease Burden and Environment in Cambodia

The inequalities in access to water become apparent in the context of Cambodia's health indicators. In Cambodia, diarrheal diseases are the second leading cause of morbidity and further contribute to the nation's leading causes of mortality: tuberculosis, acute respiratory infections and malaria (WHO 2004a). A 2004 Cambodian government survey revealed rates of diarrhea at 19% and another 2006 study confirmed that 19-25% of children under 5 had diarrhea in the preceding two weeks (Cambodia Ministry of Planning 2004:4; Brown and Sobsey 2007:1). Water-borne diseases such as cholera and diarrhea are endemic in the region: there are more than 1000 cases of cholera per year due to lack of access to potable water and latrines (Brown and Sobsey 2007:4).

Water related diseases (Whiteford and Whiteford 2005) such as vector borne diseases including dengue and malaria remain endemic. An ethnographic study on dengue performed by a public health professional and anthropologist, Sokrin Khun and Lenore Manderson, in Cambodia

2007 revealed that health treatment for dengue, was provided by both lay and institutional modalities, a syncretism of traditional and biomedical therapies (Khun and Manderson 2007). The study revealed that two-thirds of Cambodians relied on over-the-counter medications, rather than the health center, which saved villagers the money for transportation to visit healthcare workers whose presence is consistently reported as unreliable (Khun and Manderson 2007:4). The urgency of environmental and seasonal changes threatens the quality of water sources and the ability to prevent vector borne diseases such as malaria and dengue. Periodic flooding during the monsoon seasons has further exacerbated deforestation, as illegal logging plagues Cambodia, causing contamination of water sources (BBC News Channel 2008). High levels of naturally occurring arsenic and manganese are present in wells, at rates similar to Bangladesh, a nation reputed for its arsenic contamination (Buschmann et al. 2007). This eliminates wells as a consistently safe water source. The severity and range of health effects caused by arsenic remain elusive but exposure has been correlated to skin disorders, dizziness, fatigue, sleep disorders and anorexia, while other diseases such as a variety of cancers, diabetes, hypertension and still births have also shown associations (Feldman 2007). This leaves surface water and rain water catchment systems as alternatives but both have poor microbial quality and are also susceptible to contamination (Brown and Soesby 2007).

Cambodia's Public Health Infrastructure and Water and Sanitation Efforts

In the developed world, the most effective and robust public health efforts resulted from providing accessible potable water to the populace (De Villiers 2000; Whiteford and Whiteford 2005). Distrust of the government, rooted in decades of corruption and abuse and lack of fiscal transparency, has undercut the Cambodian public's confidence in the health infrastructure. This has attracted a multitude of NGOs seeking to ameliorate the situation (Meessen et al. 2008). A tangle of past and present issues include: 1) lack of health infrastructure, causing families to prefer pharmacies and private practices⁴, 2) lack of governmental trust, rooted in authorities'

⁴ This commonly forces families and take out loans attached with inflated interest rates, a phenomena still plaguing the poor, who are forced to sell their cattle, and even sell their daughters to settle the loans (Wim Van Damme et al. 2004).

violent past and a track record of unreliability, 3) undercompensated health workers demanding unregulated user fees, and 4) lack of transportation (Cambodia Ministry of Health 2008). A convergence of these factors cause many Cambodians to rely on home remedies, local pharmacies and private establishments, more than governmental subsidized health centers, combining traditional and biomedical therapies (Bowles 2005; Khun and Manderson 2007).

Cambodia's development community is aware of these issues. Initiatives to mitigate these structural deficiencies include the Health Equity Funds (HEF), which utilizes a poverty index, focusing on "financial, geographical, informational, and intra-household" indicators to determine the extremely poor and very poor. Health services are free for the latter and half price for the former (Hardeman 2004:1). HEPs are overwhelmingly managed and funded by NGOs with efforts to decentralize to local level management, decreasing governmental responsibility and ostensibly buttressing sustainability (Meessen et al. 2008). The benefits of decentralization are dubious and are demonstrated to have had a negative impact on social services in other developing nations (Birn and Garfield 2000; Bossert 1998). In addition, there is an abundance of overlap in "public" and "private" practices, caused by the paltry salaries of healthcare workers (Department of Planning and Health Information 2008). This means governmental decisions to decentralize to the "local" or "health center" level, may be auspicious for those already subsidizing their incomes, but not necessarily for those in poverty (Department of Planning and Health Information 2008). Furthermore, access to water is not integrated into HEPs poverty indexes, which is perhaps representative of organizational and governmental priorities.

While the above issues are far from being resolved, there have been significant changes in the incidence of water related disease due to massive efforts by United Nations (UN) organizations and NGOs and the infant mortality has significantly decreased (Chatterjee 2005). Preventive efforts are increasing and in 2006 approximately 1.5% of the population used some sort of water filtration device, typically a ceramic filter (Brown and Soesby 2006:5). A Cambodian non-governmental organization (NGO), Resource Development International-Cambodia (RDI-C) designed and introduced ceramic filters, which reduced levels of *E. coli* by 99.99%, in Cambodia in 2003 (UNICEF 2007:4). Many organizations have provided these filters to rural communities at

a reduced rate or no cost, and because of their popularity, private companies have started to produce the filters (UNICEF 2007). The true costs of the filters range from 5 to 25 US dollars with most selling currently for approximately 10 dollars in local markets (Brown and Soesby 2006: UNICEF 2007:6). A recent randomized trial found these filters have statistically reduce the rates of diarrheal disease by half (Brown et al. 2008:4). While the distribution and success of ceramic water filters are heartening, these technologies are not a panacea as the filters have a 2% monthly breakage rate combined with a price beyond the financial means of the majority of Cambodians (Brown and Soesby 2006:4). Further the lack of a monitoring and evaluation protocols for these initiatives leave the question of sustainability lingering (UNICEF 2007:4). A deficiency of consolidated efforts and the disjointed nature of the NGO and governmental water and sanitation efforts leave many challenges, especially as lessons learned are not effectively passed on even within organizations.

Cambodia's water and sanitation needs are far from being addressed and the venality of the government and its habit of handing off initiatives to the eager NGOs prevents a united effort to ameliorate water related disparities and disease. Still with a large majority of the rural population lacking access to sanitation facilities, developing integrated and feasible solutions including monitoring and evaluation strategies centered upon collaboration and learning from the past is critical to confront increasing climatological as well as population pressures (McMichael et al. 2006). These complex problems demands integrated rather than isolated solutions.

Anthropology and Water

Anthropology's relationship to water access and sanitation have greatly expanded in scope over the decades, shifting from cultural models of health to political economy, and most recently structural violence (Brown et al. 2008; Burghart 1996; Farmer 2005; Whiteford and Whiteford 2005). Therefore, this section will briefly highlight the range of anthropological contributions, including Cambodian cultural beliefs, cultural models of illness related to water sanitation generally, and the more recent literature, linking the macro and the micro processes which affect access to water resources and health (Farmer 2005; Rylko-Bauer et al. in press;n.d.;

Whiteford and Whiteford 2005). Reference to monitoring and evaluation techniques and challenges will be included throughout.

Water and Cultural Models of Health

The benefits of first understanding and then integrating local perspectives into water and sanitation in development programs has been consistently demonstrated by anthropologists (Green 1986; Burghart 1996; Whiteford 1997). Edward Green (1986) aided the World Health Organization (WHO) in the design of a water-borne disease control project working with the project KAP (knowledge, attitudes and practices) (Green 1986). He sought to elucidate cultural models of health and integrate them into program procedures, such as public health service announcements in Swaziland. Green details the challenges of fully contextualizing programs because of time constraints, the usage of quick and dirty methods and logistical matters such as transportation. While Green initially believed that pre-coded questionnaires were not culturally sensitive, he expressed appreciation for baseline data, which is an important component of monitoring and evaluation programs (Nolan 2002). Through in-depth interview with a variety of healers, he was able to establish that Swazis did not rely on the biomedical germ theory, but rather health behaviors were influenced by traditional beliefs (Green 1986:115). For instance, Swazis believed that diseases were caused by “breathing” in bad air and further used preventative medicinal measures on children to ward off these supernatural phenomena (Green 1986:115). By emphasizing the importance of including rather than condemning local beliefs, Green catalyzed the creation of a collaborative branch in the nation’s public health branch to work with traditional healers to facilitate the integration of community beliefs in water and sanitation initiatives.

The importance of spiritual miasma, in the form of wind, must be understood and considered when analyzing health issues in Cambodia. A cervical cancer study on Cambodian women refugees in the United States revealed that 90% believed that “wind” was a primary determinant of health; 91% believe in coin rubbing and a majority believed traditional healers were viable health seeking methods (Jackson et al. 2000:7). Only 5% knew that they were at risk for cervical cancer (Jackson et al. 2000:7). Cambodian nationals and refugees alike attest that

“wind” causes an assortment of mental health problems, most specifically posttraumatic stress disorder (PTSD), a disorder commonly experienced by Khmer Rouge survivors (Bertrand 2005; Hinton 2005). As demonstrated by Green (1986), blending local cultural health beliefs into health strategies can create more relevant programs in Lesser Developed Countries (LDC). In the context of Cambodia’s large rural populations traditional beliefs and practices need to be acknowledged and the importance of “wind” on health should be examined and incorporated into public health initiatives.

Richard Burghart (1996), an anthropologist working with a water and sanitation program to reduce cholera in Nepal revealed that the assumption of the superiority of the biomedical model should be scrutinized. Burghart similarly experienced disparate biomedical and traditional conceptions of disease revealing how they impacted communication and preventative actions (Burghart 1996). Water and sanitation programs had doctors encourage women to boil their water for fifteen minutes prior to adding oral rehydration salts. However, women were not following doctors’ orders, they would bring the water to a boil and immediately remove it. The women believed this simultaneously satisfied both the biomedical requirement and the local belief that “lightening” the water made it more “nourishing” for children (Burghart 1996:71). Lightening was perceived to be achieved at the boiling point; therefore, prolonging the process was not necessary and wasteful. While communication between the mother and the doctors was in the local language, Burghart asserts the full content of the message was lost due to the doctor’s preoccupation with biomedical beliefs and lack of understanding of the local perceptions of water quality. Furthermore, Burghart, tested the water brought to a boil and removed by the women, revealing that all fecal coliforms causing cholera were eliminated, thereby achieving the intended biomedical effect (Burghart 1996:69). In 2008 Brown, based on studies in Cambodia, had a similar experience, finding that “E. coli concentration in water at the time of sampling is not representative of the drinking water quality” underscoring the importance of recognizing the validity and practicality of local practices (Brown 2008:761).

Gender and Water

Linda Whiteford (1997) did much to advance anthropological understanding with her detailed her experiences in the Dominican Republic aiding public health initiatives to ameliorate the rates of dengue through community participation programs. Whiteford investigated the conceptual difference between biomedical and ethnomedical models of disease transmission while revealing the importance of gendered division of labor in disease prevention (Whiteford 1997:218). Gendered divisions of labor meant that women were primarily responsible for the smaller water containers, the men for the larger. However, women were responsible for water management and therefore, responsible for public health efforts to mitigate dengue. Nevertheless, their lives were already overburdened with responsibilities. The biomedical and regional conceptual model of dengue fever transmission overlapped, rather than diverged (Whiteford 1997:17). Nevertheless, the primary reasons public health instructions were not being followed by the community was due to the sense of “powerlessness” it faced (Whiteford 1997:17). This feeling of powerlessness was fueled by a history of neglect and lack of respect for political authorities responsible for public health initiatives. These sentiments likely resonates with the Cambodian people, who have also experienced endemic governmental apathy (Wim Van Damme et al. 2004). Through an ethnoecological model Whiteford was able to demonstrate the diversity of variables impacting water and sanitation from the historical and political to the biomedical and ethnomedical. Whiteford’s “expanded ethnoecological framework” allows investigation into the multifaceted factors influencing programs, identifies the intersections between them, and provides a contextualization of community experiences (Whiteford 1997:218).

In a recent volume edited by Whiteford and Whiteford (2005), to be later discussed, the implication of water and sanitation to gender equity and female empowerment is further illuminated (Whiteford and Whiteford 2005). One study in rural China revealed the importance of cultural conceptions of disease, ecology and the gendered division of labor (Manderson and Huang 2005). Lenore Manderson and Yixin Huang (2005) explain how the burden of responsibility for water procurement and management activities falls on women, causing them to compromise other duties, such as their primary role as health providers (Manderson and Huang

2005). This problem has been further exacerbated by the exodus of men to cities in search of employment (Werner 2007).

Anne Ferguson reveals that governmental programs to empower communities are often simply a strategy to shield the government from responsibilities (Ferguson 2005). This is commonly seen in Cambodia, as governments' overwhelmingly hand off initiatives to NGOs (Meessen et al. 2008). In Malawi, water models such as Promotion of Women in Water and Environmental Sanitation (PROWESS) were used to include the women in water decisions. These initiatives underscored women's closeness with the environment and children, and Ferguson posits this contributed to their subordinate role in society (Ferguson 2005). In the end, PROWESS resulted in a situation in which male authority remained intact while additional responsibility fell to the women, making more onerous an already arduous lifestyle. These initiatives occurred while the community was struggling with an AIDS epidemic and women, as the primary caretakers of the ill and orphans, could not contend with additional responsibility. Lack of time also forced women to resort to using contaminated water sources. While shifts in policy to enhance community participation and empower communities sound ideal, the reality can result in a transfer of responsibility from the government to the local level without adequate resources to even begin addressing the problem.

Water and Globalization

As the scope of anthropological research and water further expands, it is clear that water sanitation research must extend beyond local household conceptions and water treatment. In a rapidly evolving and increasingly interconnected environment a recent book, *Globalization, Water, and Health: Resource Management in Times of Scarcity* (Whiteford and Whiteford 2005), specifically addresses the issues of globalization and water. This seminal compilation details the multiple implications of globalization and the interdependence of local and global processes on water and health. This book provides literature discussing salient issues and "interstices" of globalization including its impact on water resources, management, and health of communities. Linda Whiteford and Scott Whiteford (2005) highlight a range of issues divided into two sections: linkages of water and health to water management and health. These address the disparate

access to water resources access between rural and urban areas as seen in Cambodia, how water policies formed at the national level impinge upon local communities' access to water, and the implications of water privatization which has further disadvantaged those most in need (Whiteford and Whiteford 2005). The following will touch upon the issues most geographically and topically relevant to this research.

The exigent threat population growth and urbanization present can no longer be ignored: by 2030 the urban population will be double and cities will have grown 160 percent (De Villiers 2000:100). While access to water and sanitation in cities improved in the 1990s, population growth will mean larger and more congested slums which lack infrastructure, potable water or sanitation (De Villiers 2000). Barbara Rose Johnston (2005) further elaborates on how this influx to the cities compromises the quality of existing water sources (Johnston 2005). In the past 50 years humans have destroyed half of the world's wetlands, the core of biodiversity while dam construction, ostensibly eco-friendly, typically benefits the more privileged while neglecting the tribal populations and women (Johnston 2005:137). In developing countries 70% of industrial waste is disposed of in rivers, spreading unsafe water into marginalized communities (Johnston 2005:138). Johnston also outlines the consistent triumphs of economics over morality. One example presented is of World Bank policies which created "water scarcity" by forcing South Africans to pay for water (Johnston 2005:136). This drastically lowered the daily water usage, led to unsanitary practices and the usage of unsafe water sources, which catalyzed a cholera outbreak and fueled the already flaming AIDS epidemic in the region (Johnston 2005). Johnston discusses the difficulties of merging monitoring and enforcing laws, given the marginality of communities and lack of infrastructure and financial resources.

Finally, Carl Kendall (2005) utilizes a "grounded globalization" approach by using both ethnography and epidemiology to locate salient water sanitation issues (Kendall 2005:87). Kendall emphasizes the "finite" rather than "infinite" nature of water resources, and addresses the issue of agencies framing access to water and health, as a privilege rather than a right (Kendall 2005:109). He notes that women attribute diarrhea to bad food and not to dirty water, linking local perspectives and behaviors to public health initiatives (Kendall 2005:106). Most importantly, he

underscores the issue of over consumption of water and the urgency of recognizing and integrating the “finite” nature of water into initiatives (Kendall 2005:109). He astutely recognizes the urgency of conservation, seeking a balance between providing potable water for all and available resources, concepts which should be at the core of monitoring and evaluation protocols.

The global community can no longer afford to ignore the fact that water is not boundless especially as the climate and population converge to negatively impact its availability. This above noted water and sanitation experiences underscore the diverse roles applied anthropology can play in water sanitation and health by linking macro and micro processes to better inform locally relevant programs as well as national and international policies.

Anthropological Theory: Monitoring and Evaluation, Water and Sanitation, and Global Health

Applied anthropological theories for monitoring and evaluation strategies and water and sanitation initiatives have not been established (Williams 2005). Currently, an evolving theory entitled the biocultural synthesis seeks to merge political, economic and biocultural theories as well as contextualize the implications of privatization, environmental degradation, historical trajectories and social processes and provide comprehensive solutions (Goodman and Leatherman 2001). However, some theories such as political ecology tend to neglect indigenous knowledge (Whiteford 1997:206). As mentioned above Whiteford’s “expanded ethnoecological framework” allows the inclusion of the historical, political and biological as well as ethnomedical concepts (Whiteford 1997:219). A more recent theory, moral economy, introduced by Whiteford (2005) suggests that health needs to be integrated in the existing economic frameworks to “protect common global resources” and address the political and social infrastructures that engender “structural violence” thereby defending health as human right rather than a economic privilege (Whiteford and Whiteford 2005:30; Farmer 2005). International economic and health experts are insisting water management occur at the local level and the applied anthropological perspectives have proven their utility in shifting programs from top down to bottom up (Sacher 2005; Treitler and Midgett 2007; Nachter and Hickey 2002). However, in the light of recent anthropological studies, the intentions of upper level parties in supporting the movement of

initiatives to the local level must be approached with an understanding of the methodologies and motives of their officials and agencies (Ferguson 2005; Burghart 1996).

Most recently, in the prologue of a book in press entitled *Global Health in the Time of Violence*, co-edited by Barbara Rylko-Bauer, Linda Whiteford and Paul Farmer, the authors assert the importance of examining “violence through the prism of health” by first examining health and then expanding the lens to consider how larger structural forces influence these circumstances (Rylko-Bauer et al. in press;n.d.:11). This ethnoecological framework seeks to elicit the biocultural and ethnomedical concepts of disease while viewing health as a “critical lens” through which to investigate “violence and injustice” (Burghart 1996; Rylko-Bauer et al. in press;n.d.; Whiteford 1997). An amalgamation of these theories, explored within a larger research framework, could aid in the design of an improved monitoring and evaluation (ME) program and instruct on how such a program can be molded to specifically address the social deficiency of current international ME protocols.

The role of anthropology changes with the times, adjusting to the climate, ever-increasing population and connectivity, as well as political environment. Each decade the global water situation and dynamics of human populations’ change making a fluid approach necessary. While the past values of integrating and upholding the local perspective remains the same to anthropological scholars, the multifaceted implications of globalization, political and economic processes are becoming increasingly apparent. Past methods of linearly focusing on cultural etiologies ignore the larger processes affecting the local realities. Innovative theories such as moral economy and structural violence are requisite to address the urgency of the limited water resources as multilateral corporations and organizations continue to place economic precedence over basic human rights, engendering unnatural morbidity and mortality (Farmer 2005; Rylko-Bauer et al. in press;n.d.; Treitler and Midgett 2007; Whiteford 1997).

Monitoring and Evaluation: Internationally and Anthropologically

In the context of the current global water crisis, determining what works and what doesn’t in achieving the United Nation’s (UN) Millennium Development Goals (MDG) is crucial to

success. The Joint Monitoring Program (JMP) is the primary tool with which to gauge the progress of the MDG goal of halving the number of people without access to water sanitation facilities (UN-Water Task Force on Monitoring 2006). The UN increasingly recognizes the importance of integrating the local perspective into the process (International Water and Sanitation Centre (IRC) 2004). However, the motivations behind these recent initiatives beg inquiry (Burghart 1997; Kendall 2005). Therefore, this section will briefly highlight the structure of the United Nations' Joint Monitoring Program (JMP) and explore recent UN initiatives to create Monitoring Participatory Assessments (MPA) complementary components which seek to engage and integrate local communities' perspectives into monitoring initiatives (International Water and Sanitation Centre (IRC) 2004). The section will also include the literature of anthropologists working in the design of ME initiatives.

United Nation's Joint Monitoring Program (JMP)

The UN has been implementing the Joint Monitoring Program (JMP) for decades and indicators from this data collection further inform the progress toward the Millennium Development Goals (MDGs) related to water, which are internationally agreed and sought goals. In 2005, the UN under the MDG goals, zealously committed the organization by 2015 to halve the rate of poverty and the number of people without access to "improved water sources" or "availability of at least 20 litres per person per day from an "improved" source, that source being within one kilometer of the user's dwelling by 2015 (International Water Sanitation and Development (IWSD) 2004:5). The UN openly acknowledges and recognizes one of the biggest challenges to assessing the progress of these goals is the lack of viable monitoring indicators and protocols (UN-Water Task force 2006). Cambodia claims to be on track to attain all of the MDG water and sanitation goals by 2015 (Royal Government of Cambodia 2007). However, while making improvements toward the MDGs, recent research in urban areas concludes Cambodia is not on track to achieve these goals (Heinonen 2008). Examination of this claimed progress at the rural level raises serious questions as rural areas already reveal a conspicuous lack of benefit from the UN's development initiatives and claims of progress are more difficult to substantiate given the lack of infrastructure (Royal Government of Cambodia 2004). The lack of current valid

indicators of progress coupled with, Cambodia's endemic corruption begs a deeper examination of the JMP protocols in Cambodia.

Data and technical sources are preponderant indicators in the UN JMP model including preselected "indicators" which are "measure or statistical value expressed in a meaningful way that provides an indication of the condition or direction over time of performance of a defined process or achievement of a defined outcome" (UN-Water Task force 2006:11). These indicators collected by WHO and UNICEF include tertiary sources statistics gathered from governments including rates of diarrheal disease in children under five and the concentration of faecal coliform in freshwater sources, excluding wells and other primary local water sources. Social indicators, such as whether or not the people use these technologies, are not incorporated into the indicators created to measure progress. These preselected "indicators" are used to measure the progress and conditions over time of water initiatives toward a specified outcome (UN-Water Task force 2006:11). The indicators used by the JMP model can be broken down into three components water related, health related, and gender related. However, as of 2006 gender related indicators such as women and girl hours per day spend for fetching water and girls school days lost for fetching water have not been included in the JMP (UN-Water Task Force 2006:31-32). In the context of anthropological and public health research related to gender and water the inclusion of such indicators is critical to deepening our understanding of the relationship between water, women's and children's health and opportunities (Whiteford and Whiteford 2005; Werner 2007; Watts 2004). The UN recognizes the importance of building the capacity of nations to implement the monitoring and evaluation programs to facilitate sustainability⁵. Another factor which inhibits progress of the JMP is the lack of viable social indicators that are internationally compatible, a challenge also confronted by anthropologists (Nachter and Hickey 2002; UN-Water Task Force on Monitoring 2006).

⁵ However, this "capacity building" is typically focused at the health center and due to the lack of boundaries between public and private practices in Cambodia, a deeper understanding of the local inclusion and impacts need further exploration (Cambodian Ministry of Health 2008).

Public Health and Anthropological Critiques of JMP

The JMP has been criticized by NGOs and community members who believe the JMP process is too “top down” and does not incorporate local knowledge and attitudes in planning. The Institute of Water and Sanitation Development (IWSD) in the Philippines laments that monitoring information should not be used simply to inform higher levels, such as the UN, but “should be a communication system whose information flows in different directions” (Institute of Water and Sanitation Development (IWSD) 2005:4). The IWSD underscores the importance of collaboration among stakeholders, joint problem solving, and knowledge derived from sources besides data indicators. These include complementary data sources consisting of both qualitative and quantitative and, most importantly, the participation of local people in the monitoring process (IWSD 2005).

Some of the major critiques of the JMP are: 1) the lack of continuity and availability of data collection for NGOs, which prevents use of the information to inform and improve their efforts, 2) the lack of standard indicators and methodologies which makes comparability problematic, 3) JMP does not empower communities to participate, 4) there exists a lack of water quality indicators, 5) there are no behaviour, health and hygiene indicators, and 6) JMP provides merely a snap shot of the facilities with no regard to the impact of these UN technologies on the local people (IWSD 2005). In addition, while the JMP locates a water source 1 kilometer from the home, it does not inquire whether the people actually use technologies nor are water quality perceptions and governance included in the analysis (UN-Water Task Force on Monitoring 2006). Furthermore the JMP utilizes levels of E. coli which have recently been demonstrated to be an inadequate measurement of water quality in Cambodia and insufficient in the context of the nation’s current arsenic issues (Brown et al. 2008; Buschmann et al., 2007; Brown 2008). Many of these deficiencies echo the UN water task force’s own critiques of the JMP and recognition of an improved integrated methodological design (UN-Water Task Force on Monitoring 2006; United Nations Development Programme (UNDP) 1996). Therefore, the UN is working to create more simplistic and cost efficient methods which include more community participation, an evaluation

component and integrating more local knowledge of the water sanitation and health impacts upon the community (UNDP 1996; International Water and Sanitation Centre (IRC) 2004).

Anthropologists, David Nachter and Clifford Hickey (2002) concur that indicators are critical in monitoring efforts. However, they problematize criteria and indicators that segregate and dissect an environment perceived as intrinsically interconnected by the community (Nachter and Hickey 2002). Locating transparent indicators identified by that community that are sensitive to vicissitudes of communities' life is ideal. However, fluid indicators are counterproductive to the JMP's primary goal of internationally standardizing monitoring efforts and indicators. In addition, engendering pluralism by striving for locally representative information can be difficult; timely as well as costly (Nachter and Hickey 2002; UNDP 1996). Balancing the anthropological and United Nations' perspective is essential to locating monitoring indicators, quantitative as well as qualitative, which include a human component.

JMP's Inclusion of Participatory Indicators and Anthropological Perspectives

To address the neglect of social impacts of these monitoring initiatives the UN is beginning to integrate community perspectives through its "complementary approach" of the Methodology for Participatory Assessments (MPA) or Quantified Participatory Monitoring (QIA) which includes qualitative social indicators which can be quantified (International Water and Sanitation Center (IRC) 2004:9). This model was developed by the Water and Sanitation Program (WSP) of the World Bank and International Water and Sanitation Centre (IRC). This model has been tested in 25 countries and has evolved from initiatives in the 1990s called Promotion of Women in Water and Environmental Sanitation (PROWESS) (Whiteford and Whiteford 2005). The MPA further links sustainability to gender sensitive, poverty target responsive approaches and focuses on local capacity building and further undertakes multilevel initiatives informing project staff, managers, policy makers and project designers (IRC 2004). The MPA is very time consuming and requires timely data entry. There is difficulty linking access and utilization of facilities to households, a similar concern of anthropologists (Kendall 2005). A pre-emption to the inclusion of these methods was the increase in ability to quantify these data into indicators and buttress "triangulation" (IRC 2004:18).

Anthropologists have questioned the past PROWESS results which can overload women with more responsibility, rather than empowering them with decision making authority (Ferguson 2005). Anthropologists Shankar Aswani and Pam Weiant (2004) have similarly struggled with designing sustainable monitoring initiatives for a aquaculture conservation project, as the collection of data is time consuming and again relegated to women (Aswani and Weiant 2004). In Cambodia women are already excluded from profitable economic activities such as fishing because their role has been defined by their daily responsibilities which include the task of providing the family with water (Resurreccion 2006). Adding other duties to women's daily responsibilities, such as monitoring and evaluation could buttress societal expectations preventing them from achieving economic autonomy.

Augmenting the existing JMP model with participatory monitoring and evaluation techniques is vital and would serve to inform current indicators with local perspectives while increasing sustainability. While Anthropologists and World Bank employees alike want to empower the community, it is apparent that analyzing these changing trends toward participation is critical. It is becoming increasingly understood that decentralization is not always done in a way which benefits the community (Birn and Garfield 2000; Bossert 1998; Ferguson 2005). The cognizant and collaborative nature of applied anthropology can be used identify the challenges and opportunities of augmenting monitoring activities with participatory techniques and evaluation. Even so, this has to be performed realistically, with the understanding that sustainable initiatives, while ideal, are unfortunately rarely completely realized in practice. However, by examining the multiple levels of water initiatives at the governmental, organizational and local level, merging perspectives can enhance the effectiveness of future monitoring and evaluation protocols.

Summary

Anthropological and economic pundits agree: our global water situation is serious (Whiteford and Whiteford 2005; Brabeck-Letmathe 2008). Solutions to Cambodia's health issues as shown by the MCH health indicators will not easily be found in the near future, especially given

the lack of potable water (UNESCO 2004; Kopitopoulos 2005). Nevertheless, investigating if and how these problems intersect is critical for making changes and consolidating efforts to contend with both the problem of water in Cambodia and globally. Monitoring and evaluation of water initiatives need to incorporate and consider local perspectives as well as gender related indicators. While these indicators may not always be internationally compatible, they are internationally relevant.

Public health and anthropological theory agree that identifying relationships between levels, rather than linear sources, can provide more viable solutions (Krieger 2008; Farmer 2005; Whiteford and Whiteford 2005). Therefore, the interrelationship between MCH and water access and management requires more attention and should be considered in ME strategies. Prior international initiatives, such as PROWESS that aligned women to the environment, emphasizing their nurturing or fertility, rather than more progressive qualities, were counterproductive and even damaging (Ferguson 2005). In rural regions of Cambodia where women commonly have 4 or 5 children, concomitant initiatives of family planning and safe water sources would serve the needs of these populations as well as greater global good (National Institute of Statistics of Cambodia (DHS) 2005). The possibility of the expanding the roles and responsibilities of men in water and sanitation must also be considered. Water projects and initiatives should keep in mind the burden shouldered by women in the society and seek ways to lessen this burden. Otherwise, the education and empowerment of women will always be a low priority.

The UN's acclaimed intention to improve the livelihoods of disadvantaged populations must be corroborated by actual improvement at the local level (IWSD 2005; Whiteford and Whiteford 2005; IRC 2004). The current JMP methodology of locating a water source a mile from homes fails to address the critical issues of quality, seasonal availability, and household usage of the water (UN-Water Task Force 2006). All of these factors impact access to potable water at the local level and should be included in indicators gauging MDG's "progress" (IRC 2004:6). Furthermore, solutions that are locally viable will never be identified without an inclusion of the local perspective. While this research cannot address all of these issues, it can add to the understanding of the interrelationship between local, organizational and governmental water

sanitation monitoring strategies and proffer advice for future research and improvements for the benefit of Cambodians and the larger global community alike.

The following chapter will describe the internship research methodologies used to explore some of the above issues. As evident from this literature review, the issues are complex and this internship research was preliminary and exploratory. Even so, the internship research methodologies expanded in both duration and scope for a deeper investigation of the grounded ME issues as well as to adjust to organizational and local priorities.

CHAPTER 4

RESEARCH METHODS

This chapter describes the internship objectives as well as the methodological tools used to accomplish these objectives. This section will begin with internship objectives as well as responsibilities followed by ethical considerations. A mixed methods approach was used, consisting of qualitative and quantitative data. This section will begin with internship objectives as well as responsibilities followed by ethical considerations. The data collection methodologies and modifications will then be presented. Data storage and analysis will also be discussed, concluding with the limitations of the study and a summary.

Internship Objectives

The internship aims were to become familiar with the agencies' goals and objectives while designing a locally informed and gender sensitive, monitoring and evaluation (ME) component for the agencies' water and sanitation initiatives. Therefore, the objectives were to 1) conduct a brief ethnography of the agency, including history, development, and future plans., 2) assess, when, what and how water sanitation services were provided to the community, 3) gauge the successes, failures and impacts of these water sanitation technologies and services, from distribution to household usage, 4) identify community identified indicators, or variables with which to measure the successes and weaknesses of future water and sanitation initiatives which are further are feasible, tangible and acceptable to gauge success of these technologies, 5) to consider the importance, if any, of gendered divisions of labor, local explanatory models and traditional healing health behaviors and preventative measures related to water and sanitation in Chamcar Bei to inform program development and ME, and 6) to provide suggestions to BAB on

how to structure better gender sensitive water and sanitation programs as well as monitoring and evaluation protocols, congruent with both the organizational mission and local perspective.

Internship Methodology and Modifications

Lesser Developed Countries (LDC), and especially rural settings within them, present trying environments in which to perform structured, time-bound research. The initially allotted time for this research was November 2008 to February 2009, reserving a month to build rapport with the community. However, delayed IRB approval prevented initiation of research until January 2009, which was the end of the rice harvest. Data collection prior to the completion of the harvest would have been difficult and perhaps not ethnically sound so the beginning of the actual data collection was delayed. The delay, however, allowed more time for building community relationships and trust. Therefore, the research, including the period of relationship building, lasted from January 2009 until May 2009. Prior to initiating my research, I attended the Southeast Asian Summer Study Institute (SEASSI) to study the Khmer language, which included 2 months of intensive speaking, reading and writing. I continued to study the language daily with local villagers and my desire to learn Khmer as well as ability to communicate greatly facilitated the building of rapport within the local community.

The primary responsibility of my internship was to design a monitoring and evaluation (ME) component for BAB's water and sanitation initiatives, which consisted of various technologies⁶ including 10 bathrooms, 20 wells, and 280 ceramic water filters. The scope of the research was expanded from a small survey (N=20) to a large household survey (N=90) as well as by the addition of 3 focus groups with an average of 8 participants in each (N=24). The increase of survey participants was necessary to provide adequate representation of the technologies, especially the filters. Focus groups were added because they had been included in BAB's original ME plans. While these additions allowed for a more comprehensive study, their addendum

⁶ Technologies will be the terminology used to refer to BAB's water and sanitation initiatives, specifically bathrooms, wells and ceramic filters.

required more time for the IRB modification approval process, as well as data collection and processing.

BAB's HIH program involves only one village on the southern coast of Cambodia and the members of its local community staff, the Community Based Organization (CBO), could all read and write Khmer. It was to, and through, these community members that many of the water and sanitation technologies were distributed. Therefore, the results of this research may not be representative of all rural Cambodians, the majority of whom are illiterate (DHS 2005).

Ethical Considerations

Ethical considerations remained a central concern, guiding the design and implementation of the research. The IRB completion process required awareness of the myriad of ethical considerations involved and an ethical investigation into the research objectives and methods. A seminal document guiding ethical research today entitled the Belmont Report (1979) espouses the following principles: respect for persons, beneficence and justice (Belmont Report 1979). These principles were closely integrated into the various research processes and following methods.

The most pressing ethical concern was that a majority of Cambodians live in extreme poverty and adding responsibilities to their daily struggle for existence such as completing surveys or performing ME initiatives may impact upon their livelihoods. The American Anthropological Association (AAA) underscores the paramount importance of the individuals studied, whose livelihoods should supersede all other interests (Whiteford and Trotter 2008). I remained mindful of these issues throughout the internship and research, striving to balance organizational expectation with villagers' well being.

Informed consent was acquired verbally as approved by the IRB. Past research in the rural Asia has revealed it is not culturally appropriate or feasible to require signatures where a majority of the population is illiterate, a fact confirmed by my internship host, BAB (USAID 2006; Christina Ingmire (BAB) personal communication, May 13, 2008). Therefore, prior to interviewing or surveying any participant, informed consent was verbally presented in Khmer and the right to

refuse or discontinue the questioning was made clear to all participants. However, as a vast majority of the population subsists on agrarian activities and this research fortuitously initiated *after* harvest season, the villagers were very cooperative, having both time and the inclination to participate.

The language barrier was also a salient concern as the majority of Cambodians speak only Khmer and there are high levels of illiteracy (USAID 2006). The inability to communicate and comprehend can lead to misunderstandings and inadvertent unethical treatment. Studying the Khmer language at SEASSI greatly enhanced my ability to communicate and thereby respect the villagers' needs and they were grateful for my efforts. After composition of surveys in English, all questions were translated by hand into Khmer by BAB staff. Some quantitative surveys were conducted out of necessity without a skilled translator, due to lack of organizational support. My Khmer, while far from fluent, was adequate after 3 months of immersion and continuous practice to obtain accurate information with an inexperienced translator from the BAB staff. However, when an answer was not clear, the space was left blank. Even so, all the quantitative data was collected in the company of native Khmer speakers who had a basic understanding of English and were able to provide cultural insight and assistance in locating houses with technologies to secure valid results.

Throughout the research, I attempted to be sensitive to how my actions could affect my host organization, BAB and the local community. One ethical issue commonly confronted by anthropologists is the conflict between the "contractual relationship" and the "community relationship". Unfortunately, the contract is often allowed to take priority over the needs of the community and this is "probably the most common ethical dilemma in applied anthropology" (Ervin 2005:31). Nevertheless, I was able to adhere to the AAA's position on the primary importance to the research subjects, on both the organizational and local level. This arrangement did not cause any ethical predicaments. A new program manager to HIH was very helpful in resolving such problems as she always attempted to correlate organizational actions and goals with community expressed needs. Nevertheless, while my research and subsequent

recommendations remained aligned to both organizational and local level priorities, I cannot be certain my advice will be followed (Ervin 2005).

Data Collection

The research design was based on an extensive literature review of past anthropological monitoring and evaluation experiences and methods, and considered the relevant challenges confronted by anthropologists in the field. An exploratory research paradigm was necessary due to the surfeit of issues confronting not only anthropologists, but professionals worldwide in designing participatory and sustainable monitoring and evaluation protocols. IRB approval was granted on January 2, 2009 and the research lasted until May 15, 2009. As explained more fully below, the participants were selected based on past involvement with BAB's water and sanitation technologies, either through project implementation or by receiving one of the technologies. All were over 18 and able to provide informed consent. These methods sought to apply a time-series comparison, between the intended goals of the initiatives and the actual outcomes as expressed by the organization and community. This intended sampling frame adjusted to the organizational and local climate, and will be discussed further in the analysis section. These methodologies began with a program history review, followed by agency ethnographies of 5 BAB staff to first parallel the research with agency and internship expectations. Key informant interviews with 5 community members were then performed and ethnographic data informed the content of the quantitative survey (N=90) which further informed the focus group questionnaire utilized in the 3 focus groups of 24 participants. The methods were primarily qualitative but the inclusion of a larger survey was clearly required given the number of technologies which had been provided to the community. The survey informed the discussion topics of focus groups which further contributed to the triangulation of data (Ervin 2005; LeCompte and Schensul 1999).

Program History Review

A program history review was performed by consulting the BAB website and reviewing past documentation regarding the HIH program including project histories and goals. Close attention was paid to monitoring and evaluation initiatives and expectations (BAB 2009; Ervin

2005). Data retrieved from these reviews were used to inform the content of the questionnaires for the ethnographic interviews with the agency (Appendix A) and key-informants (Appendix B). A focus on agency-stated goals and how they measure success was ascertained for identification of indicators, which are the primary tools used in monitoring and evaluation protocols to gauge the progress of initiatives (Nachter and Hickey 2002).

Prior to and upon my arrival I requested any and all documents associated with BAB's organization and HIH program goals, especially those related to the water and sanitation initiatives. BAB was kind enough to provide me with two documents: 1) the Participatory Learning Assessment (PLA) performed with the community in 2006 was used to inform future program initiatives and, 2) Hand in Hand (HIH) Annual Report outlining project activities for 2007 (BAB 2006; BAB 2007). These documents included all four of the project components, health being only one and the least supported of the components

The HIH Annual Report for 2007 documented the distribution of 100 filters, 10 bathrooms and 20 wells were provided to the community. Upon my arrival it was further revealed that 180 more filters were distributed in 2008. The HIH Annual Report for 2007 noted the central role of the Water Usage Group (WUG) in guiding the water sanitation initiatives. The WUG was originally intended to serve as gatekeepers: providing insight into technology distribution and gauging the successes of BAB's water and sanitation initiatives but according to HIH staff, no WUG existed upon my arrival. Monitoring and evaluation were mentioned in the reports but data were not included. Three months into my internship, a document with the original ME methodologies of the water and sanitation initiatives, which included focus groups, provided to me by my health counterpart, was formulated by staff during program planning after the PLA in 2006. Nonetheless, it was clear monitoring and evaluation had not been a priority in the program.

Participant Observation

Participant observation is involvement in the daily activities of the local people: this requires that the researcher immerse him or herself in the local environment to become familiar with the local attitudes and beliefs (LeCompte and Schensul 1999; Ervin 2005). This occurred at two levels, the organizational and the local. The organizational and local level observations were

performed in Kep, the Province Headquarters and Chamcar Bei, the subject village for 7 months. My research notebook was carried with me at all times and observations were noted throughout the day. These were subsequently transferred onto my computer in the evening, when power was available.

Organizational

Upon my arrival in Kep I was provided with a 30-minute orientation with two other volunteers, one from England and the other Scotland, followed by a brief introduction to the community based organization (CBO) in Chamcar Bei. I was subsequently assigned to a counterpart, a recently hired employee who had taken responsibility for two of the four components: capacity and health. He spoke almost as much English as I spoke Khmer and had no health experience. We worked together to learn each other's language and I aided him with his project responsibilities, many of which were to be performed in English, laboring not to do it *for*, but *with* him. I requested documents associated with water and sanitation initiatives to no avail, as the previous staff responsible for the water project had since left. I was informed by various parties that staff turnover is quite common in Cambodia, complicating program continuity and evaluation.

I was invited to a workshop on monitoring and evaluating for the staff in January 2009, and while conducted in Khmer it provided insight into organizational understanding and staff perceptions as well as Khmer terms associated with ME processes. Furthermore, a retreat in January 2009 with the entire BAB staff from various projects throughout Cambodia, allowed for a top down view of the agency. The presentation by the head of the organization explained BAB's vision, goals, objectives, strategies, and even its weaknesses.

Observations related to organization and community relationships involved accompanying my health counterpart to the village to visit key village members including the chief, BAB's community-based organization (CBO) and commune members. The initiation of household surveys in February 2009 allowed for deeper understanding of staff and local community relations, as these typically included visiting the more impoverished families in the community. In February 2009, the HIH office also moved from Kep to the local level of Chamcar

Bei, which changed the dynamics of the organization, enhancing relationships with the community.

Local

BAB accommodated volunteers with housing in Chamcar Bei, but was able to provide little assistance in implementation of volunteers' various projects. For the first two months I labored to introduce myself to the community, practicing my Khmer with the cook at the house and any other Khmer person in my path. Every day I biked two kilometers from the volunteer accommodation to the market or social center of Chamcar Bei, to purchase food, practice my Khmer and build as well as maintain community relations. This allowed for observation and inquiries related to behaviors related to water and food preparation, as well as gender roles. During the harvest season, I assisted community members in cutting and transplanting rice, as well as other harvesting related processes and when invited, sat for fun at various Khmer houses.

I biked to the nearest health center at Pong Tuek to meet the staff and begin developing a relationship with them and to familiarize myself with the health services and local disease burden. I periodically visited the owner of the local pharmacy, who also happened to be the head of the local health center. As mentioned in the literature review and fieldwork settings, the overlap of public and private health practice is a common characteristic of Cambodia. I attended maternal and child health vaccinations programs provided by the health center in the village as well as education provided by the Center for International Health (CIH), the other health organization operating in the Kep Krong Province, in nearby villages. I collaborated with CIH and the local government regarding health programs and activities in Kep Krong Province. I befriended the seven Red Cross Volunteers in Chamcar Bei who were the primary disseminators of health education as well as reporters of disease in the village, and attended monthly Red Cross meetings in Kep.

Another volunteer and I facilitated a participatory training of villagers in water and sanitation using WHO's Participatory Hygiene and Sanitation Training (PHAST), three times a month, which allowed for an expanded view of community perceptions related to water and disease. We also taught basic sanitation and women's health to the handicraft producers twice a

month. During the last 3 months, I began teaching English in the evenings at the private doctor's home which allowed for observations and queries pertaining to the various diseases experienced by villagers as well as treatment and costs.

Water related experiences, included using a water filter identical to the first 100 filters provided to the community by BAB in 2007. After moving to a house near the market in February 2009, I purchased my own rabbit filter which is the private brand sold in larger markets and identical to the 180 additional filters provided by BAB in 2008. I also gathered my own water, for cooking and cleaning, and observed the cook's and later host family's water related practices. I built close relationships with a family near the market and had daily Khmer language lessons as well as weekly Khmer food preparation lessons, after which we ate rice together. This allowed for observation of food preparation, from the purchasing to consumption as well as water treatment. Daily morning runs allowed for an examination of water gathering practices of the village.

Ethnographic Interviews (N=10)

After the program history review and gaining IRB approval I conducted brief ethnographic observations, first at the agency level, and then with key informants. These were all performed with a skilled translator and when consent was granted, the interviews were recorded. These were semi-structured in nature or flexible, sometimes permitting exploration into certain subjects not contained within the content of the pre-formulated survey (LeCompte and Schensul 1999). I always remained cognizant of my ethical responsibilities during these discussions. These were convenience samples, based on relevance as well as research intentions to explore the benefits of the water and sanitation technologies within a specific population (Ervin 2005). While, ideally this would include BAB's top level organizational perspectives, their staff was rarely available for interviews. One of the primary intentions of these interviews was to identify indicators, or variables with which to gauge the impacts of the water and sanitation technologies. However, it became apparent that the concept of indicators was not understood at either the organizational and local level and therefore had to be deduced from the content of what was perceived as most important about the provision and usage of the technologies to the agency and community.

Agency (N=5)

This ethnography and the respective questions focused on agency and community level roles and experiences, as well as the goals of BAB and specifically the HIH project at the organizational and community level (Appendix A). Five out of twelve HIH staffers were interviewed because had prior knowledge of, or experience with BAB's past water and sanitation initiatives. These individuals included my counterpart with special attention paid to long-term staff familiar with the agency culture of BAB and the HIH project. The subjects were chosen based on their prior experience with the health component and specifically the water initiatives. An initial interview of the staff regarding BAB's agency role, goals and culture revealed a lack of knowledge regarding on the agency's or BAB's goals as a whole, and typically lead to a recitation of the various components of the HIH project. The staff assumed my internship role was to solve the problems with water sanitation technologies and these inquiries confused them as to my intentions. Because of this lack of knowledge about the organizational culture of BAB as a whole, I adjusted the survey to focus more specifically on the goals of the HIH project and its health component to mitigate confusion and ease the interview processes. I found eliciting personal opinions in Cambodia to be difficult, and critical thinking skills are lacking as the pedagogy of the nation engenders rout learning and recitation.

Key informant interviews (N=5)

The key-informant ethnographic interviews were with five community members, the same number of individuals interviewed during the agency ethnography, to provide a balanced perspective of the initiatives. These 5 community members included a local community leader and participant in the PLA conducted in 2006, two members of the 2007 health-task force which was no longer functional and one who had benefited and not benefited from HIH's water sanitation technologies. These interviews occurred in the homes of the key informants to provide a level of comfort to the participant. These questions were informed by the program history review, agency ethnography and included questions about prior BAB's water and sanitation initiatives at the local level (Appendix B). Perceptions of effective water and sanitation programs, local sanitation needs, explanatory models of disease and gender related questions were

explored. Finally, local conceptions of positive water and sanitation program impacts were investigated to deduce indicators through which to gauge the progress of initiatives. In addition, the feasibility of moving ME to the local level was probed by inquiring as to the definitions and importance ME, assessing the concept comprehension and gauging willingness and ability to dedicate time to such initiatives.

Quantitative Survey (N=90)

This survey was originally intended to be drafted in close collaboration with the Water Usage Group, but as noted above, this group had not functioned for some time. Therefore, I designed a survey instrument informed by the above methods and translated into Khmer by BAB staff during which suggestions were received and incorporated (Appendix C). Due to the iterative nature of the research, this survey was modified to address organizational and local priorities.

The questions addressed perceptions of technologies and their problems and successes, as well as water quality assessments, treatment seeking behavior, gender related questions and the burden of disease before and after receiving the technologies. In some instances families were beneficiaries of two technologies. While these surveys were originally intended to be cross-sectional, the variety and number of water technologies complicated these efforts. Furthermore, villagers who did not receive the BAB technologies seem confused by the inquiries, some believing they might receive the technologies if they participated. Therefore, to uphold Belmont's principle, respect for persons, and avoid ethical violations this group was removed from the methodologies. This changed the research from a cross-sectional to a time-series study, and time comparisons were based on self recall (LeCompte and Schensul 1999; Erin 2005). The inclusion criteria was subsequently modified, including only villagers over the age of 18 who had BAB technologies, and who had provided verbal informed consent.

Various BAB staff coached me on how to verbalize the survey questions and I studied the Khmer version extensively. At times, the BAB staff assisted me in locating the technologies, either on moto or by bike. Nevertheless, I typically conducted the surveys in Khmer and deferred to staff only when there were translation difficulties, a strategy prompted and encouraged by staff. As mentioned previously because I lacked organizational support, I sometimes performed the

surveys without a skilled translator. If there was any confusion regarding participants understanding of the question, a blank space was left on the survey form. After performing 20 household surveys, it became apparent that the successes and weaknesses of the various technologies could not be determined from this limited sample, especially with regard to the filters of which 280 has been provided to the community. Therefore, a modification request was submitted to the USF IRB and it was approved on April 29, 2009 to allow for 90 households to be surveyed as well as utilize focus groups to identify solutions to the problem of broken filters.

Focus Groups (N=24)

Focus groups are typically held with approximately 6 to 12 people who possess common characteristics, as well as shared knowledge (Ervin 2005:175)(Appendix D). For the purpose of this research three focus groups were selected from the BAB's savings groups, those villagers who pooled their money together and opened a bank account to collect interest. Members of the group were the primary recipients of the water and sanitation technologies. Focus groups were originally intended by BAB to serve as the primary ME instruments of the water and sanitation initiatives. The inclusion of focus groups was to facilitate more in-depth and engaged discussions related to identifying solutions to filter problems, such a breakages as well as a sustainable way to resolve these issues. These focus group sessions lasted approximately an hour and questions were presented in Khmer by a BAB staff, and were not recorded. Each participant was asked to reveal their experiences with their BAB filter particularly addressing problems and breakages, as well as strategies utilized to remedy these problems. Inquiries also assessed the accessibility of filter parts, as well as willingness to purchase parts to repair the filters. Finally, the group's receptiveness to acquiring more education on the filters was probed, especially as it related to the savings groups.

Data Storage

The program history review was compiled in a word processing document kept on my password protected computer, which went with me both to Kep and Chamcar Bei. The threat of someone using my computer was minimal due to the lack of computer literacy. Furthermore, I did

not share a room mitigating the threat of someone who was computer literate, reviewing the confidential materials. Daily field notes were kept in my research notebook which was with me at all times. At night when power was available, observations and new information was transferred into word processing documents on my computer.

During ethnographic interviews a Khmer translator, aware of the importance of informed consent, was always present. These interviews were digitally recorded when consent was granted and immediately transferred to my personal computer after the interview, then erased from my digital recording device. During these interviews, notes were also taken, either on my computer or in my research notebook. Immediately following the interview, notes from my notebook and further elaborated upon in my computer and after re-listening to each interview. A month after their completion these interview recordings and transcripts were reviewed and additional information was inserted. The language recording program on my computer was password protected to diminish the possibility of disclosure.

The completed quantitative surveys were stored in a binder that stayed with me at all times. Each day after data collection, or the next day depending on the availability of power, data were inserted into a Microsoft Excel sheet. The completed surveys were stored in a binder in my room at the volunteer accommodation in Chamcar Bei, behind a locked door. When I moved to the village center, the completed surveys were stored in my locked room in Kep.

Data Analysis

These data analysis approaches are based on past monitoring and evaluation theories and analysis strategies utilized by anthropological scholars. Nolan (2002) as well as Schensul and Schensul (1990) indicate that monitoring needs are relatively simplistic, requiring three aspects of program implementation: activities, resources and results (*inputs* and *outputs*) (Nolan 2002:205). Inputs and outputs were two threads which allowed for a time series comparison and spurred other themes for investigation. These emergent themes were then included in the final analysis. This analysis was iterative and explored *what BAB* and then *what the community* considered a positive “impact” of the water and sanitation initiatives (Schensul and Schensul

1990). Therefore, the organizational and local level expressed program intentions and impacts were to be contrasted with the organizational original written as well as staff and community expressed intentions. The organizational and local level perceptions of the water and sanitation initiatives, their perceived impacts were triangulated with the descriptive data from the survey and utilized to gauge the success of the initiatives

The program history review, participant observations and qualitative data were coded with ATLAS/ti, easing the process of locating and expanding upon various themes. Program history review and field notes were coded first for the inputs, outputs and impacts and from these emerged themes including health, local water related beliefs, water management, and gender which were augmented and included in the final analysis. Ultimately, inputs and outputs were not included in the final analysis, but rather served to identify the resulting themes. Ethnographic data was transcribed and then coded in ATLAS/ti and contrasted to themes already identified from the program history review and participant observations. The results of the surveys were entered into Microsoft Excel to measure common beliefs, new themes, and corroborate findings from the previously analyzed data. These data provided descriptive statistics and an expanded understanding of community perceptions of the technologies, as well as the impacts. Community priorities related to water and sanitation, and treatment seeking behaviors were also identified. These were further broken down into gender related, perceived benefits of technologies, as well as the problems experienced with the provided materials which were corroborated with data from other methodologies. The reduction of diarrheal disease was calculated, as well as the percentage and types of breakage rates of the ceramic filters. Another reoccurring theme arising from the analysis was the issue of sustainability, not included in the input and output process and therefore assigned its own thread.

Limitations

The limitations of this study echo previous experience of anthropologists. In resource poor environments it is difficult to provide a holistic perspective of the community and organization (Nolan 2002; Ervin 2005). Time and monetary constraints impeded my ability to fully

contextualize and conceptualize the water and sanitation technologies from their reception to their current circumstances (LeCompte and Goetz 1982; Schensul and Schensul 1990, Crain and Tashima 2005; Green 1986). Lack of organizational support and my precarious financial situation made the completion of the research a central concern thereby precluding the possibility of a completely holistic perspective.

The lack of baseline data made gauging the success of the technologies difficult, although, as noted by other anthropologists, not impossible (Nolan 2002; Ervin 2005). Using self-report to gauge the success of the technologies is also problematic in Cambodia: being white automatically situates the interviewer in a position of authority. In Khmer culture, people are always polite but especially so to authority figures, and will rarely say no, striving to please. Therefore, the validity of quantitative survey is subject to question as villagers may have perceived me as someone in authority from whom they might receive some benefit if they provided socially appropriate rather than valid responses. This was evident in the survey question on hand washing when a majority of people claimed they washed their hands with soap, but could rarely produce the soap when asked. Another weakness was that some families who had a broken filter, many times claimed *not* to have one, which could influence the findings by indicating a lower rate of breakages than actually occurred.

The challenges of locating locally and agency identified indicators remained an important limitation, given the lack of time and arduous process it required. Anthropologists Shankar Aswani and Pam Weiant (2004) while attempting to design sustainable monitoring and evaluation procedures demonstrate that overly technical or laborious projects undermine sustainability (Aswani and Weiant 2004). Aswani and Weiant's two year project used indicators that were technical, requiring skills difficult to provide an impoverished and uneducated populace. This internship lasted only 7 months and fulfilling the duty of locating sustainable indicators, informed at both the organizational and local level remained a preponderant concern. The lack of organizational understanding as well as local perceptions of which indicators were used to determine success or failure further complicated the process. In addition, the usage of indicators has already been criticized by Mark Nachter and David Hickey (2002) who problematize

indicators and criteria which anatomize a community's construction of their environment (Nachter and Hickey 2002).

During program evaluation anthropologists have found that "participants" have an aversion to being assessed (Ervin 2005:101). This was a problem during the agency ethnography when interviewing staff about the BAB agency culture. Therefore, to avoid ethical issues and confusion, the instrument was modified to focus more on HIH program specifics and the health component. After evaluating a program, recommendations may be discarded or it may be determined that the program had no impact, which itself could have unintended impacts (Ervin 2005). The issue of sustainability was a critical concern and it clearly required more organizational attention to, and investment from, the community in, attending education sessions and taking responsibility for initiatives. However, strategies need to be created and implemented while remaining cognizant that such a commitment is difficult for a community contending with poverty (Whiteford and Whiteford 2005).

Summary

Methods were adjusted to the ebbs and flow at the organizational and local levels. The research objectives, to first fulfill the internships responsibilities and secondly complete the thesis research guided the iterative methodological processes. The fluid environment of Lesser Developed Countries (LDC) makes conducting time bound and structured research difficult and thus methods were adjusted and the time frame expanded. Ethical concerns were paramount due to working with vulnerable populations while contending with language barriers and cultural differences. Lack of organizational and personal resources complicated the ability of the research to provided a more comprehensive ME assessment of the water and sanitation technologies impacts. However, the assistance provided by BAB staff was sufficient to complete my predetermined methods and further expand my research methodologies.

The following chapter will discuss the resulting data from the above methodologies. While triangulation was sometimes compromised, for reasons to be explained, the resulting methodologies allowed for a comprehensive analysis of the both the organization and local

intended and perceived impacts of the technologies. The next chapter will conclude with a discussion of these findings.

CHAPTER 5

DATA ANALYSIS AND DISCUSSION

This section will present the results obtained from the program history review, secondary sources, in-depth interviews, surveys and focus groups. Learning about BAB's past ME initiatives was difficult: staff turnover and the current staff's general lack of knowledge regarding ME efforts made reconstructing the past tenuous. Therefore, triangulation was sometimes compromised. However, monitoring and evaluating the initiatives did reveal programmatic successes as well as weaknesses. Both organizational staff and local community members provided valuable insight regarding future sustainable ME indicators. Local level and organization perceptions of the water technologies impacts, while not in complete congruence, converged in some instances making suggestions for mutually inform ME indicators possible. This chapter includes a discussion of topics including local traditional beliefs related to environment, water sanitation and health as well as gender.

Water and Sanitation Initiatives

Three water and sanitation technologies were provided to the Chamcar Bei community: 1) filters, 2) wells and 3) latrines. Each technology was provided at different times to disparate populations. Therefore, both the water and sanitation initiatives as well as the ME section will address the technologies separately. During the distribution of the wells and filters in 2007, the health component of HIH had two community staff members. These staff were included in the Key Informant interviews and their input was very helpful in understanding the selection criteria for the distribution of the water and sanitation technologies.

Filters

Initiatives

Filters were provided to the savings groups, or community members who pooled their financial resources to accrue interest and provide loans when needed. One hundred filters were provided in 2007 and 180 more in 2008 for a total of 280 water filters.

Criteria and Distribution

To receive a filter, individuals had to: 1) be a member of the savings group, 2) be willing to pay a small fee and 3) pick up the filter at the Community Learning Center (CLC). The initial installment of 100 filters in 2007 had not been stored properly and mice had gnawed through the spout on many of them prior to leaving their packaging. Therefore, while the original price of these first 100 filters was allegedly 3000 riel or .75 cents⁷, some were given away due to their damaged condition. The second 180 were also provided to the savings group, based on increased membership and the same criteria at the cost of 8000 riel or 2 dollars.

Education

Many filter program participants recalled that some education was provided by BAB with the filters. However, whether this education was provided during the first or second shipments of filters was unclear. An educational pamphlet and scrubber was included in the second installment of 180 filters but not the first 100 according to two informants. Follow up education was also provided to some households by a local community member and Red Cross Volunteer.

Wells

Initiatives

Throughout 2007 and 2008, the material for the construction of 20 wells was distributed to families in the community. Of these 10 were provided with covers to prevent pollutants from entering and contaminating the well.

Criteria & Distribution

Only one key informant had knowledge about the selection criteria for the wells and therefore there is no corroboration for this information. According to that key informant, 15 of the

⁷ The cost of the filters is currently 10-12 dollars at the local markets.

20 were selected because they were included on the Most Vulnerable Families List (MVFL)⁸ or the poorest members of the community and were further located far from the center of town, where communal boreholes and wells are abundant. The family was to dig the hole but was provided with cement, the necessary number of slabs varied based on the depth of the well, and cement structure surrounding the well. The materials were provided and construction initiated *only after* the hole was dug by the family.

Education

No education was provided with the wells. There was mention of one of the past HIH health staff going house to house to provide education on the wells, but upon further investigation it was determined the education was related to the filters.

Latrines

Initiatives

In 2007 and 2008, ten latrines were provided to families in the community; however, there was no health community member or counterpart to coordinate these efforts. Latrines were an important part of the BAB water initiative due to the community's desire for latrines expressed during the Participatory Learning Assessment (PLA) in 2006 (Bridge Across Borders 2006). The importance of latrines to the community was corroborated by follow up interviews with participants, as well as statements of community members. The lack of communal latrines, which may have stemmed from families' desire to have individual household latrines, complicated the ability to provide acceptable sanitary facilities to the community.

Distribution and Criteria

Latrines were distributed to the savings group. Eligibility for latrines included having: 1) the ability to build a latrine, 2) many children, and 3) need to travel a substantial distance to go to the bathroom. While BAB would provide the necessary supplies including cement, slabs and the

⁸ The Most Vulnerable Families List (MVFL) is an initiative implemented throughout numerous provinces in Cambodia. It is part of the Health Equity Fund (HEP), discussed in the literature review. MVFL efforts are directed to providing health care to the poorest of the poor (Hardeman 2004). The list in Kep Krong Province was determined in collaboration with local villagers, by the Centre for International Health (CIH), a partner organization of BAB. This list uses participatory methodologies with villagers to locate the poorest and most poor members of villages (Hardeman 2004). The poorest families receive free health care and the poor, half price, at the provincial health centers.

toilet bowl, the family had to construct it themselves. Eligible families' names were put in a hat and drawn.

Education

A majority of respondents claimed no education was provided with the latrines.

Monitoring and Evaluation Results

Filters

| TECHNOLOGY | NOT IN USE (N) | BROKEN (N) | REASONS (N) | NOT USED (N) | REASONS (N) | GENERAL PROBLEMS (N) |
|-----------------------|-----------------------|-------------------|--|---------------------|--|-----------------------------|
| Filters (N 72) | 33.1% (24) | 26.2% (19) | 8.3 % (6) water doesn't enter bottom 8.3% (6) leak 4.2 % (3) ceramic broken 2.7% (2) spout broken 2.7 % (2) cleaning /cow/child knock over | 6.9(5) | 2.7 % (2) to busy 2.7 % (2) not enough visitors 1.4 % (1) gave child | 14% (10) filter too slow |

Table 5.1-Filter Results from Survey (Appendix C)

Of the 90 households surveyed, 72 had filters and 18 had benefited from another BAB water sanitation technology. Based on the survey responses, approximately 33.1% or 24 filters were no longer in use. Previous monitoring and evaluating initiatives in 2007 revealed that two months following the initial reception of the first 100 filters, there had been a 20% breakage rate. This was attributed to the poor condition of the filters upon reception. Of the filters no longer in use, a majority (26.2% or 19 filters) were broken. The reasons for these breakages are listed above, and most commonly occurred during cleaning or while children were playing. 6.9% or 5 families had functioning filters, but chose not to use them. Some of the reasons were listed above, but other smaller families, particularly elderly people, claimed a preference for boiling water.

Successes

If they (villagers) have the water filter, they do not get sick so the water filter is important.

-BAB Staff

Health improvements were dramatic. As with previous filter research in Cambodia this survey utilized a two-week recall of diarrheal incidence before and after reception of the filter (UNICEF 2007). After eliminating the highest and lowest values, the families were 3.97 times less likely to get diarrhea after the reception and use of the filter. Of course, these statistics are based on self report,, which can compromise the integrity of the findings and the presence of a foreigner may have influenced some of these responses but the findings were none the less significant.

An increase in the self-efficacy of women or a belief in the women's ability to control their circumstance was an auspicious result. This was because the filters provided clean water to the family, a task widely recognized by the community as a woman's responsibility.

*We don't usually boil our water and they (the villagers) don't have filter they don't boil
When they have a filter they don't boil.*

The filters make the clean and then they (the villagers) don't have to boil the water.

- local community members

Another positive result was families no longer boiled their water, relieving the family of the cost and time devoted to procuring fuel, a result which was considered very significant to the recipients although it was not an organizational indicator of success. While it is ideal to both filter and boil water from all water sources, there may have been more of a benefit than a drawback to drinking the filtered, but unboiled water. Reasons for this include that more than half of families in Chamcar Bei had admitted to *not* treating their water *at all* and one treatment is far better than none (CIH 2009). This also important when considering the economic degradation associated with the acquisition and use of fuel together with its time and financial costs. Labor associated with these tasks is further compounded by the already onerous burdens under which Cambodians live.

Challenges

Fourteen-percent or 10 families complained of the slow flow rate of the filter, and many of these families did not use it due to this problem. The slow rate of filtering was also an issue with the filter in the volunteer accommodation where I stayed. While all of the recipients purportedly received education, the only knowledge they appeared to have of the filter was the importance of washing it once a week. However, the slow filter rates are commonly the result of a failure to scrub the removable inner layers of the ceramic in-section, an important component of the cleaning process which had not been explained to the users (Mickey Sampson personal communication, February 19, 2009). Furthermore, there were no available spare parts in the village or province to repair broken filters or replace filters which were not working properly. This problem was further exacerbated by a lack of motivation of a majority of savings group members with broken filters to fix them or obtain any education on resolving the breakages and maintaining their filters.

Wells

Technologies

Of the 20 wells, all were still functioning but a majority of wells were missing their cover and those that were still attached to the well were typically open, undermining the purpose. Even so, when contrasted with the other technologies provided by BAB, the wells had the highest success rate, as they all functioned and were utilized. The obligation of family to dig the hole prior to reception may have contributed to these outcomes by increasing their sense of ownership of the technology.

Successes

Some of them (filters) are already broken but the wells are really good.

-Past Community Health Task force Member

The informants agreed that the wells, of all of the technologies, were the most successful technology. All still functioned and had minimal problems. In addition, the wells were allocated to remote sections of the village, owned by the most impoverished families, who shared them with their neighbors. In total the wells brought water to over 120 families and on average each well

provided 7 families with at least some of their water for daily consumption and usage. The vast majority of families appreciated the time it saved them and perhaps incorrectly assumed it provided them with a safe water source.

Challenges

Two of the wells had water that did not taste good, and one family complained that since they began drinking the well water their rates of diarrheal disease had greatly increased. Neither of these two wells had been provided a cover. Whether the lack of a well cover is a significant variable should be explored. However, as a whole well covers were not utilized and some wells that initially been provided with covers had been removed. Cleaning around the wells did not appear to be a priority and there was only one well that utilized the water run-off to irrigate crops (Werner 2007). Furthermore, not all of the structures had fences, which prevents animals from entering the site of water retrieval.

*If they don't have a filter, they don't always drink boiled water
and they drink water from the well or rain water directly.*

local community member

Many of the villagers in Chamcar Bei assumed that well water equated to clean water and that it is not necessary to treat water that comes from wells, even though boiling and/or filtering water prior to consumption is required to eliminate contamination. This was affirmed through surveys, as well as while conducting education. Phillips (2005), a student researcher from CIH, performed a single test of numerous wells throughout Kep Krong. Phillips revealed that a majority of the BAB provided wells were contaminated with E. coli, but the source of this contamination was not revealed (Phillips 2007). However, only two wells exceeded international standards, an indication the water was unsafe to drink. Nevertheless, continuously testing wells is not an option in Cambodia and therefore lacks sustainability. It is apparent that education on the importance of treating water from *all* sources, including wells, is critical.

Latrines

Technologies

Of the 10, five were still functioning, or still in use by the household: a 50% success rate.

Successes

Of the families whose latrine functioned properly, all appeared very satisfied with their latrine and did regular maintenance. They claimed to have better health and all members of the family, including children, used it and in some circumstances nearby families also benefited from the technology. However, it was apparent that a majority of families preferred to have a latrine for use of only their family.

Challenges

Some latrines came out ok, but we lacked education and some of people we gave the latrine to didn't complete it.

-BAB staff

Of the 5 latrines that were broken, three had building related issues including two that were unfinished, one which has been finished but the structure had collapsed, and one recipient had built the structure for holding water too close to the bowl. However, the reason for the inability to use this latrine was unclear and the lack of water nearby appeared to be an issue in both the unfinished and the finished structures. Finally, one was flooded, and the lack of a roof on many of the structures, created a threat to the latrines that had otherwise maintained functionality. The lack of a roof allows entry of rain water into the latrine, which can increase the risk of flooding, a common cause of latrine malfunction in Cambodia.

Organizational and Local Level Perceptions of Technologies and ME

Local and organization perceptions of the goals, impacts or outputs of technologies, as noted by the agency and key informant interviews, revealed overlapping and sometimes contrasting viewpoints. Therefore, the organizational and then the local community perspectives will be discussed separately. The key informant interviews, which included local community members, was purposive and comprised of an assorted sample of the community, some educated and some not. The amount of information about ME, however, was limited although valuable insight was provided by all of these informants.

BAB Staff Perceptions

Successes

We want to help decrease disease in Chamcar Bei..... We want to the villagers have nice clothes, food. To use materials such as filters, wells, latrines.

-BAB staff

BAB staff's perceptions underscored the central importance of improving the health of the community as part of the overarching goal of the organization to improve villagers' livelihoods. According to the staff, the objective of the health component was to improve the health of the Chamcar Bei community members and situate recipients as role models for the rest of the community. The staff believed it was important to the health of the community that community members consume clean water.

Monitoring and Evaluation

We go to check what has happened and then if they are doing something wrong we tell them to correct it and then we come back to see what has changed. When we evaluate, after we check, we compare.

-BAB staff

Definitions and perceptions of ME at the organizational level agreed that monitoring included going to houses to help the people. The help included doing house-to-house checks and telling the recipients what they were doing wrong, if anything, and requesting that the community members fix any problems found. The staff would sometimes return to determine if the problem had been resolved. This was laborious, as Chamcar Bei is very spread out and people are not always home, but the staff agreed the community members lacked the motivation to do it themselves. Continually cajoling the villagers was considered the only way to persuade villagers to take care of the technology or resolve the problems they experienced with the technologies. Evaluation was informed by monitoring which involved comparing the results over time. There was a BAB staff consensus that inclusion of numbers when evaluating an initiative was important (i.e the number or percentage of people who benefited from the program). Definitions of ME were typically received by the way of an example rather than presented conceptually.

When we ME the filters we see how many people use and don't use. It is from monitoring that we evaluate. For example, we say 30 people use and 30 people don't use.

-BAB Staff

ME BAB Staff Future Recommendations

The filters, a widely received technology, were a central topic. That staff agreed that ideally the community would look after the technologies themselves, and further that a system for fixing broken filters should be in place. However, ideally is rarely completely realistic and the circumstances surrounding this will be discussed under sustainability. The HIH staff agreed that the community was not able to monitor and evaluate initiatives on their own, but it may be possible in the future. Opportunities included focusing on the community based organization (CBO) members, members who were, as a whole, more educated than the typical villager. There were recommendations to choose one member of the CBO to be responsible for the ME procedures and train that person to perform ME.

The savings group was another BAB target group for monitoring and evaluating, as a majority of the technologies, except the wells, had been provided exclusively to these community members. Through the leaders of the savings groups, who represent various regions of Chamcar Bei, various saving groups members could be delegated responsibility for monitoring and evaluating the technologies. These individuals would report back to the savings group leader for the region. The leader could then report to the group at monthly meetings and educate and prepare community members who may be responsible for monitoring BAB's activities after the project phases out of the community in two years. Information and additional water technology dissemination through these entities could be easily arranged and issues with the technologies quickly identified and resolved. This option is the most feasible and could be easily coordinated, the communication system is already in place and the savings group is comprised of community members who are expected to sustain the project after BAB phases out.

Local Community Perceptions

Successes

It helps us not waste time. We don't want to waste money either.

-Local community member

Local people were pleased with the time saved by the technologies and, to a lesser extent, the money saved on medicine. With regard to the filters, the necessity of gathering the

fuel or, worse still, paying for fuel to boil the water were eliminated. Furthermore, some people agreed that sometimes they did not boil water because they were too busy. The latrines freed families from having to walk the on average 100 meters into the forest and allowed them to avoid the ghosts and snakes which they believe inhabit the forest. Sixty-three percent of 58 responses wanted a latrine because they currently traveled a substantial distance to the forest to defecate, while the sanitation provided by latrines was mentioned 37% of the time (Table 5.2). However, the identification of sanitation as a variable may have been a response provided more for my benefit than an actual reflection of local beliefs. The wells also saved the time required to obtain water but unfortunately presented a potential public health threat, as some families neglected to boil water from this presumed safe water source. Nevertheless, the community members were in accord that health had improved due to the technologies and HIH efforts had increased the community awareness of water related issues.

Monitoring and Evaluating

To see if it is good, or if it isn't good— Local community member, monitoring definition

While it was sometimes difficult to obtain information regarding ME from local community members it, as a whole, aligned with organizational perceptions: to determine if the technologies were successful. One of the key informants, a local Red Cross member, was well aware of activities related to ME. As the BAB staff, he felt it was his job to help people fix their problems, or tell them to fix it and if this wasn't successful, to do it for them. Upon hearing that some of BAB's latrines had not been completed by community members, he responded passionately:

Give me the name and I will fix it. I want to know which house. Why don't they build it... we should get it back. They didn't build it. We have to go and tell them to do it better. I want to go and help them.

—Local community member and leader

One local community member believed that monitoring was to see if it was good but this was related to the quality of the technologies and there was a lack of knowledge in general about ME processes, but a strong desire to learn more.

Local ME Future Recommendations

A majority the informants believed the community could perform ME themselves, if they were provided with the appropriate training and one informant volunteered his/her time to ensure

that future latrine initiatives were followed up. Red Cross programs provide contracts for the community member to sign or fingerprint to receive the technology in which the member pledges the recipient will care for the technology and/or finalize the construction. This appears to be a beneficial strategy as the recipient recognizes an obligation to maintain the technology although it is hardly a guarantee this will be done.

Sustainability

Filters

The filters were provided with little instruction and because the recipients paid so little they appeared to have gained no sense of ownership of the filters. The initial distribution of 100 filters to the savings group was complicated by their inferior state upon reception, due to improper storage. Previous monitoring and evaluation of the technologies performed in concurrence with other component activities revealed that many filters had broken since reception (Table 5.1). This made sustainability a pressing concern and therefore, a commitment from the recipients was requisite to design a long term solution. However, the majority of saving groups members made it clear they were *not* interested in resolving filter issues, and preferred to have a new filter provided. The sustainability of the filter component is precarious and the Chamcar Bei experience is unfortunately consistent with past research on filters in Cambodia. A primary problem is the seeming inability to develop and maintain a parts and replacement system for damaged filters (Brown and Soesby 2008). While the Red Cross is currently working on creating such initiatives, the question of funding makes the likelihood of any such programs being developed in a timely fashion, unlikely.

Wells

These are by far the most successful technology and requiring the family to dig the hole necessitated a commitment by the family which reinforced ownership. The wells appear to have the best chance of making a long lasting impact. Education is needed because of local assumptions regarding well's water quality, as well as instructions on maintenance and an understanding of the importance of keeping the areas around the well clean and free of animals.

Latrines

Q: Where do most people go to the toilet?

A: Forest, the forest. They go out to the forest.

-Local community member

Latrines were lacking two essential prerequisites: education and ownership. Simply providing families who claimed to have the skill to build a latrine with one without first requiring them to put forth any serious commitment was a mistake which was compounded by a lack of any education on building and maintaining the latrine. While a 50% success rate may sound unsatisfactory, it does compare favorably to other Cambodian led initiatives (Hilda Winarta from UNICEF personal communication, February 23, 2009). However, the results could have been more positive, had education and attention been paid to the initiatives.

They have a bathroom in the school but there is no water so people don't use it.

-Local community member

Finally, an essential criterion for future placement of latrines is a nearby water source: latrines require a significant amount of water.

Traditional Beliefs

Exploring Chamcar Bei villagers' perspectives and including them into future health program initiatives, as well as ME protocols, was also an objective of this internship. In addition, villagers are to assume responsibility for monitoring and evaluating all of the health program initiatives in the near future. Therefore, designing programs and ME protocols that consider beliefs motivating local behavior related to water and sanitation and disease would buttress future program and ME initiatives. Therefore, some questions in the key informant interviews and surveys sought to explore various local beliefs and conceptions of health and illness, related to water and sanitation.

Ghosts, Snakes and Mosquitoes

| RESPONSES TO QUESTION (N=57) | SANITATION (N) | DISTANCE(N) | FEAR COMBINED WITH DISTANCE* (N) |
|---|----------------|-------------|----------------------------------|
| “Why do you think is it important to have a latrine?” | 37% (21) | 63% (36) | 18%(10) |

Table 5.2- Reasons for Wanting a Latrine Results from Survey (Appendix C)
*Fear included ghosts, snakes, dark, mosquitoes and rain.

The desire for latrines was greatly elevated by the fear of ghosts, which are very real to Cambodians. This was most evident during participant observation and the key informant interviews but was corroborated in the survey. Complaints of having to walk far into the woods to defecate, where ghosts and snakes may linger, was the most common reason families believed latrines were important to have and nearly twice as common as the sanitation response. Fear of the threat of transmission of vector borne diseases, including malaria and dengue, were periodically coupled with the above grievances. The type of latrine was also important, and the desire for one that prevented the entry of snakes, was noted as important to some community members.

Local Water Perceptions

*It is raw food or raw water
Comes from the food, the water is not as bad
-Local community members
including a village health authority regarding diarrhea*

While not a question included in the survey, through participant observation and the key informant interviews, the following local perceptions regarding the etiology of diarrhea became evident. Local people believed that diarrhea comes from bad or “raw” food and not necessarily from water. “Raw” food or water is food that is not cooked or water that is not boiled completely. Further, “raw” food was also considered dirty, a perception affirmed by a local health authority. Raw or dirty food was believed by locals to be the first and foremost cause of diarrheal disease. “Raw” water also caused diarrheal disease, but to a lesser degree. This echoes past research of

Kendall who revealed that women attributed diarrhea to dirty food rather than water (Kendall 2005:106).

It was also obvious, as Cynthia Pun (2005) and Richard Burghart (1996) suggested and a recent CIH study (CIH 2009) confirmed, that boiling water was not always practiced, although the community was well aware of its importance. Furthermore, based on observation, boiling for 15 minutes never occurred even though many villagers agreed that was the necessary time to eliminate the “raw” quality of the water. Therefore, education is not necessarily a panacea for these issues. While not all key-informants agreed that villagers do not boil their water, past research in Chamcar Bei (CIH 2009) as well as local commentary about boiling revealed that many do not:

Most people don't boil their water. It is habit and tradition to not do it; they didn't used to and they don't have problem with it now. Taste is different after and it is hot. Warm water is difficult to drink and the taste is different.

-Local community member

It is apparent from past and current research that simply providing biomedical reasons for boiling drinking water is insufficient to overcome traditions and habits.

Wind, Traditional and Biomedical Medicine, and Miasma

(Statements referring to coining and cupping)

It releases the negative 'wind'. If you have a sore stomach and your head is dizzy it makes you feel better. If you are exhausted it makes you feel better.

It can cure you. I don't know how it works but when I do it, it makes me feel better.

If your body isn't released then it releases the wind out and then it can get rid of it (bad wind).

-Local community members regarding coining and cupping

Coining and cupping are ubiquitous in Cambodia as well as in Southeast Asian refugee populations around the world (Jackson et al. 2000). The therapies include rubbing the body with a coin and oil (coining) or heating a cup on the problem site (cupping). These healing methods are used to resolve various symptoms, including headaches, exhaustion, dizziness or any feeling that “isn't right” in your body. This is practiced by the educated and uneducated alike and the marks from coining or cupping commonly appear on Khmer people. In my initial surveys when asked what villagers did to address illness after its onset, villagers did not mention the use of traditional

therapies. Therefore, after 20 surveys I began asking directly if they ever cupped or coined and the responses changed. They divulged their first treatment choice was coining and, only if this failed, did they go to the pharmacy for medicine. Eighty-six percent of the 72 respondents revealed using the traditional healing method prior to visiting the pharmacy for medicine. The etiology of wind and the therapies was enigmatic to the key informants and many credited the beliefs and practices to their parents and ancestors.

It is in your body and it doesn't feel right and your head hurts and no energy and then you can coin or cup. They sleep and then if they still feel sick go and get medicine.

If you are busy, exhausted don't feel right. Then they rest and if it doesn't go away they go and buy medicines.

–Local community members

The success rate of cupping and coining was estimated by the Key Informants (N=5) to be approximately 5 to 10%, and the immediate line of care following this traditional therapy, if ineffective, was medicine purchased at the local pharmacy. Eighty-three percent of 90 respondents said they would then go to the local pharmacy, which was owned by the head of the health center, and only 2% said they would go to the health center. The remainder either sought care in alternative pharmacies near their home or went to the private physician in the village.

Finally, it became apparent that the wind is an extension of the miasma theory as also identified by Green (1986) in Swaziland. Response to the questions how disease was spread due to lack of latrines prompted these comments:

Viruses spreads if it rains and then it smells (feces) and you get flu because then the wind isn't good, it smells and then health isn't good especially when the smell is strong.

–Local community member

Cholera causes bad health which is caused by the bad smell

– Local community member

Traditional beliefs are powerful motivators which could significantly influence behavior. It would be possible to utilize community beliefs and practices to encourage community members to keep cleaner environments and also address perceptions about treating water. It is also possible that local latrine and water perceptions, including the miasma theory could be incorporated into future program and ME efforts in Chamcar Bei and fashioned into effective educational and public health tools.

Gender

| Water gathering participant(s) | % OF TOTAL SAMPLE (N=57) | MINUTES DEDICATED TO PROCURING WATER IN ONE DAY | AVERAGE DISTANCE (meters) TRAVELED TO GATHER WATER (N=57) |
|--------------------------------|--------------------------|---|---|
| Total Sample | 100% (N=57) | 37 | 97 * |
| Everyone in Family | 28% (N= 16) | 29 | 72 |
| Women and girls | 56% (N=32) | 45 | 70 |
| Men and boys | 16% (N=9) | 30 | 56 |
| Girls | 16% (N=9) | 60 | 283 |
| Boys | 3.5% (N=2) | 10 | 23 |

Table 5.3- Gender and Water related Results from Survey (Appendix C)

*After excluding the highest and lowest values.

*Defined as when *only* girls or boys were delegated responsibility for water procurement.

Water Procurement

Q: *How many hours a day does your household (men/women) spend collecting water?*

A: *I spend one hour. My husband walks around, he doesn't do anything, at all.*

-Female village member, with frustration

As the above results reveal, women and girls were primary responsible for carrying water. Nevertheless, men did assist in gathering water, which often involved such tasks as driving a motorcycle for transport of the water. However, most people agreed that women are the responsible gender for procuring water. Girls, unfortunately, shouldered a large burden, gathering as much as men and boys combined, and dedicated the most amounts of time and physical effort to the endeavor. This underscores the importance of recognizing the burden and future implications of water related efforts on women and girls in Cambodia and in Lesser Developed Countries (LDC) worldwide.

Water Management and Health

Q: *Who is responsible for providing the family with clean water?*

A: *The women are responsible. The women should boil the water.*

-Local community member (male)

A: The women are responsible for clean water as well as a healthy family. The women are responsible to make sure children drink clean water.
-Local community leader (male)

Water management, unfortunately, was not included in the surveys, but interviews and focus groups unanimously agreed: women were solely responsible for water management. This included boiling the water, cleaning the dishes and preparing the foods, thereby making women culpable if someone's food or water was "raw" and resulted in disease or sickness. It was agreed that women are responsible for preventing and treating diseases were responsible for providing the money to purchase medicine. The past research in the region and key informants were in concordance that the role of men was to transport large amounts of water, many times with a moto, to the household and participant observations corroborated this local belief (Pun 2005). One key informant claimed men gather water more than men because they are "stronger". The significance of these gender roles distinctions and subsequent distribution of household tasks was also found by Whiteford (1997) in the Dominican Republic. Similar to Whiteford's research, women in Cambodia were also responsible for "procurement, storage and cleaning of water" as well as the "primary water handlers" (Whiteford 1997:3). These gender distinctions relieved men of responsibilities related to water after it reached the home. Even so, this does not preclude the possibility of increasing male responsibility for treating and covering water containers once obtained or maintaining water at its sources as suggested by Whiteford in her ethnoecology of dengue (Whiteford 1997).

Women and Latrines

Latrines are more important for women. Because when there is no latrine they are ashamed because you are shitting outside and they can see you.

For the women it is very difficult. They cannot go to shit at the forest because it is shameful, but there are no latrines. If you are a women and you are going to shit everywhere where people can see you that isn't good.

-Local community members

A not unexpected finding was that latrines were especially important for women, as it is shameful for women to defecate outside. Public discussions or displays of bodily functions are taboo in Cambodian society, most especially for women. Furthermore, other research performed in the region revealed cultural taboos prohibit pregnant women from entering the woods,

therefore the lack of latrines in villages may cause undue stress during pregnancy in Cambodia (CIH 2006).

Discussion

The above results *are not* statistically significant and are only presented as descriptions of the population. The lack of any governmental initiatives to ameliorate the lack of potable water in Chamcar Bei was evident, and while technologies including boreholes were provided, they were provided all in the village center, or more financially sound section of town, but without education on how to maintain or repair them.

These results provided insight and many possibilities for future organizational water sanitation and ME initiatives. It was apparent that the intentions of BAB, but particularly the HIH staff, were genuine. However, the past actions related to water and sanitation did not align with the programs' vision and mission, which prevented sustainability. Many of the problems with the technologies were due to a lack of a health component staff or local oversight. Furthermore, the already insurmountable amount of work required of staff prevented them from being more in touch with the expressed community needs. The PLA detailed the expressed community health needs and, had the PLA been closely followed, 280 latrines rather than filters would have been provided. Nevertheless, in retrospect the 10 trial latrines demonstrated that the community *should not* be given more latrines or technologies without *first* providing education and having the recipients develop a sense of responsibility for the technology.

Indicators that resonate with both the community and the organization were not as difficult to locate as previously assumed, as the HIH project did have the community's best interest in mind and health and sanitation were deemed important by both the organizational and the local community. However, including the primary importance of saving time to the community should also be incorporated into future ME efforts. While the initiatives' primary purpose was not to provide the villagers of Chamcar Bei more time to engage in productive, non-water related activities, this was a fortuitous result. Further, if BAB truly intends to create a sustainable health program of Chamcar Bei or similar communities, more serious attention and future funding should

be delegated to the health component and a counterpart will be essential. The health component has been greatly neglected in the past, but this component is critical to the overall economic, social and physical health of the community.

Finally, local beliefs and gender characteristics of the village revealed that traditions and societal expectations greatly influence the daily decisions of villagers. The utility of developing education programs while being cognizant of these local perceptions and social norms can enhance program effectiveness, allowing one to speak to the viewpoint one desires to influence. Whiteford's research in the Dominican Republic (DR) revealing gendered distinctions of responsibility related to water procurement were substantiated by this research (Whiteford 1997). While not fully explored in this research, there is a possibility that Cambodian men, as men in the DR, retained responsibility for the large containers outside the home, and women the smaller containers in the home. Nevertheless, women in Cambodia as in the DR were also primarily responsible for preventative health efforts but already contended with a deluge of responsibility. Assigning more water related health and preventative responsibilities to men, related to water storage, or containers for which they retain responsibility for filling, could buttress local health efforts (Whiteford 1997). Shifts in gendered responsibilities are necessary alleviate some of the burden already experienced by women in LDCs. This is especially important in Cambodia, whose gender disparity after the genocide continues to press responsibility more heavily upon women (Wren 2009; Huguet 1992). Furthermore the surfeit of male free time could be harnessed to contribute to the health of the family and larger community.

Summary

The results of the monitoring and evaluation methodologies were sufficient to fulfill the internships objectives. The organizational staff and the local community had divergent perspectives regarding the impacts of the technologies, as the local community valued the time saved by the technologies, while the organizational staff perceived improved health and access to clean water to be most beneficial result. Nevertheless, the community and organization agreed

that improved health and sanitation was advantageous and this agreement allowed for the identification of mutually informed ME indicators.

The lack of consistent staff and health program support reduced the effectiveness of the water and sanitation initiatives and ME efforts. Furthermore, responsibility assumed by the organization for the success of the technologies relieved the recipients of the accountability for the care and maintenance of the technologies, an accountability which is critical to sustainability. This was compounded by the lack of commitment required from community members, prior to receiving the technologies. Nevertheless, BAB staff and local community members alike recognized the flaws of the past initiatives, and provided feasible ideas and advice on future ME efforts. The community's willingness and desire to learn provides the HIH project with many opportunities for the creation of community driven and sustainable health ME protocols.

In summary, local beliefs regarding water sanitation, disease prevention and treatment must be considered in future programs and ME initiatives whose implementation responsibility would eventually fall upon the community. In Chamcar Bei, cultural beliefs surrounding ghosts, snakes and the fear of encountering them while on the often long walk to the forest created the desire for latrines, while sanitation remained secondary. In addition, community members in Chamcar Bei believed that "raw" food was the primary cause of diarrhea, with "raw" water playing a lesser role, a belief unsupported by the medical community but strongly held in the community. Finally, traditional methods of coining and cupping typically preceded the seeking of more western medications and belief in the role of "wind" in causing disease or the miasma theory of disease, remained strong in the Chamcar Bei community. These traditional beliefs many times superseded the accepted and proven explanations for the etiology of disease. Such phenomena will be considered in the final chapter as will past literature and anthropological research. Organization and local recommendations as well as the larger implications of the research will also be presented followed by a conclusion.

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

We want education on how to do it better, we still don't really know about how to do it better to stop it (poor health). We want to learn how to solve the problems. We want to know how to do it better for our families, we didn't have people to study with us and so we didn't really know. We really want to learn. We want to know and then after that, we can lead.

-Local community member

Contributions to the Literature and Development in Cambodia

The findings of the research revealed that it is possible to create monitoring and evaluating protocols that include both the organizational and local priorities. A grassroots non-governmental organization (NGO), such as BAB, operating at the village level, can increase the likelihood that program strategies will correspond to locally perceived needs and thereby increase the possibility of successful and sustainable initiatives. However, the research demonstrates that creating health programs that consider the local community's needs must be based on an understanding that the organization should not simply *give* water and sanitation technologies to villagers. Education and a sense of ownership need to precede the reception of the technologies. Further, including local priorities in program's initiatives and ME protocols will enhance an NGOs' programs' relevancy and sustainability. While health improvement was an important impact of the technologies to both the community and the organization, the ability to save time and money was valued more highly by the local community. These local priorities as well as beliefs related to water and sanitation and disease should be incorporated into future program and monitoring and evaluation efforts, especially those that intend to serve local needs and speak to local beliefs (Green 1986).

Many of the findings in the literature were corroborated by this research and distinct concepts also emerged. Brown and Soesby's (2008) randomized control study on ceramic filters in Cambodia found a 2% average breakage rate per month (Brown & Soesby 2008: 4). This research revealed a 26.2% breakage rate of the sample of filters, over the average span of a year and a half (18 months, or 1.45% a month). While these figures do not correspond exactly, this

could be attributed to that fact that some of the broken filters had been discarded or used for other purposes, such as storing rice, and in these instances some families claimed not to own a filter. The reduction of diarrheal disease was dramatic in this research (3.97 times less likely after receiving filter) and much higher than Brown and Soesby's filter study which claimed filters reduced diarrheal disease by half (Brown and Sobsey 2006:4). This could be attributed to methodological differences in the two studies: Brown and Sobsey's study was a randomized control trial which allowed them to follow a large number of participants over time, while this research relied on one-time, self-recall of a smaller sample. This could certainly account for some of the disparities in the two data sets. Nevertheless, both studies confirm that filters are very effective in reducing diarrheal rates in Cambodia.

The underutilization of the health center and health seeking behaviors, discovered by Ben Bowles (2005) as well as Sokrin Khun and Lenore Manderson (2007) was also confirmed: the majority of Chamcar Bei villagers sought care at the local pharmacy rather than the health center (Bowles 2005; Khun and Manderson 2007). The head of the health center was also the owner of the local pharmacy, which may have impacted these results. However public and private practice overlap is a common characteristic of Cambodia's medical services (Department of Planning and Health Information 2008). Medical anthropological research in Cambodia over a decade and a half ago revealed that the reduced costs of medications at the governmental health center did not override villagers' preferences to purchase treatment *near* the home and treat disease *in* the home (van de Put 1992). This continues to resonate with rural Cambodians today and the results from this research further verify this underutilization of the health center in the villagers of Chamcar Bei, a majority of whom frequented the local pharmacist (Khun and Sokrin 2004; Ben Bowles 2005).

Traditional preferences and attitudes also influence even basic health safety measures. For instance, the importance of boiling water was common knowledge in Chamcar Bei. However, there was not always a translation of this knowledge into practice (Burghart 1997; Pun 2005; CIH 2009:4). Local feedback showed that educational programs to effect behavior change were impacted by past traditional practices and preferences. In the case of Chamcar Bei the

community tradition was not to boil water, among other complaints, because it was not pleasant to drink when warm. Therefore, education and knowledge dissemination was not enough, and strategies that consider these predilections should be included in behavioral change strategies (Green 1986). NGO and organizational programs seeking to educate and communicate with the Cambodian people should incorporate local ways of thinking into their program strategies, to elevate the resulting initiatives with local cognitive congruence, relevancy and effectiveness.

During this experience, it was apparent that doing for, rather than teaching to do, was the predominant strategy of government and NGOs alike. While these strategies are certainly easier, they encourage community dependency rather than collective self-efficacy (Zakus 1998; Birn and Garfield 2000). The latter is a pre-requisite for sustainability and this cannot be accomplished without a combined effort from all parties to provide and receive comprehensive education and skills prior to the insertion of water sanitation technologies.

Larger structural and political forces operating at the local level were also observed. Being a health adviser included attending monthly provincial health meetings with the government. These meetings made it apparent that the government wanted the NGOs to fund a majority of health related activities and thereby relieve the government of responsibility (Meessen et al. 2008). In Cambodia, water, sanitation and health are not under the authority of the Ministry of Health but rather the Ministry of Rural Development (Ministry of Health 2008). This complicates comprehensive health efforts. The Ministry of Rural Development, as observed in Chamcar Bei, provides technologies without first requiring any commitment from the community, or providing health education and skills related to the technology's sanitary importance and maintenance. The results of this research underscore the consequences of such vertical initiatives, which leave the community without the requisite knowledge and skills to resolve technological problems independently. This engenders a sense of dependency and compromises any initiative the community may have to resolve the problems themselves.

Contributions to Anthropology

This research will deepen the anthropological understanding of cultural models of water and sanitation programs, as well as the gender implications of water procurement and management in Cambodia. Furthermore, it identifies opportunities for creating locally informed indicators for water and sanitation programs in Cambodia and confirms that local priorities may diverge from Western concepts of importance (Nachter and Hickey 2002; Burghart 1996). Sustainability issues were also revealed as well as the problem created by *giving* communities materials, without providing corresponding knowledge and skills, that can result in dependency and create a sense of helplessness when the technologies do not function (Whiteford 1997).

This study also examined cultural models of health. Previously identified cultural models of health discovered in Cambodian refugees were confirmed by this research (Jackson et al. 2000). Wind remains an elemental variable operating in the Cambodian culture explanatory model of health as well as Cambodians' health seeking pathways. While using modern medications is widely practiced in the event of disease, it appears to be an option only after traditional therapies such as coining and cupping have failed. Traditional therapies will likely remain the first line of treatment for the majority of Cambodians, even though the success rate is recognized as low, in this research 5-10%. The discovery of miasma theory was an unexpected and informative result and, while only evident in the key informant interviews, they provide a glimpse into cultural paradigms rationalizing the spread of disease (Green 1986). Connections to Kendall's research (2005) also revealed that participants attributed diarrhea to bad or, in this study, "raw" food more than to dirty water (Kendall 2005).

The importance of latrines, especially for women, is a significant finding and correlates to a 2007 UNICEF study in Cambodia: "research indicates that schools with wells and latrines help to keep more children in primary schools, particularly girls" (UNICEF 2007). Increasing the availability of sanitary facilities at schools and other institutions providing skills and expanding opportunities could contribute to leveling current gender inequities. The above cultural models and nuances could and should be fashioned into effective public health programs and incorporated into larger social services (Green 1986).

Parallels to Whiteford's (1997) research in the Dominican Republic (DR) were also discovered. Women were primary responsible for the management of water, as well as health issues related to water and sanitation. Therefore, as in the DR, Cambodian public health programs are typically targeted at women, as evidenced by the scarcity of men at educational sessions in Kep Krong Province, Cambodia. These similarities demonstrate that public health efforts must remain cognizant of the burden and "powerlessness" these women may already experience (Whiteford 1997:17). Women in Lesser Developed Countries (LDC) already shoulder a myriad of responsibilities related to child care, providing food, as well as procuring and managing water. Female frustration of the lack of contribution of men in contending with these tasks was very real in Chamcar Bei. Both males and females agreed that the surfeit of male idle time could be harnessed to confront Cambodian's water and sanitation issues and ameliorate the burden women face in procuring and managing water. However, this would be more likely occur through the introduction of water technologies and strategies related to water source treatment and not an increase in male water management responsibilities, due to stringent gendered divisions of labor that will change only slowly (Manderson and Huang 2005; Whiteford 1997).

As Rylko-Bauer, Whiteford and Farmer (in press) have found, these results can position health as a prism through which to understand structural and political deficiencies. This experience confirmed that organizational and governmental health strategies too often provide technologies without the requisite skills or knowledge to resolve problems locally. This compromises the programs' sustainability and capacity of local populations who are unable to resolve problems themselves. In addition, this sets a future precedent: people see that community members receive water and sanitation technologies, such as bathrooms and wells from the Red Cross and organizations like BAB, without any prior commitment. Therefore, they prefer to wait for their own hand-out, rather than take the situation into their own hands. Education and skill transfer did not appear to be a priority of the government or BAB in relation to water and sanitation activities. Providing technologies without information as to *why* they are important to health or the skills to repair them leave populations incapable of contending with their own problems. The initial benefit of technologies such as filters is sacrificed when they break,

which currently has no solution at the village level. The inability to remedy one's situation in the event of technological malfunction reinforces the already dependent attitude of the villagers. These organizational and governmental initiatives have caused the Cambodian people believe the "ancha" or NGOs should do it for them and motivation and belief in one's ability to better one's situation has been compromised. Sustainable initiatives will take not only resources, but *time* to build capacity, increase knowledge and foster a belief in communities' own abilities. Showering resources on complicated issues tacitly communicates to the villagers that they are not capable of being part of the solution to these problems. This is wasteful and damaging, not only to the Cambodian people but our larger global environment.

Organizational and Local Recommendations

My internship duties and subsequent objectives included providing recommendations to BAB to inform future health program development, especially ME protocols. These recommendations, to be discussed in the following section, were informed by the organization and community through the above methodologies and findings. Mutually informed indicators were identified and augmented with gender and local sensitivity. The suggested indicators include gauging health improvements by measuring a reduction of diarrheal incidence before and after program implementation. Local and gender sensitive indicators could include the amount of time saved as a result of BAB's initiatives, and further what gender, benefited from this time conservation. The lack of inclusion of education and community responsibility for the technologies were two programmatic weaknesses. The distribution of technologies, prior to the insertion of education and understanding of the sanitation, health, and maintenance importance of these technologies, circumvented the programmatic goals of sustainability. Advice on future program sustainability and ME initiatives include comprehensive education, as well as accepted community responsibility for the technologies, prior to their reception.

The community's first priority, with regards to water and sanitation, is latrines. Important prerequisites for latrines include logistical as well as educational requirements prior to their reception. Finally, collaborating and consolidating future initiatives with other organizations also operating at the community level, such as the Red Cross, would serve BAB's program and ME goals of achieving sustainability.

Congruent Beliefs and Possible Indicators

Improved health and sanitation and access to clean water were the two goals of the water sanitation initiatives which both the organization and the local level agreed upon and should be used to inform future indicators. Possible indicators should be contained within questions included in a *baseline survey*, at the onset of initiatives and then a *follow up* survey occurring at least annually, but ideally within 6 months following. Triangulation can be achieved through focus groups and semi-structured interviews. Questions related to the amount of time dedicated to water procurement and management (boiling, transferring etc.) and gender related issues need to be included in the survey. Monitoring and evaluating latrines and wells should contain survey questions related to the amount the time devoted to fetching water and walking to the forest to defecate asked before and after the water initiatives. For health indicators, two week diarrheal incidence within the family could be determined as well as the monthly medication expenses to treat diarrheal diseases, in pre- and post-initiative tests. These indicators address both organizational importance of health, as well as the locally expressed importance of saving time and money in both the acquisition of water and the treatment of those made ill by contaminated water, time and money which can be used more usefully in improving the livelihoods of community members.

Education and Ownership

Education was noted as important by BAB staff but organizational action did not reflect its importance. While local community members often said they want more education, BAB staff assumed a lot of the responsibilities, which relieved the community of responsibility for the technologies and this compromised sustainability. More education and commitment is needed from the community prior to providing them more technologies. BAB claims "ownership" to be an

essential aspect of their HIH program initiatives (Bridges Across Borders 2007:58). However it was lacking in the program initiatives. These technologies were essentially free, which diminished their locally perceived value. A salient example of this was demonstrated during focus groups with the savings groups. During these focus groups, I proffered a proposal of developing sustainable solutions to filter problems within the group. My proposal suggested more individual involvement and responsibility of the recipients for the technologies. My recommendations were rejected by all three groups and were then followed by the request for more new filters from BAB or someone to come and fix their filter for them. This underscores how simply *giving the technologies* before instilling a sense of responsibility for and ability to care for technologies, circumscribes the success of current and future initiatives. Furthermore, *giving* implies they could not have acquired the technology on their own, compromising self-efficacy, or a belief in one's abilities. Granted, a majority of these technologies remain far beyond the financial means of most community members, however, *exchanging* knowledge, skill and nurturing a belief in the communities' own abilities is necessary to create sustainable initiatives. Merely *giving* and *receiving* technologies leaves communities reliant on erratic organizational and governmental initiatives and powerless to find their own solutions. In addition, NGO and governmental programs must ensure that the community has the ability to access the necessary parts and capacity to solve technological malfunctions *prior* to providing technologies. This has to be accomplished whilst maintaining a proper balance of local, organizational, and governmental responsibilities and is critical to avoid overburdening communities already in poverty (Whiteford and Whiteford 2005: Farmer 2005).

Future Sustainability

Making the savings group the primary body responsible for monitoring is by far the most sustainable and practical option for ME *if* the savings group continues to be the primary target of the technologies. However, the members of the savings groups *do not* represent the poorest members of the community, which are the expressed target group of the HIH project. Based on observations, many of the technologies went to families who were *not poor* relative to their neighbors. Therefore, I would recommend that BAB be vigilant in locating impoverished families

to be recipients of future health education and technologies. Furthermore, these local beliefs regarding water sanitation and explanatory models of disease should be considered in developing future water and sanitation program strategies.

Health groups from respective parts of the community, Antung Saw, Chamcar Jak, and Chamcar Bei, should be formed, and each should possess two group leaders, preferably a male and a female. Males should be specifically recruited for inclusion in these initiatives.

Technologies, such as latrines, filters, and wells, should not be provided without the group first having committed a significant amount of time to extensive education and training on: 1) their sanitary importance and benefit, 2) the construction/assembly, and 3) their maintenance. Ideally health group members should proceed through the steps together and disassemble as well as assemble the technologies *together*. The presence of local colleagues should enhance motivation to care for the technology upon reception and further supply nearby eyes for monitoring and evaluating initiatives. Prior to receiving any technology, a contract should be signed or fingerprinted to reinforce the commitment. A head of the health program for all of Chamcar Bei, ideally literate and a volunteer with the Red Cross should discuss and consolidate the data every 3 months with the respective leaders. By using a Red Cross member, BAB could fortify as well as consolidate local health efforts, so that programs and education are not regionally or topically redundant.

Future Water Technology Priorities

A system for providing latrines to the community should be the priority initiative: all sources agreed that latrines are most important to the community. However, having water *near the house* is a very important prerequisite. Wells are secondary, but should not be provided without comprehensive education about the wells water quality and maintenance. Any initiatives to provide more filters without a system in place to contend with future problems, which *will* occur, would undercut sustainability. However, this should be a priority as the filters, even though poorly maintained, successfully reduced the rates of disease dramatically. A more effective filter program could result in even more drastic reductions as well be more sustainable. It would be wise to allow the Red Cross which has provided filters in the past and intends to in the future, to

take responsibility for providing these technologies, if sustainable strategies remain the objective of BAB. The above recommendations will take time, but for truly sustainable initiatives time is essential. Instilling knowledge, securing commitment from and belief in the community is the only way to secure sustainable results.

Larger Implications

It is apparent that collaborative and consolidated efforts between health and water and sanitation need to be coordinated in Cambodia. The disconnect between the provision of water related and health efforts complicates the goal of providing potable water to the majority of the population in Cambodia (Tan 1998; UN Office for the Coordination of Humanitarian Affairs 2008). While the nation regularly publicizes the gravity of the situation, corresponding action is lacking (Royal Government of Cambodia 2005). Serious policy changes and shifts in governmental and departmental responsibilities will be necessary to direct a comprehensive effort to ameliorate these problems (UN Office for the Coordination of Humanitarian Affairs 2008).

Anthropologists working in development have noted the divergences in priorities and understanding of issues of donors and local communities (Nolan 2002; Ervin 2005). During this internship, it was clear that the priority of the organization was to please donors and whether resulting initiatives were relevant to and successful in meeting community needs remained secondary. While funding is essential for all development programs, donors need to have a better understanding of local realities. For example, giving things, such as the 20 wells, is favorable to donors. They envision a family enjoying clean water and revel in their altruism, which can facilitate the flow of money to projects. However, informing a donor that an organization spent 4 months training villagers about the sanitary importance, construction and maintenance of a well is not tangible and may not open as many wallets. Nevertheless, the latter can foster a capable, healthy populace and sustainable initiatives, while the former, as in this experience, could provide a polluted water source to local community members who assume it is so safe it does not need to be treated. Organizations should design programs in the best interest of the community, not the

funding sources, striving to *empower* populations: otherwise their efforts will never be sustainable and can even be harmful.

Taking the time to understand local perspectives and incorporating them into programs and monitoring and evaluation protocols and indicators can inform organizations if local needs are being met. This reinforces sustainable initiatives, which are imperative in light of our global resource and economic crisis. As discussed in the introduction and literature review, the UN's JMP represent the monitoring protocols which gauge international progress toward the MDG goals. These monitoring protocols consist of numerous technological indicators related to water and sanitation, one of which is the availability of a water technology within 1 kilometer of households. This snapshot of the local sanitary situation disregards seasonal variations impacting availability and social indicators such as whether the households actually consume the water source or their perceptions of the sources water quality. While water quality, such as the levels of E. coli are included in JMP's indicators, research in Cambodia and Nepal reveals this is not a robust indicator of water quality (Brown 2008; Burghart 1997).

If sustainable initiatives are the goal of the UN, indicators need to be created that gauge the level of local water and sanitation knowledge and technical skills related to their maintenance. The JMP is also trying to include gender related indicators variables such as the amount of time women and girls dedicate to gathering or bringing water to the home (UN Water-Task Force 2004). This indicator should also include the time women and girls dedicate to water *management*, which pertains to water responsibilities *after* the water reaches the home, including food preparation and supplying clean water for the family by boiling or maintaining a water filter. This is also very time consuming and primarily a woman's responsibility (UN-Water Task Force 2004; Whiteford 1997; Ferguson 2005; Manderson and Huang 2005; UNESCO 2004). Local priorities should also be incorporated into indicators to confirm the success of initiatives with the people whose life they are intended to improve (IWSD 2005; Whiteford and Whiteford 2005; IRC 2004).

Gender issues in Cambodia are far reaching. It is apparent that the gender survival disparity after the war, while since leveled, has not reduced the disparity in the division of

responsibilities for men and women. Men do not have the level of responsibility of women in Cambodian society. Women in Cambodia are expected to remain in the home, while men can travel and take advantages of opportunities, such as education and profitable labor. Sadly, the family unit often receives little benefit from these opportunities as men spend what they earn on non-family related pursuits and this increases the risk of returning to their villages with STDs (Werner 2007). While these gendered issues are evident in the delegation of water and sanitation responsibilities, they permeate nearly all Cambodian environment and health initiatives. Policies need to first recognize the *inherent* social divisions, start a dialogue on the topic and stress the benefits of gender equitable societies. During my time in Cambodia, it became evident the people in Cambodia *want development*.⁹ Therefore, emphasizing the importance of both male and female contributions to livelihoods and development, both in and outside the home could encourage gender equity. Focusing health and education initiatives primarily on women while neglecting the male population will only exacerbate the problems, but creating programs that provide males with opportunities to contribute to society and convince them of the advantages of educating and liberating women and girls could transform a relatively stagnant population into something productive (Whiteford 1997).

Cambodia is teeming with NGOs and other organizations whose various initiatives have relatively little connection to each other. Programs are redundant and knowledge is not shared. In addition, grants and funding are competed for by various organizations, complicating collaboration and collective efforts. The competition for resources in Cambodia undercuts consolidation of labor and resources, exacerbating the problem of waste. There needs to be intensive efforts to remedy these disjointed initiatives.

Policies also need to change. More water and sanitation responsibility should be assigned to the Ministry of Health, with recognition to its linkage to women's health as a first step in addressing the exorbitant maternal mortality rates of the nation. Secondly, NGOs, the

⁹ The benefits and consequences of development need to be addressed in Cambodia, as only the latter is evident to the rural populations. Environmental degradation due to the importation of imported goods and luxuries is increasingly impinging upon the environment as well as diet of the Cambodian people. The local populations are buying into this development without any understanding of the future ramifications.

government and all organizations must work toward the same goals, not at conflicting purposes. Policies, funding and grants that support collaborative efforts of NGOs and government working in similar regions and projects should share knowledge and resources. Resources, which would otherwise be wasted and good programs which would otherwise be forgotten, could be put to use for the benefit of the Cambodian people. However, this will only occur if various organizations and government focus on the shared objective of improving the livelihoods of the Cambodian people.

Personal View

The experience gained from performing the above research was invaluable. Nevertheless, it was not a good use of resources to send a white person with only basic Khmer language skills house-to-house to follow up on the respective technologies. This compromised the integrity and quality of the ME feedback. The BAB staff is well trained in the nuances of monitoring and evaluation and has considerable rapport with the community and knowledge of the technologies' location. If the staff had been motivated to do so, they could have identified solutions to these issues. Having a foreigner come to perform ME related tasks for BAB's water and sanitation initiatives could have been interpreted by the BAB staff to suggest they were not capable, and perhaps caused them to question their own abilities to perform ME, even though their abilities far surpassed my own. However, this could have been a valuable experience for them.

Conclusion

This chapter provides an overview of the research's contributions to past and present issues confronted by both development workers and anthropologists. The data and analysis included in this internship project suggest that the Cambodian people, while benefiting as a whole from organizational and governmental water and sanitation initiatives, could receive far more personal and sustainable profit, if more attention were given to education, ownership and capacity, rather than simply resource provision. There needs to be an *exchange* of knowledge and skills to cultivate a communities' confidence in its ability to find and implement solutions.

While *giving* and *receiving* technologies bestows power upon the donor organization or government, it may, if not implemented properly, generate a sense of powerlessness in the local people. Gender related issues need to be tailored to the society as a whole so that it appears, especially to men, that upholding gender equitable values will improve the livelihoods of *everyone*, not just women. The ultimate goal of improving the health of Cambodians living in poverty is compromised due to the lack of consolidated efforts of NGOs and governments. Working together and communicating, not only with other organizations working in development, but with the local communities is critical. Only by breaking down boundaries through communication and understanding can various perspectives coalesce and allow comprehensive as well as sustainable solutions to be reached.

REFERENCES

Asian Development Bank (ADB)

2009 Assessment of Socio-Environmental Performance Cambodia. *In* Regions and Countries: Asian Development Bank. Electronic Document, <http://www.adb.org/documents/CAPs/CAM/0103.asp>, accessed June 1, 2009.

Aswani, Shankar, and Pam Weiant

2004 Scientific Evaluation in Women's Participatory Management: Monitoring Marine Invertebrate Refugia in the Solomon Islands. *Human Organization* 63(3):301-319.

BBC News Channel

2008 BBC Country profiles: Cambodia. Electronic document, http://news.bbc.co.uk/1/hi/world/asia-pacific/country_profiles/1243892.stm, accessed April 10, 2008.

Becker, Elizabeth

1986 *When the War was Over: The Voices of Cambodia's Revolution and its People*. New York: Simon and Schuster.

Belmont Report

1979 Ethical Principles and Guidelines for the Protection of Human Subjects Research. The National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research.

Benyshek, Daniel C.

2002 A Reconsideration of the Origins of the Type 2 Diabetes Epidemic among Native Americans and the Implications for Intervention Policy. *Medical Anthropology Quarterly* 20:25-64.

Bertrand, Didier

2005 The Therapeutic Role of Khmer Mediums (kru borameŋ) in Contemporary Cambodia. *Mental Health, Religion & Culture* 8(4):309–327.

Birn, Zimmerman A., and Garfield, R.

2000 To Decentralize or not to Decentralize, is that the Question? Nicaraguan Health policy Under Structural Adjustment in the 1990s. *International Journal of Health Services* 30(1):110-128.

Bossert, T.

1998 Analyzing the Decentralization of health systems in Developing countries: Decision Space, Innovation, and Performance. *Social Science and Medicine* 47(10):1513–1527.

Bowles, Ben

2005 Health Seeking Behaviors and Barriers to Accessing the Public Health Care System in Krong Kep, Cambodia. Unpublished MS, Centre for International Health (CIH), University of Toronto.

- Brabeck-Letmathe, Peter
 2008 A water warning. The Economist, November 18: 5. Electronic document,
http://www2.economist.com/theworldin/displayStory.cfm?story_id=12494630&d=2009,
 accessed May 8, 2009.
- Braidwood, Mark
 2008 The Centre for International Health's Field Station in Kep, Cambodia: the Research so
 Far. Unpublished MS, Centre for International Health (CIH), University of Toronto.
- Bridges Across Borders (BAB)
 2006 Participatory Learning and Action (PLA) Report. General Report. Kep: Hand In Hand
 (HIH) Project.
- Bridges Across Borders (BAB)
 2007 Phnom Voar: Integrated Community Development Project. Three Year
 Operational Plan. Kep: Hand In Hand (HIH) Project.
- Bridges Across Borders (BAB)
 2009 BAB home site. Electronic document, <http://www.babsea.org>, accessed April 10.
- Brown, Joe, Mark Sobsey and David Loomis
 2008 Local Drinking Water Filters Reduce Diarrheal Disease in Cambodia: A Randomized,
 Controlled Trial of the Ceramic Water Purifier. American Journal of Tropical Medicine and
 Hygiene 79(3):394-400.
- Brown, Joe, David Proum, and Mark Sobsey
 2008 Escherichia coli in Household Drinking Water and Diarrheal Disease Risk: Evidence from
 Cambodia. Water Science & Technology 58(4):757-763.
- Brown, Joe, and Mark Sobsey
 2006 Independent Appraisal of Ceramic Water Filtration Interventions in Cambodia:
 Final Report. Phnom Penh: University of North Carolina School of Public Health,
 Department of Environmental Sciences and Engineering.
- Burghart, Richard
 1996 The Purity of Water at Hospital and at Home as a Problem of Intercultural Understanding.
 Medical Anthropology Quarterly 10(1):63-74.
- Buschmann, Johanna, et al.
 2007 Arsenic and Manganese Contamination of Drinking Water Resources in Cambodia:
 Coincidence of Risk Areas with Low Relief Topography. Environmental Science &
 Technology 41(7):2146-2152.
- Business in Asia
 2008 Update on Cambodian Garment and Textile Industry: Runckel & Associates.
 Electronic Document, http://www.business-in-asia.com/industries/cambodia_garment.html,
 accessed May 30, 2009.
- Cambodia Ministry of Health
 2008 Health Strategic Plan 2008-2015: "Accountability, Efficiency, Quality, Equity".
 Planning Report. Phnom Penh, Cambodia: Ministry of Health.
- Cambodia Ministry of Planning
 2004 Cambodia Inter-Censal Population Survey 2004. General Report. Phnom Penh,
 Cambodia: National Institute of Statistics of Cambodia.

- Carlisle, Steven
2008 Synchronizing Karma: The Internalization and Externalization of a Shared, Personal Belief. *Ethos* 36(2):194-219.
- CDC Foundation
2004 Clean Water Empowers Women and Saves Lives in Afghanistan: CDC Foundation. Electronic document, http://207.56.110.146/frontline/2004/clean_water_empowers_women_and_saves_lives_in_a_fghanistan.aspx, accessed May 30 2009.
- Central Intelligence Agency (CIA)
2008a The World Factbook page. Electronic document, <https://www.cia.gov/library/publications/the-world-factbook/>, accessed May 9, 2008.
- Central Intelligence Agency (CIA)
2008b The World Factbook page. Electronic document, <https://www.cia.gov/library/publications/the-world-factbook/>, accessed May 9, 2008.
- Centre for International Health (CIH)
2006 Khmer Women's Perceptions of Pregnancy and Childbirth: Maternal Health and Illness in Krong Kep, Cambodia. Unpublished MS. Kep, Cambodia: Centre for International Health (CIH), University of Toronto.
- Centre for International Health (CIH)
2009 Nutritional Assessment of Children in Chamcar Bei. Kep, Cambodia. Unpublished MS..Centre for International Health (CIH), University of Toronto.
- Chandler, David
2008 A History of Cambodia. 4th Edition, Westview Press.
- Chatterjee, Patralekha
2005 Cambodia Tackles High Maternal Mortality. *The Lancet* 366 (9482):281-282.
- Crain, Cathleen, and Nathaniel Tashima
2005 Anthropology and Evaluation: Lessons from the Field. *NAPA Bulletin* 24:41-48.
- De Villiers, Marq
2000 Water: The Fate of Our Most Precious Resource. New York, New York: Stoddard Publishing Co. Limited.
- Department of Planning and Health Information
2008 Health Strategic Plan 2008-2015: "Accountability, Efficiency, Quality, Equity". Planning Report. Phnom Penh, Cambodia: Ministry of Health.
- Ebihara, May, and Judy Ledgerwood
2002 Aftermaths of Genocide: Cambodian Villagers. *In Annihilating Difference: The Anthropology of Genocide*. A. Hinton, ed. Pp. 272-291. Berkeley, California: University of California Press.
- Encyclopædia Britannica Online
2008 Cambodian Education: In *Encyclopædia Britannica*. Electronic document, <http://www.britannica.com/eb/article-52468>, accessed May 17.
- Ervin, Alexander
2005 Applied Anthropology: Tools and Perspectives for Contemporary Practice. Boston, MA: Pearson.

- Ezzati, M., J. Utzinger, S. Cairncross, A. Cohen, and B. Singer
 2005 Environmental Risks in the Developing World: Exposure Indicators for Evaluating Interventions, Programmes, and Policies. *Journal of Epidemiology and Community Health* 59(1):15-22.
- Farmer, Paul
 2005 *Pathologies of Power: Health Human Rights, and the New War on the Poor*. Berkley: University of California Press.
- Feldman, Peter R., Jan-Willem Rosenboom, Mao Saray, Chea Samnang, Peng Navuth, and Steven Iddings
 2007 Assessment of the chemical quality of drinking water in Cambodia. *Journal of Water and Health* 5(1): 101–116.
- Ferguson, Anne
 2005 Water Reform, Gender, and HIV/AIDS: Perspectives from Malawi. *In Globalization, Water and Health*. Linda Whiteford and Scott Whiteford, eds. Pp. 45-66. Santa Fe, New Mexico: The Brown Foundation, Inc.
- Food and Agriculture Department of the United Nations
 2008 Sustainable Development Department. Electronic document, <http://www.fao.org/sd/WPdirect/WPre0106.htm>, accessed May 15, 2008.
- Gil-González, Diana, Mercedes Carrasco-Portiño, and Maria Teresa Ruiz
 2006 Knowledge Gaps in Scientific Literature on Maternal Mortality: a Systematic Review. *Bulletin of the World Health Organization* 84:903-909.
- Goodman, Alan, and Thomas Leatherman
 2001 *Building a New Biocultural Synthesis*. Ann Arbor: The University of Michigan Press.
- Green, Edward
 1986 Anthropology in the Context of a Water Disease Control Project. *In Practicing Development Anthropology*. Edward Green, ed. Boulder and London: Westview Press.
- Jackson, Carey, Victoria M. Taylor, Kamolthip Chitnarong, Janice Mahloch, Meredith Fischer, Rouen Sam, and Paularita Seng
 2000 Development of a Cervical Cancer Control Intervention Program for Cambodian American Women. *Journal of Community Health* 25(5):359-375.
- Johnston, Barbara R.
 2005 The Commodification of Water and the Human Dimensions of Manufactured Scarcity. *In Globalization, Water and Health*. Linda Whiteford and Scott Whiteford, eds. Pp. 133-152. Santa Fe, New Mexico: The Brown Foundation, Inc.
- Kalaichandran, Amitha, and David Zakus
 2007 The Obstetric Pathology of Poverty: Maternal Mortality in Kep Province, Cambodia. *World Health & Population*, April 2007.
- Kamm, Henry
 1998 *Cambodia: Report from a Stricken Land*. New York: Arcade Publishing.
- Kendall, Carl
 2005 Waste Not, Want not: *Grounded Globalization and Global Lessons for Water Use from Lima Peru*. *In Globalization, Water and Health*. Linda Whiteford and Scott Whiteford, eds. Pp. 85-105. Santa Fe, New Mexico: The Brown Foundation, Inc.

- Kheng, Samvada, and Kuy Huot
2004 Cambodia-Status of gender mainstreaming in Cambodia. Gender Report. Phnom Penh, Cambodia: Asian Development Bank (ADB).
- Khun, Sokrin, and Lenore Manderson
2007 Health Seeking and Access to Care for Children with Suspected Dengue in Cambodia: An Ethnographic Study. *BMC Public Health* 7(1):262.
- Kishor, Sunita, and Kiersten Johnson
2006 Reproductive health and Domestic Violence: Are the Poorest Women Uniquely Disadvantaged? *Demography* 43(2):293-307.
- Kopitopoulos, Derko
2005 A Strategy for Enhancing Urban Sanitation in Cambodia. In *The Kingdom of Cambodia*. W. Bank, ed. Pp. 1-14: The World Bank. Electronic document <http://siteresources.worldbank.org/INTWSS/Resources/strategyforenhancingurban sanitation.pdf>, accessed May 27, 2009.
- Krieger, Nancy
2008 Proximal, Distal, and the Politics of Causation: What's Level Got to Do With It? *American Journal of Public Health* 98(2):221-230.
- Hardeman, Wim, Win Van Damme, Maurits Van Pelt, Ir Por, Heng Kimvan, and Bruno Meessen
2004 Access to health care for all? User fees plus a Health Equity Fund in Sotnikum, Cambodia. *Health Policy and Planning* 19(1):22-32.
- Hinton, Alexander L.
2005 *Why Did They Kill?: Cambodia in the Shadow of Genocide*. Berkeley: University of California Press, 2005.
- Huguet, Jerold
1992 The Demographic Situation in Cambodia. *Population Journal* 6(4):79-91.
- International Water and Sanitation Centre (IRC)
2004 Monitoring Millennium Development Goals for Water and Sanitation. *Entwicklung*, ed. Pp. 1-86. Electronic document, www.euwi.net/file_upload/niki_tmpphpHcPuN9.pdf, accessed May 10.
- Institute of Water and Sanitation and Development (IWSD)
2005 Streams Participatory Monitoring: a Portal for Monitoring Water Supplies and Sanitation Programmes. Water Report. Philippines: Institute of Water and Sanitation development (IWSD).
- LeCompte, Margaret D., and Judith Goetz
1982 Ethnographic Data Collection in Evaluation Research. *Educational Evaluation and Policy* 4(3):387-400.
- LeCompte, Margaret D., and Jean J. Schensul, eds.
1999 Analyzing and Interpreting Ethnographic Data. *In The Ethnographer's Toolkit*. Vol. Five. Walnut Creek, CA: AltaMira Press.
- Manderson, Lenore, and Yixin Huang
2005 Water, Vectorborne Disease and Gender. *In Globalization, Water & Health: Resource Management in Times of Scarcity*. Linda Whiteford and Scott Whiteford, eds. Pp. 67-84. Santa Fe, New Mexico: The Brown Foundation, Inc.

- Mercy Corps
2009 Global Citizen's Corps World Water Day 2009. Electronic document, http://www.globalcitizencorps.org/issues.htm?page=issues_water, accessed May 9, 2009.
- McMichael A., R. Woodruff, and S. Hales
2006 Climate Change and Human health: Present and Future Risks. *Lancet* 367(9513):859-869.
- Meessen, Bruno, Kannarath Chheng, Kristof Decoster, Thay Ly Heng, and Seak Chhay Chap
2008 Can Public Hospitals be pro-Poor? The Health Equity Fund Experience in Cambodia. *Studies in Health Services Organization and Policy*. Antwerp: 469-490.
- Ministry of Planning: Cambodia
2005 Demographic Health Survey (DHS). Phnom Penh, Cambodia: National Institute of Statistics. Electronic document, <http://www.nis.gov.kh/index.php/component/content/article/8-dept-demographic-statistic/4-cambodia-demographic-and-health-survey-2005->, accessed May 29, 2009.
- Morris, Shaun
2005 Cambodia – Health Report and Statistics. Unpublished MS, Centre for International Health, University of Toronto.
- Mydans, Seth
2009 U.S. Deportee Brings Street Dance to Street Boys of Cambodia. *New York Times*, Nov 3: A6.
- Nachter, David, and Clifford Hickey
2002 Putting the Community Back Into Community-Based Resource Management: a Criteria and Indicator Approach to Sustainability. *Human Organization* 61(4):350-362.
- National Institute of Statistics of Cambodia (DHS)
2005 Cambodian Demographic and Health Survey 2005. Tri-Annual Report. Phnom Penh, Cambodia: National Institute of Statistics of Cambodia.
- National Institute of Statistics (CSES)
2004 Cambodia Socioeconomic Survey 2004. Annual Report. Phnom Penh, Cambodia: Ministry of Planning. Electronic Document, <http://www.nis.gov.kh/index.php/component/content/article/7-dept-social-statistic/6-cambodia-socio-economics-survey-2003-04-cses-2003-04->, accessed March 15.
- Nolan, Riall
2002 *Development Anthropology: Encounters in the Real World*. Cincinnati: Westview Press.
- Owen Taylor, and Ben Kiernan
2006 Bombs Over Cambodia. *In The Walrus*. Vol. October 2006. Pp. 1-4. Canada: The Walrus. Electronic Document, http://www.yale.edu/cgp/Walrus_CambodiaBombing_OCT06.pdf, accessed May 29, 2009.
- Phillips, David
2007 Bacterial and Chemical Contamination of Drinking Water in Rural Cambodia. Unpublished MS, Centre for International Health, University of Toronto.

Population Reference Bureau (PRB)

2003 Children in Cambodia Face High Mortality Rate: Department of Planning and Health Information, Ministry of Health, the Reproductive Health Association of Cambodia, and PRB. Electronic Document, <http://www.prb.org/Articles/2002/ChildreninCambodiaFaceHighMortalityRate.aspx?p=1>, accessed May 30, 2009.

Population Reference Bureau (PRB)

2003 Maternal Mortality a Leading Cause of Death in Cambodia: Department of Planning and Health Information, Ministry of Health, the Reproductive Health Association of Cambodia, and PRB. Electronic Document <http://www.prb.org/Articles/2003/MaternalMortalityaLeadingCauseofDeathinCambodia.aspx>, accessed May 30, 2009.

Public Broadcasting System.

2002 Cambodia- Pol Pot's shadow: Caught in the Crossfire. Electronic document, <http://www.pbs.org/frontlineworld/stories/cambodia/tl02.html>, accessed: May 17, 2008.

Pun, Cynthia

2005 Status and Knowledge of Waterborne Disease Among Residents in Kep, Cambodia. Unpublished MS, Centre for International Health, University of Toronto.

Resurreccion, Bernadette P.

2006 Rules, Roles and Rights: Gender, Participation and Community Fisheries, Management in Cambodia's Tonle Sap Region. *Water Resources Development* 22(3):433–447.

Royal Government of Cambodia

2005 Achieving the Millennium Development Goals. Annual Report. Phnom Penh, Cambodia: Ministry of Planning

Royal Government of Cambodia

2007 Progress in Achieving Cambodia Millennium Development Goals: Challenges and Opportunities. Paper presented at the Annual Ministerial Review of the High Level Segment of ECOSOC, Geneva, July 2-4.

Rylko-Bauer, Barbara, Linda Whiteford, and Paul Farmer

In press;N.d. Global Health in the Time of Violence, Prologue. School for Advanced Research Press, Santa Fe, New Mexico.

Sacher, Jeffrey

2005 *The End of Poverty*. London: Penguin Books.

Sasaki, Nophea

2006 Carbon Emissions Due to Land-use Change and Logging in Cambodia: a Modeling Approach. *Journal of Forest Research* 11(6):397-403.

Schensul, Jean, and Stephen Schensul

1990 Ethnographic Evaluation of AIDS Prevention Program: Better Data for Better Programs. *New Directions for Program Evaluation* 46:51-62

Siniscalco, Maria T.

2000 Demographic Transitions (Education, Population and Development -- The Demographic Challenge to Education and the Social Benefits of Education in the Context of Sustainable development). Report on Education and Population Dynamics. Phnom Penh, Cambodia:UNESCO.

- Sokrin, Khun, and Lenore Manderson
2007 Health Seeking and Access to Care for Children with Suspected Dengue in Cambodia: An Ethnographic Study. *BMC Public Health* 7:1-10.
- Stobbe, Mike
2007 Maternal death Rate has risen, but why? *Seattle Times*, August 26, 2007.
- Strange, Niels, et al.
2007 Integration of Species Persistence, Costs and Conflicts: An Evaluation of Tree Conservation Strategies in Cambodia. *Biological Conservation* 137(2):223-236.
- Tan, Alan
1998 Preliminary Assessment of Cambodia's Environmental Law. APCEL Report. Cambodia: National University of Singapore.
- Treitler, Inga, and Douglas Midgett
2007 It's about Water: Anthropological Perspectives on Water and Policy. *Human Organization* 66(2):140-149.
- Ulla Heinonen
2008 Millennium Development Goals and Phnom Penh: Is the city on track to meet the goals? Modern Myths of the Mekong: Unpublished PDF: University of Helsinki, Department of Engineering.
- United Nations
2008 UN data: A World of Information page. Electronic document, <http://data.un.org/>, accessed May 9.
- UN-Water Task Force on Monitoring
2006 Water Monitoring: Mapping Existing Global Systems & Initiatives. Background Document. Pp. 1-44. Stockholm: United Nations.
- UNESCO
2004 The Millennium Development Goals and Water: UNESCO. Electronic Document, http://www.unesco.org/water/wwap/facts_figures/mdgs.shtml, accessed April 20, 2009.
- UNICEF
2005 ECHO and UNICEF: Boosting Child Survival in Cambodia. Electronic Document, http://www.unicef.org/infobycountry/cambodia_26997.html, accessed June 1, 2009.
- UNICEF
2007 Improving Household Drinking Water Quality: Use of Ceramic Water Filters in Cambodia. Report Water and Sanitation Programme. Pp. 1-44. Phnom Penh, Cambodia: UNICEF.
- UNICEF
2007 In Cameroon, changing attitudes and safe water mean more girls in school: UNICEF. Electronic document, http://www.unicef.org/infobycountry/cameroon_39992.html accessed May 29, 2009.
- UNICEF
2008 Lack of Adequate Sanitation Triggers Child Health Concerns in Cambodia. Electronic document, http://www.unicef.org/infobycountry/cambodia_39558.html, accessed May 13.

UNICEF and WHO

2003 Disparities in Coverage. *In Meeting the MDG Drinking Water and Sanitation Targets: UNICEF and WHO*. Electronic Document, <http://www.unicef.org/wash/mdgreport/disparities.php>, accessed May 31, 2009.

UNDP

1996 Participatory Evaluation in Programmes Involving Governance Decentralisation: A Methodological Note Management Development and Governance Division. Electronic document, http://www.ciesin.columbia.edu/decentralization/English/General/UNDP_dgp.htm, accessed May 10, 2008.

United Nations Population Fund (UNPF)

2000 Personalizing Population: Background on Cambodia. Electronic document, <http://www.unfpa.org/focus/cambodia/index.htm>, accessed May 9, 2009.

UN Office for the Coordination of Humanitarian Affairs

2008 CAMBODIA: Rural Sanitation in Crisis. Humanitarian Analysis Report: UN Office for the Coordination of Humanitarian Affairs.

USAID

2006 Country Profile: Cambodia. Annual Country Report. Phnom Penh, Cambodia: USAID. Electronic document, <http://www.usaid.gov/policy/budget/cbj2006/ane/kh.html>, accessed January 19, 2007.

Watts, Susan

2004 Women, Water Management, and Health. Paper presented at the CDC's International Conference on Women and Infectious Diseases CDC. November 11, 2005:10. Electronic document, <http://www.cdc.gov/ncidod/EID/vol10no11/pdfs/04-0237.pdf>, accessed May 10, 2009.

Werner, David, Carol Thurman, and Jane Maxwell

2007 *Where There is No Doctor: A Village Health Care Handbook*. Berkeley, CA: Hesperian.

Whiteford, Linda

1997 The Ethnoecology of Dengue Fever. *Medical Anthropology Quarterly* 11(2):202-223.

Whiteford, Linda, and Scott Whiteford

2005 *Globalization, Water, & Health: Resource Management in Times of Scarcity*. Santa Fe, New Mexico: The Brown Foundation, Inc.

Whiteford, Linda, and Robert Trotter

2008 *Ethnics for Anthropological Practice and Research*. Long Grove, Illinois: Waveland Press, Inc.

Williams, Holly Ann

2005 Caring for those in Crisis: Integrating Anthropology and Public Health in Complex Humanitarian Emergencies. *NAPA Bulletin* 21:1-16.

Wim Van Damme, Luc Van Leemput, Ir Por, Wim Hardeman and Bruno Meessen

2004 Out-of-pocket Health Expenditure and Debt in Poor Households: Evidence from Cambodia. *Tropical Medicine and International Health* 9(2):273-280.

Wren, Hilary

2009 Knowledge, Attitudes, and Practices of Breastfeeding Women in Krong, Kep Municipality, Cambodia. MPH thesis, Lakehead University, Thunder Bay, Ontario, Canada.

World Bank

2006 Cambodia: Having Poverty by 2015? Poverty Assessment Report. Phnom Penh, Cambodia: World Bank.

World Health Organization (WHO)

- 2004a Cambodia: Environmental Health Country Profile. Electronic document. http://www.environment-health.asia/fileupload/cambodia_ehcp_03Dec2004.pdf, accessed May 10.
- 2004b Cambodia: Water, Sanitation and Hygiene Links to Health - Facts and Figures 2004. Annual Country Profile. Geneva: WHO. Electronic document, http://www.who.int/water_sanitation_health/pdf, accessed June 6.
- 2006 Mortality Country Profiles. Electronic document, http://www.who.int/whosis/mort/profiles/mort_amro_usa_unitedstatesofamerica.pdf, accessed June 5.
- 2007 Climate and Health: Fact Sheet. Electronic document, <http://www.who.int/mediacentre/factsheets/fs266/en/index.html>, accessed: May 29.
- 2007 World Health Organization's '10 Facts About Water Scarcity'. Electronic document, <http://www.wateronline.com/article.mvc/World-Health-Organizations-10-Facts-About-Wat-0001?VNETCOOKIE=NO>, accessed March 30.

van de Put, Willem

1992 Empty Hospitals, Thriving Business: Utilization of Health Services and Health Seeking Behaviour in the Two Cambodian Districts Medicam. Medical Anthropological Report. Pp. 1-42. Phnom Penh, Cambodia: Medicam.

Zakus, David

1998 Resource Dependency and Community Participation in Primary Health Care Social Science and Medicine Vol. 46(4-5):475-494.

APPENDICES

Appendix A: Agency Questionnaire

I. Bridges Across Borders' (BAB) history, roles, functions and goals

1. What is your name and project job title?
2. How many years/months have you worked with Bridges Across Borders (BAB)?
3. Why did you seek employment/choose to volunteer with BAB?
4. What do you like the most about working/volunteering for BAB? What do you like the least?
5. What do you know about the history and development of BAB?
6. What do you know about the history and development of the Hand In Hand Project (HIH) in Chamcar Bei?
7. What are the current functions of BAB in Cambodia?
8. What are the current functions of BAB's HIH project in Chamcar Bei?
9. What is the role of BAB in Cambodia?
10. What is the role of BAB in the HIH project in Chamcar Bei?
11. What are the goals of BAB in Cambodia?
12. What are the goals of BAB's HIH project in Chamcar Bei?
13. What do you think BAB's goals are in relation to health?
14. What do you think the primary focus of BAB is? Do you think that is related to health? Why or why not?
15. What do you do to ensure that HIH projects in Chamcar Bei are community driven? What do you think BAB should do to ensure sustainability?

II. Health Component and Future of BAB/interviewee

1. What do you think about BAB's health component? Why do you think it dissipated? Do you think it is important to start it up again?
2. How do you think we can better integrate the four components of HIH? Do you think this would be difficult? Do you think it would be beneficial?

III. Water and Sanitation

1. When did Bridges Across Border's (BAB) water initiatives start?
2. Why did BAB decide to incorporate water and sanitation initiatives into their Health component of the Hand in Hand (HIH) project in Chamcar Bei?
3. What was/is your role, if any, in these water and sanitation activities?
4. What did these water sanitation initiatives provide to the community?

Appendix A: (Continued)

5. Why were these technologies chosen?
6. Was there any specific criteria for the people who receive the technologies?
7. Who was provided these technologies and did they have to contribute anything?
 - a) Filter-
 - b) Well-
 - c) Latrine
8. How were the filters, latrines, wells distributed?
9. Do you think the filters were distributed well?
 - a) (if yes) Why?
 - b) (if no) How could it have been better?
10. Do you think that everyone in Chamcar Bei was aware of the availability of the filters provided by BAB?
11. Was there education provided with the filters, wells and or latrines? Why or why not?
12. Why did BAB decide to distribute 200 more filters after the first 100?

IV. Monitoring and Evaluation

1. How would you define monitoring?
2. How would you define evaluating?
3. What have you done thus far, if anything, to monitor and evaluate the water and sanitation technologies you distributed?
4. What do you believe an effective and *sustainable* water and sanitation program would consist of in Chamcar Bei?
5. How do you think it would be best to monitor and evaluate this program? How do we ensure it continues after BAB leaves the community?
6. Monitoring and evaluation programs typically have indicators with which to measure the success or weakness of a new program. Can you think of a good indicator that the community could understand and agreed upon to measure the success or weakness of the technologies?
 - a) Filter
 - b) Well
 - c) Latrine
7. Do you think it is important to include the community in these monitoring and evaluation efforts?
 - a) (if yes) How do you think they should be included?
 - b) (if no) Why not?
8. How can the community monitor and evaluate these technologies? How can we make sure these monitoring and evaluation efforts will continue after BAB leaves? Who do you think would be the best people in the community to assist us with this?

Appendix A: (*Continued*)

9. What do you think would be the ideal (best) outcome of these water and sanitation initiatives in Chamcar Bei?

V. GENERAL

1. What do you hope to accomplish before you the HIH phases out in 2 years (or if volunteer the duration of their stay)?

2. How do you believe Chamcar Bei will change since the inception of HIH and when the project phases out in 2 years?

3. What do you think is most important for BAB to do with HIH to make sure it is sustainable?

4. What direction do you hope to see BAB go in?

5. What is the greatest strengths and weaknesses of BAB?

6. How do you see your employment/volunteer position with BAB benefiting you in the future? How do you see it benefiting Cambodia? What about the larger global community?

Appendix B: Key informant Questionnaire

I. Bridges Across Borders (BAB) Activities

1. When did Bridges Across Border's (BAB) water initiatives start?
2. Why did BAB decide to incorporate water and sanitation initiatives into their Health component of the Hand in Hand (HIH) project in Chamcar Bei?
3. What was/is your role, if any, in these water and sanitation activities?
4. Did you help choose the technologies and people who would receive it?
5. Why did you stop performing these duties?
6. What did these water sanitation initiatives provide to the community?
7. Did BAB or the community choose these technologies (filters, wells, and bathrooms)?
8. Was there any criteria for the people who receive the technologies?
9. Do you think it was sustainable?
10. Who was provided these technologies and did they have to contribute anything?
 - a) Filter-
 - b) Well-
 - c) Latrine-
11. How were the filters, latrines, wells distributed?
12. Do you think the filters were distributed well?
 - a) (if yes) Why?
 - b) (if no) How could it have been better?
13. Do you think that everyone in Chamcar Bei was aware of the availability of the filters provided by BAB?
14. Was there education provided with the filters, wells and or latrines? Why or why not?
15. Why did BAB decide to distribute 200 more filters after the first 100?

II. Monitoring and Evaluation

1. How would you define monitoring?
2. How would you define evaluating?
3. What have you done thus far, if anything, to monitor and evaluate the water and sanitation technologies you distributed?
4. What do you believe an effective and *sustainable* water and sanitation program would consist of in Chamcar Bei?
5. How do you think it would be best to monitor and evaluate this program? How do we ensure it continues after BAB leaves the community?

Appendix B: (Continued)

6. Monitoring and evaluation programs typically have indicators with which to measure the success or weakness of a new program. Can you think of a good indicator that the community could understand and agreed upon to measure the success or weakness of the technologies?

- a) Filter
- b) Well
- c) Latrine

7. Do you think it is important to include the community in these monitoring and evaluation efforts?

- a) (if yes) How do you think they should be included?
- b) (if no) Why not?

8. How can the community monitor and evaluate these technologies? How can we make sure these monitoring and evaluation efforts will continue after BAB leaves? Who do you think would be the best people in the community to assist us with this?

9. What do you think the people like the most about the technologies? would be the ideal (best) outcome of these water and sanitation initiatives in Chamcar Bei?

III. Etiology of disease and cures

1. When you hear the word “sanitation” what is the first thing you think of?

2. What problems will you have if you don't have sanitation?

3. Do you think the villagers in Chamcar Bei believe water sanitation is important? Why or why not?

4. When you hear the word “diarrhea” what is the first thing you think of?

5. Why do you people in Chamcar Bei believe they or their child get diarrhea?

6. Do you think the villagers think it is important to cure diarrhea?

7. Why do the villagers think bad or “raw” food cause diarrhea?

- a) (if yes) How?

IV. Traditional Medicine- Coining () and Cupping ()

1. Which one (coining or cupping) do the villager's like best?

2. Do you usually coin or cup when someone in your family gets diarrhea?

- a) (If yes) Does that usually work?
- b) (If no) What do you do next?

3. What role does “wind” play in health?

4. What is the difference between cupping and coining? Why do people coin more often?

5. Where do you go if you need treatment?

6. Why do you go there?

Appendix B: (Continued)

7. Do you ever use traditional healers? Why or why not?

V. Gender and Water related questions

1. Who usually gathers water, men or women?
2. Who usually manages water, men or women?
3. How many hours a day does your household (men/women) spend collecting and managing water?
4. How many hours per day do women spend fetching water?
5. How many school days do girls lose per year due to fetching and/or managing water?
6. Who typically makes decisions about water and sanitation in the home, men or women?
7. Who provides money for medicine for illness related to water and sanitation (i.e. diarrhea).
8. Do you think it would be a good idea to include men in water and sanitation activities?
9. *If so*, how could men help with water and sanitation?
10. What sort of water and sanitation responsibilities would be good for me?
11. Could men be responsible for latrines?

VI. Sanitary practices

1. Do people in the village usually wash their hands?
 - i) When?
 - ii) Do they use soap?
 - iii) Why or why not?
2. Do you think most villagers treat (make clean water) their water?
 - a) *(if yes)* What do you do to make sure your water is clean?
 - b) *(if no)* Why not?
3. Where do most villagers go to the bathroom?
4. Do you think villagers want bathrooms?
5. Do they want it for sanitation or because they don't want to go in the forest.
6. Why do you think they choose to go (*answer from above*) and not somewhere else?
7. Do children usually use latrines?
 - i) Why or why not?
8. How does shitting outside affects your health? What do you think the villagers think about shitting outside?
9. What disease related to water sanitation most affects the people of Chamcar Bei?

Appendix B: (Continued)

10. If BAB could do one thing to help people in Chamcar Bei with water and sanitation, *that could be sustained in the next 2 years*, what would it be?

VII. Water and Sanitation technologies

1. What do you think about the technologies BAB provided? Did they help? How could they have been better?
2. Why do you think having a filter is important or not important?
3. Why do you think having a well is important or not important?
4. Why do you think having a bathroom is important or not important?
5. Which of the above technologies do you think is most important to the community?
6. Many people do not have bathrooms and many people who do are broken. What do you think BAB could do to help people with this? How can we make sure it is sustainable?
7. Related to the above question people do not take care of the technologies already provided to them? Why do you think this is? How do you think it could be prevented?
8. What do you think about the filters BAB provided?
9. The filters seem to break and people do not know what to do? How do you think the community and BAB can do to help address this problem?
10. If you have received any of these technologies how have they impacted your life?
 - a) filter
 - b) well
 - c) latrine
11. What do you think the impact on the Chamcar Community has been as a result of _____?
 - a) filter
 - b) well
 - c) latrine
12. Which of the three do you think are most beneficial to the community and why?

VIII. Healthier lifestyles

1. What else could help you in leading a healthier and more sanitary life?
2. What health issue is most important to your family?
3. What health issues do you think are most important to your community?
4. What problem do you think is most important to your family?
5. Do you think this is also related to the health of your family?
6. What problem do you think is most important for your community?

Appendix C: Household Survey

1. Sample ID
 - 1a. Section of Village (Ang Tung Saw, Chamcar Bei, Chamcar Jack)
2. Water Source Distance from house (m)
3. How many people in your family?
4. Number of Families Using water source
5. Who provided you the water source?
6. What problems do you have with your well?
7. Have a latrine? (Y/N)
8. Distance to Latrine (meters).
 - 8a. (*if applicable*) Does everyone in your family use the latrine?
 - 8c. Why or why not?
9. Distance to water source (meters)?
10. Who provided the latrine? Year?
11. Where do you go to shit?
 - 11a. How far (m)?
 - 11b. Why or why not?
12. If your latrine is broken, what is wrong with it?
 - 12a. What is the basic reason it happened?
13. Why is it important to have a latrine?
14. Do you boil your water (times a day)? For what purpose?
15. If you do not boil, why not?
- 16a. Have filter from BAB?
- 16b. How long have you had it?
17. Frequency of Filter filling Usage per day?
18. How often do you wash your filter (one month)?
19. Is your filter broken?
20. What problems do you have with your filter?

Appendix C: (Continued)

21. How do you make sure your water is clean?
22. Diarrhea, every two weeks) before you used the water filter
23. Diarrhea (every two weeks) after water filter?
24. What do you like about the water filter?
25. Now you have a water filter, what sickness do you get most?
26. Now that you have a filter, what could help you with the sanitation problems you face?
27. Would you buy another filter? Where would you buy it? How much would you pay?
28. What is broken on the filter?
29. If your filter is broken what are doing to make water clean?
30. When you get diarrhea what do you do?
31. When you get diarrhea where do you go?
32. How much do you have you paid for medicine for diarrhea in a month?
33. Do you wash your hands? How many times a day and when?
34. Do you use soap? Why or why not?
35. Have you ever had health education before?
- 35b. On what?
36. What would you like education on?
37. If someone gave you the some of the materials would you be willing to purchase the other items before initiating the building?
38. Who is responsible for gathering water in your family?
39. How many hours a day do (*insert answer to above*) dedicate to water procurement?

Appendix D: Focus Group Questionnaire

of Participants ____

1. How many of you recieved your a filter 2007?
2. How did you hear about the availability of the filters?
3. What made you interested in buying them?
4. Where did you go to get them?
5. Did you ever receive any education on how to maintain, or fix filters?
6. To those who didn't get a filter, why didn't you purchase one?
7. Why is it important to have a filter?
8. What you do like MOST about having a filter?
9. If your filter is broken, how long has it been broken?
10. what is wrong with it?

Spout: a) broken
 b)leak
 c) mice ate around spout

Ceramic Bowl: a) broken
 b) doesn't enter in bottom

Plastic holder: a) hole

Other:

11. If broken, what happened:
 - a) animal knock over
 - b) child knock over
 - c) Tap pulled too hard
 - d) broken while cleaning
 - e) other problems
12. Did anyone's filter break and they were able to fix it themselves?
- 12a. If is broken, why haven't you gotten it fixed, or bought another one?
13. Does anyone know where you can go to get replacement parts?
14. Now that it is broken what do you do for clean water?

II. Distribution of parts and willingness to resolve filter problems

1. Who is willing to fix their filter?

Appendix D: (*Continued*)

2. If BAB had an education session on how to fix your filter and found a way to get parts at the village level would you buy the parts?
3. Where would be the best place for the parts of the filters to be distributed? Where would be a good place to sell them?
- 3a. Does anyone know if they sell filter parts near the village? Are people willing to go there is purchase new parts?
4. Is the saving group interested in being the main contact people and distributors of the parts? Any ideas who would be?
5. Is anyone interested in learning how to fix and maintain filters to teach others in the village so that we can avoid these problems in the future?
6. Does anyone in the group go to Phnom Penh or know someone who makes regular trips there and back?