

2009

Program planning and evaluation framework for a community based food project in Mwanza, Tanzania / by Ellena Andoniou.

Andoniou, Ellena

<http://knowledgecommons.lakeheadu.ca/handle/2453/977>

Downloaded from Lakehead University, Knowledge Commons

**A PROGRAM PLANNING AND EVALUATION FRAMEWORK FOR A
COMMUNITY BASED FOOD PROJECT IN MWANZA, TANZANIA**

A project submitted

by

Ellena Andoniou

to

Lakehead University

in partial fulfillment of
the requirement for the
degree of

**MASTERS OF PUBLIC HEALTH
in
Public Health**

This project has been
accepted for the faculty of
Graduate Studies by:

Name of Chair
Chair

Name of Advisor
Advisor

Name of External Reader
External Reader

ProQuest Number: 10611528

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



ProQuest 10611528

Published by ProQuest LLC (2017). Copyright of the Dissertation is held by the Author.

All rights reserved.

This work is protected against unauthorized copying under Title 17, United States Code
Microform Edition © ProQuest LLC.

ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346

Acknowledgements

I would like to extend many thanks and appreciation to those who have bestowed upon me the opportunity to fulfill one of my life's dreams – to be part of philanthropic work in Africa. A special thank you to the Yoghurt Mamas, my new found friends and colleagues half-way around the world, and the resilient people of Tanzania who have been an absolute inspirational force in my life.

A deep debt of gratitude must be extended to my remarkable supervisor Dr. Elaine Wiersma, for her time, direction, and encouragement while completing my project. Without her unfaltering guidance and extraordinary support this project would not have been realized. I sincerely thank you for taking me under your wing and helping me achieve what seemed at times to be an unachievable goal.

I would also like to thank the external reviewer, Dr. Peter Brink for taking the time to review my project.

Abstract

The ravaging effects of the HIV/AIDS epidemic in Sub-Saharan Africa are well known. Countries in the region are facing a crisis of unprecedented proportions further compounded by poverty, malnutrition and social inequalities. This is especially true in Tanzania, one of the world's poorest countries – where the majority of the population lives in absolute poverty; there is a disproportionately high level of food insecurity and poor nutritional standards are extensive. Initiated in 2003, The University of Western Ontario (UWO) in partnership with the National Institute for Medical Research (NIMR), the Kivulini Women's Rights Organization (KWRO) and a local women's group, the Tukwamuane, launched a probiotic food based community project in Mwanza, Tanzania – a high-need area as defined by the Canadian International Development Agency. The Western Heads East (WHE) probiotic yoghurt project is an international collaboration fostering community health and development. The project is a micro-enterprise initiative which aims to improve health and nutrition, while alleviating suffering from malnutrition, diarrhoeal diseases, and urogenital disorders in vulnerable social groups in the context of the HIV/AIDS epidemic. Women with little or no formal education are trained to produce probiotic yoghurt for sale and subsidized distribution to People Living with HIV/AIDS (PLWHAs) at the community level. The project has the potential to foster health improvement, as well as empowerment, advocacy skills among women and promote knowledge transfer to future generations.

However, at the inception of WHE, the necessary steps to develop key planning and evaluation frameworks were not taken. As such, the purpose of this project is to prepare a program planning and evaluation framework which will enable project planners, stakeholders, and researchers to evaluate project outcomes, the health impacts and improvements in quality of life for the women making the yoghurt, their families and the broader community; as well as to explore women's perceptions (if any) of empowerment, and how the project is enabling them to achieve their everyday life objectives.

CONTENTS

Abstract	ii
About the Program Evaluation Project	iv
Introduction	8
The Context	13
The AIDS Epidemic in Tanzania	13
Nutrition in Tanzania	17
Socio-economic and Gender Inequalities in Tanzania	21
The Project	30
The Stakeholders	31
The Role of Probiotics	37
Yoghurt as a Delivery Medium	40
Project Planning and Evaluation Framework	48
The Need for a Gender Analysis	48
WHE: Gender Analysis	50
Literature Review	57
Empowerment	59
Powerlessness and Health Disparities	63
Gender Inequality	65
Why the Focus on Women's Income?	67
Poverty	69
The Conceptual Framework	71
Vulnerability Theory	71
Society and Health Perspective	73
Empowerment as a Means of Improved Health	75
The Need for a Logic Model	78
WHE: Logic Model	82
Evaluating Economic Empowerment and Health	85
WHE: Economic Empowerment and Health Evaluation Framework	88
Contributions to Public Health	89
References	94

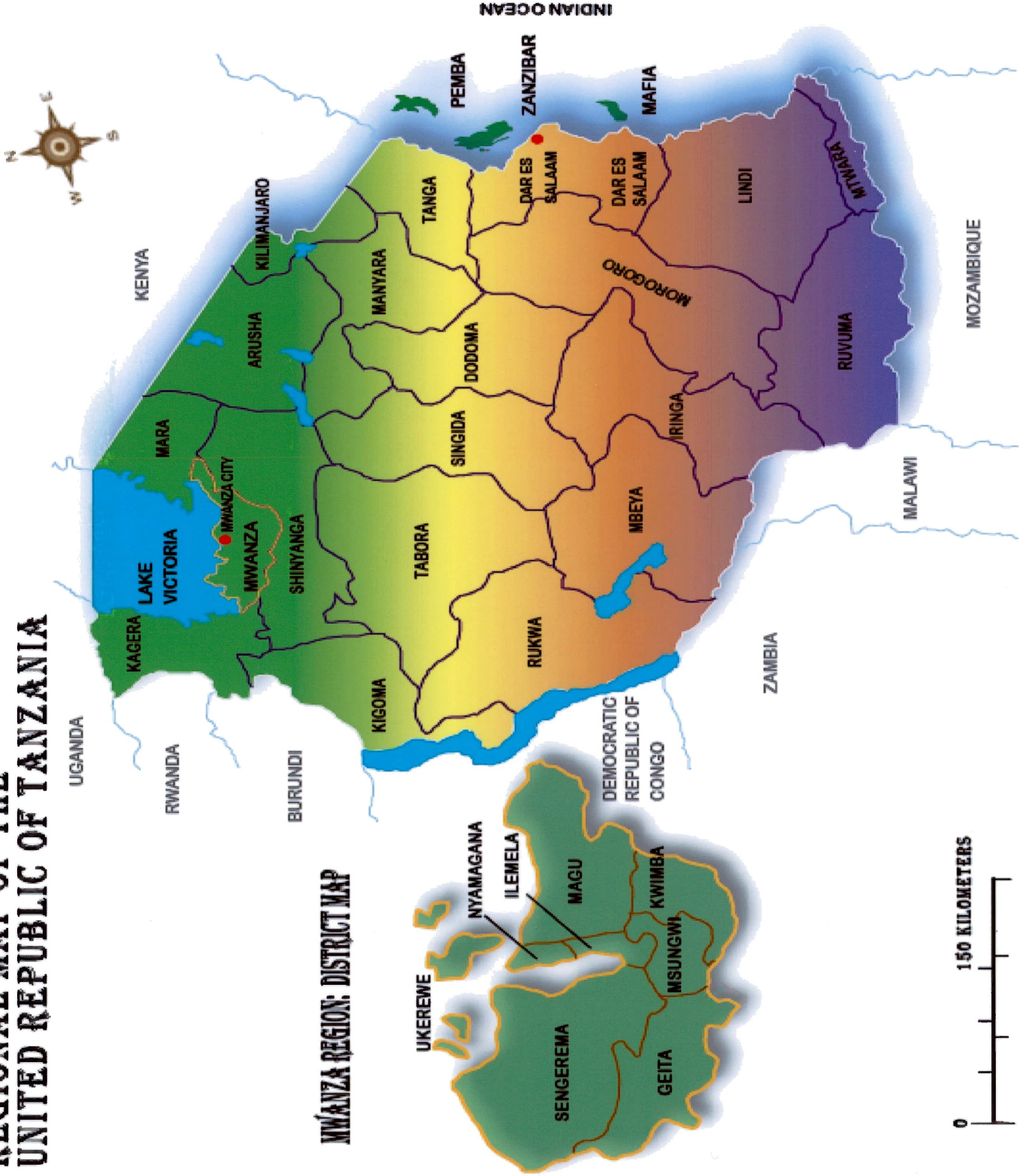
About the Program Evaluation Project

The project is organized in three sections: Context, Project, and Evaluation. For any development project or research program to be successful it must be both context-specific and context-appropriate; therefore, in the **Context** section, the project setting is documented. The impact of the AIDS epidemic on Tanzania and its citizens, the nutritional status of the population, social and economic realities, and the current level of gender equity are all explored in this section.

The **Project** section begins with an overview of the project's inception and moves on to provide background information on the Canadian and Tanzanian institutional partners and the expertise each brings to the Western Heads East project. The project participants, operating as a Community Based Organization under the name Tukwamuane, are also introduced in this section. An explanation of probiotics and the role researchers believe beneficial bacteria can play in combating the symptoms of HIV is presented along with a brief explanation of why, from among the many available media, yoghurt was chosen as the preferred delivery method for the probiotics.

Rationale for the need of a project planning and evaluation framework are provided in the **Evaluation**. In this section, a completed gender analysis is presented; following this is a literature review and conceptual framework which provide the concepts which are drawn upon to develop a logic model as well as an empowerment and health evaluation guide.

REGIONAL MAP OF THE UNITED REPUBLIC OF TANZANIA



CITY OF MWANZA
REGION: MWANZA
DISTRICT: ILEMELA



Introduction

The HIV/AIDS epidemic in Sub-Saharan Africa (SSA) has impacted women and girls disproportionately (UNAIDS, 2006). UNAIDS consistently reports growing infection rates among girls and women, their susceptibility exacerbated beyond biology by the interplay of poverty and gender inequality. Women aged 15 to 49 years in SSA are roughly 1.6 to two times more likely to be infected than men of the same age, and in some of the hardest hit countries women are five to six times more likely to be infected (UNAIDS, 2006). Nowhere has the 'feminization' of the epidemic been more severe than in SSA, where 59% of infected adults are women, and 76% of infected young people are females (UNAIDS, 2008a).

Societal and cultural norms and attitudes which rigidly prescribe what is considered appropriate behaviour limits women's power to negotiate safer sex or resist unwanted sex, with little or no control over contraception and their personal health, putting them at greater risk of becoming infected (UNAIDS, 2008b; Pettifor et al., 2004). Thus, gender-based inequalities within the epidemic are clearly marked by power imbalances between men and women. Combined, these factors make it difficult for women to opt out of abusive or violent relationships, and promote expectations of dependence on men, a dependence that is deepened and further anchored by poverty. Demands on women's care work has increased several fold as a result of the HIV/AIDS epidemic, hence, denying them access to education which has been shown to reduce risk of infection, to enhance self-esteem, and provide the knowledge and skills necessary to participate in livelihood alternatives (International Planned Parenthood Federation, 2007; International Institute for Educational Planning, 2003).

In the development context, there is general agreement that women's empowerment is essential to the reversal of the epidemic and women's vulnerability to infection, also potentially

impacting rates within the male population (IPPF, 2007; UNAIDS, 2008b). Several accounts have called for the use of multi-faceted and comprehensive approaches in order to control the epidemic. According to the UNFPA (2008), development and reproductive health programs are more effective when they address educational and training opportunities as well as empowerment of women. When women are empowered, whole families benefit, and these benefits often have ripple effects to future generations (UNFPA, 2008). More specifically, economic empowerment through income-generating activities can be seen as entry points for channels of communication and vehicles by which women can meet their needs (Rogers & Youssef, 1988). They provide effective ways to address inequalities in the areas of health, education and poverty alleviation. It has been recognized that improvements in health care (including reproductive/sexual health), nutrition, education, and family-related decision-making can only be sustained with an increase in household income and greater control by women over financial resources (Hashemi, 2004). Additionally, improved economic status translates into improved social status, whereby individuals begin to take an active role in defending their interests at various social and political levels.

In recognition of these crucial realities, in 2003, The University of Western Ontario (UWO) in partnership with the Kivulini Women's Rights Organization (KWRO), the Tanzanian National Institute for Medical Research (NIMR) and the Tukwamuane Women's Group (TWG) launched a probiotic food-based community health and development project in Mwanza, Tanzania. The 'Western Heads East' (WHE) project, whose foundation is centred around a strong group of stakeholders working together, combines elements of community health, development, and research. The project aims to empower women by improving their socio-economic status while also improving health, nutrition, alleviate suffering from malnutrition,

diarrhoeal diseases, and urogenital disorders in vulnerable social groups in the context of the HIV/AIDS epidemic. Resource poor women with little or no formal education are trained successfully to use local resources to produce a high quality nutrient rich yoghurt. The yoghurt is consumed free of charge by the women, their immediate family members, and local citizens living with HIV/AIDS. Surplus amounts are sold to community members for a modest fee and to various organizations and businesses in the Mwanza region – which generates an income for them.

The project uses a combination of technology from modern microbiology and the low tech, cost-effective, methods of food science to produce probiotic yoghurt at the household level in resource-poor settings. Combining yoghurt production techniques with probiotics is a relatively simple and inexpensive method for improving quality of life. Studies have indicated that specific probiotic strains, including *Lactobacillus rhamnosus* GR-1 (the strain used by the project), can enhance host defences such as natural killer cells, thereby potentially boosting immunity in patients with AIDS, helping alleviate complications and improve quality of life (Reid & Hammond, 2005; Reid, 2006). Other empirical evidence indicates that probiotics are effective at alleviating diarrhoea, urogenital infections, and other gastrointestinal side effects as a result of malnutrition, and can facilitate the uptake of highly active antiretroviral therapy (Anukam, Osazuwa, Osadolor, et al., 2008).

The result is a food-based community micro-enterprise for better health, which fosters leadership, empowerment and advocacy skills among women and knowledge transfer to future generations. More recently, the project has been replicated, in collaboration with the Kenya Medical Research Institute (KEMRI), the Kenyan Ministry of Health, and the Orande and Baraka Women's Groups. Two probiotic yoghurt kitchens have been constructed in the Oyugis-

Rachuonyo District of Kenya, in Nyanza Province, with start up funds for the buildings and equipment provided by a World Bank Development Marketplace Grant.

Currently, the Orande and Baraka women are being trained by the women (Yoghurt Mamas) from Mwanza, Tanzania on how to produce probiotic yoghurt. The women play a vital role in helping transfer the required knowledge and skills and to provide training to the new groups for the successful operation of the community kitchens. Women are provided by women with the necessary tools and resources through hands on training. The expectation is that hands on training from woman to woman will allow for the transfer of necessary skills and expertise to produce high quality nutrient rich probiotic yoghurt and the knowledge needed to operate a successful revolving micro-credit scheme and microenterprise. The women will learn the technical skills as well as essential business skills (such as accounting and marketing) to manage this micro-enterprise.

The project is a critical medium, providing an enabling environment for these groups of women. Whereby the skills and knowledge the women gain can be considered self-enhancing tools, provided in an encouraging setting with support systems, which in turn will aid them to make decisions and exert control over their lives. Women's empowerment must be considered a process which embodies 'self' and cannot be attained through the direct interventions of outside agents. It must be self-selected and self-driven and not susceptible to interventions of those wishing to 'empower' (IPPF, 2007).

What is necessary at this point as the project moves forward are the appropriate program planning and evaluation tools, along with opportunities to collect valuable data on the socio-cultural and health impacts. Although the original project has been operating since 2003, a comprehensive program planning framework outlining and documenting expected results in the

short, medium and long-term has not been developed, a gender analysis was not completed prior to the project being initiated, and the use of an evaluation tool to assess the impacts on the women producing the yoghurt has not been developed nor has an intervention effect evaluation been conducted.

Therefore, the overall objective of this project is to prepare a gender analysis and produce a project planning outline using a Logic Model framework (both through backwards construction), and to develop a program evaluation which can be used to examine the multifaceted perceptions of the social (including the women's views about how the project may be empowering them), health and nutrition impacts of probiotic yoghurt produced by the local 'Yoghurt Mamas' in Mwanza. The program evaluation has the potential to provide the foundation to establish empirical evidence in support of the value of this community health and development project, and the use of probiotics, a simple technology, to improve health, nutrition, the management of HIV/AIDS, and the socio-economic conditions of marginalized women in Africa.

The Context

The AIDS Epidemic in Tanzania

Forty-two million people around the world have been infected with HIV/AIDS since the pandemic's inception, and 70% of all reported cases were located in Sub-Saharan Africa (UNAIDS, 2008b; 2004). The majority of the twenty million people worldwide who have already died from AIDS have been African. Each day in Africa, 6,000 people die from AIDS, and an additional 11,000 are infected with HIV. With 25 million citizens who are HIV-positive, the countries in the Sub-Saharan region are facing a crisis of unprecedented proportions (UNAIDS, 2008a; 2004).

HIV/AIDS is a public health problem that displays a “dynamic, growing and changing character as the virus exploits new opportunities for transmission” (UNAIDS, 2004, p.3). Infection rates have been increasing exponentially, particularly among women, children and youth. Of great concern, the disease is affecting the largest youth generation in history, and the most productive adults aged 20 to 40 years, leaving older family members and orphaned children to battle with stigma, ostracism, and the inevitable cycle of poverty and disease.

Within Tanzania, HIV/AIDS was first detected in the northwest part of the country in Mwanza, in 1983 (Ministry of Health & National AIDS Control Program, 1997), and has spread dramatically since then. Currently, the HIV prevalence rate in the general population is estimated to be at 8.8%; however regional variations are common with prevalence rates often higher in urban than in rural areas, and with displayed urban variations as well (Department of Defence HIV/AIDS Prevention Program, 2005). There are approximately 1.6 million individuals living with HIV/AIDS in Tanzania, although this is likely an underestimate due to incessant problems with underreporting (DHAPP, 2005). Projections of annual deaths caused by AIDS have

increased in Tanzania from 140,000 in 1999 to about 160,000 in 2003-2004 and the number of Tanzanian children under the age of 18, orphaned as a result of parental AIDS deaths was projected to be near 1 million for 2003 (DHAPP, 2005; Beckman & Rai, 2004).

As one of the leading causes of adult mortality in Tanzania, HIV/AIDS has had a devastating impact on all segments of society (UNAIDS, 2008b). At the national level, medical expenditures have increased substantially. HIV infected adults have an estimated 17 illness episodes requiring hospitalization and intensive care prior to death, as such placing an enormous amount of strain on an already resource poor and overburdened health care system (Tanzania Commission for HIV/AIDS, 2003). At the community level, resources are stretched by reductions in production capabilities, lower school enrolment, and diminished human capacity, as well as by the increased needs of AIDS orphans and the elderly who often care for them. At the household level, individuals must manage increased medical expenditures, absenteeism from work and school, and low levels of productivity (UNAIDS, 2004; Elder, 2001; Macintyre, Brown, & Sosler, 2001).

Gender-based inequalities in health are marked by power imbalances between men and women, with women having little or no power to negotiate safe sex, and little or no control over contraception and their personal health, putting them at greater risk of becoming infected. African women aged 15 to 49 years are roughly 1.6 to two times more likely to be infected than men of the same age (DHAPP, 2005). Specifically, in Tanzania, of the 1.6 million infected adults between the ages of 15-49, more than half of those infected, 840,000 are women (UNAIDS, 2004).

Numerous factors favour and contribute to the rapid spread of HIV in Tanzania. Beckman and Rai (2004) suggest that numerous socio-cultural and behavioural factors explain the HIV prevalence, such as:

Early sexual debut for both men and women that, together with later marriage, gives rise to a long gap between first sex and first marriage; a high number of sexual partners in and out of marriage; lack of knowledge and widespread misinformation worsened by low, inconsistent or incorrect use of protection during sexual intercourse; and the background prevalence of sexually transmitted infections (STIs) in the population (p.3).

Additional risk factors have been identified to include: high mobility between regions and/or countries; high-risk heterosexual contact especially within vulnerable populations such as sex workers, fishermen, transportation workers, refugees, military personnel, and prisoners; mother-to-child transmission; denial of possible HIV-infection; and a rising incidence of unsafe injecting drug use (UNAIDS, 2008b; DHAPP, 2005; UNAIDS, 2004). Although infection rates have started to decline in Tanzania, according to '[r]ecent national population-based surveys... behaviours that can protect against sexual transmission of HIV are waning in some sections of society,' suggesting that additional preventative measures need to be taken to stymie a renewed escalation of infection rates (UNAIDS, 2008b, p.16).

Mwanza also has disproportionately high levels of food insecurity, low food production and poor nutritional standards – it has been identified as a hunger hotspot (CDC, 2006). Within the Mwanza region, almost half of urban and rural populations - 46.3 and 48.3 per cent, respectively - live below the basic poverty line¹ (National Population Commission, 2005). These factors all lead to high levels of malnutrition which exacerbate the effects of HIV by further weakening the immune system, reducing quality of life and life expectancy. Food insecurity and more specifically, malnutrition, accelerates the progression of HIV to AIDS, and the synergistic

¹ Measured as the prevalence of children under five who are underweight (NPC, 2005).

effect on the immune system can lead to premature death (Anabwani & Navario, 2005) (Figure 1). Consequently, HIV infected individuals require above average nutritional intake in order to take anti-retroviral drugs (ARVs) to slow disease progression and slow the appearance of various types of opportunistic illnesses, which concurrently bring about inefficiencies in the body's absorption and utilization of needed nutrients (Semba & Tang, 1999).

Antiretroviral therapies (ARVs) on their own improve immunity, slow disease progression and increase the life expectancy of those living with HIV/AIDS (Tomkins, 2005; Hogg, Heath, Yip, et al., 1998). Yet to date, less than 0.1% of the people infected with HIV receive anti-retroviral therapy, despite the fact that in Tanzania treatment is free to individuals who have reached a CD4 count below 250 cubic millimetres of blood. In rural communities the figure is significantly lower, and this figure is further reduced when there is a lack of adequate nutrition for ARV intake.

Adequate nutrition is required to maximize the benefits of ARVs in prolonging the lives of PLWHAs and for preventing transmission of the virus from mother to child during birth (Tomkins, 2005). There is now evidence that, when combined with a well-nourished diet, ARVs have an even greater impact on the health of PLWHAs, giving them an added advantage of a better quality of life as compared to malnourished individuals (Paton, Sangeetha, Earnest et al., 2006; Tomkins, 2005; Hogg et al., 1998). This underlines the importance that nutrition must become an essential and complementary intervention to anti-retroviral treatment in order to enhance adherence, rehabilitation and immunity to opportunistic infections. As the World Food Programme explains, '[g]ood nutrition helps those who are HIV-positive to fight the infections associated with HIV and AIDS, bolstering immunity to slow the progression of HIV to AIDS, and hastening recovery between bouts of illness' (World Food Programme, 2008). Sufficient

and nutritious food is also critical to the efficacy and adherence of anti-retroviral drugs prescribed to HIV-positive patients.

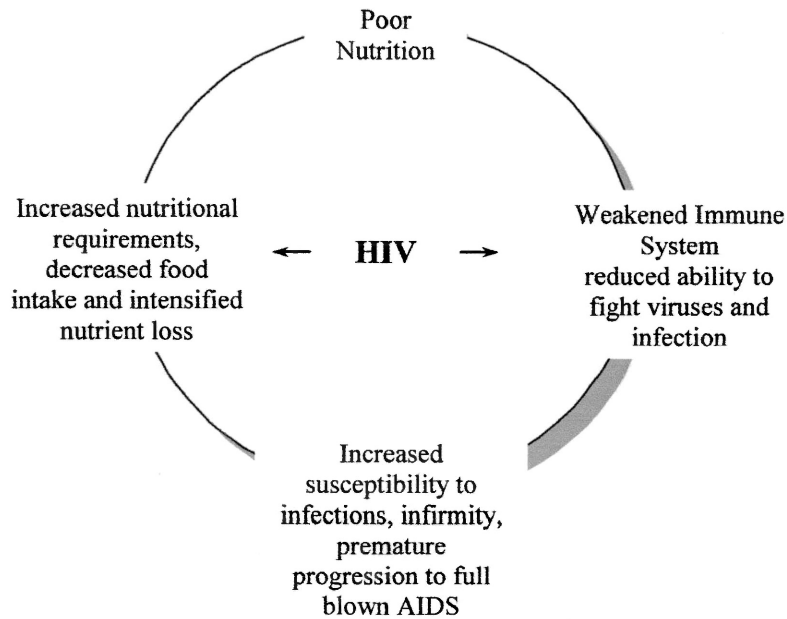


Figure 1. Synergistic Cycle between Malnutrition and HIV

Nutrition in Tanzania

Undernourishment and malnutrition, direct consequences of pervasive poverty, are also serious health concerns in Tanzania. According to the Food and Agriculture Organization of the United Nations (FAO), 44% of the country's population is under-nourished. The highest levels in all of East and SSA (FAO, 2006), and this nutritional crisis in Tanzania continues to deepen despite improvements in food supply² (FAO, 2006).

² Per capita food supply has increased recently; however, it is still well below levels achieved in the early 1990's (FAO, 2006).

Specifically, acute malnutrition is highest for women aged 15 to 19 years, women with no education or with incomplete primary education, and women in the lower wealth quintiles (NPC, 2005). A disturbing corollary of this is the direct relationship between maternal nutritional status and proper foetal and child development. Malnutrition and micronutrient deficiencies are related to impaired mental development and drastically increase their risk of morbidity and mortality (NPC, 2005). In particular, there are severe deficiencies of iodine, iron and vitamin A, all highly prevalent in Tanzania, affecting a sizeable proportion of the population (Tanzanian Food and Nutrition Centre, 2007). Pregnant women are especially prone to suffer from night blindness, which is caused by vitamin A deficiency (NPC, 2005). Micronutrient deficiencies result from both a lack of micronutrient rich foods and the inadequate uptake of available micronutrients due to infections, parasitic infestations, and other factors (NPC, 2005).

Vitamin A is an essential micronutrient for the immune system and plays an important role in maintaining the epithelial tissue in the body. Severe vitamin A deficiency (VAD) can cause eye damage (xerophthalmia) and is the leading cause of childhood blindness. VAD also increases severity of infections such as measles and diarrhoeal diseases in children and slows recovery from illness. VAD is common in dry environments where fresh fruits and vegetables are not readily available. Vitamin A is found in breast milk, other milks, liver, eggs, fish, butter, red palm oil, mangoes, papayas, carrots, pumpkins, and dark green leafy vegetables. Vitamin A is a fat-soluble vitamin, which means that consumption of oils or fats are necessary for its absorption into the body. The liver can store an adequate amount of the vitamin for four to six months.

(NPC, 2005, p. 187)

Of critical importance is a woman's nutritional status both before and during pregnancy for the proper intrauterine development and health of the foetus, and for protecting the mother against maternal morbidity and mortality. "Child nutrition including initiation, intensity, and duration of breastfeeding and use of complementary foods directly affects health status. Inadequate or inappropriate feeding leads to malnutrition and child morbidity and mortality" (NPC, 2005).

For instance, beginning at 6 months of age, children need foods other than breast milk to meet their dietary needs. According to the Tanzania Demographic and Health Survey (TDHS) less than 1 percent of breastfeeding children below the age of six months consume infant formula. “About one-third of breastfeeding children under six months eat solid or semisolid foods. The complementary foods most commonly consumed by breastfeeding children under six months are foods made from grains (30 percent) and milk products other than breast milk (12 percent)” (NPC, 2005, p. 177).

One of the leading and most widespread nutritional disorders among Tanzanian children under five is Protein Energy Malnutrition (PEM) (Figure 2), which results from inadequate food consumption and is aggravated by infections. Some studies have shown that PEM among children is an outcome of maternal nutrition, and is often correlated to impaired mental development (NPC, 2005; WHO, 2001).

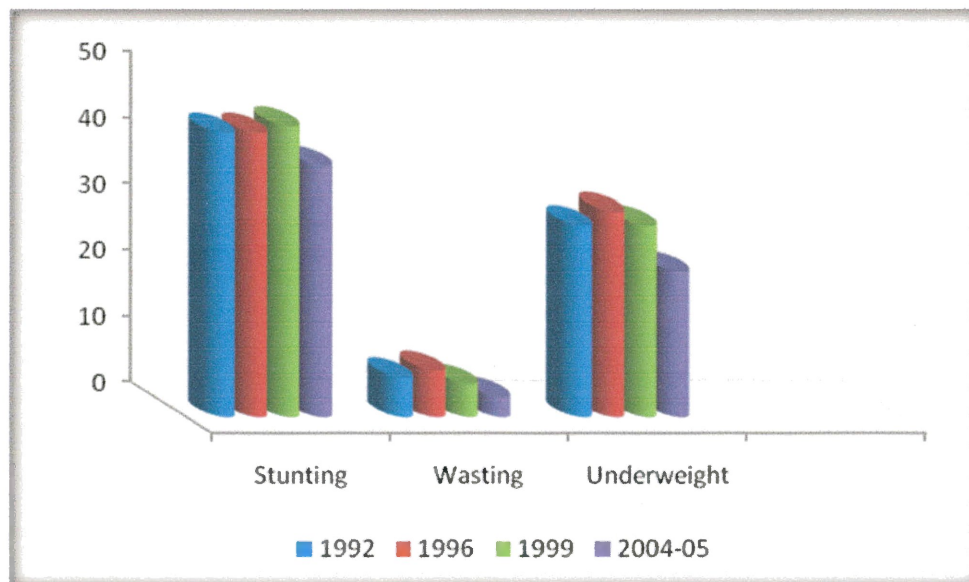


Figure 2. Trends in Protein Energy Malnutrition in Children Under Five Years (%)

PEM is also a common side effect of HIV/AIDS and this can mostly be attributed to the increase in the Resting Energy Expenditure (REE) of the person living with HIV/AIDS and consequently, a significantly increased protein turnover (Mahlungulu, Grobler, Visser, et al., 2007). Scrimshaw and SanGiovanni (1997) outlined that for all infections in people living with HIV, the average loss was about 0.6g/kilogram of body weight/day, which is equivalent to the mean recommendation for protein intake. They also noted that as diarrhoea increased in an HIV population, the protein losses were increased to approximately 0.9g/kg/day, and further, people with infections such as typhoid fever or malaria had protein losses of up to 1.2g/kg/day, which is much more than the average person consumes in one day (Scrimshaw & SanGiovanni, 1997).

Given the nutritional inadequacies within much of the Tanzanian population, the high prevalence of HIV/AIDS and the resultant health problems, provision of a food that is nutrient- and protein-rich, namely yoghurt, can provide tangible benefits. Yogurt has excellent nutritional benefits due to the microorganisms which ferment the milk, and also partially digest the carbohydrates, fats and proteins in the fluid milk (Hekmat & Koba, 2006) making these macronutrients more easily absorbed in the gut. It is also a good source of calcium, B vitamins and folic acid (Tamine & Robinson, 1999), is nutrient dense, and provides significant amounts of carbohydrates, protein, fat, vitamins and minerals, including riboflavin (vitamin B₂), which also assists with the absorption of other micronutrients.

Socio-Economic and Gender Inequalities in Tanzania

Beginning in the 1980's, gender equity was identified as a key goal of international development efforts. In the ten years from 1990-2000, the United Nations convened eleven international conferences to develop strategies that would ensure that women are fully integrated into the system of development around the globe (Table 1). Gender issues are now considered a cross-cutting theme within all development projects.

Table 1: UN Conferences on Gender Equality

UN Conferences 1990-2000			
1990	World Conference on Education for All, Jomtien	1995	World Summit on Social Development (WSSD), Copenhagen
1992	UN Conference on Environment and Development (UNCED), Rio de Janeiro	1995	Fourth World Conference on Women (FWCW), Beijing
1993	World Conference on Human Rights (WCOHR), Vienna	1996	Second UNC Conference on Human Settlements (Habitat II), Istanbul
1994	Global Conference on the Sustainable Development of Small Island Development States (DIDS), Barbados	1997	World Conference Food Summit (WFS), Rome
1994	International Conference on Population and Development (ICPD), Cairo	1999	ICPD + 5, New York
		2000	Beijing + 5, New York

Source: NPC, 2001, p.4.

Around the world, status and social roles are differentiated along gender lines, with men dominating the economy and most social institutions. The roles occupied by women tend to be determined by social constructions rather than human capacity, thus women's potential is often

under-utilized and their contributions under-valued. For any development project to be sustainable, gender roles and social status within that context must be clearly understood. If there is to be any change in their subordinate status, women must be an integral part in formulating project goals, and be considered full participants in achieving those objectives.

Sustainable development, development that supports the security and regeneration of economic, natural, human and social resources, cannot be achieved if women, who make up half of [the world's] population are neglected...The failure to involve women in all aspects of life, according to the World Bank is responsible for the continued underdevelopment of sub-Saharan African countries.

(NPC, 2005, p. 4-5)

Within Tanzania there are significant geographical variations in economic, health, and gender indicators. Specifically, in Mwanza district 46.3 percent and 48.3 of the urban and rural populations respectively live below the basic poverty line. Environmental conditions, such as housing facilities and household characteristics, correlate to health because they are associated with household welfare. One quarter of Tanzanian households are headed by females, which are typically poorer than male headed households. Larger households are generally associated with greater crowding in the dwelling, poverty, unfavourable health conditions and poor quality of life. Most Tanzanians live in dwellings with one or two rooms for sleeping, though the number of bedrooms varies by place of residence. For instance, about 40 percent urban households have just one room for sleeping (NPC, 2005, p. 23).

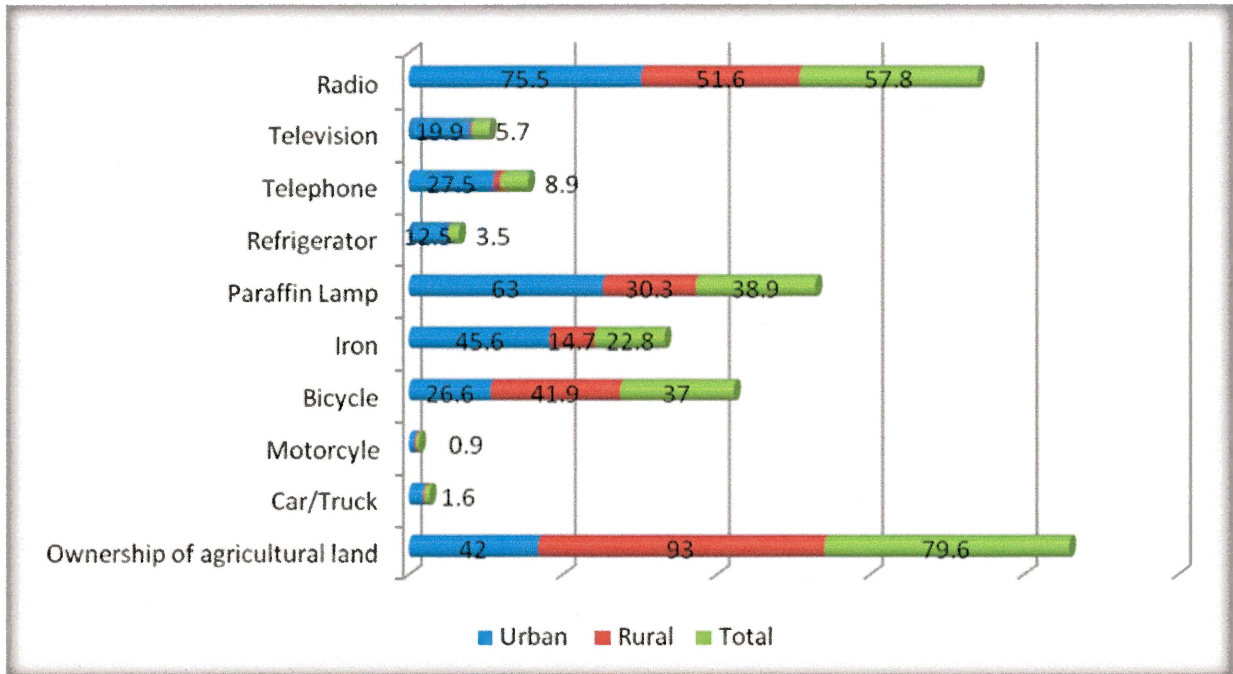
The physical characteristics of households are important determinants of the family members' health, especially children. The 2004-05 TDHS reports data on respondents' household environment, including access to electricity, the source of drinking water, type of sanitation facility, type of flooring, walls, and roof, and number of rooms in the dwelling. Only eleven percent of Tanzanian households have electricity, and significant disparities exist between urban and rural areas. On the mainland, 38 percent of urban households have electricity,

compared with just 1 percent in rural areas (NPC, 2005, p. 21). Installation of cement floors in the household greatly reduces exposure to disease-causing agents, but nearly three quarters of all Tanzanian households still have earth or sand floors (NPC, 2005).

Sources of drinking water and sanitation are important determinants of health status. Waterborne diseases including diarrhoea and dysentery are prevalent in Tanzania. Piped water, protected wells, and protected springs are considered to be relatively disease-free, while wells, rivers or streams, ponds, lakes, or dams are more likely to carry pathogens. Recent data indicates that a majority of Tanzanian households now have access to clean water sources (35 percent from piped water, 13 percent from a protected well and 6 percent from a spring) (NPC, 2005). However, sanitation remains a problem in Tanzania; 80 percent of Tanzanian households have traditional pit toilets and only 3 percent use a modern flush toilet. In rural areas of the mainland, 17 percent of households have no sanitation facilities at all (NPC, 2005).

Durable consumer goods are both a good indicator of socio-economic status and have a strong bearing on health status. Access to a radio or television exposes people to health information, a refrigerator prolongs the wholesomeness of foods, and modes of transport promote accessibility to health centres. Nationally, over half of households own a radio, but less than 4 percent have access to a refrigerator.

Figure 3: Household Possessions:
 Percentage of households possessing various durable consumer goods and agricultural land, by residence, Tanzania 2004-05.

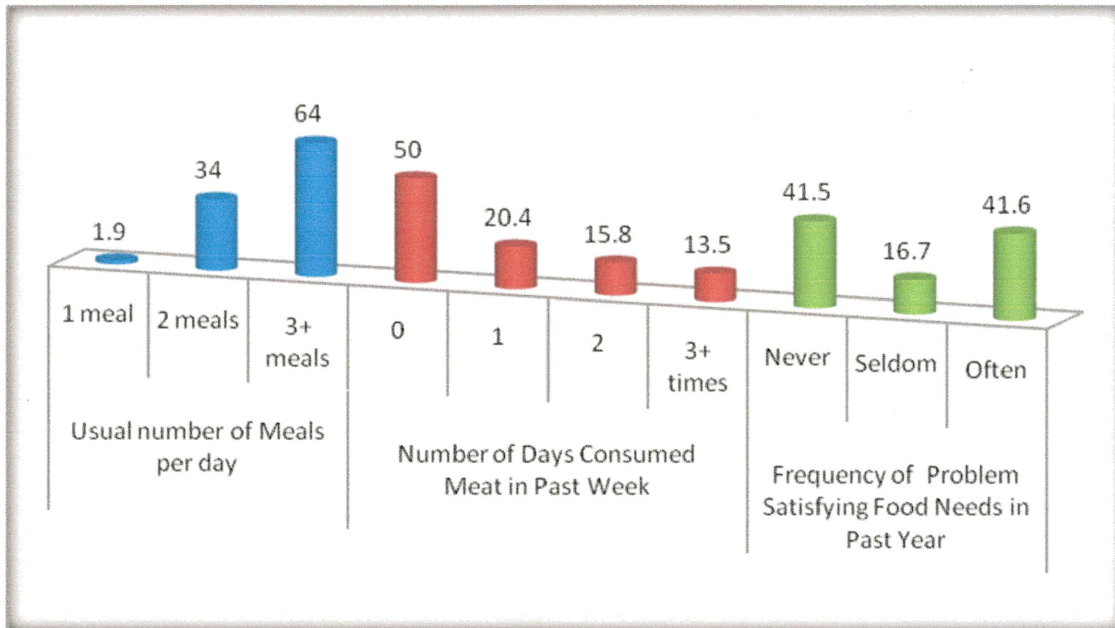


Source: Adapted from NPC, 2005, p.24

Household food security is also another critical problem, with a relatively large proportion of households, approximately 42% often having a problem in meeting their food needs (NPC, 2005). Further, half of all households in Tanzania report that they rarely consume meat (Figure 4).

Figure 4: Household Food Security:

Percentage of households by usual number of meals per day, number or days that meat was consumed during the last week, and frequency of problems satisfying food needs in the past year, Tanzania 200-05.



Source: Adapted from, NPC, 2005, p.25.

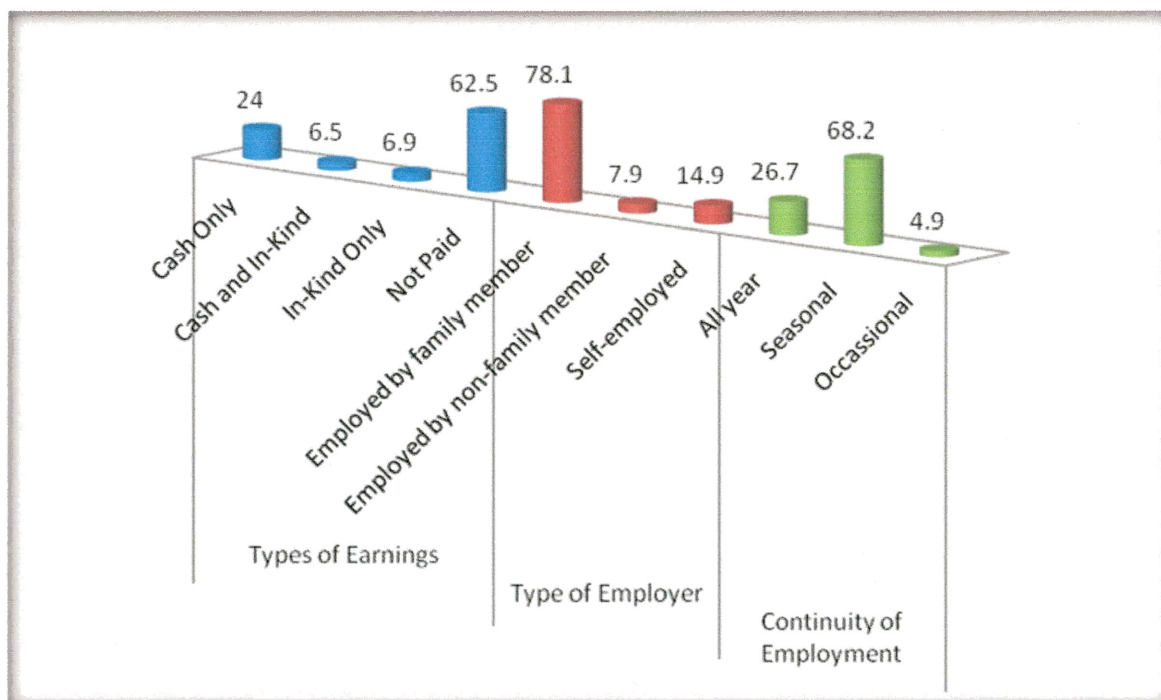
Education offers people the knowledge and skills which may lead them to an improved quality of life. Education is strongly correlated with the health of mothers, their children, as well as sexual and reproductive behaviour. Additionally, literacy is an important factor in well being. Where literacy levels are high, public health officials can effectively disseminate important information regarding health.

There are extreme variations in educational attainment among household members across wealth quintiles. Among males, just 9 percent of those from the wealthiest households have never been to school, compared with 42 percent of those from the poorest households (NPC, 2005). A similar pattern applies to the female household population, though the wealth disparity is even wider for females than males. More than half of females (53 percent) from the poorest households have never been to school, compared with 13 percent from the wealthiest households

(NPC, 2005). Fifty-eight percent of women and 64 percent of men have completed primary school. Increasing age is associated with lower levels of education, especially for women. The most disadvantaged group are women between the ages of 45-59, of whom more than half have no education. Geography compounds gender disparities; with 9 percent of urban women lacking any education, compared to 30 percent of rural women.

Employment can empower, and lift people out of poverty. Currently, 83 percent of the total sample of women surveyed are employed, however 62 percent are not receiving compensation for their efforts. Recent programs aimed at helping women become self-employed are slowly changing this dynamic, and increasingly putting women in control of income and assets. Women are primarily employed in the agricultural sector and by family members; however they are not compensated for their work (Figure 5).

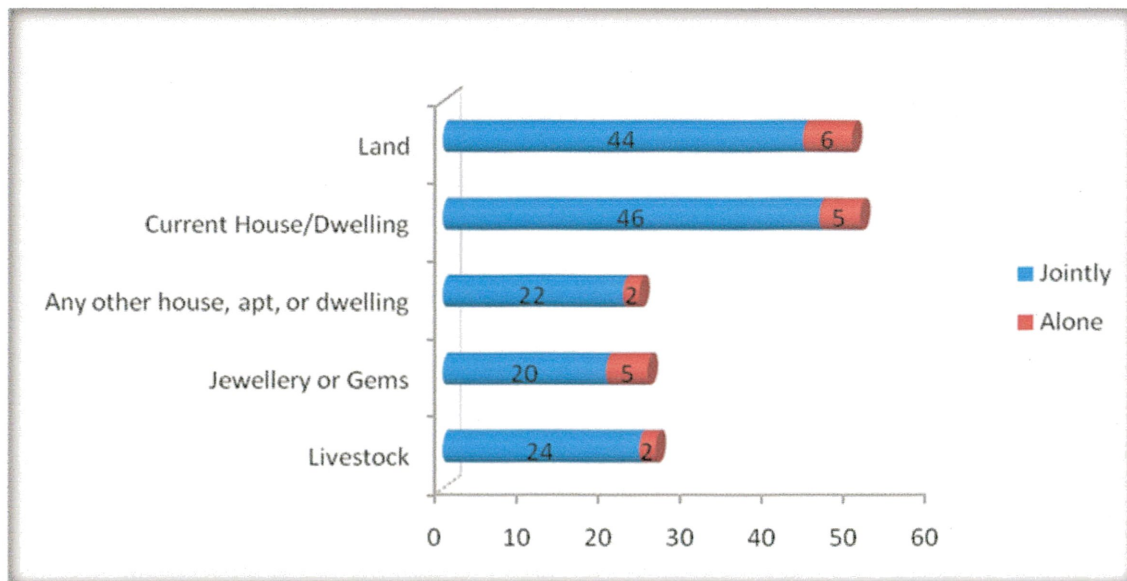
Figure 5: Women's Employment by Type:
Percent distribution of women employed in the 12 months preceding the survey by type of earning, type of employer, and continuity of employment in Tanzania 2004-05.



Source: Adapted from, NPC, 2005, p. 43.

As a measure of women’s status, the Demographic and Health Survey (NPC, 2005) uses as indicators control over assets and cash earnings. Of the 24 percent of women who received cash earnings, eighty-four percent reported that they themselves, or jointly with another person, decided how their earnings were used. Only 16 percent of women reported that someone else decided how their earnings were used. Women’s decision-making autonomy regarding the use of their earnings varies according to location (urban-rural), level of educational attainment, and wealth quintile. Approximately half of Tanzanian women reported that they were the sole proprietors or jointly owned land or their current residence (Figure 6). Despite this encouraging trend, a sizeable proportion of women who owned their own assets reported that they could not sell it without permission (NPC, 2005).

Figure 6: Women's Ownership of Assets

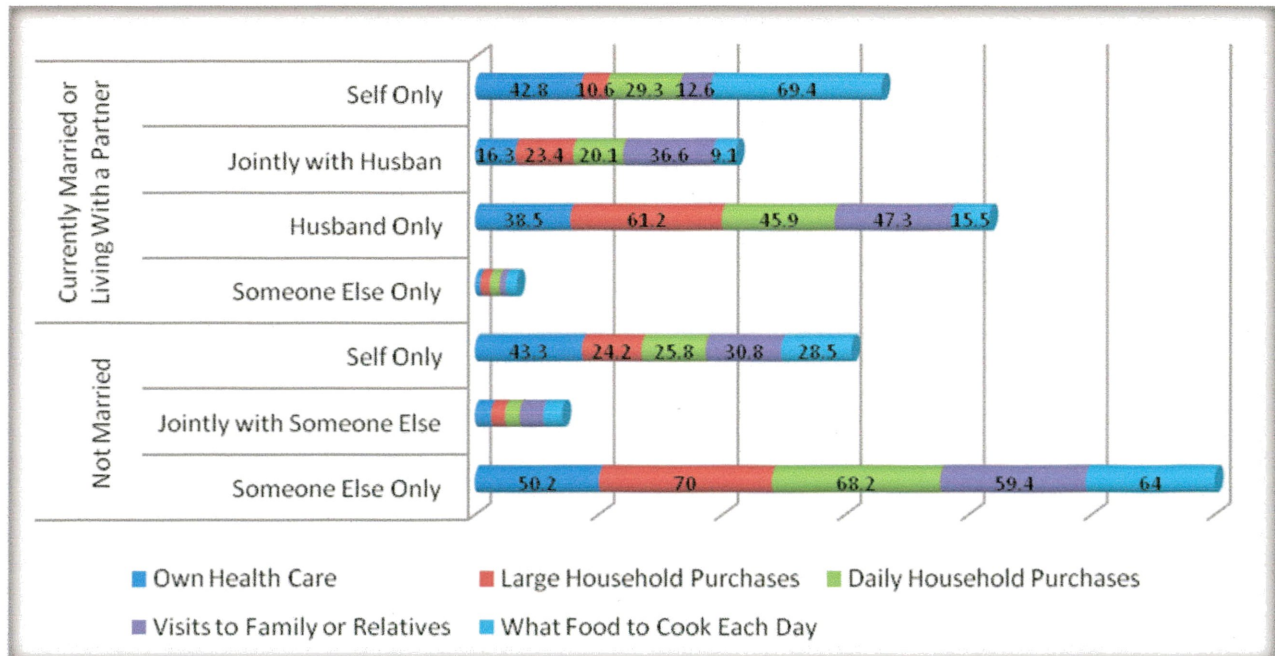


Source: Adapted from NPC, 2005, p. 45.

An essential indicator of gender equity is a women’s participation in decision-making. The ability of women to make decisions that affect the circumstances of their own lives is an

essential aspect of empowerment; however the role of women in decision-making varies by the type of decision in the Tanzanian context. For example, approximately 69 percent of married women in Tanzania can decide what food to cook each day, but do not make decisions about daily purchases or visits to family and relatives. However, only 43 percent of these women are allowed to make decisions about their own health. Additionally, only one-third of women participate in household decisions regarding large purchases, and this typically remains the domain of husbands. Single women who are dependent on their parents do not fare much better either. They have very little decision-making power in any dimension, except in regards to their own health (Figure 7).

Figure 7: Women's Decision Making:
Percent distribution of women by person who has the final say in making specific decision, according to current marital status and type of decision, Tanzania 2004-05.



Source: Adapted from NPC, 2005, p. 46.

As development theorists and practitioners are well aware, '[s]ustainable development, development that supports the security and regeneration of economic, natural, human and social resources, cannot be achieved if women, who make up half of [the world's] population are neglected' (NPC, 2001, p. 4). It is critical then to examine gender relations and how gender may influence women's participation in a community based project such as WHE. Culturally-sanctioned and structurally-reinforced gender roles tend to foster power imbalances that may end up increasing women's risks of spousal disagreements and in some cases violence (Creighton & Omari, 2000). When the hegemony of men appears to be challenged, expressions of power may escalate and violence may be used as a form of redistribution of power as men may use their physical strength to reinforce their dominance over women (Gonzalez-Brenes, 2003; Connell, 1987). Men's abusive behaviour is often a response to the fear of loss of control and dominance over women (Baylies & Bujra, 2000). With the potential socioeconomic benefits of the larger project on women, there is a need to explore the contextual gender relations and how they may influence the women's health and safety. As such, developing a program evaluation is imperative in monitoring project impacts.

The Project

Western Heads East was launched by The University of Western Ontario in response to a call to action issued by Stephen Lewis, UN Special Envoy for HIV/AIDS in Africa. Mr. Lewis addressed a conference at The University of Western Ontario on the current state of the HIV/AIDS pandemic in Africa, and he asserted that the future of entire nations is being threatened by the disease. His remarks, “The world has been terribly delinquent,” struck a deep chord with members of the university community, and inspired a group of housing employees to lead the university’s response to one community in Tanzania. Tanzania is defined by the Canadian International Development Agency as a high-need area, and Mwanza is the site where AIDS first claimed lives in the country. The University of Western Ontario in partnership with the Kivulini Women’s Rights Organization, the National Institute for Medical Research, and the Tukwamuane Women’s Group have since launched a community based probiotic food project in Mwanza, Tanzania. The development phase of the project was initiated in 2003 and WHE has entered a collaborative and multi-disciplinary research phase.

The Western Heads East project is unique for a number of reasons. WHE combines elements of community health, development, and research. It is the first international development project launched by The University of Western Ontario (UWO), an institution widely recognized for its research expertise. The project also brings together a unique group of stakeholders, including individuals, community groups and institutions on two continents. Interested parties from the university involve staff, interns, faculty and the student body.

The goal of Western Heads East (WHE) was to establish a sustainable community based probiotic food project in Mwanza, Tanzania. The primary objectives of the WHE project are, therefore, fourfold: 1) to improve the nutritional status of these economically marginalized

Mwanza women and their immediate families; 2) to support the women in yoghurt production as a small business enterprise; and 3) to support further research about the effectiveness of probiotic yoghurt in HIV/AIDS prevention and in treating symptoms of the disease; and 4) to increase knowledge of the benefits of probiotics, especially among Tanzanian physicians, clinicians, and public health officials. Additionally, UWO has two supplementary goals for the project: 1) to raise awareness of the African HIV/AIDS pandemic within the university and surrounding community; 2) to provide Western students interested in development with hands-on experience in 'the field'.

The Stakeholders

Western Heads East was conceived and initiated by Residence Staff at UWO as a response to the pandemic. This is a significant departure from the majority of university initiatives which are typically led by faculty or senior administration. The staff have leveraged their access to the student residence population in order to build broad campus awareness, widespread student involvement and successful fundraising. The Western Heads East program is based on the probiotic research of Dr. Gregor Reid of the Canadian Research and Development Centre for Probiotics (CRDC – Probiotics) at the Lawson Research Institute (UWO), and the nutrition research of Dr. Sharareh Hekmat of Brescia University College at The University of Western Ontario. The CRDC's primary focus is to undertake excellent basic discovery research on lactobacilli and bifidobacteria. This includes studies in the areas of microbial ecology, proteomics, microbial genetics, biofilm studies, cell-signaling, immunology and population health. The research at the centre is directed at the development of new knowledge that can be applied directly to patient care. Much of the probiotic research is geared toward examining the

normal flora of the intestine and vagina, with a research focus on women's health, premature infants, and adults prone to or suffering from intestinal, urinary tract, wound and cardiovascular problems. Although the foundation of the project is based in science and nutrition, the project transcends conventional university initiatives and has attracted faculty and students from many disciplines, making it collaborative and multi-disciplinary in nature.

The Kivulini Women's Rights Organization (KWRO) is a registered Non-Governmental Organization (NGO) based in Mwanza, Tanzania. In Kiswahili, Kivulini means 'in the shade', implying that Kivulini offers a safe haven where people can discuss issues and support each other. Kivulini's mission is to empower women and foster a community free from domestic violence in which women's rights are respected. KWRO is committed to raising awareness, facilitating dialogue and advocating for change by mobilizing men and women in the community to create an environment of safety, equality and respect.

Kivulini Women's Rights Organization was founded in 1999 and its activities focus on: increasing women's access to and control over economic resources; eliminating laws that discriminate women and girls; building the capacities of community leaders to create a safe environment for women and girls to live and do business; promote women for positions in local leadership and decision making positions and increasing access to education for women and girls. The catchment area includes Ilemela and Nyamagana districts, with a combined population of approximately 476,646 (approximately, 50% male and 50% female).

The international community strongly supports the work of Kivulini, and major funders include HIVOS (Netherlands), the McKnight Foundation, Anti-Slavery International, Terre de Hommes (Switzerland), and the Hilden Trust Foundation. KWRO has established partnerships with other NGOs both in Tanzania and abroad. Currently, Raising Voices, HakiElimu, Women's

Dignity Project, and Interteam (Switzerland), UNIFEM and Youth Challenge International are key collaborators.

KWRO's programs include advocacy, capacity building, community awareness, legal aid and social services, media, and economic empowerment. The strategies of empowering women economically focus on building their skills, expanding small businesses, and creating an environment in the community which is conducive for them to do business. These strategies are critical; studies by Kivulini and other organizations have shown that simply empowering women does not work. In communities where women are less valued, they often are not allowed to own resources, and frequently suffer abuse by their family members or partners. In these situations, community support structures must be in place for women to succeed. KWRO's programs aim to empower women to more fully participate in the formal sector, to increase the benefits of their labour, and to reduce their dependency.

The National Institute for Medical Research (NIMR) was established by the Tanzanian government in October 1979 as a parastatal institution. NIMR became operational a year later, and is responsible for carrying out, controlling, co-ordinating, registering, monitoring, evaluating and promoting health research in Tanzania. It has approximately 330 staff and is comprised of ten Centres/Stations throughout the country.

Formal medical research in Tanzania was initiated by German scientists at the end of the 19th century, with a focus on malaria and tuberculosis. After World War I, the British expanded the focus to include other diseases such as trypanosomiasis, bilharzia and filariasis. Medical research in western Tanzania dates back to the 1920s. In 1947 the East African Medical Survey at Malya near Mwanza was established, institutionalising the use of regional medical centres. Until the late 1970s all the health research institutions in Tanzania were administered by the East

African Medical Research Council. With the demise of the East African Community in 1977, the government recognized the need to establish a national body to generate scientific data and information required in the development of better methods and techniques of enhancing disease management, prevention and control in the country. To this end, in 1980 NIMR was empowered to take over all in the medical research in the country.

At the national level, NIMR's major responsibilities include supporting the Ministry of Health in disease control activities and building zonal and district capacities for health research and service delivery. The Institute continues research activities in its traditional disease areas and is engaged in strengthening capacity in clinical research, zoonotic diseases, and HIV/AIDS interventions. NIMR has evolved from a disease-specific approach to the current wider mandate that includes all health research at the local, zonal, national and regional levels. NIMR's mandate at the local level includes working in close collaboration with the district Council Health Management Teams and health facilities to address local priority problems.

The early focus at the Mwanza Centre was on schistosomiasis and intestinal helminthes. However, as new public health concerns arose, the Centre emerged as a regional health research facility serving the Lake and Western Zones. At this, the institute also expanded its focus to include Sexually Transmitted Diseases (STDs), Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome (HIV/AIDS), diarrhoeal diseases, and malaria.

To be able to accomplish its activities, the NIMR embarked on research capacity development vigorously and established close working collaborations with both local and foreign partners. This has enabled the institute to move from 2 scientific staff in 1980 to 40 in 2008. This is exemplified by the recognition of all interventions developed against STDs and HIV/AIDS both in Tanzania, Africa and the world in general. WHO has incorporated the

intervention on STDs as a means to control HIV transmission in their best practice series. The findings from two HIV/AIDS research projects, The Tanzania-Netherlands Project to Support HIV/AIDS (TANESA) and the African Medical and Research Foundation's (AMREF) project called Mpango wa Elimu na Maadili (MEMA) kwa Vijana have also been accepted and recommended by WHO and the World Bank as good models for programs to control HIV/AIDS among adolescents.

In an attempt to address what Kingsley Anukam has called the 'severe lack of probiotic use and research in Africa' (Anukam, 2007, p.83), NIMR has also played an important role in helping to achieve the long-term research-oriented goals of the project. Together, Western, NIMR, and other Tanzanian scientists and health professionals have jointly applied for capacity-building funding from various Canadian government sources to support the HIV/AIDS research of African scientists.

At the inception of the Western Heads East probiotic yoghurt project, Kivulini Women's Rights Organization recruited twelve women from Mabatini, one of the poorest suburbs of Mwanza to act as the main producers and recipients of the probiotic yoghurt. The group was drawn from several Community Action Groups with which KWRO had established ties. The women formalized their group into a Community Based Organization in 2006 under the name Tukwamuane, but more colloquially refer to themselves as the 'Yoghurt Mamas', are currently pursuing registration as a Non-Governmental Organization and to become a certified business with the Tanzanian Business Bureau.

At the center of the WHE project, the Tukwamuane group which has transformed into twelve to ten members spend at least six hours per day, six days a week in the small community kitchen in Mabatini, producing 60-80 litres of probiotic yoghurt daily, which has been named

'Fiti' (or 'Health' in Kiswahili). The live and active culture used to produce the project's yoghurt is obtained weekly from the National Institute for Medical Research (NIMR), where microbiologists culture the *L. rhamnosus* GR-1 bacteria strain from a starter batch provided by UWO. As a quality control measure, a yoghurt sample is taken to NIMR on a weekly basis to verify that it contains appropriate bacterial counts.

In addition to the yoghurt they themselves consume, the women also provide 200 ml of yoghurt per day without charge to approximately 125 HIV-positive community members who are usually referred to them by a leading local HIV physician. Remaining yoghurt is sold at a nominal price within the Mabatini community and to the People Living with HIV/AIDS Nutrition Program (operated by Catholic Relief Services). Gradually, the product is also being marketed at slightly higher prices to selected local restaurants, stores, and orphanages in Mwanza. Despite the yoghurt's appealing taste and texture, income derived from its sales is minimal and is subsidized by UWO, which pays for electricity, propane, and reimburses the group for most equipment purchases. Half of Tukwamuane's limited net monthly income is directed towards paying bills, providing each woman with a small amount of earnings, and is deposited into the women's joint bank account to cover group activities and project emergencies; the remaining 50 percent funds micro-credit loans for group members at a 10 percent interest rate.

The Yoghurt Mamas range in age from 30 to 54, have a primary school education, and could be described as living in significant poverty. In nine of the ten households there is only one adult wage-earner. Family sizes vary from six to fourteen and, in some cases the households include extended family members. Combined, the women and their immediate and extended families constitute a group of approximately 95 adults and children, many of whom have

consumed the project's yoghurt on a relatively regular basis since January 2005. Notwithstanding their personal HIV status, all of the Tukwamuane women are active advocates for marginalized groups, especially children and HIV-positive women, and are celebrated as community leaders. Their visible status within and beyond the Mabatini community has helped promote the project and raised additional awareness about HIV/AIDS.

As this brief overview demonstrates, the WHE project is comprised of a wide range of individuals, groups, and institutions with different expertise, experiences, and expectations. This diversity, while clearly beneficial, also poses a number of challenges, calling for a program planning framework and evaluation to ensure that objectives and expected outcomes are being met.

The Role of Probiotics: Friendly Bacteria

Throughout history, human beings across cultures regularly consumed fermented foods which contained a variety of beneficial lactobacilli and bifidobacteria genera. Fermented foods have gradually fallen away in our contemporary diet, a situation which researchers in the field of probiotics believe may be contributing to the prevalence of some diseases. Underlying the notion of using probiotics as a treatment for health conditions is a belief modern human beings do not consume adequate amounts of beneficial microbes to maintain optimal levels of healthy flora in their bodies, and that this situation can be remedied by taking probiotics (Reid & Hammond 2005). Probiotics are lactobacilli or bifidobacteria, with no known virulence, that commonly inhabit the healthy gut and vagina. Initially it was believed that probiotics needed to be delivered via bile and acid-resistant systems such as gel or entero-coatings, but subsequent research has shown that a number of probiotic strains are bile and acid resistant. For example, Lactobacillus strain GR-1 can function in the gut, survive passage, and be excreted in feces

(Gardiner, Heinemann, Baroja, et al., 2002; Morelli, Zonenenschain, Del Piano, et al., 2004).

This knowledge has led to development of probiotic products that are easily delivered in foods.

Historically, ingested probiotic strains were believed to adhere to the gut wall, to block pathogen adhesion and growth (Reid, Cook & Bruce, 1987), and also to give a nonspecific boost to immunity (Perdigon, Alvarez, Rachid, et al., 1995). Current thinking suggests that probiotics have other functions, including producing anti-infectives, such as hydrogen peroxide and bacteriocins (Ocana & Nader-Macias, 2004); cell signals that strengthen host-cell mucus barriers against pathogen invasion (Mack, Ahme, Hyde, et al., 2003); and other signals that prevent virulent factors, such as toxins, from being released (Reid & Hammond, 2005).

While the term ‘probiotics’ only dates to the 1960’s, the concept of beneficial bacteria has a much longer history. In 1906 French paediatrician Henry Tissier observed that children with diarrhoea had much lower counts of ‘bifid’ bacteria in their stool than did healthy children. The following year, Russian Nobel laureate Elie Metchnikof suggested that it might be possible to modify the flora in our bodies, replacing harmful microbes with beneficial ones (FAO/WHO, 2001). Research conducted over the last decade indicates that probiotics can improve immunological, digestive and respiratory function, and may alleviate infectious disease in children (FAO/WHO, 2001).

In a 2001 Expert Panel Report, the Food and Agriculture Organization of the United Nations and World Health Organization proposed that probiotics should be made more available to populations at high risk of morbidity and mortality. Specifically, probiotics are “live organisms which when administered in adequate amounts confer a health benefit on the host” (FAO/WHO, 2001, p.22). Clinical studies have shown the ability of probiotic bacteria to kill HIV in vitro, colonize the intestine and vagina, help alleviate suffering from diarrhoea-which is

prevalent in Sub-Saharan Africa and amongst HIV/AIDS patients, and reduce the risk of bacterial vaginosis, a condition that predisposes women to HIV and other sexually transmitted diseases. The FAO/WHO concluded “specific strains of probiotics are safe for human use” (FAO/WHO, 2001, p. 22) and that “adequate scientific evidence exists to indicate that there is potential for the derivation of health benefits from consuming food containing probiotics” (FAO/WHO, 2001, p. 22). In particular, the FAO/WHO urged the medical community to utilize probiotics in the treatment of gastrointestinal infections, certain bowel disorders, allergies, and urogenital infections (FAO/WHO, 2001; Reid & Bruce, 2001). It must be emphasized that probiotics are not new to Africa, and indeed many fermented foods, such as Attieke, soubala/dawa-dawa/netetou/afitin/iru, gari, burukutu, tchoukoutou/dolo, remain part of the Maasai and Kalenjin staple diets.

Studies indicate that probiotics can improve nutrient bioavailability, including B vitamins, calcium, iron, zinc, copper, magnesium and phosphorus. Researchers suggest that probiotics hold great promise in the treatment of diarrhoea and HIV/AIDS, two of the top causes of death in the developing world. A number of trials have shown that daily intake of probiotics significantly reduces diarrhoeal episodes in children (Reid et al., 2005; Reid & Devillard, 2004). Bacterial vaginosis, a condition associated with depleted levels of lactobacilli in the vagina and an overgrowth of anaerobic pathogens, is associated with pre-term labour in otherwise healthy women and has been found to increase the risk of women contracting sexually transmitted diseases, including HIV (Reid et al., 2005; Reid & Bocking, 2003; Martin, Richardson, Nyange, et al., 1999; Sewankambo, Gray, Wawer, et al., 1997). Research shows that selected strains of lactobacilli are able to colonize the vagina, displacing the bacterial vaginosis pathogens (Reid et al., 2005). The Western Heads East project utilizes the probiotic *Lactobacillus rhamnosus* GR-1

(also known as *L. rhamnosus* Fiti, named after 'Health' in Kiswahili), an organism known to modulate immunity (Baroja, Kirjavenainen, Hekmat, et al., 2007), which is also able to colonize the vagina and inhibit the growth and adhesion of urogenital and intestinal pathogens, while themselves being highly adherent to uroepithelial and vaginal cells (Reid & Bruce, 2001) and importantly survives well in yogurt (Hekmat, Soltani, & Reid, 2008).

Yoghurt as a Delivery Medium

Health officials are increasingly recognizing that dairy products are a suitable delivery method for probiotics (FAO/WHO, 2001), because lactobacilli utilize the lactose from the protein in the milk to proliferate. In comparison to plain milk, fermented dairy products are more digestible and nutritious because the proteins, fats, and carbohydrates are pre-digested by the bacterial cultures. This partial hydrolysis of the protein also enhances the action of digestive enzymes. Yoghurt was chosen as the delivery medium for this project as it was revealed that a) consumption of dairy products within the Mwanza region is extremely low, mainly due to financial constraints; b) there is a long history of fermented foods in Africa; c) it is relatively easy to produce; and d) helps with several micronutrient deficiencies such as vitamin A and promotes weight gain. Besides tasting good, yogurt offers several nutritional benefits:

- ❖ It is nutrient-dense; in other words, it provides significant amounts of carbohydrates, protein, fat, vitamins and minerals for relatively few calories.
- ❖ Yogurt is an excellent source of calcium and riboflavin (vitamin B₂). Compared to milk, it often contains more protein and calcium since fat-free milk solids are usually added to milk in the production of yoghurt, thus boosting its content.

- ❖ For those people who are lactose intolerant and therefore cannot drink milk without experiencing abdominal cramps, bloating or gas, consuming yoghurt can be a pleasant way to ensure adequate calcium intake. The live active cultures create lactase, the enzyme lactose-intolerant people lack, and another enzyme contained in some yoghurts (beta-galactosidase) which also helps improve lactose absorption in lactase-deficient persons. Bacterial enzymes created by the culturing process partially digest the milk protein casein, thereby making it easier to absorb and less allergenic.

An important characteristic of the lactobacilli strains utilized in this project is their bile resistance. Normal yoghurt cultures are not bile tolerant and thus can not survive in the intestinal tract, but *L. rhamnosus* GR-1, is able to pass through the human gastrointestinal tract without being destroyed, and without inducing systematic immune or inflammatory responses.

Recently, probiotic yoghurt has also been shown to improve the gut health of PLWHAs, thus aiding in nutrient and mineral absorption (Hekmat, Soltani, & Reid, 2008). Probiotic yoghurt improves protein status, and thereby prevents progressive muscle wasting. Also probiotics have been shown to reduce the severity of diarrhoeal episodes, which often leads to the poor absorption of nutrients (Alam & Ashraf, 2003; Ashworth, 2001).

Therefore, the rationale for including probiotic organisms in the yoghurt, was several-fold. Probiotic bacteria have been shown to address a number of problems associated with HIV/AIDS and malnutrition, namely (i) improving resistance to infection through immune modulation (Perdigon et al., 1995); (ii) improving intestinal barrier function (Isolauri, 2001); (iii) alleviating diarrhoea (Anukam, et al., 2008); and improving nutrient bioavailability, including B vitamins, calcium, iron, zinc, copper, magnesium and phosphorus (Kopp-Hoolihan, 2001). In recognition of the health benefits conferred on the host by probiotics, and the additional

nutritional benefits of yoghurt as a delivery medium, establishing probiotic yoghurt producing centres in HIV/AIDS ravaged regions, as a community based intervention optimizes the reach to marginalized populations as most individuals face health service inequities and extreme difficulty in accessing health care.



Photo 1: Members of Tukwamane Women's Group



Photo 3: Making Yoghurt at the Community Kitchen in Mabatini



Photo 4: Interior mural at the Community Kitchen, depicting a Tanzanian family consuming yoghurt



Photo 5: Tanzania's Future Hope, kids outside the Community Kitchen

Project Planning and Evaluation Framework

The Need for a Gender Analysis

Gender analysis illuminates the variances between women's and men's access to and control over economic, political and social resources, thus allowing project co-ordinators to develop context specific strategies and measures that improve women's position. Gender analysis is an excellent tool to identify barriers to female participation in project activities, and allows development personnel to identify the daily realities of community members who will be impacted by planned development. Gender roles vary from generation to generation, from place to place, and from time to time.

The trap we often fall into when planning for development interventions is that we make assumptions about the context of development based on our own experience in a different context. These assumptions can result in a terrible waste of resources both for the agencies and the local community involved. Gender analysis is a tool to make sure you have real information to base your activities on, not assumptions.

(Vainio-Mattila, 1999, p.22)

Although a gender analysis is critical in identifying barriers to female participation in project activities and a necessary step prior to developing a project planning and evaluation framework, it was not completed at the project's inception nor has one been conducted since. Without recognizing and identifying the lived realities of the women who are a fundamental component of the project as well as beneficiaries, this can lead to unnecessary pitfalls and failed expectations.

From among several international gender analysis tools, the FAO framework was selected. The FAO framework allows for broad based participation, is jargon free, and has a user friendly format. Importantly, this framework is equally effective at all stages of the project life cycle, including planning, appraisal, and evaluation (Vainio-Mattila, 1999), lending itself to

current timeframe of the project. The gender analysis is presented prior to the logic model, laying the groundwork for a better understanding of the context.

Western Heads East: Gender Analysis

CONTEXT PROFILE	
CONSTRAINTS	SUPPORTS
<ul style="list-style-type: none"> ➤ Women lack access to financial resources ➤ Cultural climate in which women suffer inequality ➤ Women's work often unpaid ➤ Women lack enterprise experience/skills ➤ High incidence of domestic violence ➤ Cultural climate in which many men perceive women's empowerment as a threat ➤ Street leaders and religious leaders lack knowledge of HIV/AIDS transmission and lack education, resources and strategies to combat HIV/AIDS ➤ Cultural barriers to discussing sex and sexually-transmitted disease ➤ Women more vulnerable to disease due to higher nutrition needs ➤ Women at higher risk of poor nutritional status due to cultural practise of feeding males/children first ➤ Women at higher risk of contracting HIV/AIDS ➤ Lack of knowledge of nutrition among local women ➤ High levels of domestic violence associated with increased HIV infection rates 	<ul style="list-style-type: none"> ➤ Existence of local organizations that support, educate and advocate for women's empowerment and gender equality ➤ Local women's population organized into Community Action Groups ➤ Strong role of Street Leaders in local community ➤ Strong links between local partner (KWRO) and Community Action Groups ➤ Existence of awareness campaigns by government and NGOs to combat domestic violence ➤ Local physicians and public health officials supportive of programs to combat HIV/AIDS, although they lack the necessary resources to assist implementation ➤ Local medical research facility (NIMR) is a project partner ➤ Strong motivation among local women to improve their socio-economic status ➤ Project supports WID, MDG and Tanzanian health and development goals

ACTIVITY PROFILE			
LOCATION	ACTIVITIES	GENDER	TIME
➤ Home	Allocation of family financial resources	M	weekly/monthly
	Procuring food from the market	F	daily/weekly
	Preparing food	F	daily
	Distributing food to family members	F	daily
	Subsistence farming	F	daily
	Childcare	F	daily
	Wage Labour	M	daily
➤ Cow Shed	Fodder Collection	M/f	daily/weekly
	Shed construction	M	occasionally
	Cow husbandry	F	daily
	Milking of cows	F	daily
	Veterinary services	F	occasionally
	Fetching water	F	daily
➤ Community Kitchen/Yoghurt Production Facility	Cleaning	F	daily
	Renovation	M	occasional
	Construction	M	occasional
	Equipment Maintenance	F	daily/occasional
	Yoghurt Production	F	daily

Program Planning and Evaluation: Empowerment & Health

LOCATION	ACTIVITIES	GENDER	TIME
	Yoghurt Sales	F	daily
	Recording income and expenses	F	weekly/monthly
	Banking	F	occasional
	Procurement of probiotic culture	F	weekly
	Obtaining milk	F	daily

RESOURCES PROFILE			
RESOURCES	ACCESS BY GENDER	CONTROL	BENEFITS
➤ Capital	F	Project	Initiate Project Maintain Project
➤ Cows	F	Project	Control milk supply
➤ Land	M/f	Husband/State	Decide land use
➤ Training	F	Project	Knowledge and Skills
-Yoghurt Production	F	Project	Skills
-Maintaining a sterile environment	F	Project	Skills
-Cow husbandry	F/m	Project	Skills
-Enterprise Management Skills	F	Project	Skills Empowerment (Economic and Social)
➤ Yoghurt Mamas Committee	F	Project Participants (Yoghurt Mamas)	Social Empowerment Management Structure Future Access to Funding Independence of Project Sustainability of Project Income Status Management of Resources

PROGRAM ACTION PROFILE		
PROGRAM OBJECTIVES AND ACTIVITIES	GENDER CONSIDERATIONS	RECOMMENDATIONS FOR PROGRAM ACTION
<p>Objective:</p> <ul style="list-style-type: none"> ➤ Establish a local, community based project in Mwanza, Tanzania to re-introduce fermented food products, specifically probiotic yoghurt, to local population for improved health and development <p>Activities:</p> <ul style="list-style-type: none"> ➤ Obtain necessary equipment and supplies ➤ Training in yoghurt production skills ➤ Renovate community kitchen building and obtain electric service ➤ Obtain land on which to keep milk cows and construct cow shed ➤ Training in cow husbandry skills ➤ Training in enterprise management skills <p>Objective:</p> <ul style="list-style-type: none"> ➤ Undertake research to determine the efficacy of probiotic yoghurt in combating bacterial vaginosis, diarrhoea and other conditions associated 	<ul style="list-style-type: none"> ➤ Recruit participants based on the goal of increasing gender equality 	<ul style="list-style-type: none"> ➤ Female project participants develop a distribution strategy based on their knowledge of local communities ➤ Female project participants set the price point based on their knowledge of local resource levels ➤ Offer educational and counselling sessions to the community, male household members and spouses regarding project activities in order to mitigate domestic violence, stigma, and negative attitudes regarding participation of women in the project. For ongoing projects this should also be offered retrospectively. ➤ Recruit female project participants ➤ Recruit and train a female to act as the local project co-ordinator ➤ Regular assessment and reporting of changes in the level of gender equality throughout the life cycle of the project ➤ Each women's yoghurt group be invited to participate the decision-

PROGRAM OBJECTIVES AND ACTIVITIES	GENDER CONSIDERATIONS	RECOMMENDATIONS FOR PROGRAM ACTION
<p>with HIV/AIDS</p> <p>Activities:</p> <ul style="list-style-type: none"> ➤ Assemble a multi-disciplinary research team ➤ Obtain Research Protocol Permits the Tanzania Ethics Board ➤ Obtain funding ➤ Obtain local permits/permission from District Commissioners <p>Objectives:</p> <ul style="list-style-type: none"> ➤ Empowerment for women participating in the project <p>Activities:</p> <ul style="list-style-type: none"> ➤ Training in enterprise management skills ➤ Write and adopt a constitution governing the project ➤ Obtain CBO/NGO status ➤ Provide the women with adequate skills so that they may train other females <p>Objectives:</p> <ul style="list-style-type: none"> ➤ Improved nutrition of children, women and PLWHA's 	<ul style="list-style-type: none"> ➤ Awareness of religious and cultural norms regarding physical examinations. ➤ Knowledge of physiological differences in HIV transmission between men and women ➤ Provide gender sensitive training sessions ➤ Provide level and skill appropriate training sessions ➤ Give priority to women's groups when expanding the project into other communities 	<p>making process during the life cycle of the project</p> <ul style="list-style-type: none"> ➤ Opportunities for knowledge transfer between the various yoghurt groups be fostered ➤ Collaboration between the various groups be encouraged

PROGRAM OBJECTIVES AND ACTIVITIES	GENDER CONSIDERATIONS	RECOMMENDATIONS FOR PROGRAM ACTION
<p>Activities:</p> <ul style="list-style-type: none"> ➤ Provide yoghurt at low or no cost to PLWA's ➤ Provide yoghurt within the community at price points commensurate with local resource levels ➤ Establish baseline information regarding household nutritional intake ➤ Monitor improvements in nutritional status 	<ul style="list-style-type: none"> ➤ Women's lower socio-economic status ➤ Women more vulnerable to disease due to higher nutrition needs ➤ Women at higher risk of poor nutritional status due to cultural practise of feeding males/children first 	
<p>Objectives:</p> <ul style="list-style-type: none"> ➤ Expand project to other communities 		
<p>Activities:</p> <ul style="list-style-type: none"> ➤ Identify interested communities, and community action groups ➤ Conduct community readiness survey ➤ Obtain funding, and resources in order to replicate earlier project 	<ul style="list-style-type: none"> ➤ Give priority to women's groups ➤ Women from the initial project oversee activities and train new project groups ➤ Women's empowerment is considered a threat 	

Literature Review

In this section, the literature review is intended to provide the information necessary to make a conceptual link between women's economic empowerment and health status. The literature cited, although dated in some instances, is the underpinning for much of the research and policy which has followed in their respective fields and has set a gold standard.

Today, there is widespread consensus among leading international organizations (e.g. WHO, UN, ILO, World Bank) and development scholars that there are many factors and forces affecting women's health, their quality of life, and welfare system. According to these organizations, in order to achieve effective and lasting change for better health and quality of life (QOL) for women, a dual approach is needed (Kar & Alcalay, 2000; UNDP, 1999). The dual approach suggests that structural and social adjustments to current systems are necessary to address the practical and strategic needs of women. More specifically, Kar and Alcalay (2000) suggest that a dual approach encompasses: 1) reforming health and welfare systems that meet the specific and urgent needs of women (e.g. health care, day care) and 2) reforming socio-cultural systems that perpetuate the gender inequalities which are the source of all day-to-day problems (e.g. unequal opportunities for education, income disparity, negative cultural practices and devaluation of women).

These two approaches address what Moser (1987) identifies as two types of women's needs: "practical needs" and "strategic needs". The first approach focuses on meeting day-to-day needs, and is comparable to giving a meagre amount of money to a poor person. In contrast, the "strategic needs" approach can be equated with giving that individual the same amount of money, as well as providing the skills and opportunities needed to put the money to productive use.

The WHO (1995, 1996, 1998, 1999) has for a significant period of time maintained that health development can not be fully accomplished solely by the health sector. It has strongly encouraged and promoted a multi-sectoral approach for reforming health and welfare systems (defined as social organizations and practices, both formal and informal) which affect the health and well-being of populations. Thus, development researchers now recognize the interconnectedness of income, education and health and acknowledge that positive outcomes in all three are both a product of, and contribute to, effective social systems. The 1999 United Nation's Human Development Reports used a Human Development Index (HDI) to rank nations on levels of development. The HDI combined average life expectancy at birth (health), adult literacy and combined school enrolment ratio (education), and standard of living (income). More recently however, gender equality, gender empowerment, and human poverty level have been added to the HDI in order to more accurately assess the overall QOL.

It is intended that this literature review illustrate the usefulness of empowerment strategies in targeting social determinants which affect health - the basis for performing the gender analysis, as well as the economic empowerment and health evaluation for this women's empowerment and health project in Mwanza, Tanzania. More specifically, the social determinants which lead to poor health include powerlessness, poverty, and inequity; each of which are significant barriers to improving individual, family and community capacities such as the ability to advocate for social change. The literature review will present the theoretical and practical rationale for adopting 'empowerment' as a health-enhancing strategy to reduce health disparities, specifically among sub-ordinate groups. It will discuss powerlessness as an important risk factor in the context of social determinants, absolute poverty and income inequities, as well as explore empowerment as a key protective factor.

Empowerment

Our understanding of human empowerment and its role in ameliorating health problems has evolved considerably over the last two decades. Empowerment as a construct has played a vital role in developing health-enhancing strategies and reducing health disparities.

In a historical context, the term ‘empowerment’ has come into usage fairly recently. In the field of public health empowerment had usually been described by its absence, as powerlessness (Wallerstein, 1992). When the term ‘empowerment’ was used, it was conceptualized as a means of individual change and often overlooked the relationship between individual agency and the social structures which either foster or constrain the actor’s ability to effect change. Thus, the individual was often viewed as an actor separate from the broader social systems which affect health (Wallerstein, 1992). The recent trend toward more widespread use of the term, in conjunction with its multifaceted application across numerous disciplines and throughout the international arena, has resulted in the concept gaining increased relevance.

According to Wallerstein (1992), empowerment has come to embody a reflective understanding of the perceived and actual components of powerlessness. It encompasses the linkages and interactions between processes of change on an individual, community, organizational, and system-wide level. Empowerment then has come to signify opportunities which allow individuals to challenge internalized powerlessness, gain control of their lives, and transform their settings. To examine how powerlessness and empowerment can be operationalized in health as a synergistic interaction between the individual and larger system change, empowerment is defined as “a social-action process that promotes participation of people, or organizations, and communities towards the goals of increased individual and community control, political efficacy, improved quality of community life, and social justice”

(Wallerstein, 1992, p. 197). An alternate definition of empowerment is: “a process by which individuals gain mastery over their own lives and democratic participation in the life of their community” (Zimmerman & Rappaport, 1988, p.725).

Empowerment can exist at four levels: personal, small-group, organizational and community. At the personal level, empowerment is achieved by gaining control and influence in daily life and in community participation. At the small-group level, empowerment is derived through the shared experience, analysis, and influence of small groups on their own efforts. At the organizational level, empowerment is achieved through capacity building that influences decision-making processes. Lastly, empowerment at the community level entails gaining and utilizing resources and strategies to enhance community control (Health Promotion, 2006). On the personal level, individuals with an internal locus of control have consistently been associated with better health habits, higher levels of adherence, and fewer illnesses than those associated with an external locus of control (Seeman & Seeman, 1983; Wallerstein, 1992). Subjects in intervention studies who were able to strengthen their self-efficacy scores also demonstrated increased treatment adherence and compliance and participated in healthier behaviours (Wallerstein, 1992; O’Leary, 1985).

Empowerment, at all levels (personal, small-group, organizational, and community), encompasses the idea of control. Field research has indicated that increased participation and control in one’s life leads to improved mental and physical health development (Schulz, 1995; Wallerstein, 1992; Rodin, 1986). In this manner, the concept of control has also been developed to signify a ‘sense of coherence’ in life. Rather than controlling ‘situations’, those with a high sense of coherence possess the ability to interact well within their environment. “Their worlds are comprehensible, manageable with the resources available to them and meaningful”

(Wallerstein, 1992, p.199). According to Antonovsky (1984, 1988), coherence affects health in the sense that individuals are able to participate in decision making and effectively appraise their situations. Importantly, this concept eliminates the cultural bias favouring individualism whereby an internal locus of control would invoke individual decision making at the expense of the group. This is of particular importance within societies, such as Tanzania, which have a stronger focus on the collective good. It must be recognized that simply implementing interventions geared towards increasing individuals' locus of control without taking into consideration the contextual and environmental conditions may actually increase frustration and lead to more perceived powerlessness, and ultimately ill health (Furby, 1979; Wallerstein, 1992). Often, those who live in poverty and experience chronic stress and discrimination have an accurate appraisal of the extent of their control over their environment. From this a broader definition of control emerges, that of "control over destiny" (Syme, 1989), which takes into consideration the interactions between the individual and the prevailing social systems.

In essence, individuals who lack sufficient social, financial, and physical resources have poor system access, and lack decision making power are inadequately prepared to cope with the demands in their lives. Their low position within the socio-economic hierarchy leads to greater structural constraints and fewer opportunities to gain access to resources (Wilkinson, 1996; Wallerstein, 1992; Marmot, Rose, Shipley, et al., 1978). Life demands, such as chronic stress and powerlessness, exceed their resources and tax their ability to exert control, which in turn leads to poor health outcomes (Haan, Kaplan, & Camacho-Dickey, 1987). Thus, lack of control over destiny creates susceptibility to poor health for individuals who live in chronically marginalized situations and who lack sufficient resources, support, and the ability to exert control in their lives (Syme, 1988). Empowerment becomes a strategy to directly address lack of

control over destiny, consequently reducing physical and social risk factors which lead to poor health.

Researchers focused on community empowerment define the term 'empowerment' as a process through which individuals, communities, and organizations gain control over issues and problems that concern them most (Zimmerman, 1995; Wallerstein & Bernstein, 1994; Zimmerman, Israel, Schulz, et al., 1992; Rappaport, 1987). The aim of an empowerment movement is to enable the powerless to take proactive actions for the prevention of threats and the promotion of positive aspects of their lives. In this sense, empowerment is the means and QOL is the end. However, empowerment and QOL have a synergistic and dynamic relationship; today's end may be tomorrow's means. For instance, a job-training program can enhance employability of a poor, unemployed woman; this process also empowers or enables her to obtain paid employment. A new job with personal income and health care benefits in turn may enhance her status within her family and improve QOL for herself and her family members. At the same time, this new job may offer her options for future advancement and allow her to join an organized labour union, which may provide job security and further her process of empowerment.

Empowerment is a multilevel construct; therefore, analysis of empowerment methods and outcomes should be directed at three interdependent levels. These three levels are (1) individual or psychological empowerment (PE), (2) community empowerment (CE), and (3) organizational empowerment (OE) (Israel et al., 1994; Rothman and Tropman, 1987; Zimmerman et al., 1992; Wallerstein & Bernstein, 1994). Based on Freire's empowering education theory, Wallerstein and Bernstein (1994) propose that psychological empowerment aims at the enhancement of individuals' "critical consciousness", belief in self-efficacy, awareness and knowledge of

problems' sources and the solutions, and personal competency to deal with problems adversely affecting QOL. Community Empowerment focuses on the enhancement of a community's resource base including leadership development, communication systems, community support and networks needed to mobilize community assets and resources to address common concerns. Organizational Empowerment aims at the creation of a power base and the enhancement resources available to community-based organizations (voluntary organizations, unions, associations, and cooperatives) to better protect, promote, and advocate priorities of the powerless.

In summary, in order to combat susceptibility to disease which stems from powerlessness, it is necessary to have a comprehensive understanding of its multiple causes, including gender inequality, living in poverty, and a lack of resources and support and empowerment should be embraced as a comprehensive strategy to improve health.

Powerlessness and Health Disparities

“The relationship between health and the economy cannot be separated from questions of power—who wields it, how, and to what ends” (Hofrichter, 2003, p.161).

Recent literature on the social determinants of health has been accumulating evidence that adverse psychosocial factors are associated with poor health outcomes (Berkman & Kawachi, 2000; Kawachi, Kennedy & Wilkinson, 1999; Marmot & Wilkinson, 1999), which is in addition to the well-established relationship between adverse material conditions and poor health outcomes, such as material and physical deprivation, lack of sanitation, and absolute poverty. Early on, numerous researchers questioned whether an association between social

conditions and generalized psychosocial and immunological susceptibility to disease truly existed. It was soon determined that relationships exist between hierarchy and disease (Rose & Marmot, 1981; Marmot & Theorell, 1988), that there is an association between work with low levels of control and high demand and increased morbidity rates (Karasek, Baker, Marxer, et al., 1981; Alfredson, Karasek & Theorell, 1982), and that chronic stress and a lack of social support are related to mortality (Israel, 1985).

Social support and social networks are associated with lower morbidity and mortality rates (Wilkinson & Marmot, 2003; Uchino, Uno & Holt-Lunstad, 2002; Cohen & Syme, 1985), which can be explained in part by the role that social support networks play in promoting one's perception of control. Increased social support networks have been associated with positive health outcomes particularly in low control jobs (Park, 2007). Such support networks have permitted lay persons to develop community level problem solving mechanisms that empower the actors themselves and secondarily enhance other community members. By strengthening individual actors, reciprocally networks are also reinforced and consequently affect well-being (Wilkinson & Marmot, 2003; Hawe & Shiell, 2000; Israel, 1985).

The very broad relationships encompassed under the category of 'stress', and the factors protective against 'stress' (Sapolsky, 1990; Dantzer & Kelley, 1989), have given focus to the importance of social relationships, and or their absence, as correlates of morbidity and mortality. One's position within the social hierarchy, level of self-esteem and self-worth, degree of control or powerlessness all appear to have health implications quiet independent of the conventional risk factors (Sapolsky, 1990; House, Landis & Umberson, 1988; Dutton, 1986; Marmot, 1986). These social factors are indicative of the fact that mortality and morbidity (in instances where

morbidity is measurable) follow a gradient across socio-economic classes. Lower income and/or lower social status are associated with poorer health.

Over the last several decades, correlations have been identified between morbidity and mortality and social environments, individuals' experiences of discrimination, economic disparities and inequities, and a lack of social cohesion (Berkman and Kawachi, 2000; Siegrist, 2000; Kawachi et al., 1999; Marmot & Wilkinson, 1999; Yen & Syme, 1999; Whitehead, Scott-Samuel, & Dahlgren., 1998; Smith, 1996). A lack of access to employment opportunities, poor working conditions, and neighbourhoods of concentrated disadvantage where there is a lack of social services have also been correlated to diminished health status (Amick, 2000; Wallace & Wallace, 2000). There is also a plethora of information relative to income polarization and its effect on life expectancy, as well as disease and mortality, both cross-nationally and within individual countries (Kawachi et al., 1999; Lynch et al., 1998).

In summation, these studies suggest that living in an environment of physical and social disadvantage - being poor, occupying a low position in the social hierarchy, poor working conditions, unemployment, being subjected to discrimination, living in a neighbourhood of concentrated disadvantage, lacking social capital, and being at relative disadvantage to others - is a major predisposing factor for poor health status. Being powerless, or as Syme (1988) suggests, lacking 'control over one's destiny', therefore becomes a core social determinant of health and disease.

Gender Inequality

The world has witnessed an unprecedented growth of wealth and a technological revolution, especially during the second half of the 20th century. At the same time, the overall

health status in most nations has concurrently improved, an indication of the correlation between health and economic development (UNDP, 1999; WHO, 1999; World Bank, 1999). “In spite of these achievements, women and the poor, which constitute the majority of the world's population, continue to suffer from persistent inequalities which cause preventable harm to their health and quality of life” (Kar & Alcalay, 2000, p.3) .

A recent UNDP Human Development Report has found that, in spite of unparalleled world economic growth between 1820 and 1992, “World inequalities have been rising steadily for nearly two centuries....the distance between the richest and poorest country was about 3 to 1 in 1820, 11 to 1 in 1913, 35 to 1 in 1950, 44 to 1 in 1973, and 72 to 1 in 1992” (UNDP, 1999, p. 3). Twenty percent of the poorest countries share 1% of the world GDP; while the richest 20% of countries share 86% of the world's GDP (UNDP, 1999). While some women have benefited from various forms of development, the vast majority of women continue to experience and suffer from persistent inequalities in both poor and rich societies.

In general, women carry most of the burden of caring for their children and performing daily household tasks. Empirical studies show that women also suffer the greatest impacts of poverty and abuses due to persistent inequalities and relative powerlessness (Kar & Alcalay, 2000; Sen, 1988; Boserup, 1970).

Both in rich and poor nations, women suffer various forms of institutionalized injustice and abuse including: denial of basic needs (education and health care); feminization of poverty; unfair opportunities for employment, income, and leadership; sexual harassment and exploitation; physical mutilations and deaths; domestic violence; insufficient interest in gender-related issues in policy and research; and culturally conditioned practices that endanger women's health and quality of life (e.g. FGM, dowry deaths, honour killing, early marriages)

(Kar & Alcalay, 2000, p.3).

In a recent investigation, development economist and Nobel Laureate Amartya Sen summarizes his thesis on development by entitling his book “Development as Freedom”. Based on his analysis “Expansion of freedom is viewed, in this approach, both as the primary end and as the principal means for development” (Sen, 2001, p.xii). If individual freedom does not exist, development is incomplete. “An increase in individual freedom will contribute positively to economic development. Indeed, increased freedom, political participation, economic development, and social progress *including better health*, are all integral parts of development and they are mutually reinforcing” (Kar & Alcalay ,2000, p.3).

A direct relationship between health status and human development has been well established, and documented by numerous reports and data sets commissioned by organizations such as WHO (Worlds Health Reports), World Bank, UNESCO, UNDP (Human Development Reports), UNICEF, and scholars (Sen, 1990; Boserup, 1970). For instance, analyses show that the health status of the population significantly affects economic productivity (WHO, 1996). Better health of populations increases economic productivity through several processes; it (1) reduces production losses due to worker's ill health, (2) increases human capital by increasing the proportion of an educated public (through increased enrolment of children in schools), (3) frees up resources otherwise spent on treatment of diseases for other social and economic projects, and (4) increases national wealth by making available natural resources and cultivatable land previously not accessible due to persistent epidemics and endemic risks (WHO, 1996; ILO, 1998).

Why the focus on women's income?

Both empirical and anecdotal evidence indicates that the income women earn is more likely to be spent on basic household needs and food than is income earned by men. Thus, it has

a greater positive effect on health, children's nutritional status, and education (Rogers & Youssef, 1988; Guyer, 1980; Loose, 1980; Kumar, 1979). This is partially explained by the fact that traditionally women in nearly all parts of the world have the primary responsibility for feeding and care of children (Rogers & Youssef, 1988). Furthermore, women in developing countries usually seek employment out of severe financial necessity, so their incomes must be devoted to survival needs. From these facts it is evident that an increase in income earned *by women* is likely to improve the status of children, even more than an increase in household income *per se*. More often than not for a large percentage of households, women's income is the main determinant of consumption. They are the sole or major economic providers as a result of migration and family dissolution (Rogers & Youssef, 1988).

An additional motive to focus on women's income is the fact that women active in the labour force (either formal or informal) are more capable to act on the many ideas conveyed through health promotion such as nutrition and health education projects. Women whose activities are confined to the household sphere and to income-conservation rather than income-generation are less likely to implement messages conveyed through such health promotion initiatives (Rogers & Youssef, 1988).

Lastly, there is sufficient evidence that the expressed priority of women is for initiatives which provide economic benefits rather than those that offer possibilities for long-term development or offer social services (Caughman, 1982; Jain, 1980). Generally, poor women are aware of their insecure economic situation and the need to have income they control (Chand, Jain, Kalyanasundaram, et al., 1980; Guyer, 1980; Jones, 1983). Therefore, the opportunity to earn an income is a greater incentive for women to change traditional patterns of behaviour than

less clearly perceptible benefits of improved home-management practices (Rogers & Youssef, 1988).

Poverty

“Poverty is the most obvious manifestation of inequality in the distribution of economic and other resources and potentially the strongest determinant of health” (Raphael, 2003, p. 70)

One of the longest known, and single most important determinants of health, is absolute poverty, specifically as it relates to high infant mortality, life expectancy, and a broad range of disease (Hofrichter, 2003). A significant body of research has been amassed since the early 1980’s which clearly substantiates the link between poverty, low socioeconomic status, and poor quality of life, to morbidity and mortality, predisposing people to chronic disease in both the interim and long term (Hofrichter, 2003; Townsend, 2000; U.S. Department of Health and Human Services, 1999; Kuh & Ben-Shlomo, 1997). “Poverty, a broad and multi-dimensional concept, is often a by-product of income and wealth inequality. Individuals at a socioeconomic disadvantage are more susceptible to death and all types of disease due to their greater exposure to the conditions that produce disease” (Hofrichter, 2003, p. 16). It has determined that a strong relationship exists between the degree of economic inequality and poverty (Kuh & Ben-Shlomo, 1997). Poor living conditions and absolute poverty impose constraints on various aspects of daily life which affect access to requisites for good health. These may include poor access to adequate housing, proper nutrition, and education, transportation, recreational facilities, and environmental conditions (Hofrichter, 2003; Pantazis and Gordon, 2000; Shaw, Dorling and Davey-Smith, 1999). According to Brunner and Marmot (1999) “[s]ocial and psychological effects of absolute poverty are also harmful. Uncertainty, lack of control over one’s life, helplessness, chronic

stress, anxiety, and depression all contribute to ill health and even death” (p.17). Poor health can be a cause of poverty, and poverty can occur as a consequence of ill health (Brunner & Marmot, 1999).

Our understanding of poverty must not only focus on the lack of basic economic resources, such as money and food, but also on the impacts of material deprivation (Gershman, Irwin, & Shakow, 2000; Townsend, 1979). There is ample evidence documenting that material deprivation leads to poor health and to the lack of social resources, including access to education and health care (Gershman, Irwin, & Shakow, 2000; Townsend, 1979). According to Sen (1995), human beings must not be seen simply as “recipients of income” but as “people attempting to live satisfactory lives” (p. 17). Income statistics are inept at capturing the “texture of people’s lives and their aspirations and at the same time mask distinctions fundamental for those confronting the lived reality of poverty” (Gershman, Irwin, & Shakow, 2000, p.162). Poverty definitions derived from household income are incapable describing the income distribution within a household. This uneven income distribution leads to an “invisible” poverty affecting mostly women and children (Gershman, Irwin, & Shakow, 2000). Similarly, most quantitative measures can not “account for the ‘double jeopardy’ experienced by minority groups in which poverty is created by or exacerbated by discrimination, overt or covert” (Spencer, 1996, p. 4).

The concept of vulnerability (Gershman, Irwin, & Shakow, 2000; Oppong, 1998), separate from the concept of poverty, assists in analyzing the “exposure of particular social groups to external risks, shocks, and stresses, and assess their capacity to respond to these challenges. Vulnerability to disease both reflects the severity of poverty and contributes to its perpetuation” (Gershman, Irwin, & Shakow, 2000, p.163).

The literature on empowerment and health highlights the necessity of addressing both the needs of individuals and the social circumstances in which they are situated. Indeed, as noted by Kar and Alcalay (2000) health initiatives must address both “practical needs” (e.g. shelter, education, health facilities) and “strategic needs” (e.g. women’s rights, support services & gender friendly policy frameworks). Individuals will always attempt to act with agency, but systems of inequality constrain their efforts and, in many cases, shape outcomes. Initiatives to improve the health of women and children in developing nations must, therefore, incorporate strategies that foster control over one’s destiny, increase access to social and economic resources, and promote social cohesion.

The Conceptual Framework

The theoretical approaches which inform the creation of an interview guide for the program evaluation include: the Vulnerability Theory, the Society and Health Perspective, and these approaches are complemented by the conceptual framework for empowerment developed by Wallerstein (1992).

Vulnerability Theory

Vulnerability theory can be described with a tripartite explanation whereby entitlement, empowerment and political economy intersect to lay the necessary foundation for well-being (Watts & Bohle, 1993). The “tripartite causal structure defines the space of vulnerability through the intersection of these three causal powers: command over food (entitlement), state-civil relations seen in political and institutional terms (enfranchisement/empowerment), and the

structural-historical from of class relations within a specific political economy” (Watts & Bohle, 1993, p. 44). Issues of differential access to resources, can be applied to local-regional-global processes such as health, including HIV/AIDS, without ignoring the strong social, political, and economic forces, and not simply culturally determined patterns of behaviour (Packard & Epstein, 1991). The vulnerability perspective also explains the general ineffectiveness of AIDS prevention programs as the result of an unwillingness to move beyond simplistic approaches which concentrate on individual sexual behaviour rather than economic, social and political contingencies which make certain social groups more vulnerable than others. The reality is that risky behaviour is much more intricate and complicated. “In fact, behavioural interventions based solely on information and reasoned on persuasion are insufficient to produce risk reducing behaviour change among vulnerable social groups” (Oppong, 1998, p. 438). Conventional prevention programs including education are ill-focused because they do not concentrate on issues of vulnerability and poverty (Kalipeni, 2000). Expecting individuals to abandon behaviours which are pleasurable, and provide immediate gratification is unreasonable, especially when it provides them with income or power, even when these behaviours pose unacceptable personal, family and community health risks (Kalipeni, 2000; Oppong, 1997). Poverty and gender play vital roles in limiting the number of resources available, leaving certain social groups increasingly vulnerable. Kalipeni, Craddock, Oppong et al., (2004) argue that women in particular are more affected-jobs are scarce, resources such as government training projects or agricultural extension services are either non-existent or directed toward men, and local income-earning opportunities are unavailable. Further, scarce job opportunities for men means that migrancy is high among many SSA countries leaving their wives and families increasingly vulnerable to risky behaviours in order to survive. “In short, vulnerability, whether

it be that of an individual or a country has a lot to do with the well-being of members of society. Individuals in certain social groups are more vulnerable than others. Poorer countries can ill afford the provision of employment and health care facilities” (Kalipeni, et al., 2004, p. 308).

Vulnerability theory also has it that adverse life circumstances such as hunger and disease do not affect social groups homogeneously, which also means that gradients of risk are present within groups (Graham & Der, 1990). For instance, while all individuals are biologically susceptible to health risks, particular social and economic determinants place certain individuals and groups at increased vulnerability (Parker, 1996). Hence, in order to prevent the spread of disease, particularly HIV/AIDS in SSA, it is imperative to attempt to improve living conditions for as many individuals as possible. Providing opportunities for women to prevent them from turning to risky behaviour for economic survival may be as important as any education measure in the fight against HIV/AIDS (Kalipeni, 2000; Oppong, 1997).

The project provides an opportunity to not only curb rates of disease and reduce vulnerability in the current adult generation, but also can impact future generations. Many cultural practices and traditions have fallen away due to broken economic, social, and educational processes in SSA, the introduction of Western practices, and the urbanization of communities, particularly as a result of the HIV/AIDS pandemic. Consequently, many children have been left orphaned and families are trapped in the enduring cycle of poverty as a result of losses in knowledge transfer between generations. The women, now capable of transferring acquired knowledge and skills to future generations, will enable the most vulnerable to improve their quality of life, and potentially their health. For this reason it is also imperative to incorporate a community perspective to health.

Society and Health Perspective

While the society and health perspective was proposed for macro-level analysis, it will be utilized at the micro-level (community level) to investigate and uncover complex processes which determine health outcomes in sub-ordinate groups (e.g. Chen, Subramanian, Acevedo-Garcia, et al., 2005; Dedobbeleer, Beland, Contandriopoulos, Manuella et al., 2004; Horne, Donner & Thurston, 1999). Complimenting the vulnerability theory is the construct put forth by Walsh. Proposing a 'society and health lens', Walsh (1995) attempts to analyze cultural, social, economic and political processes in society that produce differential health risks in women and men (Figure 7). A distinctive feature of this perspective is its emphasis on how health concerns, responses to risk factors, signs and symptoms as well as the social construction of knowledge about health are predetermined and constrained by mechanisms of social control and distribution of resources and power (Walsh, 1995). The argument is that epidemiological research on gender and health overlook the systems of social stratification which "allocate resources and power on the basis of gender-determined social roles and leaves the underlying social processes unidentified, unquestioned and unexplored" (Walsh, 1995, p.149). Adopting various aspects of a society and health perspective means raising questions about how social structure may affect personal choice and health.

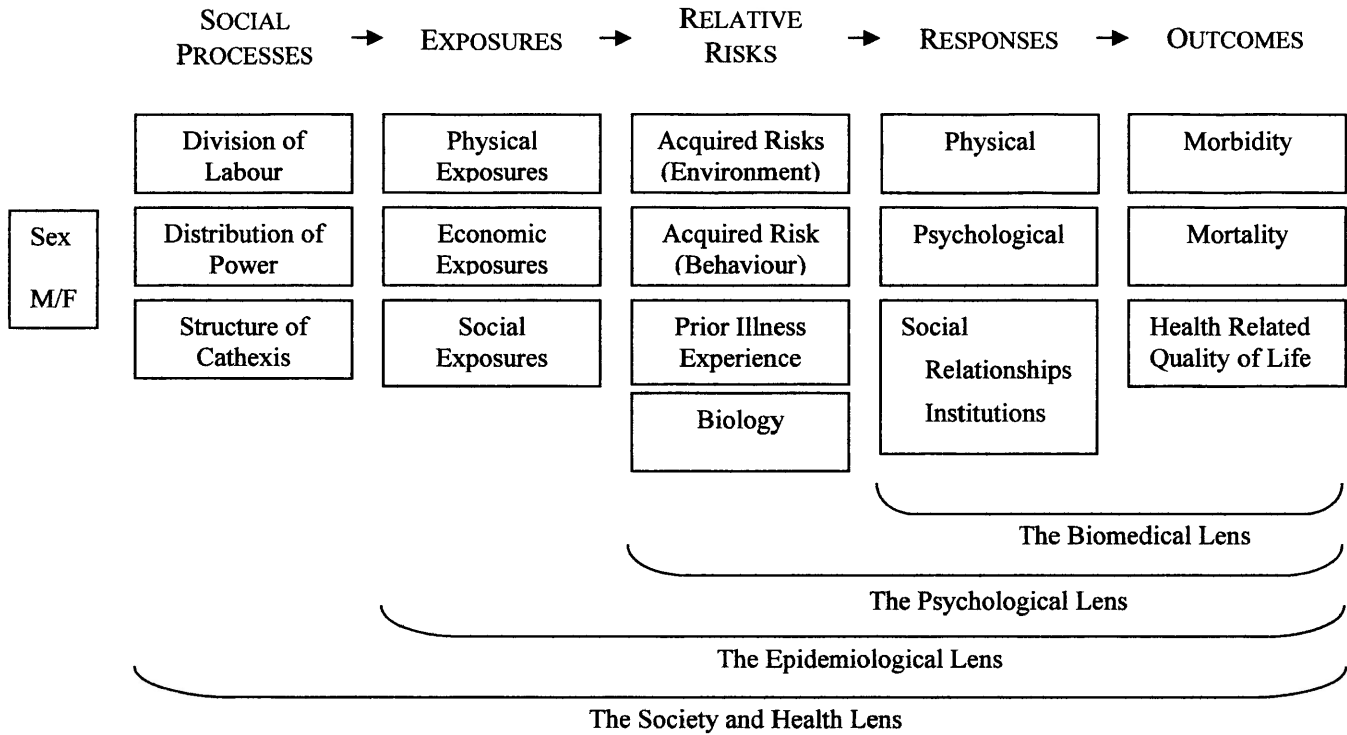


Figure 7: Alternative disciplinary lenses for analyses of relationships between gender and health
Source: Walsh, 1995.

Empowerment as Means for Improved Health

The Delphi panel of experts have identified ‘empowerment’ and ‘community participation’ as significant societal level ‘process indicators’ of health promotion, and over the course of the last two decades numerous international organizations have published documents focusing on empowerment as a central theme of health and human development. Some of these documents include, the Alma Ata Declaration (1978), the CEDAW/UN, Beijing Platform of 1995, Beijing+5 Review in 2000, and the Calcutta Declaration on Public Health (2000).

In order to create more gender equality, alleviate poverty, and improve health among women in both urban and rural settings, women’s empowerment is a critical component. As a

process, empowerment is a change in power relations that is both multi-dimensional and interlinked (Mayoux, 2000). The process required for such empowerment includes several elements in different spheres of life, each one a step to the next: a) acquiring *power within* - enabling women to articulate their own aspirations and strategies for change by developing self-worth a belief in one's ability to secure desired changes and the right to control one's life; b) developing *power to* - enabling women to develop the necessary skills and access the necessary resources to achieve their aspirations; c) developing *power with* -enabling women to examine and articulate their collective interests, to organize to achieve them and to link with other women's and men's organizations to influence social change in order to create a more just social and economic order; d) gaining *power over* - changing the underlying inequalities in power and resources that constrain women's aspirations and ability to generate choices and exercising bargaining power in order to achieve them (UNFPA, 2008; Mayoux, 2000).

Furthermore, it is argued that initiatives seeking gender equity, including women's health development, ought to focus on empowerment of women through leadership development, equity education, and mobilization of resources in order to promote health and quality of life. Women's empowerment, which leads to community empowerment, should be a focal point towards achieving effective health (Figure 8). There are at least four pragmatic rationalizations for empowering women to achieve better health for all: 1) despite a longer life span, women experience a greater burden of disease, health risk and abuses; 2) women are the primary care givers in all families particularly in the developing world where they are also the only caregivers to children and the elderly; 3) women spend their discretionary money and time on means to improve health and quality of life for their children and family; 4) targeting women for education and training results in enhanced health benefits for their families. Hence, empowering women

has a positive affect on the health of women, but also results in improved health status of their families and communities. Therefore, the goal of empowerment (women’s empowerment and community participation) is to enable the powerless to take proactive actions to improve their quality of life.

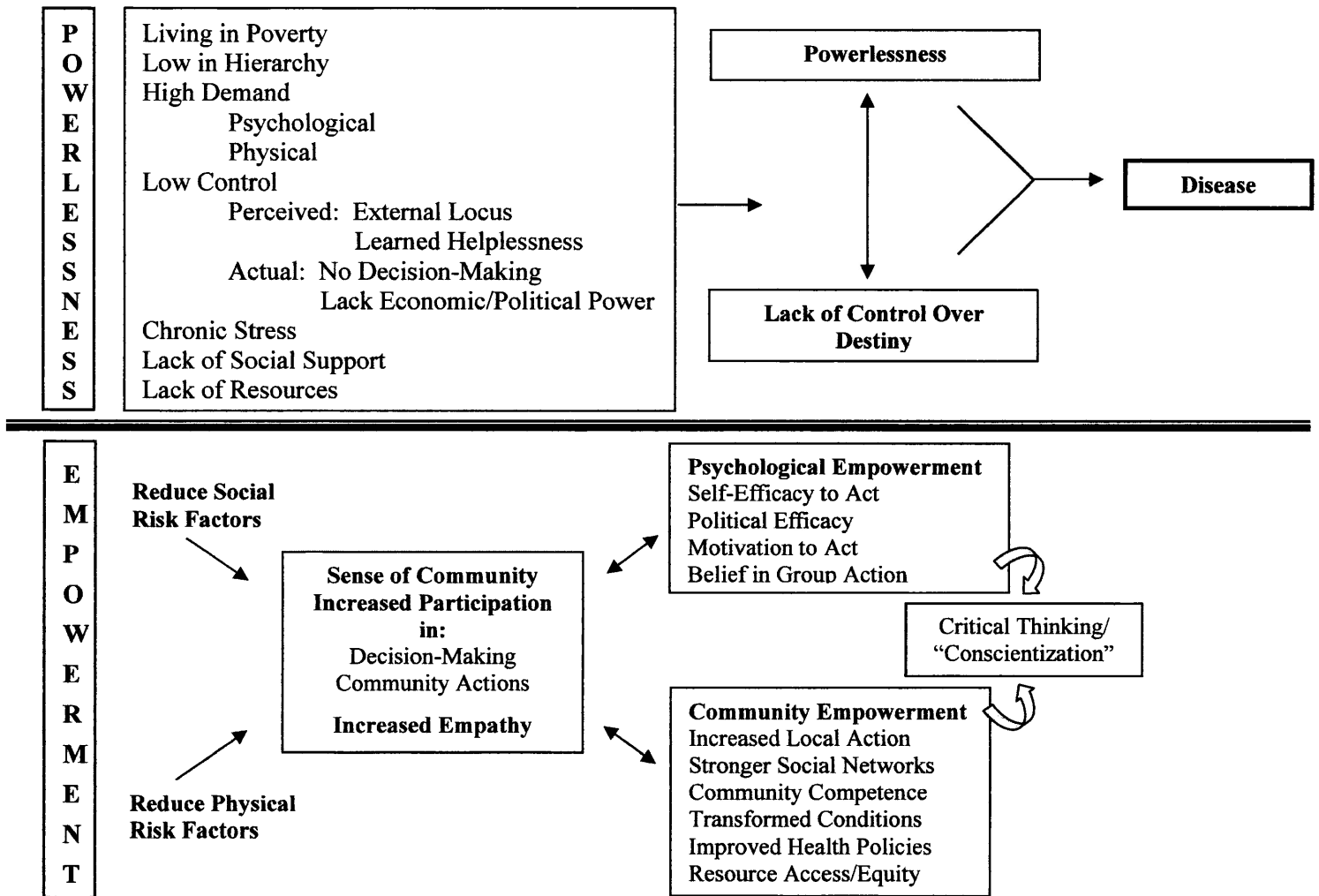


Figure 8. Schematic Representing ‘Powerlessness’ as a broad based risk factor for disease; and ‘Empowerment’ as an important promoter of health.

Source: Wallerstein. 1992

By incorporating these complementary perspectives a framework to evaluate the impacts of the project was designed and is presented further down. It is intended through this evaluation that those involved with the project can assess how inter-connecting determinants at the micro level, such as socio-cultural factors are contributing to the women's daily experiences with the project and to understand the impacts of the project on health and nutrition, empowerment, family relationships and the surrounding community.

The Need for a Logic Model

From the outset, Western Heads East sought to bring a results-oriented focus to the project. Despite this intention, a project planning outline or a Logic Model and evaluation framework was never developed by the project stakeholders to communicate and document their shared vision, objectives and accomplishments. Throughout its relatively short history, the project has moved forward on many occasions without the collective consensus of the stakeholders. The project has been charged with not meeting stakeholder expectations, as well as failing to meet collaborative criteria, as UWO is often found to be in command of project activities. This is attributable to the fact that there is no communication strategy in place, and more importantly, a logic model was not developed at the onset of the project by all stakeholders to facilitate discussion around project resources, activities and expectations. Developing a planning and evaluation framework is an approach which stresses participation as an effective means of improving the quality, efficiency, and sustainability of development actions. The logic model is a critical tool for involving all stakeholders in project and program planning; implementation, as well as project monitoring, reporting and managing results.

An in-depth analysis of responses obtained from a qualitative study assessing the state of the project with regard to goals, results, challenges, communication and sustainability, revealed a comprehensive picture of stakeholder perceptions and the critical need for a planning and evaluation framework to be developed and implemented. The analysis exposed a significant disparity in perceived project goals both between and within the stakeholder groups. This lack of consistency with respect to goals continues to clearly impact the project on many levels despite its successes. Additionally, respondents expressed concerns surrounding project ownership and the belief that not all partners are contributing to and benefiting from the project equally. The stakeholders were also asked if the project was meeting their expectations. The majority felt that the project was meeting their expectations to some extent; however, areas of concern were identified, and those who were involved with the project on a daily basis were the most critical. It is significant that the Yoghurt Mamas, the intended beneficiaries of the project, indicated that their expectations have not been met at a satisfactory level. Reasons cited were unfulfilled promises/credibility issues, lack of a steady income stream, and relatively low production, which leads to the importance of developing an evaluation to assess the group's economic empowerment and health status in addition to developing a logic model for the project.

Concerns have also surfaced relating to structural weaknesses within the project. Stakeholder linkages were not adequately established at the beginning of the project, and weak communication has exacerbated the situation. There is frustration over the practise of WHE interns coordinating communication between the stakeholder groups, lack of follow-up, inability to answer technical questions, lack of decision-making authority, frequent turnover, and lack of cultural sensitivity are specific problems. There is also confusion over stakeholder roles and responsibilities, and stakeholders lack a common vision for the project. Another important

theme that emerged was that stakeholders do not feel adequately empowered to solve problems, as a result, the institutional partners do not always work in concert. To ensure that “everyone is speaking the same language”, holding an all-stakeholder meeting and formulating a project planning and evaluation framework such as a logic model, and regular updates would allow all parties to remain informed, participate in decisions and deal with current and emerging issues. This would also allow all stakeholders to develop a shared sense of ownership regarding project outcomes, strategize, and effectively resolve challenges as they arise collaboratively. As a program planning tool, the logic model helps to clarify the purpose of the project and the expected results during the different stages of development, while also seeking to capture changes that occur in the short, medium and long-term. A logic model can be utilized as a method to continually reassess project activities and the efficacy of current approaches in achieving intended results. With all dimensions of the project cycle more results-based, a logic model can foster sound decision-making and enhance the sustainability of development results. Development results can include changes in power relations, resource distribution, improvements in well-being, as well as changes in attitudes and behaviours. Measuring and reporting results will increase participation and accountability of all the key stakeholders and strengthen stakeholders’ communication.

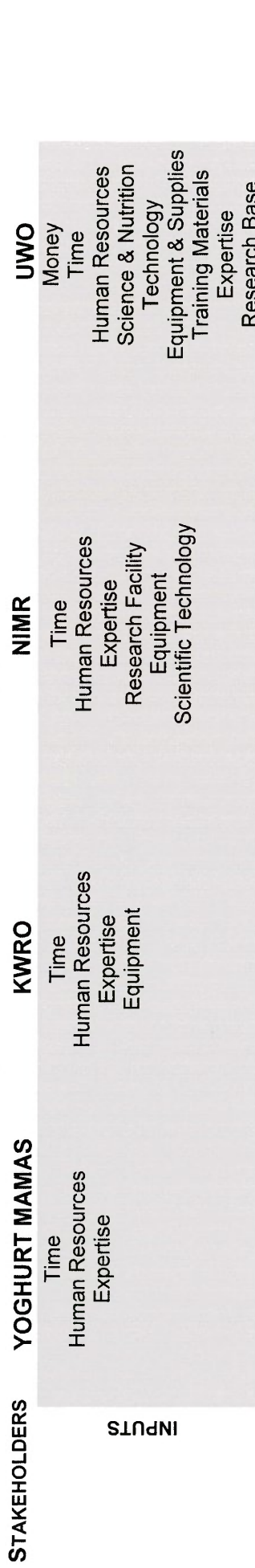
Ideally, all stakeholders should be present for the development of the project logic model, however, due to the obvious constraints; the most practical solution is to first of all develop a planning document from which the stakeholders can work from and with to ensure the project is meeting expectations. Further, being the primary researcher on the sustainability study, documenting first hand the stakeholder’s expectations, provides the ideal foundation for developing the logic model with a well-rounded perspective of the stakeholder’s perceptions.

Program Planning and Evaluation: Empowerment & Health

The logic model below includes outputs and outcomes which have already been accomplished, likewise, the logic model (and the program) are not linear, certain outputs and outcomes may have already been achieved, or may be listed as a short term target, but has not, as of yet been accomplished.

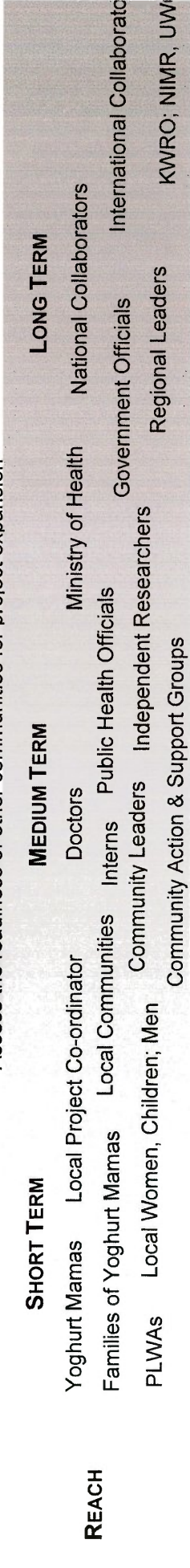
GOALS:

- To determine through collaborative multi-disciplinary research the health benefits associated with the use of probiotics to alleviate suffering in resource deprived African communities.
 - Improve nutritional status of individuals consuming probiotic yoghurt.
 - Alleviate suffering from HIV/AIDS and combat diarrhoeal disease through the use of probiotics.
 - Improve the socio-economic status of marginalized women in Mwanza, Tanzania.
 - Promote gender-sensitive strategies which support female empowerment and gender equality.
 - Increase the knowledge about probiotics amongst Tanzanian physicians, clinicians and public health officials.



OUTPUTS-ACTIVITIES

- Identify women from several community action groups that are interested in learning how to produce probiotic yoghurt
 - Identify a suitable location for yoghurt production & acquire necessary amenities for the community kitchen
 - Develop educational & training material for use during yoghurt production
- Purchase equipment & supplies necessary to produce yoghurt as well as maintain/increase yoghurt production levels
 - Develop materials to be used to conduct workshops on probiotics & their health benefits
 - Train the women in probiotic yoghurt production & quality control
 - Facilitate sessions for the development of business, accounting & micro-enterprise skills
 - Develop materials & resources to be used to explain what probiotics are to the community
 - Conduct workshops/informational seminars on the efficacy of probiotics within the community
 - Develop & administer a sustainability questionnaire for the Stakeholders
 - Assess efficacy of project in helping women achieve economic empowerment & health
 - Develop & administer a Food Frequency Questionnaire which includes a nutritional analysis
- Conduct a Health Impact Assessment on HIV/AIDS patients who are not receiving ARVs, but are consuming probiotic yoghurt
 - Assess the readiness of other communities for project expansion



OUTCOMES-IMPACTS

SHORT TERM

- Yoghurt production operational at community kitchen
- Twelve women acquire the skills to produce probiotic yoghurt
- PLWAs living in the district of Mwanza have regular access to free probiotic yoghurt
- Small clientele base which purchases yoghurt from the community kitchen
- Second access point established to distribute probiotic yoghurt
- Increase the degree of awareness of the benefits of probiotic yoghurt
- Increase the degree of awareness of the nutritional properties and importance of probiotic yoghurt through information sessions during yoghurt pick up and/or purchase

PERFORMANCE INDICATORS

- Average number of days yoghurt is produced successfully in a month
- Project co-ordinator and NIMR observe yoghurt production procedure and ensure that the correct process is being utilized
- Average number of days per month sufficient amounts of probiotic yoghurt is available to meet demands of PLWAs
- Average number of people per day which request to purchase yoghurt
- Track the number of days per month that each yoghurt mama supplies family with yoghurt
- Track the degree of utilization of the second access point
- Track the number of people who have been informed about the beneficial properties of yoghurt

MEDIUM TERM

- Change in nutritional status of children consuming yoghurt (height, weight, skinfold status and other anthropometric measurements)
- Reduction in infant morbidity & mortality due to illness
- Reduction in urogenital infections and re-infections in women
- Reduction in illness episodes in PLWAs
- Improvement in quality of life among PLWAs
- Improvement in family income and/or increase in economic activities
- The Yoghurt Mamas produce yoghurt independently without external output
- Physicians acknowledge the effectiveness of probiotics, & begin to implement probiotics as part of their treatment regimens
- The Yoghurt Mamas acquire enough skills to operate a small business selling yoghurt
- Expand the project into other areas of Tanzania
- Improved nutrient and vitamin intake for 150 PLWAs, the 10 yoghurt mamas and their families
- Increase the level of yoghurt production to 150 L per day
- Improved capacity of yoghurt mamas to carry out training sessions to expand the project in other communities

PERFORMANCE INDICATORS

- An external/independent reviewer examines the degree of financial sustainability
- The number of physicians who implement probiotics as part of their treatment regimens
- Use of specific survey instruments and interview guides to measure improvements in health, nutrition and quality of life
- The Yoghurt Mamas begin to claim an income
- The number of communities which begin to reproduce the project
- Average number of litres produced per month as compared to the previous month's production
- The number of workshops/seminars which are conducted about the benefits of probiotic yoghurt with community leaders, religious leaders, and regional leaders
- Yoghurt Mamas demonstrate their ability to carry out training sessions on yoghurt production

LONG TERM

- Re-introduce fortified fermented food products to Tanzania
- Implement probiotics in order to alleviate suffering from diarrhoea and other health conditions associated with malnutrition, and opportunistic infections associated with HIV/AIDS
- Create an environment whereby government and put health officials will support regional initiatives to make probiotic yoghurt available to those living with HIV/AIDS
- Create an environment whereby the government and public health officials will support the use of probiotics to provide nutritional and health benefits
- To augment and strengthen the health management capacities at the municipal/local level in Mwanza and other regions
- Increase the level of participation of women in enterop management, employment and income from yoghurt activities

PERFORMANCE INDICATORS

- Number of access points which probiotic yoghurt may be purchased
- Government is willing to provide financial assistance enable the operation of local yoghurt projects, the culturing of probiotics, and sponsor research initiative
- Government and public health officials endorse the use of probiotics to improve health and nutrition
- Public Health officials and physicians are conversant with the current state of probiotics and their benefits
- Number of yoghurt projects in which women are primary or co-stakeholders



**RISKS
(BOTH
EXTERNAL &
INTERNAL
FACTORS)
&
ASSUMPTIONS**

- Goals and expectations may not be commonly held among key stakeholders
- Theft and/or loss of equipment & money
- Funding is withdrawn
- Motivation & interest is lost among key stakeholder groups
- Research results may not support the hypothesis that probiotics confer the expected health benefits
- Strain on resources and human capacity deemed to outweigh benefits
- Inability to manage quality control particularly for mass production and consumption
- Stigma around the probiotic yoghurt as being one for PLWAs / those who are sick, and is no longer acceptable in community
- Socio-cultural circumstance jeopardize the participation of women in local yoghurt production
- Fermented foods may not be popular amongst the larger populace



- Funding for expansion is not attained and increased production and expansion into other communities is denied
- Research and project outcomes do not demonstrate that a community based project for health, nutrition and empowerment is viable and sustainable
- Lack of funding from national and international organizations leads to a halt in production and the project is terminated
- Turnover of personnel in key positions can lead to a change in priority issues and the project loses a key partner
- The Tukwamuane disband as a group
- Corporate interest and involvement may displace women's roles in probiotic yoghurt production

EVALUATION

Structural Milestones



Measured quantitatively and qualitatively using in-depth interviews and focus group discussions with Yogurt Mamas, key informants, and stakeholders

Health and Nutritional Milestones



Measured quantitatively and qualitatively using the World Health Organization's Quality of Life (WHOQOL) – BREF Questionnaire, WHOQOL-HIV/AIDS BREF Questionnaire, Harvard Food Frequency Questionnaire, validated questions on morbidity and nutrition from the Demographic and Health Surveys.

Social Milestones



Measured qualitatively using in-depth interviews, and focus group discussions with Yogurt Mamas, key informants, and stakeholders

Evaluating Economic Empowerment and Health

Researchers from the university initiated the first phase of the project evaluatory studies in the summer of 2006 (Andoniou & Flesher, 2007). One of the studies, designed to assess project sustainability, gathered data from representatives of each stakeholder group regarding initial project objectives. The findings revealed a lack of consistency in project goals both within and between stakeholder groups, and the critical need for a planning framework and an evaluation of the women's economic empowerment and health status (Andoniou & Flesher, 2007).

One of the goals which was prioritized by the project participants, and by some but not all of the institutional stakeholders, was that involvement in the project would result in empowerment for the female participants. However, all stakeholders agreed that the overarching objective of the project was to bring health benefits to the community. Public and social health research clearly indicates that empowerment and health are linked. Thus, the need to evaluate whether or not this expected outcome is being realized is multiple: 1) to determine whether or not the stakeholders' expectations are being met, 2) the project participants are among Tanzania's poorest citizens for whom economic empowerment is critical, 3) social empowerment is a poignant goal given the marginalized status of women in Tanzania, 4) the overarching goal which underpins the project is to achieve improved health status. As the link between empowerment and health is strongly evident in the research, it is important to determine whether or not the project is achieving this particular goal.

The evaluation intends to explore the impacts of this community based probiotic food project on the lives of the women taking part in the project, their family members, and the members of the community. Specifically, the evaluation is intended as a tool to examine the

health impacts and perceived improvements in quality of life for the women making the yoghurt, as well as explore and understand their household environment and family circumstances. It is also anticipated that the tailored interview guide used for the evaluation will lead to an exploration of large-scale cultural, social, economic and political processes which create differential health risks for sub-ordinate groups, specifically women.

Objectives of the Evaluation

1. Develop an impact evaluation interview guide which adequately captures the health and economic situation of these women and exposes areas of concern which need to be addressed.
2. To adequately capture the social processes which create differential health risks for the women participating in the project through the evaluation.
2. Explore the health impacts of the project and improvements in quality of life resulting from participation in the project.
3. Explore the economic impact of the project on the women and their immediate families and improvements in quality of life resulting from participating in this community based health and development project.

The proposed evaluation will assist all involved with the project to understand the contextual factors which contribute to the participants' current and lived situations, and what strategies can be realistically employed to address them. It is also critical to collect in depth

information about underlying circumstances and experiences in order to understand what determines health in such contexts, and to establish strategies by which the specific determinants can be influenced. Interpreting the results of the evaluation can provide a unique opportunity to gain a richer and deeper understanding of the women's experiences and life circumstances. Through data reduction, interpretation, and synthesizing the findings, gaps and connections will be uncovered. The analysis of the evaluation will facilitate the observation of themes, any existing relationships between themes, and identify potential concepts which are vital to projects continued progress and success.

WHE: Economic Empowerment and Health Evaluation Tool

Background

Tell me a little bit about yourself.

Tell me a little bit about how you got involved with this initiative/program.

What do you think is good about the program?

What would you like to change about the program?

How are the working conditions here in the program?

Impacts of the program

How has this program impacted you?

Health

How would you describe your health?

What are some of the major challenges you experience in trying to be healthy or have good health? (Probe about access to health services)

Has that changed since being involved with the program?

Economic Situation

Has this program impacted your economic situation? If yes, how?

Do you supplement your income from other sources of paid work?

Do you have trouble meeting household food needs? (Probe-how many times a week this occurs)

Self-Esteem

Has this program made you feel better or different about yourself? Do you see yourself in a different way? Is there a reason for this change?

Family Relationships

What does your family (i.e., spouse/partner, children, extended family) think about you being involved with this program?

How did your significant other first react to you participating in the project? Was there a negative reaction and if so, how did it manifest itself?

Is there more pressure to balance work and home tasks?

While you are working, who cares for your children?

Do you feel that you are more equitable/have more control over your personal resources/assets in your household as a participant in the program?

Community

Has this program provided you with the opportunity to get to know other people?

How do you feel that this program is viewed in your community?

Is your community supportive of the program? (Probe about local officials)

How has your involvement influenced your relationships with others in the community?

Do you think this program is making change in the community? (Probe about creating awareness regarding women's issues and HIV/AIDS)

Is there anything else you would like to add?

Do you have any questions for me?

Contributions to Public Health

The intent of this project was to create a functional program planning and evaluation framework which can be utilized by those involved with the project to gain a comprehensive understanding of WHE's objectives, achievements to date, while also mapping out future activities and the means by which to achieve these goals, while bearing in mind the context in which project activities are carried out in. The logic model is a fundamental building block of any project, without it, a shared vision can rapidly lead to a failed and unsuccessful initiative, and the lack of any evaluation can deem a project ineffective and useless. Importantly, WHE is at a cross-roads, if it is going to continue to thrive, and expand successfully for the purpose of bringing about improved health and quality of life to marginalized populations, it is absolutely necessary that this collaborative and multi-disciplinary initiative begin to plan, monitor, evaluate, and report its health and socio-cultural impacts.

It is hoped through the evaluation that a clear representation of the project's impacts is produced. By demonstrating how this contextually and locally relevant community health and development project which aids marginalized and vulnerable groups, in achieving improved health, quality of life, as well as status within their community can create both direct and indirect benefits.

The policy implications resulting from the evaluation can carry great weight - future community efforts could be supported by local leaders and government, as effective participatory community projects will be seen as a viable method of creating sustainable lifestyles, improving health and the quality of life of sub-ordinate and marginalized groups.

The project also offers an opportunity to take the feminist perspective both within and outside the medical framework into account, which is a needed direction in public health

(Hammarström, 1999). The gender analysis, logic model and project evaluation presented allow the women to be positioned as actors. By implementing these gender-sensitive methods, improved theoretical frameworks can be developed and ultimately used to bring about change. This project embraces the shift towards the 'new' public health which aims at focusing on "holistic and multidisciplinary activities, based on theoretical pluralism, multiple perspectives and collective actions with the aim of improving the health of gender-subordinated groups" (Hammarström, 1999, p. 241).

Concerns have been raised indicating that public health research must embrace developments made in understanding gender and other power dynamics which influence the social distribution of health and illness within populations (Hammarström & Ripper, 1999). "Furthermore, it is crucial to recognize that social research (including that in health) is part of the social fabric-not separable from-the processes of power" (Hammarström & Ripper, 1999, p.286). Existing work in public health has neglected the interactions between gender and power dynamics. The power perspective in public health brings a comprehensive and subtle understanding of the "multiple and contradictory elements of gender and other relations of power that impact on the health status of populations" (Hammarstrom & Ripper, 1999, p.286). Public health with feminist interpretations represents shifts towards holistic and multidisciplinary activities which also take on multiple perspectives and collective actions intended to improve the health of subordinate groups (Hammarström and Ripper, 1999). The program planning and evaluation framework allows project planners to explore the intersection between health and societal-level contextual factors which are essential in making a meaningful impact on morbidity and mortality within this context. From a feminist standpoint, it will assist in addressing the power relationships which exist and the social phenomena which shape the participant's lives.

Further, the framework presented provides a basis to review and the potential to update national policy on women's rights and empowerment. It provides a medium to articulate the need for a plan of action towards effective participatory community projects as viable methods of creating sustainable lifestyles, improving health and the quality of life of sub-ordinate groups. By developing an environment which fosters community empowerment, and more specifically women's empowerment, the opportunity to change conditions of power at the micro-level will enhance health. It is hoped that the findings stemming from the current work will provide additional support to existing literature on the importance of empowerment of women (through economic development and skill transfer) for reducing disparities in health and quality of life across gender and ethnic groups. Dynamic new programs which are personal and considerate of cultural dimensions reflecting gender differences, political and economic factors, are needed to generate awareness and produce behaviour change within the population. Effective models and methods of women's empowerment movements in underserved and disadvantaged communities may provide a stepping stone for national policy makers to make further recommendations to health system reforms, and promote nationally empowerment of women as an indirect means of health promotion. Importantly, the program planning and evaluation framework is a critical in determining the public health efficacy of the project. Evaluating the impacts of the WHE project is greatly needed to extend the success of the existing program, and establish more effective strategies for empowering women, and improving health in Sub-Saharan Africa.

Overall, this community health and development project which empowers the locals, specifically women, has broad benefits for those infected who are generally ill, malnourished or have HIV, through low cost, and feasible methods at the community level. The project reveals the importance of interdisciplinary research, particularly in contexts of complex social and

epidemiological processes. Empowerment and health are so firmly rooted in human behaviour, guided by cultural, social and economic conditions, it is imperative that a framework is used to synthesize ideas into workable plans of action. To increase the likelihood of success, interventions need to be culturally appropriate as well as locally relevant, reflecting the social context within which they are embedded. The views of Macfarlane, Racelis and Muli-Musiime (2000) reflect this quite appropriately, suggesting that if public health is to succeed, “it must be re-crafted in a framework that locates organized and active communities at the centre as initiators and managers of their own health” (p. 845). In such a paradigm, multisectoral co-operation involves the exchange of knowledge, expertise, ideas, philosophies, and resources whereby governmental, private sector, non-governmental, and international stakeholders - listen to and learn from the people, then, discuss and make decisions jointly, allowing for local solutions to take root (Macfarlane, Racelis, & Muli-Musiime, 2000).

If these factors are not taken into consideration, poor health and quality of life will continue to challenge people’s ways of life. Unless the philosophies underlying the approaches to public health delivery and intervention strategies targeting changes in social and cultural norms are addressed, marginalized groups will continue to suffer.



References:

- Alam, N.H., Ashraf, H. (2003). Treatment of Infectious Diarrhea in Children. *Paediatric Drugs*, 5(3), 151-165
- Alfredsson, L, Karasek, R., Theorell, T. (1982). Myocardial infarction risk and psychological work environment: an analysis of the male Swedish working force. *Social Science and Medicine*, 16, 464-476.
- Amick, B.C. & Kasl, S.V. (2000). Work stress. In J.C. McDonald (Ed.), *The epidemiology of work related diseases*. London: British Medical Journal Press.
- Anabwani, G. & Navario, P. (2005). Nutrition and HIV/AIDS in SSA: An Overview. *Nutrition*, 21, 96-99.
- Andoniou, E. & Flesher, G. (2007). *Is the Western Heads East Project Sustainable?* Unpublished Manuscript.
- Anukam, K. C., Osazuwa, E.O., Osadolor, H.B., Bruce, A.W., Reid, G. (2008). Yogurt Containing Probiotic Lactobacillus rhamnosus GR-1 and L. reuteri RC-14 Helps Resolve Moderate Diarrhea and Increases CD4 Count in HIV/AIDS Patients. *Journal of Clinical Gastroenterology*, 42(3), 239-243.
- Anukam, K. (2007). The potential role of probiotics in reducing poverty-associated infections in developing countries. *Journal of Infections in Developing Countries*, 1(2), 81-83.
- Antonovsky, A. (1988), *Unravelling the Mystery of Health: How People Manage Stress and Stay Well*, Jossey-Bass Publishers, San Francisco, CA .
- Ashworth, A. (2001). Treatment of Sever Malnutrition. *Journal of Pediatric Gastroenterology & Nutrition*, 32(5), 516-518.
- Baroja, M.L., Kirjavainen, P.V., Hekmat, S., Reid, G., 2007. Anti-inflammatory effects of probiotic yogurt in inflammatory bowel disease patients. *Clinical and Experimental Immunology*, 149(3), 470-479.
- Baylies, C. & Bujra, J. (2000). *AIDS, Sexuality and Gender in Africa: Collective Strategies and Struggles in Tanzania and Zambia*. London: Routledge and Taylor & Francis.
- Beckman, S., Rai, P. (2004). HIV/AIDS, work and development in the United Republic of Tanzania, 2004, International Labour Organization, Retrieved 6 October 2006 from http://www.ilo.org/public/english/protection/trav/aids/publ/cp_2_tanzania.pdf.
- Berkman., L., & Kawachi, I. (Eds.). (2000). *Social epidemiology*. Oxford: Oxford University Press.

- Boserup, E. (1970). *Women and Economic Development*. New York: St. Martins Press.
- Brunner, E., & Marmot, M.G. (1999). Social organization, stress, and health. In M.G. Marmot, & R.G. Wilkinson, R.G. (Eds.), *Social determinants of health*. New York: Oxford University Press
- Caughman, S. (1982). *Women at work in Mali: The case of the Markala cooperative*. (Working Paper no. 50). Boston: African Studies Center, Boston University.
- CDC. (2006, July 4). Safe Water System (SWS)-Where has the SWS Been Used? Nyanza Healthy Water Project. Retrieved September 25, 2008, from http://www.cdc.gov/safewater/where_pages/kenya_project.htm
- Chand, M., Jain, D., Kalyanasundaram, R., Singh, N. (1980). *Income generating activities for women: Some Case Studies*. New Delhi; Indian Cooperative Union.
- Chen, Y.Y., Subramanian, S.V., Acevedo-Garcia, D., Kawachi, I. (2005). Women's status and depressive symptoms: A multilevel analysis. *Social Science and Medicine*, 60(1), 49-60.
- Cohen, S., and Syme, S.L. (Eds.) (1985). *Social Support and Health*. San Francisco: Academic Press.
- Connell, R.W. (1987). *Gender and Power: Society, the Person and Sexual Politics*. Cambridge: Policy Press.
- Creighton, C. & Omari, C. K. (eds.). (1995). *Gender, Family and Household in Tanzania*. Aldershot: Avebury, USA
- Dantzer, R., & Kelley, K.W. (1989). Stress and immunity: An integrated view of relationships between the brain and the immune system. *Life Sciences*, 44, 1995-2008.
- Dedobbeleer, N., Beland, F., Contandriopoulos, A., Manuella, A. (2004). Gender and the social context of smoking behaviour. *Social Science and Medicine*, 58(1), 1-12.
- DHAPP (Department of Defence HIV/AIDS Prevention Program), 2005. Winning battles in the war against HIV/AIDS. Retrieve February 22, 2007 from, <http://www.nhrc.navy.mil/programs/dhapp/countryreports/yearly05/tanzania05.pdf>
- Dutton, D.B. (1986). Social class and health. In L.H. Aitken, & D. Mechanic (Ed.), *Allocations of social science to clinical medicine and health policy* (pp. 31-62). New Brunswick, New Jersey: Rutgers University Press.
- Elder, J., (2001). *Behaviour Change & Public Health in the Developing World*. Thousand Oaks, CA: Sage Publications.

- FAO (Food and Agriculture Organization). (2006). *United Republic of Tanzania Monitoring progress towards hunger reduction goals of the World Food Summit (WFS) and the Millennium Declaration (MD)*. Food and Agriculture Organization of the United Nations, Statistics Division Socio-Economic Statistics and Analysis Service
- FAO/WHO (Food and Agriculture Organization of the United Nations/World Health Organization) (2001). Health and Nutritional Properties of Probiotics in Food including Powder Milk with Live Lactic Acid Bacteria. Cordoba, Argentina: Food and Agriculture Organization of the United Nations and World Health Organization. Retrieved March 20 2007, from, <http://www.fao.org/es/ESN/probio/probio.htm>
- Freire, P. (1987). *Education for Critical Consciousness*. New York: Seabury Press.
- Furby, L. (1979). Individualistic Bias in Locus of Control Studies. In A.R. Buss (Ed), *Psychology in Social Context*. New York, Irvington.
- Gardiner, G., Heinemann, C., Baroja, M.L., Bruce, A.W., Beuerman, D., Madrenas, J., Reid, G. (2002). Oral administration of the probiotic combination *Lactobacillus rhamnosus* GR-1 and *L. fermentum* RC-14 for human intestinal applications. *International Dairy Journal*, 12 (2-3),191-6.
- Gershman, J., Irwin, A., & Shakow, A. (2000). Getting a grip on the global economy: Health outcomes and the decoding of development discourse. In Y. K. Jim, J. Millen, A. Irwin & J. (Eds). *Dying for growth: Global inequality and the health of the poor* (pp. 157-194). Monroe, Maine: Common Courage Press.
- Gonzalez-Brenes, M. (2003). *Domestic Violence, Bargaining and Fertility in Rural Tanzania*. Department of Economics: University of California (Draft): Retrieved September 5, 2008 from, http://www.sscnet.ucla.edu/polisci/wgape/papers/4_Gonzalez.pdf
- Graham, H., Der, G. (1999). Patterns and predictors of smoking cessation among British women. *Health Promotion International*, 14, 231-240.
- Guyer, Jane I. (1980). *Household budgets and women's incomes*. (Working papers / African Studies Center). Brookline, Mass.: African Studies Center., Boston University
- Hammarström, A. & Ripper, M. (1999). What could a feminist perspective on power bring into public health? *Scandinavian Journal of Public Health*, 27, 2862-89.
- Haan, M., Kaplan, G., Camacho-Dickey, T. (1987). Poverty and Health a prospective study of Almeida County Residents. *American Journal of Epidemiology*, 125, 989-998.
- Hashemi, S. 2004. Microfinance and the MDGs. Id21, Issue #51. Retrieved March 23, 2009 from <http://www.id21.org/insights/insights51/insights-iss51-art01.html>

- Hawe, P., & Shiell, A. (2000). Social capital and Health promotion: a review. *Social Science & Medicine*, 51(5), 871-885.
- Hekmat, S., Soltani, H., and Reid, G., 2008. Growth and survival of *Lactobacillus reuteri* RC-14 and *Lactobacillus rhamnosus* GR-1 in yogurt for use as a functional food. *Innovative Food Science & Emerging Technologies*, 10, 293-296.
- Hekmat, S., and Koba, L. 2006. Fermented Dairy Products: Knowledge and Consumption. *Canadian Journal of Dietetic Practice and Research*, 67(4), 199-201.
- Hofrichter, R. (Ed.). (2003). *Health and social justice: A public health reader*. Toronto: John Wiley.
- Hogg, R.S., Heath, K.V., Yip, B., Craib, K.J.P., O'Shaughnessy, M.V., Schechter, M.T. et al. (1998). Improved Survival Among HIV-Infected Individuals Following Initiation of Antiretroviral Therapy. *Journal of the American Medical Association*, 279(6), 450-454.
- Horne, T., Donner, L., Thurston, W.E. (1999). Invisible Women: Gender and Health Planning in Manitoba and Saskatchewan and Models for Progress. Prairiewomen's Health Centre of Excellence
- House, J.S., Landis, K.R., & Umberson, D. (1988). Social relationships and health. *Science* 241, 540-45.
- International Planned Parenthood Federation (2007). Change, Choice and Power: Young women, Livelihoods and HIV-Prevention Literature Review and Case Study Analysis. London, UK: IPPF. Retrieved on March 19, 2009, from <http://www.ippf.org/NR/rdonlyres/50CC6D5F-F254-4659-86CB-265F281FA625/0/ccp.pdf>
- International Institute for Educational Planning (2003). *HIV/AIDS and Education A Strategic Approach*. Paris, France. Retrieved on March 22, 2009 from <http://unesdoc.unesco.org/images/0012/001286/128657e.pdf>
- Isolauri, E., 2001. Probiotics in human disease. *American Journal of Clinical Nutrition*, 73(6), 1142S-1146S.
- Israel, B.A., Checkoway, B., Schulz, A., Zimmerman, M. (1994). Health Education and Community Empowerment: Conceptualizing and Measuring Perceptions of Individual, Organizational and Community Control. *Health Education and Behaviour*, 21, 149-170.
- Israel, B., (1985). Social networks and social support: Implications for natural helper and community level interventions. *Health Education Quarterly*, 12, 65-80.
- Jain, D. (1980). *Women's quest for power: Five Indian case studies*. Ghaziabad, Uttar Pradesh, India: Vikas Publishing House.

- Jones, C. (1983). The impact of SEMRY I irrigated rice project on the organization of production and consumption at the intrahousehold level. No. 5 Draft Paper. Washington: USAID/PPC.
- Kalipeni, E., Craddock, S., Oppong, J.R., and Ghosh, J. (Eds.) (2004). *HIV and AIDS in Africa Beyond Epidemiology*. Malden, MA: Blackwell Publishing
- Kalipeni, E. (2000). Health and disease in Southern Africa: a comparative and vulnerability perspective. *Social Science and Medicine*, 50, 965-983.
- Karasek, R., Baker, D., Marxer, F., Ahlbom, A., Theorell, T. (1981). Job decision latitude, job demands, and cardiovascular disease; a prospective study of Swedish men. *American Journal of Public Health*, 71, 694-705.
- Kar, S.B., and R. Alcalay. 2000. *Health Communication: A Multicultural Perspective*. Thousand Oaks, CA: Sage Publications.
- Kawachi, I., Kennedy, B.P., & Wilkinson, R., (Eds.). (1999). *The society and population health reader: Income inequality and health*. New York: New Press.
- Kopp-Hoolihan, L., 2001. Prophylactic and Therapeutic Uses of Probiotics A review *Journal of the American Dietetic Association*, 101(2), 229-241.
- Kuh, D., & Ben-Shlomo, Y. (Eds.). (1997). *A lifecourse approach to chronic disease epidemiology*. New York: Oxford University Press. Suggest more current text
- Kumar, S. (1979). *Impact of subsidized rice on food consumption and nutrition in Kerala. (Research Reports no. 5)*. Washington, D.C.: International Food Policy Research Institute.
- Loose, E. (1980). *Women's time budgeting in rural Senegal*. Paper presented at a workshop on Sahelian Agriculture, Department of Agriculture, Purdue University, West Lafayette, Indiana.
- Lynch, J.W., Kaplan, G.A., Pamuk, E.R., Cohen, R.D., Heck, K.E., Balfour, J.L. et al. (1998). Income inequality and mortality in metropolitan area of the United States. *American Journal of Public Health*, 88, 1074-80.
- Macfarlane, S., Racelis, M., Muli-Musiime, F. (2000). Public Health in Developing Countries. *The Lancet*, 356, 841-846.
- Macintyre, K., Brown, L., Sosler, S. (2001). It's not what you know, but who you knew: Examining the relations between behaviour change and AIDS mortality in Africa', *AIDS Education and Prevention*, 13(2), 160-175.
- Mack, D.R., Ahrne, S., Hyde, L., Wei, S., Hollingsworth, M.A. (2003). Extracellular MUC3 mucin secretion follows adherence of *Lactobacillus* strains to intestinal epithelial cells in vitro. *Gut*, 52(6), 827-33.

- Mahlungulu S., Grobler, L.A., Visser, M.E., Volmink, J., 2007. Nutritional interventions for reducing morbidity and mortality in people with HIV. *Cochrane Database of Systematic Reviews*, Issue 3.
- Marmot, M.G., Rose, G, Shipley, M., Hamilton, P.J. (1978). Employment grade and coronary heart disease in British civil servants. *Journal of Epidemiology and Community Health*, 3, 244-249.
- Marmot, M., Wilkinson, R. (Eds.). (1999). *Social determinants of health*. Oxford: Oxford University Press.
- Marmot, M., Theorell, T. (1988). Social class and cardiovascular disease: The contribution of work. *International Journal of Health Services*, 18, 659-74.
- Marmot, M.G. (1986). Some inequalities in mortality: The social Environment. In R.G. Wilkinson (Ed.), *Class and health: Research and longitudinal data* (pp. 21-33). London: Tavistock.
- Martin, H.L., Richardson, B.A., Nyange, M.A., et al. (1999). Vaginal Lactobacilli, Microbial Flora, and Risk of Human Immunodeficiency Virus Type 1 and Sexually Transmitted Disease Acquisition. *The Journal of Infectious Diseases*, 180(6), 1863-8.
- Mayoux, L. (2000). Microfinance and the empowerment of women: A review of the key issues. Social Finance Unit Working Paper, 23. Geneva: ILO
- Ministry of Health and National AIDS Control Program (MOH & NACP). (1997). *National AIDS Control Programme HIV / AIDS / STD Surveillance*. Dar es Salaam, Tanzania: Epidemiology Unit, NACP, MOH. *Surveillance Report*, 20, 1-40.
- Morelli, L., Zonenenschain,D., Del Piano, M., Cognein, P. (2004). Utilization of the intestinal tract as a delivery system for urogenital probiotics. *Journal of Clinical Gastroenterology*, 38 (6 Suppl), S107-10.
- Moser, C.O.N. (1987). Women, human settlements, and housing: A conceptual framework for analysis and policy-analysis. In, C. Moser, and L. Peake (Ed.), *Women, human settlements, and housing*. (pp. 89-97). London: Tavistock.
- NPC (National Population Commission [Tanzania] and ORC Macro), 2005. Tanzania Demographic and Health Survey 2004. Calverton: ORC Macro.
- National Population Commission (NPC). (2001). Nigeria Population Census Analysis: Gender and Sustainable Development. NPC, Abuja, Nigeria 2000.
- Ocana, V.S., Nader-Macias E.M. (2004). Production of antimicrobial substances by lactic acid bacteria II: screening bacteriocin-producing strains with probiotic purposes and characterization of a Lactobacillus bacteriocin. *Methods in Molecular Biology*, 268:347-53.

- O'Leary, A. (1985). Self-Efficacy and Health. *Behaviour Research and Therapy*, 23(4), 437-451.
- Oppong, J.R. (1998). A vulnerability interpretation of the geography of HIV/AIDS in Ghana, 1986-1995. *Professional Geographer*, 50, 437-448.
- Oppong, J. (1997). Medical geography of Sub-Saharan Africa. In: S. Aryeetey-Attoh (Ed.), *Geography of Sub-Saharan Africa*, (pp.141-181). Prentice Hall, Upper Saddle River, NJ.
- Packard, R.M., Epstein, P. (1991). Epidemiologists, social scientists, and the structure of medical research on AIDS in Africa. *Social Science & Medicine*, 33(7), 771-794.
- Pantazis, C., & Gordon, D. (Eds.). (2000). *Tackling inequalities: Where are we now and what can be done?* Bristol, England: Policy Press.
- Park, K. (2007). Social support for stress prevention in hospital settings. *Perspectives in Public Health*, 127 (6), 260-264.
- Parker, R.G. (1996). Empowerment, community mobilization and social change in the face of HIV? *AIDS*, 10, 27-31.
- Paton, N., Sangeetha, S., Earnest, A., Bellamy, R. (2006). The Impact of Malnutrition on Survival and the CD4 Count Response in HIV-infected Patients starting Antiretroviral Therapy. *HIV Medicine*, 7 (5), 323-330.
- Perdigon, G., Alvarez, S., Rachid, M., Agüero, G., Gobbato, N., 1995. Immune system stimulation by probiotics. *Journal of Dairy Science*, 78 (7), 1597-1606.
- Pettifor, A.E., Measham, D.M., Rees, H.V., and Padian, N.S. (2004, November). *Sexual Power and HIV Risk, South Africa*. Presented at the International Conference on Women and Infectious Disease. Retrieved on March 20, 2009, from, <http://origin.cdc.gov/ncidod/eid/vol10no11/pdfs/04-0252.pdf>
- Raphael, D. (2003). The political, economic, and social determinants of health inequalities in the United States. In R. Hofrichter (Ed.), *Health and social justice* (pp. 59-88). San Francisco: John Wiley.
- Rappaport, J. (1987). Terms of empowerment/examples of prevention: Toward a theory for community psychology. *American Journal of Community Psychology*. 15, 121-148.
- Reid, G. (2006). Scientific evidence for and against the safe use of probiotics. *Microbiology*, 8, 348-352.
- Reid, G., Sanjeev, A., and Bingham, M.O. (2005). Probiotics for the Developing World. *Journal of Clinical Gastroenterology*, 39(6), 485-488.

- Reid, G., and Hammond, J. (2005). Probiotics, some evidence of their effectiveness. *Canadian Family Physician*, 51, 1487-1493.
- Reid, G., and Devillard, E. (2004). Probiotics for Mother and Child. *Journal of Clinical Gastroenterology*, 38(Supp2), S94-101.
- Reid, G., and Bocking, A. (2003). The potential for probiotics to prevent bacterial vaginosis and preterm labour. *American Journal of Obstetrics and Gynaecology*, 189(4), 1202-1208.
- Reid, G., and Bruce, A.W. (2001). Selection of *Lactobacillus* Strains for Urogenital Probiotic Applications. *The Journal of Infectious Diseases*, 18(Supp1), S77-80.
- Reid, G., Cook, R.L., Bruce, A.W., (1987). Examination of strains of lactobacilli for properties which may influence bacterial interference in the urinary tract. *Journal of Urology*, 138, 330-335.
- Rodin, J. (1986). Aging and health: effects of the sense of control. *Science*, 233(4770), 1271-1276.
- Rogers, B. and N. Youssef. (1988). The Importance of Women's Involvement in Economic Activities in the Improvement of Child Nutrition and Health. *Food and Nutrition Bulletin* 10 (3).
- Rose, G., Marmot, M. (1981). Social class and coronary heart disease. *British Journal of Heart Disease*, 4, 155-69.
- Rothman, J., & Tropman, J. E. (1987). *Models of community organization and macro practice perspectives: Their mixing and phasing*. In F. M. Cox, J. L. Erlich, J. Rothman, & J. E. Tropman (Eds.), *Strategies of community organization* (pp. 3-26). Itasca, IL: F. E. Peacock.
- Sapolsky, R.M. (1990). Stress in the Wild. *Scientific American*, 262, 116-23.
- Scrimshaw, N. S., and SanGiovanni, J. P., 1997. Synergism of nutrition, infection, and immunity: an overview. *American Journal of Clinical Nutrition*, 66, 464-477.
- Seeman, M, and Seeman, T.E. (1983). Health Behaviour and Personal Autonomy: A longitudinal Study of the Sense of Control in Illness. *Journal of Health and Social Behaviour*, 24(2), 144-160.
- Semba, R. D. & Tang, A. M. (1999). Micronutrients and the Pathogenesis of Human Immunodeficiency Virus Infection. *British Journal of Nutrition*, 81, 181-189.
- Sen, A. (2001). *Development as Freedom*. Oxford: Oxford University Press.

- Sen, A.K. (1995). The Political Economy of Targeting. In van de Walle, D., and Nead, K. (Ed.), *Public Spending and the Poor: Theory and Evidence*. Baltimore: John Hopkins University Press.
- Sen, A. (1988). *Gender and cooperative conflicts*. Helsinki, Finland: World Institute for Development Economics Research of the United Nations University.
- Sewankambo, N., Gray, R.H., Wawer, M.J., Paxton, L., McNaim, D., Wabwire-Mangen, F., Serwadda, D., Li, C., Kiwanuka, N., Hillier, S.L., Rabe, L., Gaydos, C.A., Quinn, T.C., Konde-Lule, J.. (1997). HIV-1 infection associated with abnormal vaginal flora morphology and bacterial vaginosis. *Lancet*, 350(9077), 546-50.
- Schulz, A.J., Israel, B.A., Zimmerman, M.A., Checkoway, B.N. (1995). Empowerment as a multi-level construct: perceived control at the individual, organization and community levels. *Health Education and Research*, 10, 309-327.
- Shaw, M., Dorling, D., & Davey Smith, G. (1999). Poverty, social exclusion and minorities. In M. G. Marmot, & R. G. Wilkinson (Eds.), *Social determinants of health*. New York: Oxford Univeristy Press.
- Siegrist, J. (2000). Place, social exchange and health: proposed sociological framework. *Social Science and Medicine*, 51, 1283-93.
- Smith, G.D. (1996). Income inequality and mortality: Why are they related? *British Medical Journal*, 312, 987-1014.
- Spencer, N. (1996). *Poverty and Child Health*. Oxford: Radcliffe Medical Press.
- Syme, S. (1988). Social epidemiology and the work environment. *International Journal of Health Services*, 18, 635-45.
- Tanzania Commission for HIV/AIDS (TACAIDS). (2003). National Multi-Sectoral Strategic Framework on HIV/AIDS 2003-2007, Dar Es Salaam, Tanzania. Available from: http://www.moh.go.tz/documents/aids_nmsf2003.pdf [Accessed 13 July 2006].
- Tamine, A.Y., and Robinson, R.K., 1999 *Yogurt: Science and Technology*. Boca Raton: Woodhead Publishing.
- Tanzanian Food and Nutrition Centre (TFNC). (2006). Nutrition for Human and Economic Development in Tanzania. Retrieved on April 15 2009 from <http://www.tanzania.go.tz/images/tfnc.pps>
- Tomkins, A.M. (2005). Evidence-based Nutrition Interventions for the Control of HIV/AIDS. *South African Journal of Clinical Nutrition*, 18(2), 187-191.

- Townsend, P. (2000). Ending world poverty in the 21st century. In C. Pantazis, & D. Gordon (Eds.), *Tackling inequalities*. Bristol: Policy Press.
- Townsend, P. (1979). *Poverty in the United Kingdom: A survey of Household Resources and Standards of Living*. Berkeley: University of California Press.
- Uchino, B.N., Uno, D., & Holt-Lunstad, J. (2002). Social Support, Physiological Processes, and Health. *Current Direction in Psychological Science*, 8(5), 141-148.
- U.S. Department of Health and Human Services. (1998). *Socioeconomic Status and Chartbook*. Washington: U.S. Government Printing Office.
- UNAIDS (2008a). *Sub-Saharan African Regional Summary 2007 AIDS Epidemic Update*. Joint United Nations Programme on HIV/AIDS (UNAIDS) and World Health Organization. Retrieved April, 18, 2009 from http://data.unaids.org/pub/Report/2008/JC1526_epibriefs_subaharanafrica_en.pdf
- UNAIDS (2008b). *Report on the Global AIDS Epidemic*. Geneva, Switzerland. Retrieved February 10, 2009 from http://data.unaids.org/pub/GlobalReport/2008/jc1510_2008_global_report_pp63_94_en.pdf
- UNAIDS (2006). *Report on the Global HIV Epidemic*. Geneva, Switzerland. Retrieved February 15, 2009 from <http://www.unaids.org/en/KnowledgeCentre/HIVData/GlobalReport/2006/default.asp>
- UNAIDS (2004). Report on the global AIDS epidemic, Joint United Nations Programme on HIV/AIDS. 2004, Retrieved 2 October 2006 from <http://www.unaids.org/bangkok2004/report.html>.
- UNDP. (1999). *Human Development Report*. New York: Oxford University Press. UNDP. Retrieved December 2, 2008, from http://hdr.undp.org/reports/global/1999/en/pdf/hdr_1999_full.pdf
- UNFPA. (2008). Gender Equality: Women's Work and Economic Empowerment. Retrieved on February 28, 2009 from <http://www.unfpa.org/gender/empowerment1.htm>
- Vainio-Mattila, A., 1999. *Navigating Gender. A framework and a tool for participatory development*. Helsinki, Finland. Ministry of Foreign Affairs, Development for International Development Cooperation, Government of Finland.
- Wallace, D., Wallace, R. (2000). Life and death in Upper Manhattan and the Bronx: toward and evolutionary perspective on catastrophic social change. *Environmental Planning*, 32, 1-22.
- Wallerstein, N., and Bernstein, E. (1994). Health education and community empowerment: conceptualizing and measuring perceptions of individual, organizational and community control. *Health Education Quarterly*, .21, 141-148.

- Wallerstein, N. (1992). Powerlessness, empowerment and health: implications for health promotion programs. *American Journal of Health Promotion*, 6, 197-205.
- Wallerstein, N., and Bernstein, E. (1988). Empowerment Education: Freire's Ideas Adapted to Health Education. *Health Education & Behaviour*, 15(4), 379-394.
- Walsh, C. D. (1995). Gender, Health and Cigarette Smoking. In B. C. Amick III, C. Levine, A. R. Talov, & D.C. Walsh (Eds.), *Society and Health* (pp. 131-171). New York: Oxford University Press.
- Watts, M.J., and Bohle, H.G. (1993). The space of vulnerability: The causal structure of hunger and famine. *Progress in Human Geography* 17, 43-67.
- WFP (World Food Programme) (2008). Nutrition and HIV/AIDS: Why Food Matters' *World Food Programme: A Front-Line Defence Against HIV/AIDS*. Retrieved April 10, 2009 from http://www.wfp.org/food_aid/food_for_hiv/nutrition.asp?section=12&sub_section=2
- Whitehead, M., Scott-Samuel, A., Dahlgren, G. (1998). Setting targets to address inequalities in health. *Lancet*, 351, 1279-82.
- WHO (World Health Organization). (2001). *The main consequences of malnutrition throughout the course of life*. Retrieved October 17, 2008, from <http://www.who.int/mip2001/files/2233/NHDbrochurecentrefold.pdf>
- WHO. (1999). *The World Health Report-Making a Difference*. Geneva: World Health Organization. Retrieved October 15, 2006, from <http://www.who.int.proxy1.lib.uwo.ca:2048/whr/1999/en/>
- WHO. (1998). *Gender and health: A Technical Paper*. Geneva: World Health Organization. Retrieved November, 15 2006, from <http://www.polisci.wisc.edu.proxy1.lib.uwo.ca:2048/~sapiro/ws102/gendertech.htm>
- WHO. (1996). *Investing in Health Research and Development*. Report of the Ad Hoc Committee on Health Research Relating to Future Intervention Options. Geneva: World Health Organization. Retrieved November 15, 2007, from http://p2048www.who.int.proxy2.lib.uwo.ca.proxy1.lib.uwo.ca:2048/tdr/publications/publications/investing_report.htm
- WHO. (1995). *Bridging the Gaps*. Geneva: World Health Organization. Retrieved November 23, 2006, from <http://www.who.int/whr/1995/en/index.html>.
- Wilkinson, R.G. (1996). *Unhealthy Societies: The Afflictions of Inequality*. New York: Routledge.
- World Bank. (1999). *Poverty Reduction and the World Bank: Progress in Fiscal 1998*. Washington, D.C.