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Probiotics in Tanzania: A review

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Introduction

The University of Western Ontario in partnership with the Kivulini Women's Rights Organization and the National Institute of Medical Research have launched a food-based probiotic project in Mwanza, Tanzania. Initiated in 2003, the Western Heads East probiotic yoghurt project is now entering a collaborative and multi-disciplinary research phase, with the goal of determining the health benefits of probiotic yoghurt within the Tanzanian context.

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). The FAO/WHO concluded that "specific strains of probiotics are safe for human use" (FAO/WHO, 2001) and "adequate scientific evidence exists to indicate that there is potential for the derivation of health benefits from consuming food containing probiotics" (FAO/WHO, 2001). Clinical studies have shown the ability of probiotic bacteria to kill HIV in vitro, colonize the intestine and vagina, help alleviate suffering from diarrhoea, and reduce the risk of bacterial vaginosis, a condition that predisposes women to HIV and other sexually transmitted diseases.

Yoghurt was chosen as the delivery medium for this project as there is a long history of fermented foods in Africa, it is relatively easy to produce, helps with vitamin A deficiency and promotes weight gain.

The yoghurt is produced by the Tukwamuane women's group at the Community Kitchen in Mabatini. For the last several years, probiotic yoghurt has been provided free of charge, six days a week, to approximately 24 HIV-positive individuals, whose health has markedly improved. Currently, efforts are underway to assess the health impacts of probiotic yoghurt amongst HIV-positive individuals, and to measure nutritional improvements among project participants and their families who have been consuming the probiotic yoghurt for more than a year.

As Western Heads East is now poised to enter a collaborative and multi-disciplinary research phase, it is timely to provide all stakeholders with a critical review of the project. This report explores the development context in Tanzania, utilizes a results-based management framework to assess the project's intended impacts and actual outcomes to date, presents the results of several preliminary studies, and assesses project sustainability.

About the Report

The report is organized in five sections: Stakeholders, Context, Project, Outcomes, and Project Sustainability. The **Stakeholders** section provides 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.

For any development project or research programme to be successful it must be both context-specific and context-appropriate; therefore, in **Context** 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 explanation of probiotics and the role researchers believe beneficial bacteria can play in combating HIV and alleviating diarrhoea. There is 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 selection of the project planning and reporting framework and the selection of a gender analysis tool are given and, following this, the project document and the completed gender analysis are presented in their entirety.

As Western Heads East organizers prepare to enter the research phase of the project, two preliminary studies were undertaken to measure results thus far. In **Outcomes**, the results of a Rapid Health Impact Assessment and an Economic Empowerment & Health case study, and a Community Readiness Assessment are presented.

A key goal of the Western Heads East collaborators was to create a sustainable project, thereby ensuring that the health and nutritional benefits of probiotic yoghurt would continue to be available to Tanzanian citizens for years to come. To assess **Project Sustainability**, stakeholders were surveyed on the steps necessary to reach sustainability. This section of the report will be of particular interest to other groups interested in launching similar initiatives, allowing them to leverage WHE's successes and avoid unnecessary pitfalls.

THE STAKEHOLDERS

The University of Western Ontario (UWO) is located on 155 hectares of land along the banks of the Thames River in London, Ontario. London is a thriving city of 432,451 people approximately 200 kilometres west of Canada's largest city, Toronto. Founded in 1878, UWO is one of Canada's oldest and most prestigious universities. The first students graduated in arts and medicine in 1883. Today, the University of Western Ontario (<http://www.uwo.ca>) is a vibrant learning centre with 1,164 faculty members and almost 29,000 undergraduate and graduate students. Through its 12 Faculties and Schools, and three affiliated Colleges, the University offers more than 60 different degree and diploma programmes.

Research is an integral part of the University's mission and external support for research projects totals nearly \$221 million annually. UWO ranks as one of the top ten research-intensive universities in Canada, with an international reputation for success. Western's goal is to firmly establish an entrepreneurial research culture and to encourage the practice of innovation in all units at Western.

The Canadian Research and Development Centre for Probiotics (CRDC – Probiotics), under the direction of Dr. Gregor Reid, is the leading probiotic research facility in North America. As well as leading the research team at the CRDC – Probiotics, Dr. Reid is a Professor of Microbiology and Immunology, and Surgery at the University of Western Ontario. The CRDC – Probiotics (<http://www.crdc-probiotics.ca/>) is housed at the Lawson Health Research Institute (Lawson) in London, Ontario, the research arm of London Health Sciences Centre and St. Joseph's Health Care, London. Lawson is one of the largest hospital-based research institutes in Canada. Lawson is dedicated to helping people live healthier lives by advancing our knowledge of how to prevent, diagnose and treat disease.

The vision of the CRDC – Probiotics is to create an internationally recognized probiotic research centre that fosters the pursuit of excellent basic, discovery, developmental and translational research leading to tangible benefits for humans and animals. The Centre'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 internationally recognized scientists at Lawson and the CRDC – Probiotics direct their research to the development of new knowledge that can be applied directly to patient care. The scientists at the CRDC – Probiotics examine 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.

Kivulini Women's Rights Organization is a registered Non-Governmental Organization based in Mwanza, Tanzania. In Kiswahili, Kivulini means "in the shade", implying that Kivulini (KWRO) 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 Organisation (<http://www.kivulini.org>) 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 safe environment for women and girls to live and do business; promotion 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 (50% male and 50% female).

The international community strongly supports the work of Kivulini, and major funders include HIVOS (Netherlands), the McKnight Foundation, Anti-SlaveryInternational, 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) are key collaborators.

KWRO's programmes 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 communities where women are less valued, 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 programmes aim to empower women to more fully participate in the formal sector, to increase the benefits of their labor, and to reduce their dependency.

The National Institute for Medical Research (NIMR) is a parastatal institution which was established by the government of Tanzania in October 1979 and became operational a year later. NIMR is responsible for carrying out, controlling, coordinating, registering, monitoring, evaluating and promoting health research in Tanzania. Currently it has 315 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 (<http://www.nimr.or.tz>) 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.

Mwanza Research Centre, formerly known as the East African Institute for Medical Research, is located on the shores of Lake Victoria. The Centre was formed in 1954 following the merger of the Filariasis Unit and the East African Medical Survey under the East African Community. The Centre became one of the constituents of the National Institute for Medical Research in 1979. 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 Centre 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 Centre embarked on research capacity development vigorously and established close working collaboration with both local and foreign partners. This has enabled the Centre to move from 2 scientific staff in 1980 to 31 in 2006. 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 researches, The Tanzania-Netherlands Project to Support HIV/AIDS (TANESA) and Mpango wa Elimu na Maadili (MEMA) kwa Vijana have also been accepted and recommended by WHO and the World Bank as good models for programmes to control HIV/AIDS among adolescents.

At the inception of the Western Heads East probiotic yoghurt project, Kivulini Women's Rights Organization recruited twelve women from Mabatini as project participants. The group was drawn from several Community Action Groups with which KWRO had established ties. The women have formalized their group into a Community Based Organization under the name Tukwamuane, and are currently pursuing registration as a Non-Governmental Organization.

The group has transformed from twelve members to ten. Members of Tukwamuane range in age from twenty-eight to fifty-two and all have a primary school education. 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. To date, the Tukwamuane members have not received financial compensation from the yoghurt project, but some members do engage in income generating activities. The project participants and their families together constitute a group of ninety-two adults and children who have been directly benefiting by consuming the yoghurt for the past three years.

The Tukwamuane group members were trained in probiotic yoghurt production by Western Heads East interns from the University of Western Ontario. Initial objectives included: improving the nutritional status of family members; introducing women to small business enterprise through yoghurt production; and conducting research using a strain of lactobacilli believed to prevent intestinal infections and lower the incidence of HIV infection in women.

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. 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, 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). If vigilant efforts are not made infection rates are capable of increasing exponentially, particularly within women, children and youth. Among the largest youth generation in history, 6,000 new infections occur every day. The HIV/AIDS pandemic is affecting the most productive adults (aged 20-40 years), leaving family members and orphaned children to deal with ostracism, stigma, and the inevitable cycle of poverty and disease. The larger impact of AIDS will become apparent in the wake of food crises, increased number of orphans, and depleted human capacity (UNAIDS, 2004). The effects of AIDS related mortality will be felt within all aspects of community life. Whole societies are affected by disruptions in schooling, work patterns, and human productivity, limiting their ability to develop or maintain previous progress (Macintyre, Brown, and Sosler, 2001; Elder, 2001). HIV/AIDS continues to diminish social networks, leaving entire societies unable to cope with the crippling and debilitating health and social effects of the disease (UNAIDS, 2004).

Stephen Lewis, UN Special Envoy for HIV/AIDS in Africa, notes that the pandemic in Africa is gender-based, and stresses the critical links between the disease and gender oppression (UN, 2001). Indeed, there are marked gender differences in HIV/AIDS infection rates. Amongst critical groups are women of reproductive age, pregnant women, and those under 25 years of age. Particularly, young women aged 15–24 years are approximately 2 to 5 times more likely to be infected than young men of the same age. Generally, women are more vulnerable and severely affected than men. Women aged 15–49 years are about 1.3 to 2 times more likely to be infected than men (WHO, 2005; DHAPP, 2005). Countries in the Sub-Saharan region are facing a crisis of unprecedented proportions, particularly as the percentage of HIV-women steadily increases. “Nowhere is the epidemic's ‘feminization’ more apparent than in Sub-Saharan Africa, where 57% of infected adults are women, and 75% of infected young people are women and girls” (UNAIDS, 2004). 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).

HIV/AIDS was first detected in the northwest part of the country in Mwanza, Tanzania in 1983 (MOH & NACP, 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 (DHAPP, 2005).

Approximately 1.6 million individuals are living with HIV/AIDS, and 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; ILO, 2004).

There are numerous factors favouring and contributing to the rapid spread of HIV in Tanzania. A number of socio-cultural and behavioural factors help explain the HIV prevalence level. 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 (DHAPP, 2005). Specifically, significant risk factors have been identified to include: high-risk heterosexual contact (which includes contact with vulnerable populations such as commercial sex workers, fishermen, transportation workers, refugees, military personnel, and prisoners), high mobility, trafficking of young girls, and abuse of child domestic workers, multiple sexual partners, mother-to-child transmission, and denial of possible HIV-infection by the majority of Tanzanians (DHAPP, 2005; UNAIDS, 2004).

The heterogeneous spread of HIV/AIDS has had a devastating impact on all sectors of society, and is now the leading cause of adult mortality (Semali and Kimambo, 2003). The effects of the epidemic have been felt at the household, community, and national level. At the household level, there have been increased medical expenditures, absenteeism, and low productivity (UNAIDS, 2004). Community resources are being stretched due to reductions in production, school enrolment, and human capacity, and the increased needs of orphans and the elderly (UNAIDS, 2004). Nationally, medical expenditures have increased with an estimated 17 illness episodes in HIV infected adults before death, placing great strain on an already capacity and resourced diminished health care system (MOH & NACP, 1997). These factors are compounded by widespread poverty and inequality, as Tanzania is one of the poorest countries in the world (DHAPP, 2005), low literacy rates (78.2%, with an uneven distributed between men and women) (DHAPP, 2005), specific socio-cultural practices, an overburdened healthcare system, and importantly the low status and marginalization of women.

Nutrition in Tanzania

According to the Food and Agriculture Organization of the United Nations, the prevalence of under-nourishment in Tanzania is the most extreme in East Africa and Sub-Saharan Africa, with 44 percent of the Tanzanian population being under-nourished (Fig.1) (FAO, 2006). For the period 1990-92 to 2001-03, the nutritional crisis in Tanzania deepened despite improvements in food supply (Fig.2) (FAO, 2006). Per capita food supply has increased recently; however, it is still well below the 1990-92 level (Fig.3) (FAO, 2006).

Figure 1

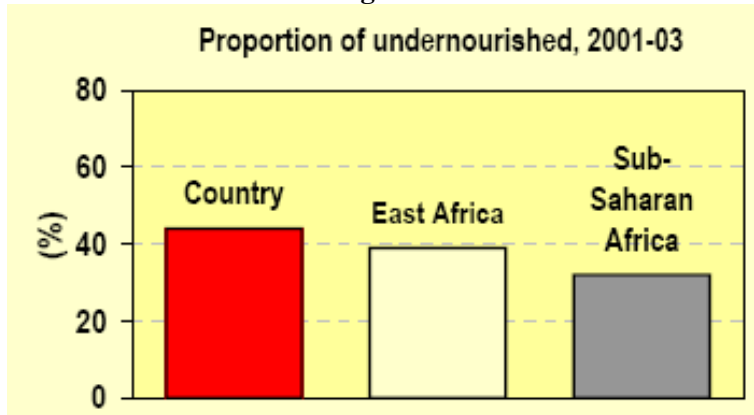


Figure 2

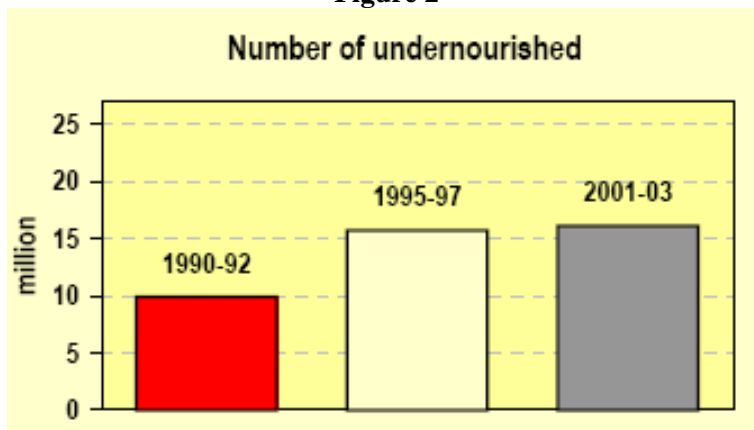
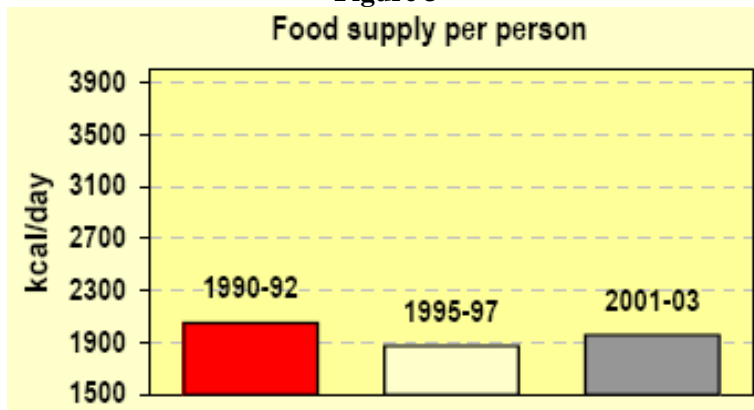


Figure 3



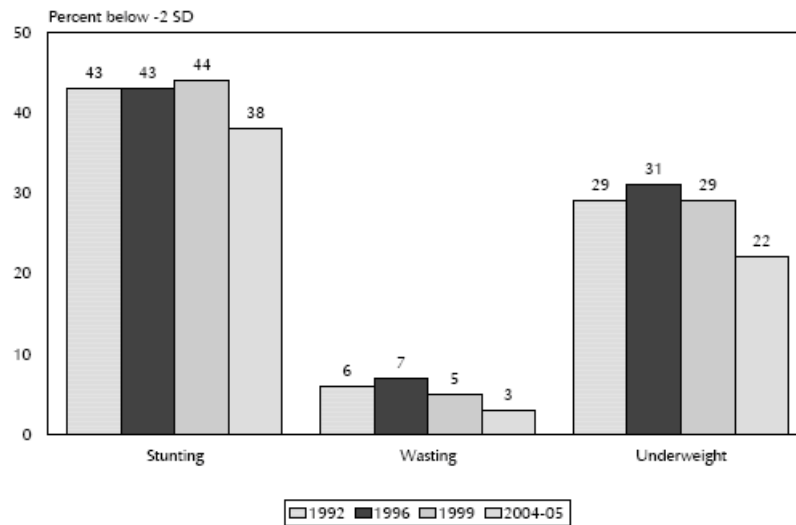
Acute malnutrition is highest in women age 15 to 19 (19 percent), women with no education or with incomplete primary education (11 and 16 percent, respectively), and women in the lower wealth quintiles (NPC, 2005). Micronutrient deficiencies are a major contributor to morbidity and mortality amongst women and children. In particular, there is a severe lack of iodine, iron and vitamin A. The 2004-5 Tanzania Demographic Health Survey (TDHS) indicated that pregnant women are especially prone to suffer from night blindness, which is caused by vitamin A deficiency. Micronutrient deficiencies result from both a lack of micronutrient rich foods and the inadequate uptake of available micronutrient 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)

A woman’s nutritional status both before and during pregnancy is vital for proper intrauterine development and health of the foetus, while 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). One of the leading nutritional disorders among children under five is Protein Energy Malnutrition (PEM) which results from inadequate food consumption and is aggravated by infections (Fig.4). Malnutrition among children increases their risk of morbidity and mortality and is related to impaired mental development, and is often correlated to maternal nutrition (NPC, 2005).

Figure 4
Trends in the Nutritional Status of Children under Five Years



Beginning at 6 months of age, children need foods other than breast milk to meet their dietary needs. The 2004-05 TDHS measured foods eaten by breast feeding and non-breastfeeding children under three years. 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).

Figure 5: Complimentary foods consumed by children in a 24-hour period

Percentage of youngest children under three years of age living with the mother who consumed specific foods in the day or night preceding the interview, by breastfeeding status and age, Tanzania 2004-05

Age in months	Infant formula	Other milk/cheese/yogurt	Other liquids ¹	Food made from grains	Fruits/vegetables ²	Food made from roots/tubers	Food made from legumes	Meat/fish/shellfish/poultry/eggs	Food made with oil/fat/butter	Fruits and vegetables rich in vitamin A ³	Any solid or semisolid food	Number of children
BREASTFEEDING CHILDREN												
<2	0.1	3.5	1.2	5.4	0.3	0.0	0.0	0.0	0.4	0.3	8.2	250
2-3	0.4	10.9	8.8	26.3	1.2	0.1	0.9	0.5	1.6	0.8	34.1	303
4-5	2.0	22.5	18.4	56.5	12.1	2.3	4.7	2.9	8.8	8.6	63.0	267
6-7	5.3	29.6	30.7	85.1	34.7	8.4	12.5	17.0	16.1	32.7	91.7	299
8-9	3.1	26.6	30.9	92.2	55.4	15.3	22.4	22.9	21.3	51.5	96.3	295
10-11	4.0	31.3	36.5	94.1	67.2	22.4	26.0	35.5	27.9	60.3	99.1	288
12-15	4.7	28.2	34.4	96.3	70.2	19.4	29.5	31.5	24.3	65.1	99.5	495
16-19	3.7	24.9	37.5	95.7	78.6	26.0	31.4	35.9	29.9	72.8	99.2	463
20-23	3.2	26.1	31.8	98.6	77.7	20.8	32.0	31.5	31.5	72.6	99.6	267
24-35	4.6	25.2	32.4	98.5	79.1	17.5	36.7	24.9	42.1	74.5	99.4	126
<6	0.8	12.4	9.6	29.8	4.5	0.8	1.9	1.2	3.6	3.2	35.6	819
6-9	4.2	28.1	30.8	88.6	45.0	11.8	17.4	19.9	18.7	42.0	94.0	594
NONBREASTFEEDING CHILDREN												
12-15	(3.8)	(49.0)	(36.1)	(97.9)	(70.2)	(22.3)	(22.7)	(47.8)	(23.2)	(67.4)	(97.9)	49
16-19	4.7	38.3	39.9	95.1	72.0	19.0	24.0	40.2	16.8	67.4	97.8	92
20-23	5.3	33.6	38.3	94.9	76.0	20.9	26.6	41.4	25.2	73.2	98.4	215
24-35	3.2	28.4	37.8	96.2	79.2	25.1	32.4	35.0	35.7	74.2	98.4	930

Note: Breastfeeding status and food consumed refer to a "24-hour" period (yesterday and last night). Figures in parentheses are based on 25-49 unweighted cases.

¹ Does not include plain water

² Includes fruits and vegetables rich in vitamin A

³ Includes pumpkin, red or yellow yams or squash, carrots, red sweet potatoes, green leafy vegetables, mangoes, papayas, and other locally grown fruits and vegetables that are rich in vitamin A

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 (Fig.6). Gender issues are now considered a cross-cutting theme within all development projects.

Figure 6: UN Conferences on Gender Equality

Box 1.1: 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 UN Conference on Human Settlements (Habitat II), Istanbul
1994	Global Conference on the Sustainable Development of Small Island Development States (DIDS), Barbados	1997	World 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. 3.

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, 2001, 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. “On the mainland, about four in ten urban households have just one room for sleeping, compared with about one-quarter of rural mainland households” (NPC, 2001, 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, 2001, p. 21) Installation of cement floors greatly reduces exposure to disease-causing agents, but nearly three quarters of all Tanzanian households still have earth or sand floors (NPC, 2001).

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, 2001). 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, 2001).

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 7: Household Possessions

Type of possession	Residence				
	Mainland			Zanzibar	Total
	Urban	Rural	Total		
Household effects					
Radio	75.5	51.6	57.8	80.4	58.4
Television	19.9	0.7	5.7	20.1	6.1
Telephone	27.5	2.3	8.9	23.2	9.3
Refrigerator	12.5	0.3	3.5	14.7	3.8
Paraffin lamp	63.0	30.3	38.9	45.3	39.0
Iron	45.6	14.7	22.8	26.3	22.9
Means of transport					
Bicycle	26.6	41.9	37.9	53.4	38.3
Motorcycle	1.9	0.5	0.9	8.7	1.1
Car/truck	4.6	0.5	1.6	2.0	1.6
Ownership of agricultural land	42.0	93.0	79.6	48.4	78.8
Number of households	2,492	6,990	9,483	252	9,735

The 2004-2005 TDHS gathered important data related to household food security. Survey responses show that meat consumption is not common in Tanzania, with half of the households reporting that they had not consumed meat in the previous week. When

asked how often they have problems in meeting the food needs of the household, eighteen percent of households reported often having a problem and an additional 19 percent reported sometimes having a problem (NPC, 2001).

Figure 8: Household Food Security

Food security characteristic	Residence				
	Mainland			Zanzibar	Total
	Urban	Rural	Total		
Usual number of meals per day					
1 meal	1.2	2.2	1.9	0.6	1.9
2 meals	17.9	39.7	34.0	32.9	33.9
3+ meals	80.8	58.0	64.0	66.5	64.1
Total	100.0	100.0	100.0	100.0	100.0
Number of days consumed meat in past week					
0	32.4	56.2	50.0	65.0	50.3
1	20.2	20.5	20.4	18.4	20.4
2	21.9	13.7	15.8	10.2	15.7
3	12.2	6.1	7.7	3.2	7.6
4	4.9	1.8	2.6	1.5	2.5
5	1.7	0.5	0.8	0.4	0.8
6	0.9	0.3	0.5	0.2	0.5
7	5.7	0.5	1.9	0.8	1.9
Total	100.0	100.0	100.0	100.0	100.0
Frequency of problems satisfying food needs in past year					
Never	54.7	36.8	41.5	62.7	42.1
Seldom	15.0	17.4	16.7	13.1	16.6
Sometimes	14.6	20.5	19.0	13.9	18.8
Often	13.4	19.9	18.2	9.8	18.0
Always	2.3	5.2	4.4	0.5	4.3
Total	100.0	100.0	100.0	100.0	100.0
Number of households	2,492	6,990	9,483	252	9,735

Note: Totals may not add to 100 because of a small number of missing cases.

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, 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, 2001). 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, 2001). 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 women are employed, however 62 percent are not receiving compensation for their efforts. Recent programmes aimed at helping women become self-employed are slowly changing this dynamic; and increasingly putting women in control of income and assets. Figure 8 displays the employment of women by type. The data shows that the vast majority of women are employed in the agricultural sector by family members, and are not compensated.

Figure 9: Women's Employment by Type

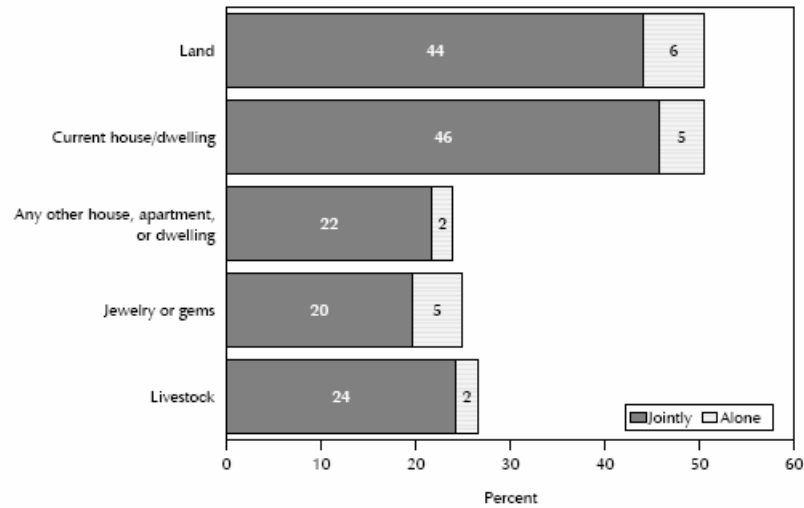
Percent distribution of women employed in the 12 months preceding the survey by type of earnings, type of employer, and continuity of employment, according to type of employment (agricultural or nonagricultural), Tanzania 2004-05			
Employment characteristics	Agricultural work	Nonagricultural work	Total
Type of earnings			
Cash only	5.5	91.3	24.0
Cash and in-kind	7.9	1.4	6.5
In-kind only	8.8	0.4	6.9
Not paid	77.8	6.9	62.5
Total	100.0	100.0	100.0
Type of employer			
Employed by family member	91.9	28.2	78.1
Employed by non-family member	0.6	29.8	7.0
Self-employed	7.5	42.0	14.9
Total	100.0	100.0	100.0
Continuity of employment			
All year	14.4	70.7	26.7
Seasonal	82.5	17.0	68.2
Occasional	2.8	12.3	4.9
Total	100.0	100.0	100.0
Number of respondents	6,684	1,842	8,550

Note: Total includes 24 women (weighted) with missing information on type of employment who are not shown separately. Continuity of employment totals do not add to 100 percent because of a small number of missing cases.

In the 2004-2005 TDHS, one of the measures of women's status was control over assets and her 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 Tanzanian women reported that

“they alone or jointly own land or their current residence...However, even among those women with sole ownership of an asset, sizable minorities report that they could not sell the asset without permission” (NPC, 2001, p. 43-44).

Figure 10: Women's Ownership of Assets



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.

“The role women have in decision-making varies with the type of decision. A majority of currently married women participate in making decisions about what food to cook each day (79 percent) and on their own health (59 percent), but less so in making daily purchases and visits to family or relatives. Only one-third of women have a say in decision-making about large purchases, which largely remains the domain of husbands. Women in the “not married” category uniformly report having little in the way of decision-making power in any dimension, except with regard to their own health. This is likely a result of the fact that the majority of unmarried women are dependent girls living in their parents’ households who play no role in household decision-making.”

(NPC, 2005, p. 46)

Figure 11: Women's Decision Making

Percent distribution of women by person who has the final say in making specific decisions, according to current marital status and type of decision, Tanzania 2004-05

Decision	Currently married or living together						Not married ¹						
	Self only	Jointly with husband	Jointly with someone else	Husband only	Someone else only	Total	Number of women	Self only	Jointly with someone else	Someone else only	Decision not made/ not applicable	Total	Number of women
Own health care	42.8	16.3	0.3	38.5	2.1	100.0	6,950	43.3	6.5	48.6	1.6	100.0	3,379
Large household purchases	10.6	23.4	0.5	61.2	3.9	100.0	6,950	24.2	5.7	66.6	3.4	100.0	3,379
Daily household purchases	29.3	20.1	0.6	45.9	3.9	100.0	6,950	25.8	5.9	65.3	2.9	100.0	3,379
Visits to family or relatives	12.6	36.6	0.6	47.3	2.6	100.0	6,950	30.8	9.8	56.9	2.5	100.0	3,379
What food to cook each day	69.4	9.1	1.5	15.5	4.4	100.0	6,950	28.5	7.5	61.5	2.5	100.0	3,379

Note: Totals may not add to 100 percent because of a small number of missing cases.
¹ Never married, divorced, separated or widowed women

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 (UWO) 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 (UN, 2001),” struck a deep chord with members of the university community, and inspired a group of housing employees to lead the university’s response to a continent in crisis.

The goal of Western Heads East (WHE) was to establish a sustainable grass-roots probiotic project in Tanzania. The development phase of the project was initiated in 2003 and Western Heads East is now poised to enter a collaborative and multi-disciplinary research phase. The selected project site, Mwanza, Tanzania is the African site where AIDS first claimed lives. Additionally, Tanzania is defined by the Canadian International Development Agency as a high-need area.

The Western Heads East project is unique for a number of reasons. WHE combines elements of development, research, and community-health. It is the first international development project launched by the University of Western Ontario, 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 WHE project was conceived and initiated by Residence Staff 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 high profile of the project within the UWO community has resulted in significant student interest in possible internships. A diverse group of faculty are serving on the projects steering committee highlighting the multi-disciplinary nature of the project.

The Role of Probiotics

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 stools 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. Probiotics

represent a relatively simple and inexpensive method of alleviating diarrhoea, a condition that is prevalent in Sub-Saharan Africa and amongst HIV/AIDS patients. 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 et al., 2001a).

Studies indicate that probiotics may 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 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., 2005a; Reid and 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., 2005a; Martin et al., 1999; Sewankambo et al., 1997; Reid and Bocking, 2003a). Research shows that selected strains of lactobacilli are able to colonize the vagina, displacing the bacterial vaginosis pathogens (Reid et al., 2005a). The Western Heads East project is utilizing *L. rhamnosus* GR-1 and *L. fermentum* RC-14, probiotic strains developed by Canadian researcher and University of Western Ontario faculty member Dr. Gregor Reid. Both of these strains of lactobacillus are 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 and Bruce, 2001a). As bacterial vaginosis is prevalent among women in Africa, this project is particularly appropriate in the Tanzanian context (Reid et al., 2005a).

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. Investigation by the WHE team revealed that consumption of dairy products within the Mwanza region is extremely low, mainly due to financial constraints. 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 there is a long history of fermented foods in Africa, it is relatively easy to produce, helps with vitamin A deficiency 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 yogurts (beta-galactosidase) 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 both *L. rhamnosus* GR-1 and *L. fermentum* RC-14, are able to pass through the human gastrointestinal tract without being destroyed, and without inducing systematic immune or inflammatory responses.

Selecting a Project Planning and Reporting Framework

From the outset, the Western Heads East steering committee sought to bring a results-oriented focus to the project. As the majority of international donors have adopted Results-Based Management as a project planning and assessment tool, this seemed the logical choice for WHE.

Results-Based Management (RBM) is a management philosophy and method which emphasizes results in development planning, implementation, learning and reporting. It is an approach which stresses participation as an effective means of improving the quality, efficiency, and sustainability of development actions. RBM is a critical tool for involving all stakeholders in the planning of projects & programmes; implementation of projects; monitoring, reporting and managing results.

As an assessment tool, results-based management helps to clarify the purpose of the project and the expected results during the initial stages of development, while also seeking to capture changes that occur in the short, medium and long-term. Results-based management is 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, RBM fosters sound decision-making and enhances 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.

After careful consideration, CIDA's Results-Based Management project and programme framework was deemed ideally suited by the members of the steering committee, as it highlights Canada's six ODA priorities. The priorities include Basic Human Needs; Gender Equality; Infrastructure Services; Human Rights, Democracy and Good Governance; Private Sector Development and the Environment. In addition, the Canadian ODA policy framework includes gender equality and environment as cross-cutting themes that must be addressed in all development initiatives. CIDA guidelines stipulate that every project's intended results must take into account the following elements:

- The project or programme’s contribution to poverty reduction, along with gender equality and environmental issues must be fully considered at the design stage of any project or programme;
- Adequate preparatory analysis involves undertaking poverty assessments, gender analysis and environmental impact assessments. Such analyses can provide a more holistic picture of the context in which the project is implemented and influence the type of strategies that can best contribute to reducing poverty, while appropriately addressing gender equality issues and ensuring sound environmental practices.

Specific to the Western Heads East Yoghurt Project, results-based management has assisted with the planning, design, and implementation phases, while measurement and reporting will be enhanced by:

- use of an internationally-recognized planning and reporting framework
- clearly identifying expectations
- ensuring goals are commonly-held among stakeholders
- differentiating short-term from long-term goals
- activities being aligned with intended results
- measuring actual vs. intended results at the output, outcome and impact levels
- allowing unintended results to be more easily identified/corrected
- maintaining a results-based focus throughout the life-cycle of the project;
- a participatory approach that ensures buy-in, commitment and a common understanding of what the project or programme is trying to achieve

Measuring and reporting results will increase participation and accountability of all the key stakeholders and strengthen stakeholders’ communication. Additionally, adopting an RBM framework will build credibility with grantors.

Selecting a Gender Analysis Framework

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)

From among several international gender analysis tools, the FAO framework developed by Dr. Arja Vainio-Mattila was selected. Dr. Vainio-Mattila, currently the chair of the International and Comparative Studies programme at Huron University College at the University of Western Ontario, is an internationally recognized expert in participatory development strategies and research. 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).



Photo 1: Members of Tukwamuane Women's Group



Photo 2: Making Yoghurt at the Community Kitchen in Mabatini

JIKOLA



JAMMI.



Kabébumé



MAZIWA "Fiti"




MAZIWA
KABÉBUMÉ
LIMBOURNE

Photo 3: Exterior Sign on the Community Kitchen, advertising 'Fiti' Yoghurt

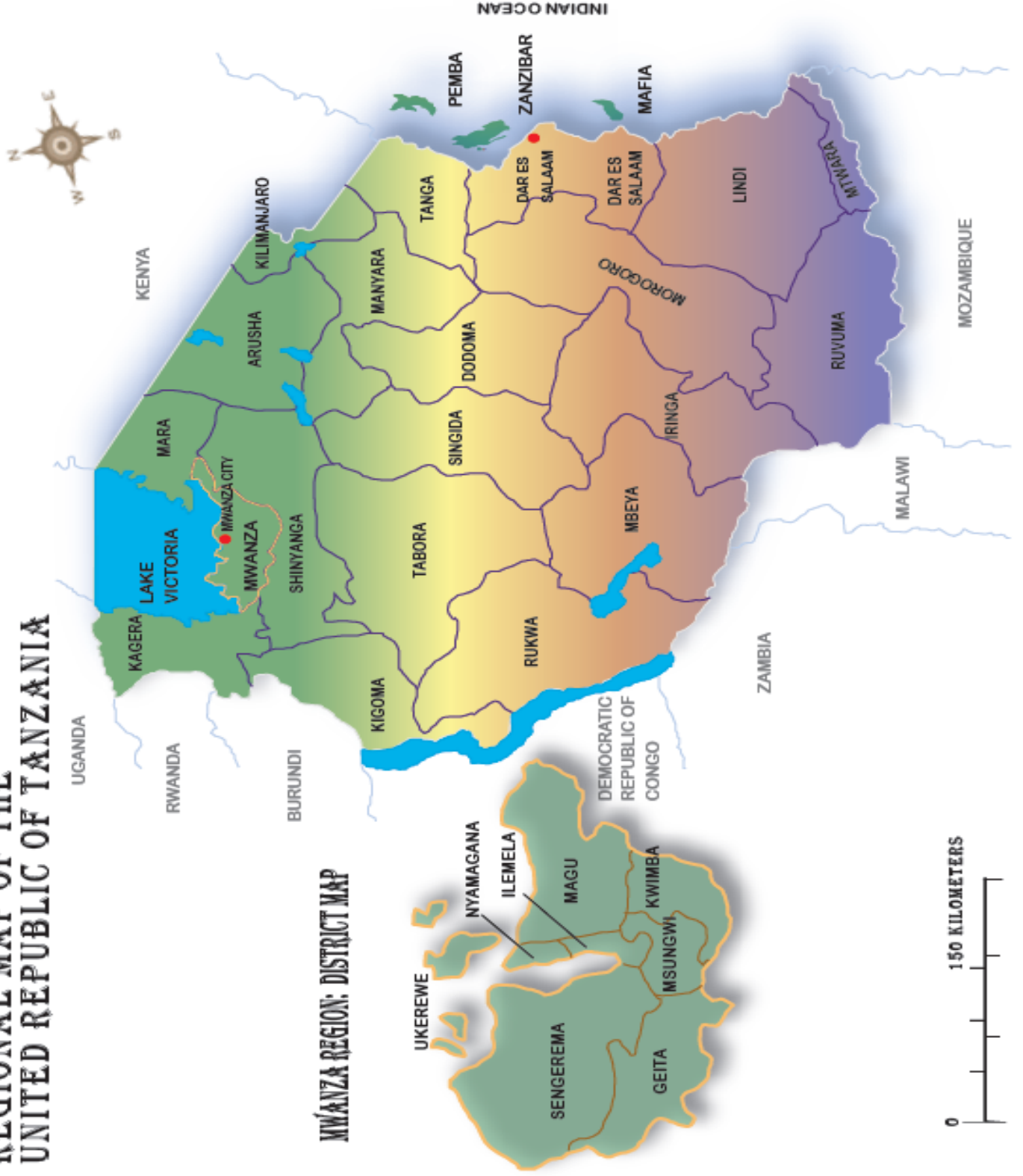


Photo 4: Interior mural at the Community Kitchen, depicting a Tanzanian family consuming yoghurt



Photo 5: Tanzania's Future Hope

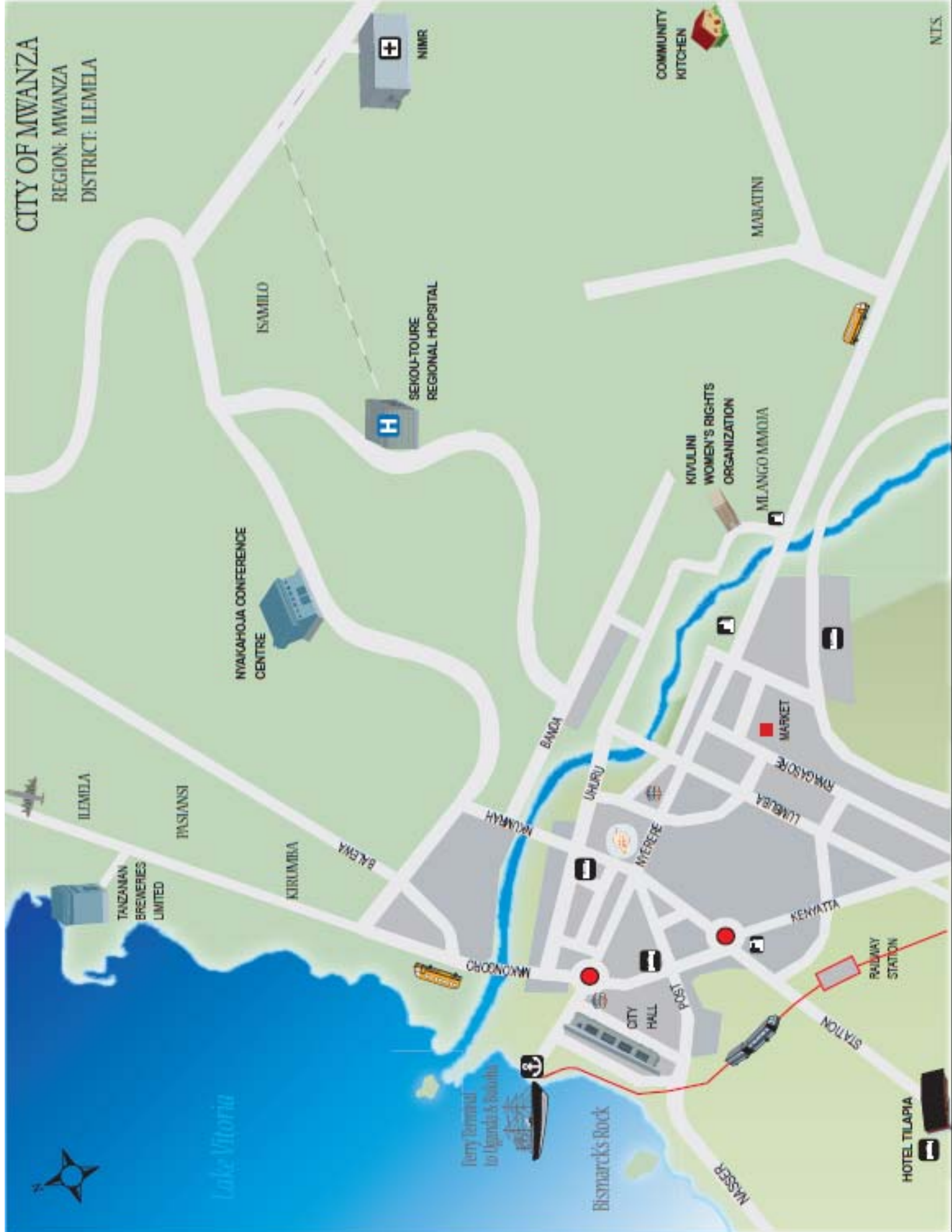
REGIONAL MAP OF THE UNITED REPUBLIC OF TANZANIA



MWANZA REGION: DISTRICT MAP



CITY OF MWANZA
REGION: MWANZA
DISTRICT: ILEMELA



Lake Victoria

Ferry Terminal
to Uganda & Rwanda

Bismarck's Rock

NTS


Western Heads East: Results-Based Management Project Document


Programme Project Title: Western Heads East	Project Budget:	Project Duration:
<p>Purpose: <i>(Short-term “statements of intent” or purpose to be achieved within the life of a specific project or period of a specific programme. Linked to programme or project outcome results.)</i></p> <ul style="list-style-type: none"> ▪ To establish a sustainable, grass-roots probiotic food-based development project to improve nutrition and potentially help alleviate suffering from HIV/AIDS. ▪ To conduct research on the use of probiotics to combat morbidity and mortality in at risk populations in urban and rural areas. ▪ Increase the knowledge of probiotics amongst Tanzania physicians, clinicians and public health officials. 	<p>Goals: <i>(Broad, long-term strategic “statements of intent” of the programme or project. Linked to the impact results.)</i></p> <ul style="list-style-type: none"> ▪ 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. 	

<p>Activities: (The contribution, technical assistance, training and other project related actions organized and executed by project personnel. Tip: Answer the question “how” will we achieve the expected results of the programme or project? A result is a describable or measurable change of state that is derived from a cause and effect relationship; at the output, outcome and impact level.)</p>	<p>Outputs or Short Term Results (Expected outputs are the immediate, visible, concrete, tangible and logical consequences of a programme or project inputs and activities.)</p>	<p>Outcomes or Medium Term Results (Expected outcomes are the short-term effect of the programme or project which are linked to purposes. Corresponds to developmental results that are the logical consequence of achieving a combination of outputs. This is generally the level where the beneficiaries or end-users take ownership of the project and CIDA funding comes to an end. Tip: Results at the outcome level should answer the question “what” is the observable, measurable change occurring in the programme or project?)</p>	<p>Impacts or Long Term Results (The broader, higher-level, long-term effect or consequences linked to the goals or vision of the programme or project. Impact results are developmental results at the societal level that are the logical consequences of a combination of outcomes. Tip: Answer the question “why” are we doing this programme or project?)</p>
<ul style="list-style-type: none"> ▪ Identify twelve women (four each from three different community action groups) that are interested in learning how to produce yoghurt. ▪ Develop educational and training materials for use during yoghurt production. ▪ Purchase equipment and supplies necessary to produce yoghurt. ▪ Arrange for the delivery of 	<ul style="list-style-type: none"> ▪ Yoghurt production operational in Kivulini facility. ▪ Twelve women acquire the skills to produce yoghurt. ▪ Yoghurt production operational at community kitchen in Mabatini. ▪ PLWA’s living in the district of Mwanza have regular access to free probiotic yoghurt. 	<ul style="list-style-type: none"> ▪ The yoghurt mama’s produce yoghurt independently without external input. ▪ Physicians acknowledge the effectiveness of probiotics, and begin to implement probiotics as part of their treatment regimens. ▪ Twelve women acquire the skills to operate a small business selling yoghurt. ▪ Expand the project into 	<ul style="list-style-type: none"> ▪ Re-introduce fortified fermented food products, in Tanzania. ▪ Introduce probiotics in order alleviate suffering from diarrhoea, and other conditions associated with HIV/AIDS. ▪ Create an environment whereby the government and public health officials will support regional initiatives to make probiotic yoghurt available.

<p>milk daily</p> <ul style="list-style-type: none"> ▪ Train the group of twelve women in yoghurt production. ▪ Culture probiotic bacteria weekly. ▪ Test for spoilage bacteria and the proliferation of GR-1 in the yoghurt. ▪ Renovate the community kitchen in preparation for transferring the yoghurt production to Mabatini. ▪ Develop and administer sustainability questionnaire. ▪ Assess the readiness of other communities for expansion of the project. ▪ Develop and administer a Food Frequency Questionnaire which includes a nutritional analysis. ▪ Perform a Gender Analysis 	<ul style="list-style-type: none"> ▪ Small clientele base which purchases non-probiotic yoghurt from the community kitchen. ▪ Families of yoghurt mamas consume probiotic yoghurt. ▪ Second access point established to distribute probiotic yoghurt. 	<p>other areas of Tanzania</p> <ul style="list-style-type: none"> ▪ Increase the degree of awareness of the benefits of probiotic yoghurt. ▪ Increase the degree of awareness of the nutritional properties and importance of yoghurt. ▪ Improved nutrient and vitamin intake for 46 children, 24 PLWA's, for 10 of women, and 10 men. ▪ Improved capacity of yoghurt mamas to carry out training sessions to expand the project into other communities. ▪ Increase the level of yoghurt production. 	<ul style="list-style-type: none"> ▪ 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. ▪ Increase the level of participation of women in enterprise management, employment and income from yoghurt activities.
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<ul style="list-style-type: none"> ▪ Perform a Health Impact Assessment on HIV/AIDS patients who are not receiving ARV's, but who are consuming probiotic yoghurt. ▪ Acquire electricity for community kitchen. ▪ Obtain land and construct a cow shelter. ▪ Training in cow husbandry. ▪ Purchase cows. ▪ A research protocol to investigate the benefits of probiotics is approved by the National Ethics Board in Dar es Salaam. ▪ Local approval is obtained from the District Commissioner to conduct informational seminars/workshops on the efficacy of probiotics. 			
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<p>Performance Indicators: <i>(Specific performance measures chosen because they provide valid, useful, practical, and comparable measures of progress toward achieving expected results. They can be quantitative: measures of quantity, including statistical statements and/or qualitative: judgements and perceptions derived from subjective analysis.)</i></p> 	<ul style="list-style-type: none"> ▪ Average number of days yoghurt is produced in a month at Kivulini. ▪ Interns observe yoghurt production procedure and ensure that the correct process is being utilized. ▪ Average number of days per month yoghurt is produced in community kitchen in Mabatini. ▪ Average number of days per month sufficient amount of probiotic yoghurt is available to meet demand of PLWA's. ▪ 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 	<ul style="list-style-type: none"> ▪ A local project supervisor familiar with yoghurt production procedures assesses the processes. ▪ An external/independent reviewer examines the degree of financial sustainability. ▪ The number of physicians who implement pro-biotics as part of their treatment regimens. ▪ Conduct a Community Readiness Survey. ▪ The number of communities which begin to produce the project. ▪ The number of workshops/seminars which are conducted regarding the benefits of probiotic yoghurt with community leaders, religious leaders and regional leaders. ▪ Quantitative analysis, using 	<ul style="list-style-type: none"> ▪ Number of access points which probiotic yoghurt may be purchased. ▪ The government is willing to provide financial assistance to enable the operation of local yoghurt projects, the culturing of probiotics, and sponsor research initiatives. ▪ 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. ▪ Number of yoghurt projects in which women are primary or co-stakeholders.
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	<p>access point.</p>	<p>the Food Frequency Questionnaire and 3-Day Food Intake Record.</p> <ul style="list-style-type: none"> ▪ Yoghurt Mamas demonstrate their ability to the local project supervisor that they are capable of conducting training sessions on yoghurt production. ▪ Average number or litres produced per month, as compared to the previous month's production. 	
<p>Reach: <i>(For "whom" will the programme or project make a difference? The users, participants and direct beneficiaries – at the outcome level – or main clients of the programme or project in terms of scope including WID/GE targets when appropriate. Can also include key stakeholders and delivery agents.)</i></p> 	<ul style="list-style-type: none"> ▪ Yoghurt Mamas ▪ The families of the Yoghurt Mamas ▪ PLWA's ▪ NIMR ▪ UWO Student Interns ▪ Independent Researchers ▪ Kivulini 	<ul style="list-style-type: none"> ▪ Doctors ▪ Community leaders/Religious Leaders/Regional Leaders ▪ Local communities ▪ Community Action Groups ▪ PLWA's ▪ Women and girls ▪ UWO faculty and students 	<ul style="list-style-type: none"> ▪ Citizens who consume yoghurt. ▪ PLWA's ▪ Government and Public Health Officials ▪ Ministry of Health ▪ Women and girls ▪ Interns ▪ Independent Researchers

	<ul style="list-style-type: none"> ▪ Local project co-ordinator ▪ Citizens who consume yoghurt. 	<ul style="list-style-type: none"> ▪ Citizens who consume yoghurt. 	<ul style="list-style-type: none"> ▪ NIMR ▪ Kivulini ▪ UWO ▪ Indirect Beneficiaries: <ul style="list-style-type: none"> -UWO Student body (increased awareness of HIV/AIDS) -Community awareness of HIV/AIDS and probiotics.
<p>Risks and Assumptions: <i>(The probability that a critical assumption required to attain the expected results is not met. Should be in direct link to the programme or project and include both internal and external risks.)</i></p>	<ul style="list-style-type: none"> ▪ Goals and expectations may not be commonly held among the key stakeholders. 	<ul style="list-style-type: none"> ▪ Funding is withdrawn. ▪ Motivation and interest is lost within key stakeholder groups. ▪ Research results do 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 	<ul style="list-style-type: none"> ▪ Funding for expansion is denied. ▪ Research and project outcomes do not demonstrate that yoghurt projects are viable and sustainable. ▪ Strain on resources and human capacity deemed to outweigh benefits. ▪ Lack of funding from national and international organizations.

		<p>control particularly for mass consumption.</p> <ul style="list-style-type: none">▪ Socio-cultural circumstances jeopardize the participation of women in local yoghurt production.▪ Fermented foods may not be popular amongst the larger populace.	
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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 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 programmes to combat HIV/AIDS ➤ 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

Yoghurt Sales	F	daily
Recording income and expenses	F	weekly/monthly
Banking	F	occasional
Procurement of 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	??
➤ Training			
-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	Social Empowerment Management Structure Future Access to Funding Independence of Project Sustainability of Project Income Status Management of Resources

PROGRAMME ACTION PROFILE

PROGRAMME OBJECTIVES AND ACTIVITIES	GENDER CONSIDERATIONS	RECOMMENDATIONS FOR PROGRAMME ACTION
<p>Objective:</p> <ul style="list-style-type: none"> ➤ Establish a local, grass-roots project in Mwanza, Tanzania to re-introduce fermented food products, specifically probiotic yoghurt, to local population <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 with HIV/AIDS 	<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 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-making process during the

Activities:

- Assemble a multi-disciplinary research team
- Obtain Research Protocol Permits
- Obtain funding
- Obtain local permits/permission from District Commissioners

Objectives:

- Empowerment for women participating in the project

Activities:

- 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

Objectives:

- Improved nutrition of children, women and PLWA's

Activities:

- Provide yoghurt at low or no cost to PLWA's

- 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

- Women's lower socio-economic status

life cycle of the project

- Opportunities for knowledge transfer between the various yoghurt groups be fostered
- Collaboration between the various groups be encouraged

- 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

Objectives:

- Expand project to other communities

Activities:

- Identify interested communities, and community action groups
- Conduct community readiness survey
- Obtain funding, and resources in order to replicate earlier project

- 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

- 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

OUTCOMES

Several preliminary studies were performed in the summer of 2006 in order to provide institutional stakeholders with a measure of project outcomes to date. As Western Heads East is poised to enter a collaborative and multi-disciplinary research phase, these studies will provide researchers with baseline data and provide guideposts indicating fruitful areas for further study.

A Rapid Health Impact Assessment was conducted to measure the efficacy of probiotic yoghurt in treating diarrhoea and other side effects of HIV/AIDS. As a number of socio-economic factors affect health, the researcher gathered extensive data on a wide range of other socio-economic indicators, preventative health practices, primary health measures, and social and cultural barriers to health.

Economic empowerment is a primary goal of the project participants, members of the Tukwamunae women's group. Before giving consideration to replicating or expanding the project it is necessary to determine whether this objective is being met and to study the relationship between economic gains and health improvements. Thus, a case study was designed to measure the economic impacts of the project to date.

A Community Readiness Assessment was then conducted to assess the ability of selected communities to take on the project and the degree of assistance which would potentially be required to replicate and expand into other areas in the Mwanza Region.

RAPID HEALTH IMPACT ASSESSMENT

BACKGROUND

How do Probiotics Work?

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 humans 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 and 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* strains GR-1 and RC-14 can function in the gut, survive passage, and be excreted in feces (Gardiner et al., 2002; Morelli 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 et al., 1987), and also to give a nonspecific boost to immunity (Perdigon et al., 1995). Current thinking suggests that probiotics have other functions, including producing anti-infectives, such as hydrogen peroxide and bacteriocins (Ocana et al., 2004); cell signals that strengthen host-cell mucus barriers against pathogen invasion (Mack et al., 2003); and other signals that prevent virulent factors, such as toxins, from being released (Reid and Hammond 2005).

Probiotics: Mechanisms of Action

There is still a great deal of controversy as to how probiotics work, however key mechanisms have been identified as being important to the function of probiotics within the body, these include:

Adherence and colonisation of the gut

It has been shown that probiotics have the ability to adhere to intestinal cells and colonize the gut. This desirable quality is the first key step which enables the modification of the host immune system (Fuller, 1989; Salminen and Isolauri, 1996). Studies have indicated that numerous probiotics are capable of strongly adhering to human cell lines, including *Lactobacillus casei* GG, *Lactobacillus acidophilus* LA1, *Lactobacillus plantarum* and a variety of *Bifidobacteria*. These studies have also demonstrated the ability of probiotic organisms to inhibit adherence and colonization by pathogenic organisms such as enteropathogenic *Escheria coli* and *Salmonella typhimurium* (Bernet et al., 1994; Saxelin, 1997; Johansson et al., 1993). Likewise, *Lactobacillus plantarum* 299v has been shown to express a mannose-specific adhesin which it uses to adhere to human colonic cells (Alderberth et al., 1996).

Competition for nutrients and production of antimicrobial substances

Additional studies have demonstrated the ability of certain probiotic strains to inhibit pathogenic organisms both in-vitro and in the gut. Such probiotic strains inhibit pathogenic organisms by competing for the limited substrates required for fermentation and by secreting antimicrobial products called bacteriocins (Bernet et al., 1994). A specific strain exhibiting these characteristics is *Lactobacillus acidophilus*, the strain has demonstrated an ability to produce several compounds, bacteriocin lactacin B and Acidolin. Lactacin B was shown to inhibit the function of other *Lactobacilli* in-vitro, and Acidolin inhibited enteropathogenic organisms which can cause severe illness (Barefoot and Klaenhammer, 1994; Zamfir et al., 1999). Other bacteria with similar activity profiles, such as *Lactobacillus GG*, have also to be involved in the production of inhibitory substances (Silva et al., 1987).

Stimulation of mucosal and systemic host immunity

The immune system is part of the host's mechanism to prevent against pathogenic forces from outside of the body (Gibson, 2005). CD4 cells are a component of the white blood cell and are known as helper cells; they play an important role in maintaining the integrity of the immune system (WHO, 2005a; WHO, 2005b); they are the primary target of HIV and are preferentially depleted during the course of disease (Anukam et al., 2006; Cunningham-Rundles et al., 2000).

The strains *Lactobacillus rhamnosus* GR-1 and *Lactobacillus reuteri* RC-14 have a proven efficacy to treat and protect against many gastrointestinal and urogenital infections (Hekmat and Reid, 2006). Moreover, treating and preventing opportunistic infections can reduce the decline of CD4 T-lymphocytes in patients with HIV (Meydani and Ha, 2000). People with HIV often have diarrhoeal episodes and consequently experience malabsorption of certain nutrients (McGhee et al., 1992). A study Cunningham *et al.* found that certain probiotic strains have a positive impact on CD4 lymphocytes in children who are HIV-seropositive. Dairy products such as yogurt are suitable vehicles for these beneficial microorganisms (Link-Amster et al., 1994).

Substantial evidence has been accumulated from animal studies that probiotic organisms can modulate systemic and mucosal immune systems (Arunachalam et al., 2000). It is believed that host immunity is stimulated by the ability of microorganisms to

adhere to the intestinal cells and interact with the gut-associated lymphoid tissue (GALT) (Kalia et al., 1992). Evidence indicating the effects of immunomodulation in human clinical trials is increasing. A study conducted by Link-Amster concluded that there was an enhancement of the hormonal immune response in 16 volunteers after being exposed to the *Salmonella typhi* Ty21a vaccine (Oberhelman et al., 1999). The volunteers were recruited and given fermented milk supplemented with *Lactobacillus acidophilus*, *Bifidobacterium Bb12* and *Streptococcus thermophilus* for three weeks. During this time they ingested attenuated *Salmonella typhi* Ty21a vaccine. He found that the specific serum immunoglobulin (IgA) titre rise was significantly higher than in the control group, indicating that there was an enhancement of the humoral immune response (Guandalini et al., 2000). Additionally, Arunachalam et al., demonstrated stimulation of the innate immune system in 13 healthy subjects administered *Bifidobacterium lactis*. Their phagocytic cell capacity was significantly enhanced as compared to the 12 participants in the control group (Shornikova et al., 1997). In similar trials, the immune system was found to be stimulated in response to rotavirus infection (Huang et al., 2002). Kaila et al. (1992) recruited 39 children with acute rotavirus diarrhoea. The participants were randomly assigned to receive either a *Lactobacillus GG* or a placebo milk product. The results indicate that there was an increase in immunoglobulin (IgA) specific antibody secreting cell response to the rotavirus in the probiotic group, which is associated with a reduction in diarrhoea (Saavedra et al., 1994). In conclusion, probiotics seem to be able to modulate various aspects of the host immune system, but whether this will confer any health benefit to the host, in terms of resisting or treating disease, remains to be determined.

CLINICAL APPLICATIONS OF PROBIOTICS TO TREAT DISEASE

<p>Diarrhoea</p>	<p>There is a significant and growing body of evidence indicating that probiotics are effective in both reducing the risk of diarrhoea and reducing the severity and duration of diarrhoea episodes. A study by Oberhelman et al. (1999) generated level I evidence demonstrating the efficacy of probiotics in reducing the risk of diarrhoea in children. Two hundred and four undernourished children 6 to 24 months old in Peru were given <i>L. rhamnosus</i> GG once-daily, 6 days a week, for 15 months, resulting in significantly fewer episodes of diarrhoea per child per year (5.21 in the treatment group compared with 6.02 in the placebo group, P = .028) (Guarino et al., 1997).</p> <p>Level I evidence also exists for probiotic treatment of diarrhoea. Guandalini et al. (2000) conducted a study of 140 children aged 1 to 3 months. After 4 to 6 hours of oral rehydration, the subjects were randomized to receive milk with placebo or with <i>L. rhamnosus</i> GG. Those children receiving the probiotics had shorter bouts of diarrhoea ; duration of diarrhoea episode was reduced from a mean of 3 days to 2.4 days (P = .03) (Guandalini et al., 2000). In another randomized, placebo-controlled study of 40 patients age 6 months to 3 years, with acute diarrhoea (75% rotavirus), treatment with <i>L. reuteri</i> DSM 12246 for up to 5 days resulted in reduced duration of watery stools (1.6 days in the treatment group compared with 2.9 days in the placebo group, P = .07) (DuPont and Ericsson, 1993). In 2002, Huang et al. conducted a meta-analysis of 18 eligible studies, which revealed that the provision of probiotics in conjunction with standard rehydration therapy reduced duration of acute diarrhoea by approximately 1 day (random-effects pooled estimate -0.8 days [-1.1 to -0.6], P < .001) (Impallomeni et al., 1995).</p>
<p>1) Infantile Diarrhoea</p>	<p>Rotavirus is the most common cause of acute childhood diarrhoea worldwide and contributes significantly to infant mortality rates. Rotavirus is generally self-limiting, and supportive treatment generally entails the replacement of fluids and electrolytes. Probiotic therapy has been used to treat established rotaviral infections, to supplement rehydration therapies, and to prevent the disease. Saavedra et al. (1994) conducted a study 55 of infants, randomized to receive either <i>Bifidobacterium bifidum</i> and <i>Streptococcus thermophilus</i> in a milk formula or a placebo. Ten percent of the children in the probiotic group shed rotavirus in their stools, as compared with 39% of the control group. The overall rate of diarrhoea was also reduced in the treatment group (Barlett et al., 1980).</p>

	<p><i>Lactobacillus GG</i> has been shown effective in reducing the duration of diarrhoea in children. One hundred children suffering from acute were administered <i>Lactobacillus GG</i>, with a resultant reduction of three illness days (3 days as compared to 6 days for the control group) (Gotz et al., 1979). In a large, randomized, controlled, multicenter trial of children with diarrhoea, treatment with oral rehydration salts was compared to the same treatment regimen enhanced with <i>Lactobacillus GG</i>. There was a significant reduction in diarrhoea duration and decreased hospital stay in the probiotic group (Tankanow et al., 1980).</p>
2) Traveller's Diarrhoea	<p>Diarrhoea is common among travelers, with approximately 80% of bacterial infections being caused by enterotoxigenic <i>Escherichia coli</i>, <i>Shigella</i> species, <i>Campylobacter jejuni</i> and <i>Salmonella</i> (Vanderhoof et al., 1999). A wide variety of probiotics have been used as a treatment for, or as prophylaxis against, diarrhoea with mostly disappointing results. Without more conclusive results, it is difficult to advocate the use of probiotics in travelers diarrhoea at the present time.</p>
3) Antibiotic associated Diarrhoea	<p>The over-use of antibiotics has become a serious problem, and is often associated with gastrointestinal side-effects such as diarrhoea. Pseudomembranous colitis is a serious, occasionally fatal, complication of antibiotic therapy in which subjects experience profuse diarrhoea, toxemia and 'pseudomembrane' formation at sigmoidoscopy (Mimura et al., 2004). <i>Clostridium difficile</i> is well established as the cause of pseudomembranous colitis and treatment usually consists of oral vancomycin or metronidazole. Despite adequate treatment, clostridia-related diarrhoea can relapse in up to 25% of cases (Prantera et al., 2002). Numerous strains of lactobacilli have been tested in the treatment of antibiotic related and clostridial diarrhoea, with varying degrees of efficacy.</p> <p>An early study by Gotz (1979) demonstrated a reduction in ampicillin-induced diarrhoea in patients who received <i>Lactobacillus acidophilus</i> and <i>Lactobacillus bulgaricus</i> as compared with controls (Kim et al., 2003). A replication of the study in 1990 by Tankanow failed to demonstrate a significant variation between the study and control groups (Sen et al., 2002). More recently, a study of 188 children being treated with oral antibiotics for acute infectious disorders showed decreased stool frequency when <i>Lactobacillus GG</i> was added to the treatment regimen (O'Sullivan and O'Morain, 2003). Given the encouraging results with some probiotic strains and the disappointing results with others, further study is warranted to determine which strains of lactobacilli are most effective at treating antibiotic-related diarrhoea.</p>

<p>Inflammatory Bowel Syndrome</p>	<p>Canadian researchers at Seaford Pharma have generated level I evidence of the effectiveness of probiotics in ameliorating pouchitis and Crohn’s disease. The probiotic product, VSL#3, combines ten viable bacteria from eight strains in a dried sachet. In a randomized, placebo-controlled study, 36 patients with inflammation and infection in the rectal pouch, in whom remission was induced by 4 weeks of treatment with combined metronidazole and ciprofloxacin, were randomized to receive 6 g of VSL#3 or placebo once daily for 1 year or until relapse. Seventeen patients (85%) taking VSL#3 were still in remission 1 year later, as was one patient (6%) taking placebo (P < .0001). The inflammatory bowel disease questionnaire score remained high in the VSL#3 group (P = .3), but decreased in the placebo group (P = .0005) (Sewankambo et al., 1997).</p> <p>Not all strains of lactobacilli have proven effective in the treatment of inflammatory bowel disease. A 45-patient study utilizing <i>L. rhamnosus</i> GG failed to show that this probiotic prevented endoscopically observed recurrence of Crohn’s disease or reduced severity of recurrent lesions (Schwebke, 2005). Evidence is also lacking for the efficacy of probiotics for irritable bowel syndrome (IBS). Twice-daily use of VSL#3 was not particularly effective in one study of gastrointestinal transit and symptoms (Gardiner et al., 2002). <i>Lactobacillus plantarum</i> 299V was not shown to be effective in a double-blind, placebo-controlled, cross-over, 4-week trial in 12 previously untreated patients with IBS (Reid, et al., 2001b), nor was <i>L. rhamnosus</i> GG in another study of 25 patients (Morelli, et al., 2004). The role of microbiological therapy in inflammatory bowel disease is at an early stage. Current evidence suggests that probiotics may have a role in the management of patients with IBD. More research is required to elucidate the true role of these substances in clinical practice.</p>
<p>Bacterial Vaginosis</p>	<p>The probiotic strain present in the ‘Fiti’, has been shown to reach the vagina after oral intake and alleviate bacterial vaginosis (BV), a condition that has been shown to double the risk of women acquiring HIV (Reid, et al., 2001c; Anukam, et al., 2006). There is no documentation of any other probiotic strain or yogurt which has been able to achieve this, and strains found in yoghurt are unable to colonize. The evidence comes from several studies which prove that this probiotic strain passes through the intestine after consumption in milk (Frick et al., 1987), reaches the vagina (Kawase, et al., 2000; Bukowska, et al., 1998), and can cure BV on its own (Krieger, 2002; Morelli, et al., 2004).</p>
<p>Probiotics and lipid modulation</p>	<p>Ischaemic heart disease is a major cause of morbidity and mortality in Western populations, and is also on the rise amongst the affluent in developing countries, and is associated with elevated cholesterol levels.</p>

	<p>Enormous amounts of money are spent annually on the multitudes of pharmaceuticals claiming to lower lipid levels which are used as a primary prevention, often times in conjunction with dietary adjustments to reduce the incidence and mortality of ischaemic heart disease (Reid, et al., 1994).</p> <p>More recently a wide range of probiotic products have been used in clinical trials of serum lipid modulation. Despite the mixed results, probiotics appear to be promising in having a positive effect on lipid levels. A trial published by Kawase et al. (2000), has demonstrated a significant reduction in the atherogenic index in 10 healthy volunteers, who were administered <i>Lactobacillus casei</i> and <i>Streptococcus thermophilus</i> fermented milk for a period of eight weeks (Reid, et al., 1995). In 1997, Bukowska et al., administered <i>Lactobacillus plantarum</i> 299v, in an oat and fruit drink medium (Proviva™), to 15 men with moderately elevated cholesterol, and the control group received a placebo fruit drink. A fall in cholesterol levels was demonstrated at six weeks in the probiotic group, but cholesterol levels were higher in the test group than the placebo group at onset of the trial (Reid, et al., 2003). There was also a significant reduction in fibrinogen levels in the test group, an independent risk factor for cardiovascular disease (Brumfitt and Hamilton-Miller, 1998).</p>
<p>Urogenital Infections</p>	<p>Orally administered lactobacilli reach the vagina via the anus and the perineal and vulval skin, as do pathogens, irrespective of hygiene (Brumfitt, et al., 1983). There is level I evidence demonstrating the effectiveness several strains of lactobacilli in treating urogenital infections. <i>L. rhamnosus</i> GR-1 and <i>L. reuteri</i> B-54 and RC-14 have been shown effective in restoring vaginal lactobacilli and reducing infections in more than 50% of women after daily oral use and in 79% of women after once-weekly vaginal use (Brumfitt, et al., 1992; Reid, et al., 2001b). Results of 25 women's once-weekly vaginal use of <i>L. rhamnosus</i> GR-1 and <i>L. fermentum</i> B-5433 compare favourably with results from various daily antibiotic regimens and twice-daily vaginal washes for breakthrough urinary tract infections (UTI) (Reid, et al., 1995; Krieger, 2002). Growing resistance to certain antibiotics and incidence of adverse effects from their over-use suggest that further study on the use of probiotics to prevent UTIs is warranted.</p>

SCOPE

What is a Health Impact Assessment?

Generally, health impacts are considered to be the overall effects, direct or indirect, of a programme, project or policy strategy on the health of a population. This may include direct effects on the health of the members of the population and more indirect effects through intermediate factors that influence the determinants of the health of the population. The effects of such activities can have impacts which may be felt immediately, in the short term, or reverberate after a longer period.

A Health Impact Assessment (HIA) is a combination of procedures, methods and tools by which a policy, programme or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population. Health Impact Assessment is a broad concept that may be interpreted in different ways and have a wide range of different uses. Within the structure of the assessment there are common elements which provide a framework for common action. A number of specific usages exist, all of which imply an interest in the safeguarding and enhancement of human health and a concern that human activities and decisions, in the form of development projects, plans, programmes and policies can affect human health in both positive and negative ways.

Applications of a Health Impact Assessment

- ❖ Inclusion of human health in Environmental Impact Assessment
 - ❖ Risk assessment
 - ❖ Healthy public policy
 - ❖ Retrospective versus prospective assessment
 - ❖ Environmental health impact assessment
 - ❖ Social impact assessment
 - ❖ Environmental epidemiology
 - ❖ Retrospective evaluation of the effectiveness of medical interventions at community level
 - ❖ Strategic assessment
 - ❖ Hazard mapping
 - ❖ Health inequalities impact assessment
-

Source: <http://www.ihia.org.uk/abouthia.html>

The most effective way to administer a HIA is through a prospective activity, as the health impacts associated with the intervention(s) have not occurred at the time of assessment. Ideally, HIA should be applied *prospectively* (before policy, programme or project implementation) to ensure that steps are taken, at the planning stage, to maximise positive health impacts and to minimise the negative effects. In practice it is not always possible to do this so HIAs may also be carried out concurrently (during the implementation stage) or retrospectively (after it has finished) in order to inform the ongoing development of existing work.

Additionally, HIAs allow for further distinctions to be made between interventions where health changes are an explicit objective, such as a vaccination programme or in this case a probiotic yoghurt programme, and where health changes are not explicitly part of the objectives, such as an HIV/AIDS policy. Health Impact Assessments are tool for informing decisions on interventions both within the health sector, and externally taking into consideration a broad range of health impacts.

Health Impact Assessment - a new approach

A HIA is a tool which enables informed decisions to be made based on a valid assessment of an activity's health impacts, while simultaneously adding health awareness to policy making at every level. Based on the application of the results, public health can make informed decisions about population health. HIA aims to provide a practical framework for identifying health impacts and ways of addressing them, and is based on a number of key principles.

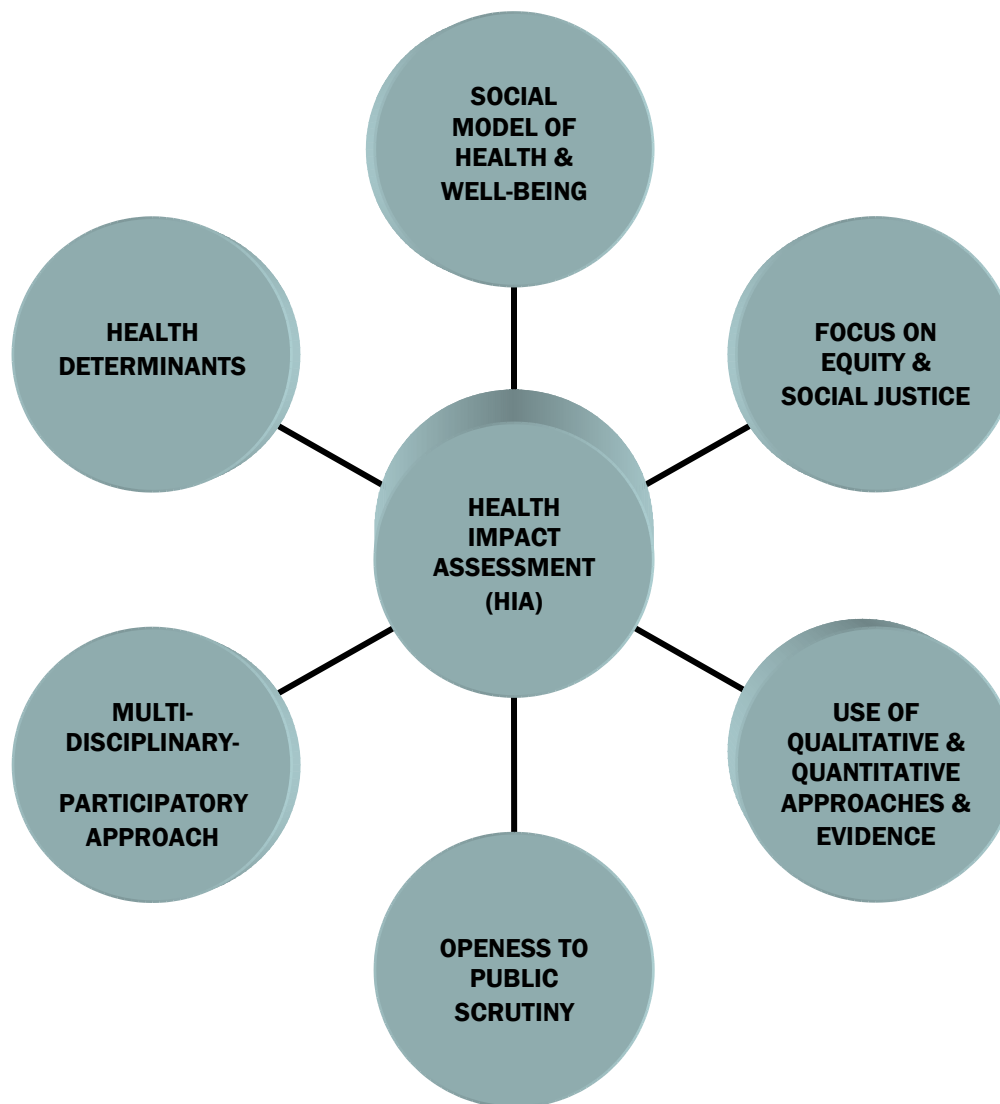
<i>Health Impact Assessment</i>	
Definition	❖ The estimation of the effects of a specified action on the health of define population.
Purpose	<ul style="list-style-type: none"> ❖ To asses the potential health impacts-posting and negative-of project, programmes, and policies. ❖ To improve the quality of public policy decision making through recommendations to enhance predicted positive health impacts and minimize negative ones
Key Principles of HIA	<ul style="list-style-type: none"> ❖ a social model of health and well-being ❖ an explicit focus on equity and social justice ❖ a multidisciplinary, participatory approach ❖ the use of qualitative as well as quantitative evidence ❖ explicit values and openness to public scrutiny

Source: <http://www.ihia.org.uk/abouthia.html>

Figure 1: Key Principles of a HIA

- biological factors, e.g. age, gender and ethnicity
- personal or family circumstances and lifestyles, e.g. education, income, employment, risk taking behaviour, diet, exercise, recreation and leisure
- the social environment, e.g. culture, social networks and community participation
- physical environment, e.g. air quality, housing, crime, civic design and transport
- public services, e.g. access to services and quality of services

HIA is based on a holistic, social model of health which recognises that the well-being of individuals and communities is determined by a wide range of economic, social and environmental influences as well as by heredity and health care



HIA is not the preserve of any one disciplinary group. Instead, it draws on the experience and expertise of a wide range of stakeholders, who are involved throughout the process. These may include professionals with knowledge relevant to the issues being addressed, key decision makers, relevant voluntary organisations and perhaps most importantly representatives of the communities whose lives will be affected by the policy.

HIA is also underpinned by an explicit value system focussing on equity and social justice. In this context, equity has a moral and ethical dimension resulting from avoidable and unjust differentials in health status:

- Equity is concerned with creating equal opportunities for health and with bringing health differentials down to the lowest possible level.

HIA involves an evaluation of the quantitative, scientific evidence where it exists but also recognizes the importance of more qualitative information. This may include the opinions, experience and expectations of those people most directly affected by public policies and tries to balance the various types of evidence.

To be consistent with the focus on equity, HIA also aims to be transparent and open to public scrutiny throughout.

METHODOLOGY

The recognized Health Impact Assessment framework developed by Scott-Samuel et al. (1998) was utilized in conjunction with an adapted Demographic and Health Survey Template as the diagnostic tool for this study. The assessment was designed to include both qualitative and quantitative data collection methods during the study phase of the initiative.

Information was gathered over the course of two months, between mid-July and mid-September. Despite this short study period, conducting a Rapid Health Impact Assessment was desirable for two reasons: in order to fully understand the preliminary impacts of the probiotic yoghurt 'Fiti' both on the health of community members, and because no baseline data was collected at the inception of the project.

HIV/AIDS patients seeking medical treatment at Sekou-Toure regional hospital during the end of June and the beginning of July were eligible for the study. The following inclusion criteria were applied to patients a) HIV-positive; and were b) between 15-49 years of age. The optimal participant mix would have been an equal distribution between the control and study groups, and an equal distribution by gender. Sixty patients were recruited to facilitate appropriate group allocations; however, as a result of attrition, 49 participants were enrolled and followed for the present study. Patients who met the inclusion criteria were randomly allocated to either Group 1 (probiotic yoghurt) or Group 2 (non-probiotic yoghurt) by the overseeing physician. Upon allocation, the participants were to follow up with registration at the point of yoghurt distribution.

At the point of registration consent was provided by the patient or, if the patient was unable to, by immediate family members. The Ethics Board at the University of Western Ontario approved the study protocol. Before their admittance into the study, written and oral informed consent were provided from all study participants or their relatives. The study was performed in accordance with International Conference on Harmonization Good Clinical Practice guidelines based on the Declaration of Helsinki.

Patients who met the inclusion criteria and provided consent were randomly assigned to one of the treatment groups (based on their assignment by the physician) to receive either 1) probiotic yoghurt; or 2) non-probiotic yoghurt. Each participant was given 250 ml of yoghurt, with Group 1 being administered with 'Fiti' yoghurt, containing the probiotic strain *Lactobacillus rhamnosus*, GR-1. Both treatments had identical sensory properties, and the probiotic treatment was tested weekly by the National Institute for Medical Research to ensure adequate bacterial counts of GR-1, and absence of pathogens. The participants were expected to consume the yoghurt in the presence of the researcher to ensure regimen adherence and the integrity of the product. The quality of the treatment would have been jeopardized if participants were permitted to leave with the treatment as they lack the resources to properly store the treatment in their homes, leaving the project liable if pathogens developed in the treatment due improper handling and food safety.

The study was designed to be a single-centre double-blind, placebo controlled trial. As a supplementary diagnostic tool, an illness schedule was provided to participants (upon registration), and were administered with the study treatment or placebo preparations. Administration of the illness schedule was used to identify and

record disease frequency throughout the 4 week study phase. Participants were to report, using hash marks the frequency of diarrhoea, unusual vaginal/penal discharge, skin conditions, and any other illnesses experienced during this period. The recruited participants were responsible to visit the distribution centre daily to obtain their treatment; this was to be followed for 30 days consecutively, six days a week. At which point they were scheduled for their interview, and responsible for returning their illness schedule.

On completion of the 4 week study cycle, participants were interviewed in person. For the quantitative aspect of the study, an examination of gathered survey information was conducted in order to ascertain whether the pro-biotic yoghurt has had a measurable affect on health. Using semi-structured interviews information for qualitative analysis was obtained. Participants were allowed to extrapolate on their health experiences.

ANALYSIS

The participants recruited for the project were from five districts and fifteen wards surrounding Mwanza city. A total of 49 respondents were followed through for the duration of the study, two-thirds of which resided in a town and one-third in rural villages.

The participants were almost equally divided between male and female, with 49% being male, and 51% being female. The mean age group was 35-39. The treatment group (Group 1) was comprised of 29 subjects, and Group 2 (control) was comprised of 20. Twenty percent of the entire sample was taking ARV's as compared to 80% who were not. Many of the participants who fell within this 80% were eligible to receive subsidized ARV treatment, however had chosen not to receive them due to a lack of resources and food. Their inability to increase their caloric intake prevented them from accessing ARV treatment even though their CD4 cell counts had dropped below 250 (level at which ARV administration begins). A total of 10 participants (5 in G1, and 5 in G2) were taking ARV's.

Number of Participants taking ARV's by Study Group

		Taking Anti Retroviral Drugs		Total
		Yes	No	
Study Group	Probiotic	5	29	29
	Non-Probiotic	5	20	20
Total		10	39	49

PARTICIPANT CHARACTERISTICS

Educational Attainment

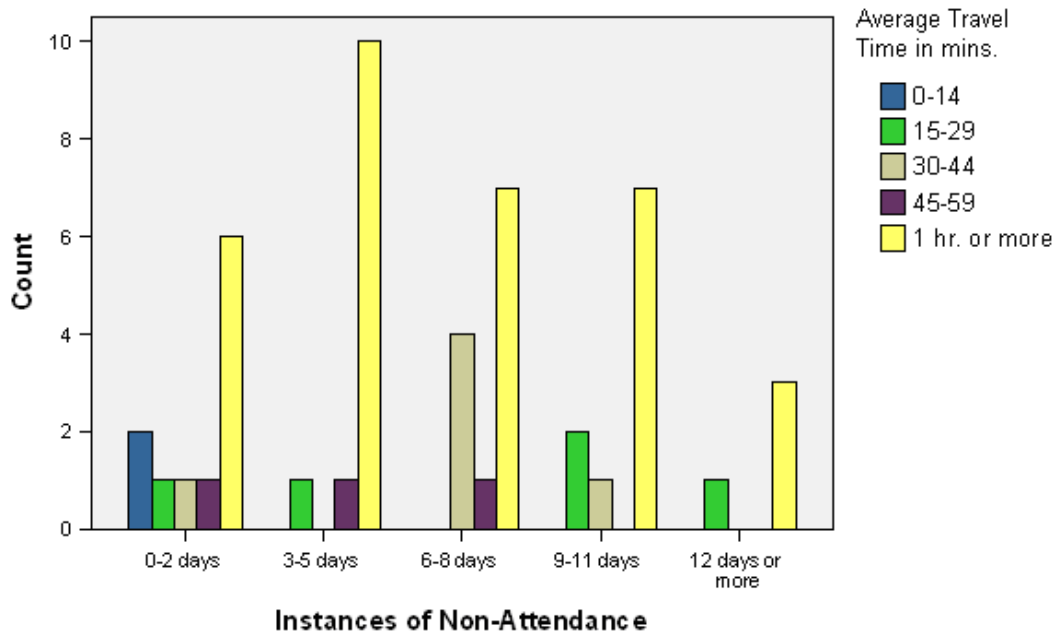
The vast majority of participants had completed standard 7 and the results indicate that there was no gap in educational attainment between males and females, and all participants indicated that they could read and write with understanding in Kiswahili.

Programme Adherence

Participants were not in adherence to programme guidelines on average for 3-5 days, and women were more likely to have been in non-attendance (marginal difference) than men. This may be an indication of women's additional roles and responsibilities, fewer resources, and traditional roles within the Tanzanian context. Some of the female participants reported being too sick to travel, but lacked a family member to assist with programme adherence by delivering yoghurt. Additionally, there was attrition from the programme due to stigma and a fear of domestic violence. This happened in cases where a woman's husband was unaware of their sero-positive status, and daily attendance would have resulted in violence.

In the case of broader project implementation, special considerations must be made to accommodate for this difference either through extended hours, centres which are spatially distributed to accommodate the most common method of transportation, walking, and can accommodate the hardest to reach members within the community. This will help prevent attrition in both groups, and maintain programme adherence in order to achieve maximum health benefits.

**Treatment Adherence
by Travel Time to Distribution Centre**



Correlations

		Urban or Rural	Instances of Non-Attendance
Urban or Rural	Pearson Correlation	1	.288(*)
	Sig. (2-tailed)		.045
	N	49	49
Instances of Non-Attendance	Pearson Correlation	.288(*)	1
	Sig. (2-tailed)	.045	
	N	49	49

Correlation is significant at the 0.05 level (2-tailed).

It may be inferred that treatment adherence is jeopardized based on distance and travel time to the distribution centre.

Weight Gain

A paired samples t-test was conducted to evaluate the impact of the intervention (yoghurt) on the participant's weight gain. It was determined that there was a statistically significant increase in weight gain measured at the onset of yoghurt consumption Time 1- ($M=49.65$, $SD=6.59$) to Time 2 [$(M=51.41$, $SD=6.73$, $t(48)=10.242$, $p<.0005$]. The eta squared statistic (0.696) indicates a large effect size.

A comparison between the age groups using the Kruskal-Wallis test demonstrates that there was a statistically significant difference ($p>0.05=0.31$) in weight gain across the age groups. The 40-44 age group was ranked with the highest overall weight gain.

Based on the results of weight gain, an independent samples t-test was run to compare total weight gain for males and females. There was no significant difference in scores for males ($M=1.88$, $SD=1.29$) and females [$M=1.64$, $SD=1.11$; $t(45.33)= .680$, $p=0.5$]. The magnitude of the difference in the means was very small (eta squared=0.009).

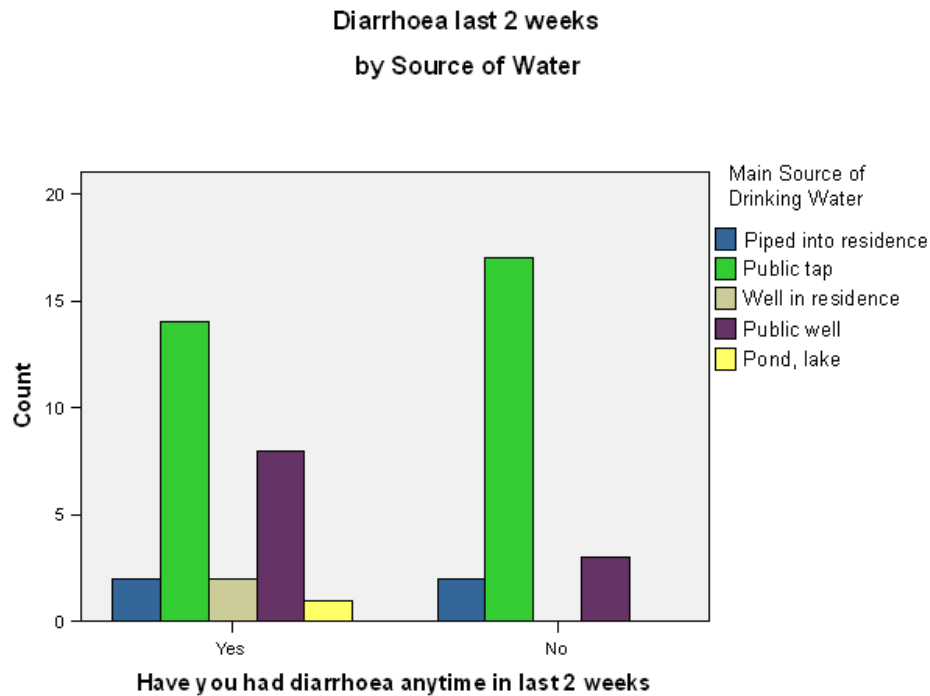
HOUSEHOLD ENVIRONMENT

Housing Characteristics

The physical characteristics of households are important determinants of the health status of household members. The physical characteristics are also strong indicators of the socio-economic status of households. The participants were asked to describe their household environment and possessions based on numerous indicators such as electricity, source of drinking water, type of sanitation facility, type of floor, walls and roof. The information is summarized in Tables 1 and 2.

The source of drinking water is particularly important as waterborne diseases including diarrhoea and dysentery are prevalent in Tanzania. Piped water, protected wells

and protected springs are expected to be free of such waterborne diseases; however, other unprotected sources (ponds, lakes, rivers, streams, dams) even wells, are very likely to carry disease-causing agents. Table 1 indicates that 64% of the sample has access to a protected water source, however 22% access their water from an unprotected public well.



With respect to sanitation facilities 88% are still using traditional pit toilets, and 71% share their sanitation facility with other households.

The type of material used for housing construction is an indicator of the economic status of the household as well as potential exposure to disease-causing agents. The most commonly used flooring materials are earth or sand (67%) or cement (33%). The predominant materials used for constructing walls in dwellings are poles and mud (67%) and sundried bricks (25 percent). About 35% of households use iron sheeting for roofing, and 67% has grass/leaves as their roofing material.

Table 1:

Household Characteristic	Residence				
	Mwanza	Town	Rural	Total	%
Source of Drinking Water					
Piped into Residence	0	0	4	4	8
Public Tap	1	22	8	31	64
Well in Residence	0	1	1	2	4
Public Well	0	7	4	11	22
Pond/Lake	0	0	1	1	2
Total				49	
Time to get to water source					
<=5 min.	1	10	0	11	22
10-20 min.	0	8	8	16	33
20-30 min.	0	11	8	19	39
30+ min.	0	2	1	3	6
Total				49	
Sanitation Facility					
Own Water Closet	0	3	1	4	8
Shared Flush Toilet	0	1	0	1	2
Traditional Pit Latrine	1	28	14	43	88
No Facility (Bush/Field/River)	0	0	1	1	2
Total				49	
Share Sanitation Facility					
Yes	1	23	11	35	71
No	0	9	5	14	29
Total				49	
Flooring Material					
Earth/Sand	1	14	18	33	67
Concrete	0	10	16	16	33
Total				49	
Wall Material					
Unbaked Brick, Mud, Earth (Poles and Mud)	1	19	10	30	61
Corrugated Iron	0	1	3	4	8
Baked Brick	0	6	6	12	25
Terrazo/Marble/Hewn Stone	0	0	3	3	6
Total				49	
Roof Material					
Earth/Mud	0	1	0	1	2
Thatch/Mat Leaves	1	7	24	31	63
Corrugated Metal	1	7	9	17	35
Total				49	

Household Possessions

The availability of durable consumer goods is another strong indicator of a household's socio-economic status. Moreover, particular goods have specific benefits. For instance, having access to a radio or a television exposes household members to innovative ideas; a refrigerator prolongs the wholesomeness of foods; and a means of transport allows greater access to many services away from the local area. Table 2

demonstrates the availability of selected consumer goods by area. Within the sample, the most commonly owned items are paraffin lamps (63%), radios (57%), and bicycles (35%). Only 12% of the sample owned a telephone, and none owned a television or a refrigerator as 98% of households did not have electricity. Everyone reported that they did not have motorized transportation (either a motorcycle or a car).

Table 2:

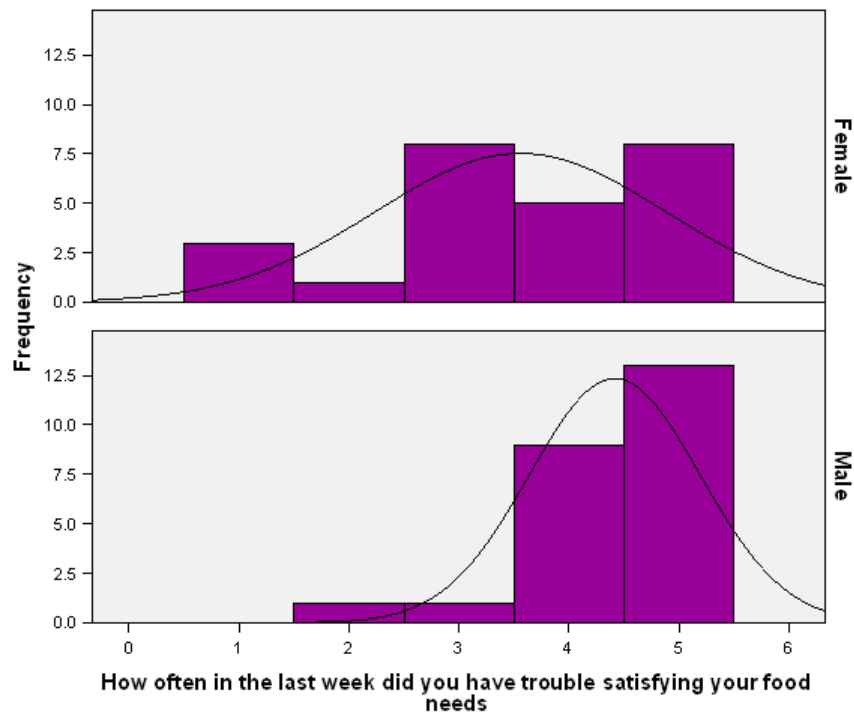
Household Characteristic	Residence				Total	%
	Mwanza	Town	Rural	Total		
Electricity						
Yes	0	1	0	1	2	
No	1	31	16	48	98	
Total				49		
Lamp						
Yes	1	21	9	31	63	
No	0	11	7	18	37	
Total				49		
Radio						
Yes	1	21	6	28	57	
No	0	11	10	21	43	
Total				49		
Television						
Yes	0	0	0	0	0	
No	1	32	16	49	100	
Total				49		
Telephone						
Yes	0	5	1	6	12	
No	1	27	15	43	88	
Total				49		
Fridge						
Yes	0	0	0	0	100	
No	0	0	0	0	100	
Total				49		
Bicycle						
Yes	0	13	4	17	35	
No	1	19	12	32	65	
Total				49		
Donkey						
Yes	0	0	0	0	100	
No	0	0	0	0	100	
Total				49		
Motorcycle						
Yes	0	0	0	0	100	
No	0	0	0	0	100	
Total				49		
Car						
Yes	0	0	0	0	100	
No	0	0	0	0	100	
Total				49		

HOUSEHOLD FOOD SECURITY

The health impact assessment included several questions related to household food security. Assessing household food security is particularly important as it highlights the importance of grass-roots food based projects such as WHE. The ability to access a source of nourishment has vast current and future implications for those who are malnourished, and those who are unable to take ARV's because they lack a steady food supply.

The questions concerned the number of meals the household usually has each day, the number of days in the week preceding the survey in which the household consumed meat, the number of days in the week preceding the survey in which the household consumed other proteins, and how often the household had problems satisfying food needs in the week before the survey. When asked how often they have problems in meeting the food needs of the household, 43% of the respondents reported always having a problem, 29% reported often having a problem and just 6% reported never having a problem meeting their food needs.

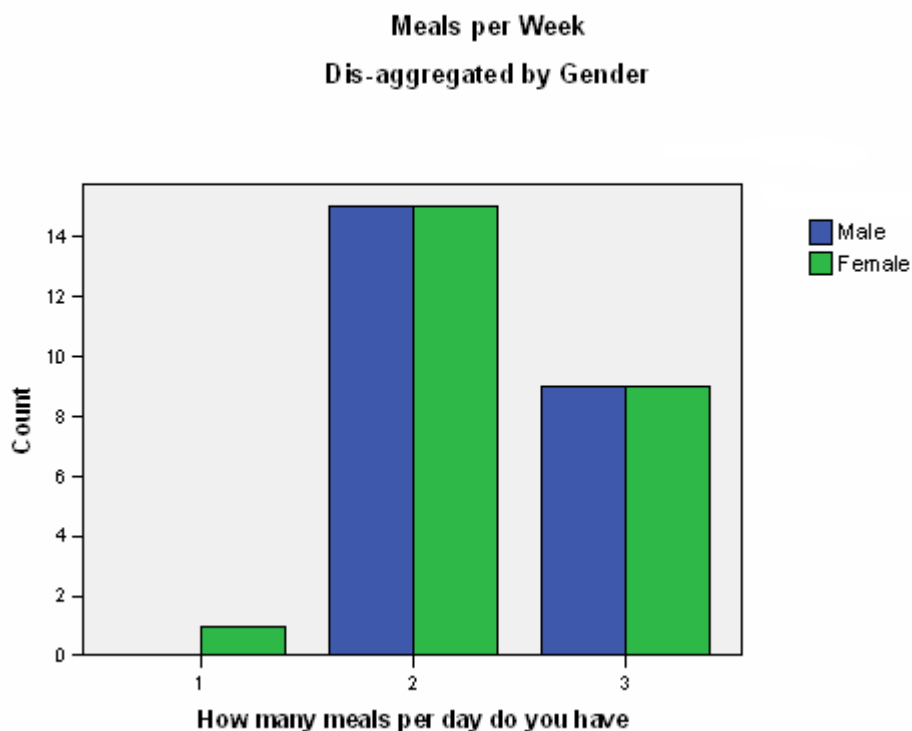
Disaggregated by gender, it is evident that men report having greater difficulty in satisfying food needs. Despite empirical evidence that men have more resources than women, and should potentially be more capable of satisfying food needs, the trend here may be indicative of woman's control of food allocation through their traditional role in preparing and serving household meals.



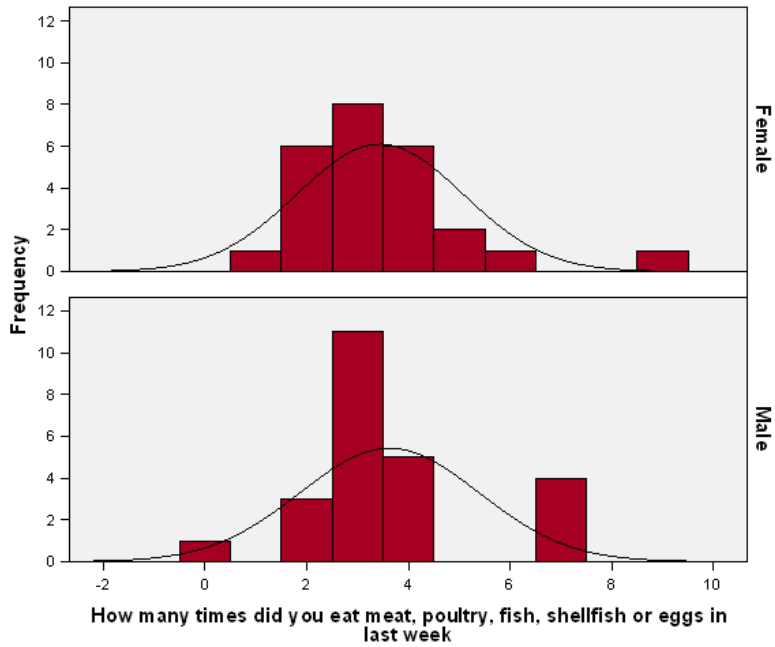
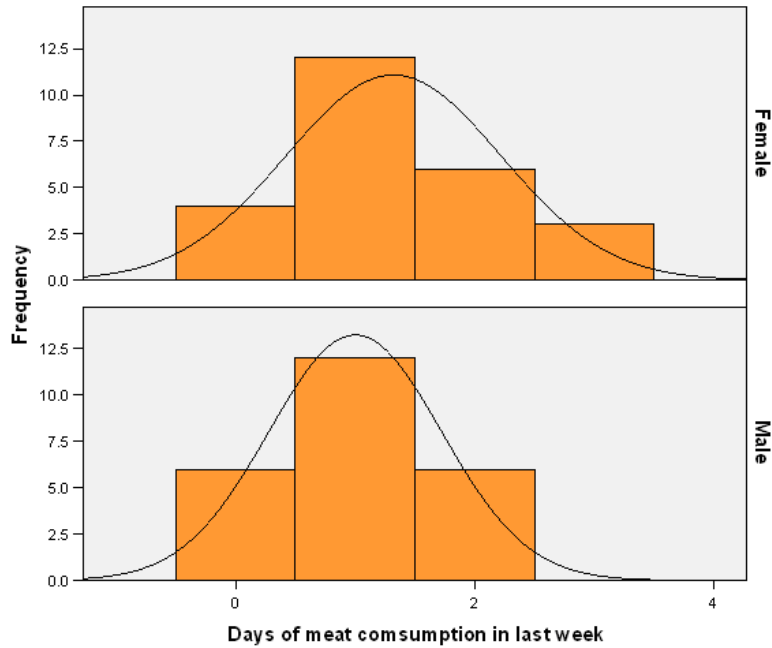
Household Characteristic	Residence				Total	%
	Mwanza	Town	Rural			
Frequency of problems in satisfying food needs						
Never	0	3	0		6	
Seldom	0	1	1		4	
Sometimes	0	8	1		18	
Often	1	6	7		29	
Always	0	14	7		43	

The data show that nearly two-thirds of households (61%) report usually having at least two meals per day, and a sizeable proportion (37%) have only three meals per day.

Household Characteristic	Residence				Total	%
	Mwanza	Town	Rural			
Meals per day						
1	0	0	1		1	2
2	1	20	9		30	61
3	0	12	6		18	37



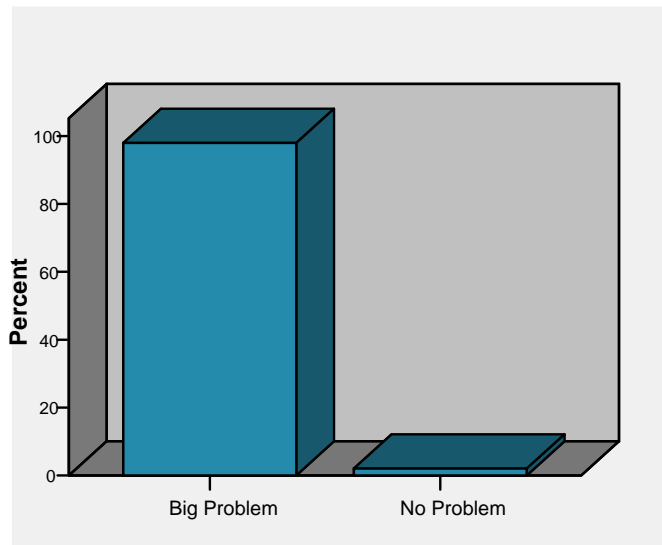
Meat consumption is not common in Tanzania. Twenty percent of households interviewed reported that they had not consumed meat in the past week, 49% reported meat consumption once in the previous week, and 24% had meat at least two times this week. Tanzanians obtain their protein from a variety of sources, including poultry, eggs, and fish.



ACCESS TO MEDICAL CARE

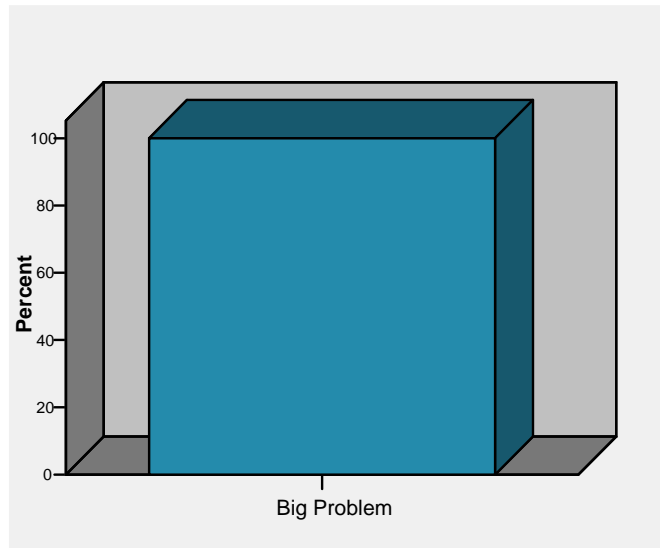
This section presents findings from several areas of importance to accessing health care and the degree of difficulty in doing so. The information provided in this section is important as it provides a look into the degree of effort needed to gain access to public health care services. The results provide an opportunity to identify critical accessibility issues affecting the local population and people living with HIV/AIDS. In almost all cases government hospitals were the preferred choice for obtaining health care, as care is accessed free of charge; however, obtaining funds for treatment and transportation have been identified as major obstacles to accessing health care services. The study results provide an opportunity to identify critical barriers to accessing health services, and the information will assist project planners and other collaborators to formulate appropriate strategies and interventions to improve education about health services and accessibility to health care. The information adds to the current argument; stressing the importance of the necessity to implement interventions at the community level, so that even the most marginalized have access to care.

Medical Care - Knowing Where to Access Health Services



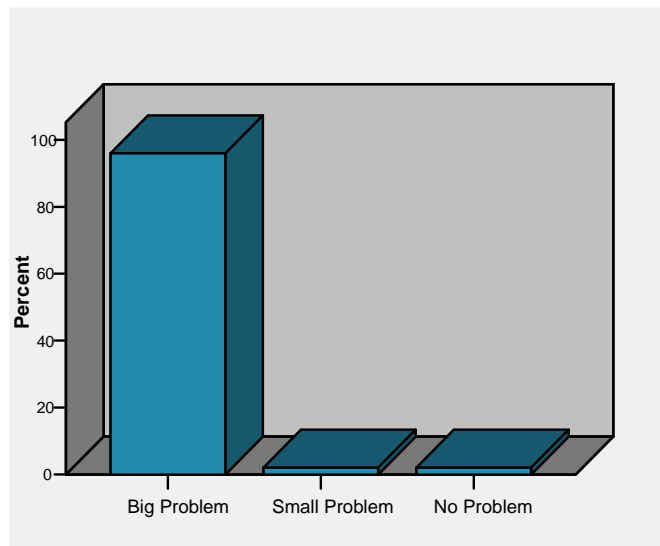
Of the respondent's surveyed 98% stated that knowing where to access the required health services was a concern for them.

Medical Care - Distance to a Facility



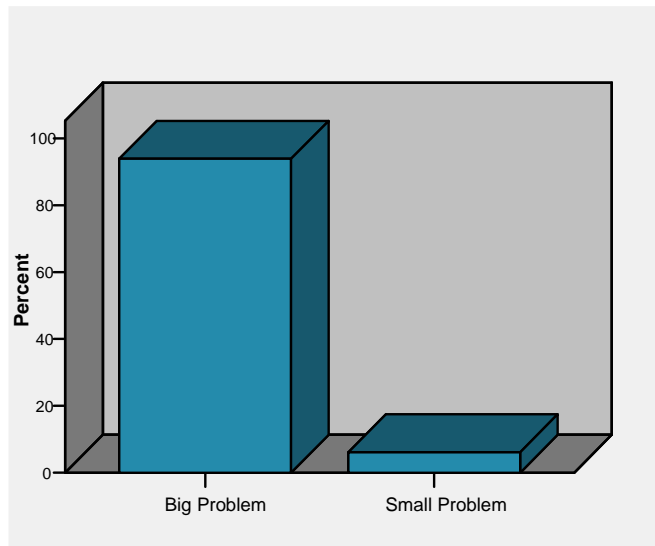
All respondents indicated that medical facilities are not easily accessible due to distance.

Medical Care - Have to Take Transport



Ninety-six percent lack the resources for public transportation. This poses a significant problem in accessing health care, when taking into consideration the distance needed to travel on foot, and factoring in the degree of difficulty due to illness.

Medical Care - Have Money for Treatment



Ninety-four percent stated that paying for treatment posed a substantial barrier to obtaining health care. Although costs are covered for health services at government hospitals, prescriptions and treatments are an out-of-pocket expense.

During the interview phase, participants were asked to identify health improvements. Their reported health improvements were based on both self-perceptions and physician diagnoses. For group 1 participants, statistically significant correlations were found for fungal conditions, diarrhoea, and overall energy level. For an initial short duration study, this is extremely encouraging data and warrants further investigation.

Correlations

		Which Study Group was the respondent in	Status of Fungal Condition
Which Study Group was the respondent in	Pearson Correlation	1	.417(**)
	Sig. (2-tailed)		.003
	N	49	49
Status of Fungal Condition	Pearson Correlation	.417(**)	1
	Sig. (2-tailed)	.003	
	N	49	49

** Correlation is significant at the 0.01 level (2-tailed).

Correlations

		Which Study Group was the respondent in	Status of Diarrhoeal Disease
Which Study Group was the respondent in	Pearson Correlation	1	.372(**)
	Sig. (2-tailed)		.008
	N	49	49
Status of Diarrhoeal Disease	Pearson Correlation	.372(**)	1
	Sig. (2-tailed)	.008	
	N	49	49

** Correlation is significant at the 0.01 level (2-tailed).

Correlations

		Which Study Group was the respondent in	Degree of Tiredness
Which Study Group was the respondent in	Pearson Correlation	1	-.365(**)
	Sig. (2-tailed)		.010
	N	49	49
Degree of Tiredness	Pearson Correlation	-.365(**)	1
	Sig. (2-tailed)	.010	
	N	49	49

** Correlation is significant at the 0.01 level (2-tailed).

DISCUSSION

Given the high levels of nutrient deficiency, under-nutrition and vitamin deficiencies among Tanzanians, the nutritional benefits conferred by yoghurt are substantial. Additionally, sero-positive Tanzanians who qualify for subsidized ARV's often refuse these life extending treatments due to inadequate caloric intake (ARV's taken without food produces severe cramping and other side-effects). Thus, an intervention offering both significant nutritional benefits and health benefits is of great interest to poor countries with high levels of HIV infection. Of additional importance is the idea that the project is a culturally appropriate intervention at the community level. As a community based intervention it optimizes its reach as most individuals face extreme difficulty in accessing health care.

The results also demonstrate that the project creates an environment conducive to forming support networks and information groups. Participants were able to meet in a non-discriminating environment to discuss their health concerns, and share ideas. They were able to provide each other with moral and emotional support which they often stated they lacked in their daily lives. Moreover, respondents stated that the study, more specifically the yoghurt gave them a sense of hope, which transpired into a renewed zeal and the ability to continue living life.

This rapid health impact assessment provides project stakeholders and future researchers with important baseline data and offers guideposts for promising avenues of future research. The initial data from this assessment indicate correlations between consumption of the probiotic yoghurt and health improvements. It is hoped that future studies can expand and substantiate these findings. These initial findings offer great promise for an alternative and sustainable HIV/AIDS intervention in the Tanzanian context.

ECONOMIC EMPOWERMENT AND HEALTH: A CASE STUDY

1.0 Literature Review

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, welfare, and quality of life. 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 and Acalay, 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 Acalay (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.

WHO (1995, 1996, 1998, 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 Report 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 this case study of a 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 and Rappaport, 1988, p.725).

Empowerment can exist at four levels: personal, small-group, organizational and community. On 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 and 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 (O'Leary, 1985; Stecher et al., 1986; Wallerstein, 1992).

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 (Wallerstein, 1992; Rodin, 1986; Schultz, 1980). 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), a sense of 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 (Wallerstein, 1992; Marmot (Whitehall Study); Wilkinson). 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 et al., 1989). 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 (Kaplan et al., 1987; 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 (Friere, 1987; Rappaport, 1987; Zimmerman et al., 1992; Wallerstein and Bernstein, 1994; Zimmerman, 1995). 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 programme 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) (Rappaport, 1984; Rothman and Tropman, 1987; Zimmerman et al., 1992; Israel et al., 1994; Wallerstein and Bernstein, 1994). PE aims at the enhancement of individuals' "critical consciousness" (Friere, 1968; Friere, 1974; Friere, 1987), belief in self-efficacy, awareness and knowledge of problems' sources and the solutions, and personal competency to deal with problems adversely affecting QOL. CE 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. OE 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 (Kawachi et al., 1999; Marmot and Wilkinson, 1999; Berkman and Kawachi, 2000). This 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 (Antonovsky, 2000). 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 and Marmot, 1981; Marmot and Theorell, 1988), that there is an association between work with low levels of control and high demand and increased morbidity rates (Karasek et al., 1981; Alfredson et al, 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 (Cohen and 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 (Digman, 1988; Johnson, 1988). 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 (Israel, 1985).

The very broad relationships encompassed under the category of 'stress', and the factors protective against 'stress' (Dantzer and Kelley, 1989; Sapolsky, 1990), 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 (Dutton, 1986; Marmot, 1986; House et al., 1988; Sapolsky, 1990). 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 (Smith, 1996; Whitehead et al., 1998; Yen and Syme, 1999; Kawachi et al., 1999; Marmot and Wilkinson, 1999; Berkman and Kawachi, 2000; Siegrist, 2000). 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, 2000a; Amick, 2000b; Wallace and 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 (Lynch et al., 1998; Kawachi et al., 1999).

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 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. Concurrently, the overall health status in most nations has also improved (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.

A recent UNDP Human Development Report concludes that, in spite of phenomenal 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). The richest 20% of the countries share 86% of

the world GDP; the poorest 20% of the countries share 1% of the world GDP (UNDP, 1999). While some women have benefited from various forms of development, the majority of women continue to 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 most of the brunt of poverty and abuses due to persistent inequalities and relative powerlessness (Boserup, 1971; Sen, 1990; Tinker, 1990). 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). In a recent analysis, Nobel Laureate and development economist Amartya Sen sums up his thesis on development by the title of his latest book "Development as Freedom" (Sen, 1999). According to his analysis "Expansion of freedom is viewed, in this approach, both as the primary end and as the principal means for development" (Sen, 1999). Development is incomplete if individual freedom does not exist. 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.

A direct relationship between human development and health status has been well established by numerous reports and data sets by WHO (Worlds Health Reports), UNDP (Human Development Reports), World Bank, UNESCO, UNICEF, and individual scholars (Boserup, 1971; Sen, 1990, Tinker, 1990). 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 anecdotal and empirical evidence suggests that the income women earn is more likely to be spent on food and other basic household needs than is income earned by men and, thus, it has a greater positive effect on children's nutritional status, health, and education (Kumar, 1979; Loose, 1980; Guyer, 1980). This is explained at least in part by the fact that women in virtually all parts of the world have traditionally had the primary responsibility for feeding and care of children. Further, women in developing countries generally join the work force as a result of severe financial necessity so their incomes must be devoted to survival needs. From these facts it follows that, even more than an increase in household income *per se*, an increase in income earned *by women* is likely to

improve the status of children. Moreover, there are a large percentage of households in which women are the sole or major economic providers as a result of factors such as family dissolution and migration. For these households, women's income is the main determinant of consumption.

Another reason to focus on women's income is that economically active women are more likely to be able to act on many of the ideas conveyed through nutrition and health-education projects than are women whose activities are confined to the household sphere and to income-conservation rather than income-generation.

Finally, there is ample evidence that the expressed priority of women is for programmes that provide economic benefits rather than those that offer social services or the possibility of long-term development (Jain, 1980; Caughman, 1982). Poor women are universally aware of their precarious economic situation and the need to have some income they control (Chande et al., 1980; Guyer, 1980; Jones, 1983). Thus, the opportunity to earn an income will be a greater initial incentive for women to change traditional patterns of behaviour than will be the less clearly perceptible benefits of improved home-management practices.

Poverty

The single most important determinant of ill health, long known, is absolute poverty, particularly as it relates to life expectancy, high infant mortality, and a wide range of disease (Black et al., 1988). A significant body of research has been amassed since the early 1980's which clearly documents that poverty, poor quality of life, and low socioeconomic status are principal causes of morbidity and mortality, predisposing people to chronic disease in both the short and long term (U.S. Department of Health and Human Services, 1999; Kuh and Ben-Shlomo, 1997; Townsend, 2000). 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. A strong relationship exists between degree of economic inequality and child poverty (Kuh and Ben-Shlomo, 1997). Poverty and correlated living conditions impose constraints on many aspects of everyday life that affect access to requisites for good health such as good nutrition, adequate housing, and education, transportation, recreational facilities, and environmental conditions (Shaw, Dorling and Davey, Smith, 1999; Pantazis and Gordon, 2000). Social 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 (Brunner and Marmot, 1999). Poor health can be a cause of poverty, and poverty can occur as a consequence of ill health.

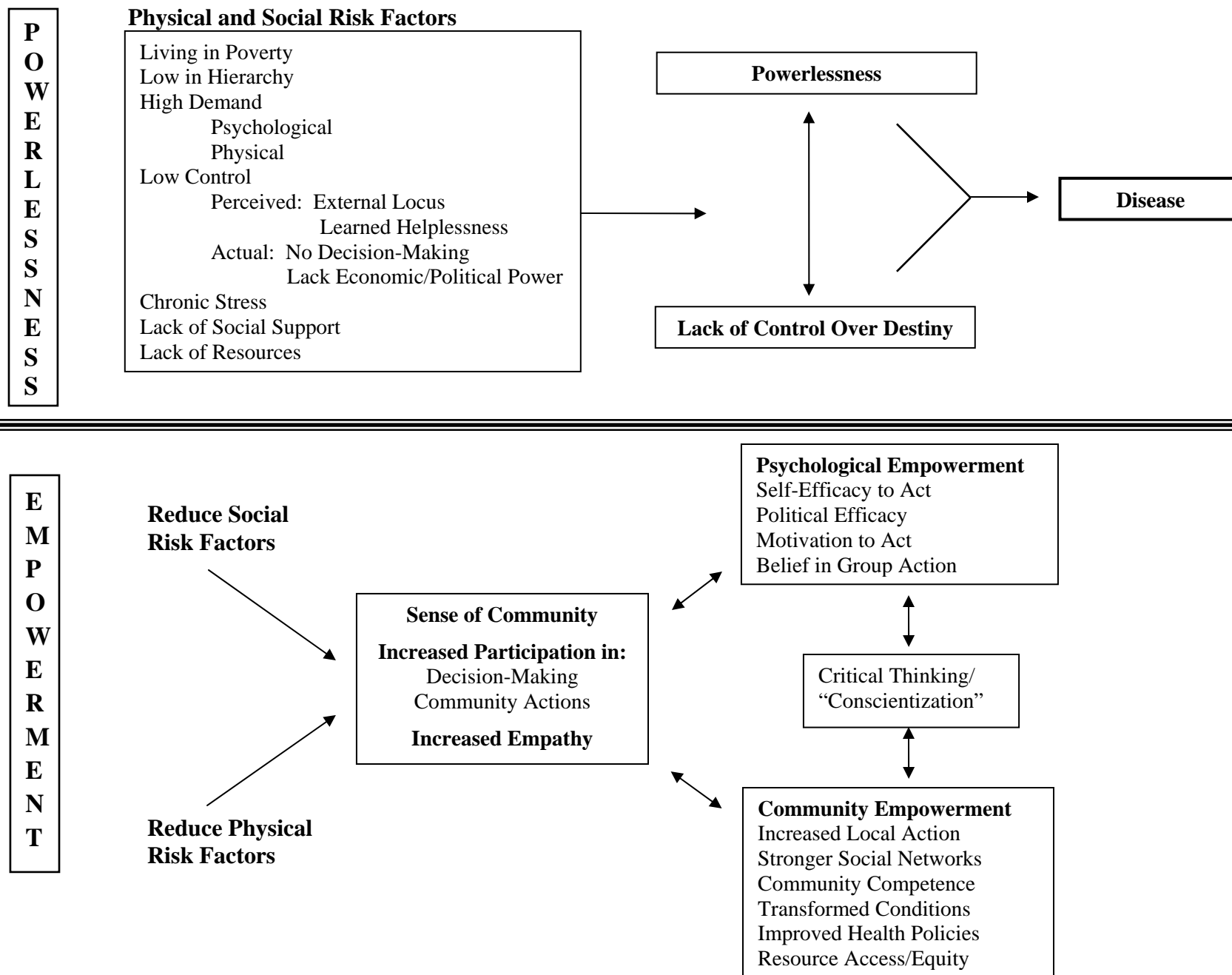
Our understanding of poverty must pay attention not only to the lack of basic economic resources (including money and food) but also to how material deprivation leads to poor health and to the lack of social resources, including access to education and health care. For Sen, human beings must be seen not merely as "recipients of income" but as people attempting to live satisfactory lives (Sen, 1995, p. 17). Income statistics fail to capture 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. Poverty definitions based on household income say nothing about uneven income distribution

within a household, which leads to an “invisible” poverty affecting mostly women and children. Likewise, most quantitative measures cannot “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 (or insecurity), as distinguished from the concept of poverty, helps us analyze 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.

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 Acalay (2000) health initiatives must address both "practical needs" and "strategic needs". 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.

Figure 12: Schematic Representing ‘Powerlessness’ as a broad based risk factor for disease; and ‘Empowerment’ as an important promoter of health.



1.1 Statement of Problem

The Western Heads East Project is unique for a number of reasons. WHE combines elements of development, research, and community health. It is the first international development project launched by the University of Western Ontario, 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.

Researchers from the university initiated the first phase of the project evaluatory studies in the summer of 2006. 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. 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 test 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.

As Western Heads East is now poised to enter a collaborative and multi-disciplinary research phase, it is timely and important to review the economic and health impacts that the project has had specifically on the women participating in the project, their families and the surrounding community. This is the first opportunity to test whether the project is leading to expected outcomes.

1.2 Scope and Justification

Recent scholarship suggests that public health research must acknowledge gender issues and other power dynamics which influence the social distribution of health and illness within populations (Hammarstrom and Ripper, 1999). "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" (Hammarstrom and Ripper, 1999, p.286). Existing work in public health has neglected the interactions between gender and power dynamics. A 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 and 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 subordinated groups (Hammarström and Ripper, 1999).

According to Hammarström (1999), existing work has neglected to focus on gender sensitive research methods and there is a need for a broad range of reflexive methods within feminist public health. Reflexive analysis is based on the premise that knowledge is unavoidably shaped by socio-political frames of reference which include assumptions about gender, race and class etc. (Harding, 1986). Additionally, qualitative methods such as discourse analysis and grounded theory are necessary in order to acquire deeper knowledge regarding processes and complex interactions. There is a need for further research to improve our understanding of the complex interactions which take place and their implications for sub-ordinate groups.

Delphi experts (the Delphi panel includes over 424 experts in public health from forty-two countries) have identified ‘empowerment’ and ‘community participation’ as significant societal level ‘process indicators’ of health promotion. Over the last two decades numerous international organizations have published documents focusing on community empowerment as a central theme of health and human development. Some of these documents include:

<i>Document</i>	<i>Initiative</i>
Alma Ata Declaration (1978)	Stressed the importance of ‘community participation’ as a method for developing effective health promotion (UNDP, 1999; Kar and Acalay, 2000)
Ottawa Charter for Health Promotion (1986)	Summarized global consensus: “At the heart of this process (Health Promotion) is empowerment of the communities, their ownership and control of their own endeavors and destinies” (UNDP, 1999; Kar and Acalay, 2000).
CEDAW/UN, Beijing Platform of 1995, Beijing+5 Review in 2000	Recent international initiatives focus on women's status and gender equity, which advocate for cultural and structural changes which empower women.
Calcutta Declaration on Public Health (2000)	With respect to the philosophy and scope of “Public Health in the South-East Asian Region in the Twenty-first century”, the declaration emphasizes human rights protection, empowerment of disadvantaged groups, and calls for the reduction of poverty as central public health concerns (WHO/SEARO 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 from various

agencies in order to promote health and Quality of Life (QOL). Women's empowerment, which leads to community empowerment, should be a focal point towards achieving effective health. 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.

This case study, using standardized open-ended questions in one-on-one interviews aims at discussing the theoretical construct of empowerment and its importance to health enhancing strategies to reduce health disparities. Powerlessness, discrimination, poverty and income inequalities are explored as risk factors in the context of social determinants. Empowerment will be presented and compared to community capacity and social capital as approaches to strengthen social protective factors. This study of women's empowerment aims at demonstrating the value of empowerment strategies in both targeting social determinants, as well as improving community capacities which can ultimately lead to social change.

This case study utilizes numerous perspectives in an attempt to analyze the impacts of the grass-roots food based project (WHE), with the overarching purpose of exploring large-scale cultural, social, economic and political processes in society which create differential health risks for sub-ordinate groups, specifically women.

2.0 OBJECTIVES

This case study focused on the measurement of impacts. Through the use of qualitative methods and a thorough understanding of the context, dynamics of change and outcomes of transformed conditions and practices can be explored. Qualitative analysis is the preferred methodology to uncover factors which contribute to the empowerment of women, and the betterment of individual and community health. As well, the greater contextual (social, cultural, economic) factors which create a community's social fabric will be revealed and allow a community level understanding to emerge.

2.1 To determine the direct health benefits, if any, of consuming probiotic yoghurt amongst the women, and their family members.

2.2 To determine the potential for 'powerless' women within the Tanzanian context to undertake successful grassroots movements.

2.3 To determine whether the collaborative model used by the project participants and the institutional stakeholders, has been a positive catalyst within the community to combat powerlessness and reduce social disparities.

2.4 To examine the association between socio-economic status and behavioural change with respect to seeking and accessing health care.

2.5 To determine the cultural acceptability of the project within the Mabatini community.

2.6 To quantify the social impacts of the project on the female participants and the broader community.

2.7 To explore and gain an understanding of the physical and social environment experienced by the project participants and their families.

2.8 To examine the association between socio-economic status and personal/family circumstances and lifestyle.

2.9 To determine whether the project has acted as a catalyst within the community to mobilize greater efforts amongst community leaders and local government officials to support the objectives/mission of the programme.

3.0 To examine the health impacts, and perceived improvements in quality of life.

Research Question:

Has the WHE grass-roots food based project improved the lives of the female project participants, their family members, and the community?

3.0 SCHOLARLY IMPORTANCE AND PRACTICAL SIGNIFICANCE

3.1 Theoretical: Comprehensive understanding of how community development projects with a focus on empowerment can aid women in achieving improved health, quality of life (QOL) and status within the community.

3.2 Methodological: Utilizing the existing project as a case study to examine the impacts of empowerment, specifically with respect to the health of the women involved in the project, their families and the surrounding community using one-on-one standardized open-ended interviews.

3.3 Policy: Community participation projects which are contextually and locally relevant and focus on empowering women can create both direct and indirect benefits. Future community efforts should be

supported by local leaders and government, as effective participatory community projects can be viable methods of creating sustainable lifestyles, improving health and the quality of life of sub-ordinate and marginalized groups.

This community based grass roots project, which aims to empower local women, is also designed to bring broad health benefits to those infected with HIV. The delivery medium yoghurt offers significant nutritional benefits on its own. Probiotics have been proven to alleviate diarrhoea, a condition that is prevalent in SSA and amongst HIV/AIDS patients. As well, probiotics have been shown to treat gastrointestinal infections, certain bowel disorders, allergies, and urogenital infections.^{i,ii} Overall, probiotics have been proven to help alleviate many ailments prevalent within the population. It is a low cost, easily deliverable treatment offering nutrimental benefits. The research itself focuses on issues pertaining to the health and socio-economic benefits of community projects by marginalized African communities.

In addition to the above practical significance of the project, according to Hammarström (1999) new directions are needed in public health; specifically, directions should be pursued which take the feminist perspective both within and outside the medical framework into account. An example of such directions would be positioning women as actors, developing improved theoretical frameworks, the use of gender-sensitive methods, and ultimately the use of such results for change. This research 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).

Through this research it is expected that a significant contribution will be made to the current body of literature on community empowerment, specifically women’s empowerment while considering societal-level factors within Tanzania, and Sub-Saharan Africa more broadly. Research in social epidemiology has assisted in identifying socially determined factors which have been considered to have profound influences on health and health behaviours. However, there is a lack of research to date that considers how these factors influence individuals’ ability to reduce their risks and their interest in health behaviour change. In order to make a meaningful impact on morbidity and mortality, it is essential that the intersection between health and societal-level contextual factors is explored.

This research will provide a basis to review and update national policy on women’s rights and empowerment; and 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, the opportunity to change conditions of power at the micro-level will enhance health. It is hoped that the research 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 (QOL) across gender and ethnic groups. Dynamic new programmes which are personal and considerate of cultural dimensions reflecting gender differences, political and economical 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 will 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.

Methodologically, the qualitative aspect of the research will permit for the identification of social contexts in which beliefs and values are manifested in actions, and describe the cultural models of health and illness to understand "individual and group-level knowledge and beliefs about health threats, transmission dynamics, and behavioural norms" (Trotter, 1997, p.259). From the feminist standpoint, the research will assist in addressing the power relationships which exist and the social phenomena which shape the participant's lives.

Additionally, the appraisal will assist in determining public health efficacy of the project. Research on the impacts of community participation projects such as this is greatly needed to extend the success of the existing programme and establish more effective strategies for empowering women, and improving health in Sub-Saharan Africa. The study reveals the importance of interdisciplinary research, particularly in contexts of complex social and epidemiological processes. Empowerment and health is so firmly rooted in human behaviour, guided by cultural, social and economic conditions, it is imperative that the social sciences provide a framework for its development, using theories 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. 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.

4.0 THEORETICAL APPROACHES

The theoretical approaches which will inform this study draw on theory found in the feminist perspective and social inequality literature. The assorted theories to be used will be the Ecological Perspective, Vulnerability Theory, the Society and Health Perspective, and the Population Health Perspective.

4.1 Ecological Perspective

Contemporary public health and health promotion is concerned with more than simply educating individuals about healthy practices. It encompasses efforts to alter organizational behavior, as well as the physical and social environment of communities (National Cancer Institute, 2005). "It is also about developing and advocating for policies that support health, such as economic incentives. Plans for health promotion programmes that seek to address health problems across this spectrum employ a range of strategies, and operate on multiple levels" (NCI, 2005, p. 10). The ever increasing concentration on 'community' in health promotion is a result of the growing recognition that behaviour is significantly influenced by the environment in which individuals live.

“Proponents of community approaches to behavioural change recognize that local values, norms, and behaviour patterns have a significant effect on shaping an individual's attitudes and behaviours” (Chinman et al., 1996, p. 45).

The ecological perspective stresses the interaction between, and interdependence of, factors within and across all levels of a health problem (NCI, 2005). It emphasizes people's interactions with their socio-cultural and physical environments. “Two key concepts of the ecological perspective help to identify intervention points for promoting health: first, behavior both affects, and is affected by, multiple levels of influence; second, individual behavior both shapes, and is shaped by, the social environment (reciprocal causation)” (NCI, 2005, p.10).

To describe the first key concept of the ecological viewpoint, *multiple levels of influence*, McLeroy and colleagues (1988) identified five levels of influence for health-related behaviours and conditions, these levels include: (1) intrapersonal or individual factors; (2) interpersonal factors; (3) institutional or organizational factors; (4) community factors; and (5) public policy factors.

The second key concept of the ecological perspective, *reciprocal causation*, implies that people both influence, and are influenced by, those around them (NCI, 2005). With respect to this project, it is understood that the community has great influence on the actions of the women participating, and it is hoped, through thorough analysis to uncover the reciprocal effects the women have on the community. The ecological perspective is advantageous in that is capable of demonstrating the multi-level interventions that combine environmental and behavioural components (NCI, 2005). Health promotion is more effective when multiple levels of influence on health are considered.

With this multi-dimensional approach it is anticipated that community level efforts will change the social and physical environment to support positive behaviour change and promote healthy behaviours.

4.2 Society and Health Perspective

The society and health perspective is of macro-level analysis, but will be utilized at the micro-level (community level) to investigate and uncover complex processes which determine health outcomes in sub-ordinate groups. Walsh Chapman et al. (1995) have proposed this ‘society and health lens’ which attempts to analyze cultural, social, economic and political processes in society that produce differential health risks in women and men. A distinctive feature of this perspective is its emphasis on how health outcomes are predetermined and constrained by mechanisms of social control and distribution of resources and power. Existing 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 Chapman et al., 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.

4.3. Vulnerability Theory

Vulnerability theory states 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 and 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). Economic need may coerce vulnerable populations to participate in risky survival tactics such as commercial sex work that then makes them a ‘population at risk’ for contracting many diseases (Watts and Bohle, 1993). “In fact, behavioural interventions based solely on information and reasoned persuasion are insufficient to produce risk reducing behaviour change among vulnerable social groups” (Oppong, 1998, p. 438). 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.

The project provides an opportunity to not only curb rates of disease and reduce vulnerability in the current adult generation, but also for 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, the urbanization of communities, and 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. Hence it is imperative to incorporate a community and population perspective to health.

4.4 Population Health Perspective

The Population Health Perspective (PHP) has as its overarching goal “to maintain the health of the entire population and to reduce the inequalities in health between population groups” (Health Canada, 1998, p.1). This concept of health acknowledges the many factors (economic, social and environmental) which contribute to health. The PHP places the person within a broader context (McGrail et al., 1998), while importantly balancing the macro and micro factors which affect health. Individuals can alter some determinants of health; however others must be altered by organizations and groups. For instance, income inequality is a population characteristic rather than an individual, however personal income level is attributable to personal skills, but also to tax policies and redistributive programmes, all factors considered to be beyond the control of the individual. The PHP takes into consideration issues on conceptually distinct levels encompassing society, community, family and the individual. Hence, health issues are addressed at several levels concurrently.

5.0 RESEARCH DESIGN AND METHOD

A qualitative perspective is necessary to understand the contextual factors which contribute to health problems and the strategies needed to address them. It is imperative to collect in-depth information about underlying circumstances and experiences in order

to understand what determines health in any given context, and to establish strategies by which the specific determinants can be influenced. This type of research study and the qualitative data generated add a richness and depth to the quantitative data that is already present in the literature. Limitations of this methodology are sufficiently documented in many texts and literature. However, despite key limitations, understandings gained from such a method are invaluable. In this case, a qualitative research design was necessary in order to meet the stated research objectives. Such a design allowed the researcher to focus on all aspects of the human experience by taking a holistic approach and understanding the complexities of that experience as it affects daily living (Liehr, Marcus, & Cameron, 2005).

The Western Heads East probiotic yoghurt project provides the backdrop of this economic empowerment and health case study. For the survey a total of ten women were interviewed. They have participated in the project since its inception in 2003. A survey instrument was developed by the researcher (standardized open-ended questions in one-on-one interviews) and was utilized to evaluate the impacts of the project. Preceding data collection, the researcher and a translator verbally explained the objectives and procedures of the study (Appendix X) to the participants. Subsequently, questions and concerns were addressed pertaining to confidentiality, as well as the collection and use of the information gathered. The participants were assured that the data would remain confidential and secure, and were informed that they were free to withdraw from the study at any time if they felt uncomfortable and would not be reprimanded, or face any consequences. Following this brief introductory discussion, the participants, translator, and researcher collectively signed the consent form (Appendix X).

The interviews were conducted in the community kitchen where the yoghurt is produced, and were arranged for times when the interviewee was on duty alone. The duration of the interviews ranged from a minimum of forty-five minutes up to one hour.

Structured questions were asked to preserve the reliability of the survey instrument. However, participants were also encouraged to describe their experiences openly and freely in order to provide a comprehensive and accurate depiction of their daily experiences. Prior to the interviews the researcher was able to meet with the participants on many occasions and was able to cultivate trustful relationships and build rapport, thereby ensuring that a comfortable, relaxed and sensitive atmosphere was created for the ensuing interviews.

The interviews were conducted in Swahili, using an independent female translator who was not affiliated in any way to the project, participants, or stakeholders. The interviews were tape-recorded, translated, and transcribed by both the translator and the researcher following qualitative research protocol. The information was then analyzed in SPSS. It would have been preferable to utilize a software platform developed specifically for qualitative data; however, SPSS was the only statistical software package available at the time and it was deemed more important to conduct preliminary analysis on site, and thus be able to correct flaws in the survey instrument, rather than delaying analysis until another software suite was available. By sensitively interpreting the complex data a unique opportunity exists to gain a richer and deeper understanding of experiences and life circumstances through data reduction, interpretation, and synthesizing the findings to uncover gaps and connections. Performing preliminary

analysis on site also facilitated immediate observation of themes, relationships between themes, and potential concepts.

The use of an 'in-depth' interview format allowed respondents the opportunity to share in full their experiences, provide details about their understandings, and empowered them to have a say in the matters which affect their daily lives. As such the interview allowed "new understandings during the research process, [as] this method works well with an inductive theoretical approach and with grounded theory" (Pranee and Ezzy, 1999, p.68). Additionally, the women's responses were less influenced by the presence of their peers, and they felt comfortable to discuss sensitive matters. The interviews provided a unique opportunity to examine the impact of the project. Analysis was undertaken to explore the relative contributions of the project (health impacts, economic, social, personal contributions) to the women, of their families and the community. The analysis is imperative in order to determine whether or not the programme is effective, for whom, and if there are any differences in the impacts experienced by the individual participants, or areas of concern which must be addressed.

6.0 FINDINGS

The data was examined to determine whether or not relationships existed between: household status of the female participant, age, incidence of domestic violence prior to entering the project, and the relative level of empowerment in three areas (increased equity, increased control of assets, and increased joint decision making). The five 'young' participants (under 35 years of age) uniformly reported that they occupied a sub-ordinate position within the household. This demographic reported less incidence of domestic violence prior to entering the project than did their older counterparts. However, the younger participants expressed a lack of tangible improvements with respect to household empowerment.

For the older demographic (36 years of age or older), 3 out of 4 respondents occupied the dominant position within the household and in the case of re-marriage did not lose this dominant status. All of the older participants indicated having at least one source of personal income and were less likely to be subordinate than the younger group. Further research should be conducted to determine whether empowerment is a result of the supplemental income or participation in the yoghurt project.

Economic empowerment was a primary goal for the project participants, and was one of the goals held by a number of the institutional stakeholders. Unfortunately the data reveals that this has not been an outcome of the project to date. In fact, all of the participants indicated that they had not been economically empowered by the WHE project.

Several factors may have contributed to the lack of economic empowerment to date. First, project administration and decision-making have remained the purview of the University of Ontario Western (UWO) interns or their proxy, a Mwanza project coordinator hired and paid for by the university. There is strong local demand for the probiotic yoghurt. However, the owner of the probiotic organism has not authorized sales of the product. As an alternative, there is a small amount of non-probiotic yoghurt produced each day and offered for sale. As the non-probiotic version is not the desired choice of Mwanzans, sales are modest. The project participants, on several occasions,

have submitted requests for containers in order to facilitate marketing and distribution of the non-probiotic yoghurt both to local restaurants and through other local outlets. So far, containers have not been provided. The milk used to produce yoghurt is purchased locally using funds from the University of Western Ontario. In order to increase production and spur sales of the non-probiotic version of the yoghurt, the university offered to make funds available to purchase more milk. However, milk availability fluctuates seasonally and has been affected by the extended drought in Tanzania. To date, the Mwanza project coordinator has been unable to locate a secure source of milk sufficient to increase production to an economically sustainable level.

Another factor affecting the potential for economic empowerment is the project participants themselves. The researcher, other interns and visiting faculty have observed a tendency of the project participants to avoid engaging in the activities necessary to increase production, such as seeking out additional milk suppliers, willingness to work additional hours at the community kitchen facility, or a willingness to approach local vendors who might order or sell the product.

Despite reporting of a lack of economic empowerment, there was unanimous agreement among the participants that the project has provided other important benefits. Participants and their family members, which comprise a group of ninety-four adults and children, report positive health impacts and improved nutritional status as a result of consuming the yoghurt on a daily basis. The provision of yoghurt to each family has allowed for discretionary income, previously allocated to the purchase of food, to be spent on other items. Among the poorest members of Tanzanian society, food accounts for a significant portion of the household budget. Thus, provision of a nutritionally beneficial consumable (yoghurt) must be considered a materially important economic benefit of the project. Even though all of the participants recognized that receiving free yoghurt was a benefit, they all stated that this had not freed up sufficient money to send their children to school or obtain health care services.

Despite a lack of individual economic empowerment from yoghurt production, the Tukwamuane group members have exercised agency by modifying the project design to develop alternative financial empowerment mechanisms. The small amount of money generated each day from the sales of non-probiotic yoghurt is deposited into the group's bank account. Fifty percent of that money is allocated as a project emergency insurance fund. Even though project participants have been assured they have stable funding from the University of Western Ontario, they feel anxiety over the continuation of the project and feel it prudent to maintain a balance sufficient to weather a project emergency. The remaining fifty percent of the monthly total is allocated to a revolving micro-credit loan fund. There is no restriction regarding how each participant uses the loan proceeds. Commonly, the funds are used either for school registration fees or major health costs. Over the course of the last 12 months, eight out ten Tukwamuane members have accessed these micro-credit funds.

The researcher was interested to learn that the Tukwamuane group had not disclosed the existence of the emergency insurance fund or the micro-credit fund to the Canadian institutional partner, UWO. In the future it would be important to discuss with the project participants the barriers (perceived or real) which prevented them from discussing these new initiatives with the WHE steering committee.

The researcher observed a reluctance on the part of the Canadian institutional partner to grant the project participants decision-making authority. For example, the WHE steering committee hired and directed the Mwanza project coordinator, and did not seek input from the Tukwamuane group as to the responsibilities of this position or who might be best suited in this role. As well, project operating funds were administered by one of the Tanzanian institutional partners rather than by the Tukwamuane leadership. Another university researcher working during the same time period conducted research that included auditing Tukwamuane's financial records and discussing financial oversight strategies with the group. The researcher's final report indicated that group treasurer maintained accurate financial records, and that both the group bank account and micro-credit fund were being effectively administered.

It was discovered during the course of the interviews that the Tukwamuane group had applied for and received a grant from the Tanzanian AIDS Commission (TACAIDS) totalling \$2,500 USD. Of the total, the first \$1,800 USD has been disbursed. It should be noted that the group did not inform the Canadian institutional partner of the successful grant application. The funds will be used for a health impact assessment study and the development of a community outreach programme. Within the Tanzanian context, for a small Community Based Organization (CBO) such as Tukwamuane, this is significant funding for one year. The success of the grant proposal, coupled with the creation and administration of the project emergency insurance and micro-credit funds, demonstrates that Tukwamuane members possess the skills necessary to manage project funds and carry out administrative tasks. Thus, it is recommended that further discussions be held with Tukwamuane to explore why the group chose not to disclose these developments with all the other project partners.

Eight out of nine respondents indicated that participating in the WHE project had provided new social networks. All of the project participants indicated that the project fosters a supportive environment whereby the women are able to share ideas, express themselves freely, and gain moral and emotional support from one another. This would support the ample literature indicating that support networks lead to improved health outcomes. Additionally, the group has been able to establish vital connections with community members, local leaders, and government officials – all of whom are cognizant of project benefits and provide valuable encouragement and support.

The survey gathered data on the types of illness experienced by the Tukwamuane group members prior to the inception of the project and the ingestion of probiotic yoghurt. Reported ailments included stomach ulcers, diarrhoea, fever, malaria, headaches, dizziness, weakness, tiredness, difficulty focusing, and depression. In one case, illness was so severe that the respondent had been bedridden and unable to work. In all cases where a prior illness was reported, the respondent indicated an improvement during the period the yoghurt had been administered. Additionally, one third of the project participants reported lowered stress levels and eight out of nine respondents indicated significant improvement in physical strength. Both physical weakness and stress can be the result of a variety of factors, including poor nutrition. Further investigation would be needed to determine whether lack of nutrition was the causative agent or these conditions arose due to other physiological imbalances.

The survey included questions designed to determine whether the project participant's illnesses had been diagnosed, whether or not they had used medications to

control their symptoms, and whether these medications were effective. It was noted that only three illnesses had been treated with over the counter or prescriptions medications: stomach ulcer, diarrhoea and fever. These three illnesses are similar in that they each exhibit a unique set of symptoms, allowing for self-reporting. In contrast, medical complaints such as headache, weakness, dizziness, and tiredness often require medical testing to identify causes and appropriate treatment regimens. For this low socio-economic group it would be difficult to access health care services due to prohibitive costs.

The project participants unanimously reported that the yoghurt project is culturally appropriate and meets the needs of the community. However, less than half (4/9) responded positively to the question: “Are local officials supportive of the project?” Supplementary questions reveal that local government officials have provided moral support (2/9), advice (5/9), co-ordinated efforts to obtain community support and/or resources (3/9), encouraged the project members (1/9), and encouraged other members of the Mabatini community to participate in the project (2/9).

An overwhelming majority of the respondents felt that the programme has led to increased awareness among local community leaders and government officials of the potential of probiotics as an intervention for HIV/AIDS. The project has also highlighted the capabilities of women as entrepreneurs, their status as role models and mentors, and the pivotal role of women in fostering family health. Unfortunately, to date support from local and regional officials has been symbolic rather than substantive. In fact, the respondents were unanimous that local leaders and government officials had not passed policies that would support the continued success of the project.

Mabatini community members exhibited great interest in the project; specifically, five project participants had been approached by members of the community who sought to participate and three project participants had been asked to provide training in yoghurt production. Overall, the community has acknowledged the efforts of the Tukwanuane group members, positively supports the production and sale of yoghurt, and actively encourage HIV positive individuals to enrol in the free probiotic yoghurt distribution scheme.

In summary, all respondents indicated that the project had empowered them and all were experiencing improved overall wellness. Further study is recommended in order to determine whether or not there is a causal link between the two.

7.0 DISCUSSION

There is a growing amount of clinical research on the benefits of probiotics, however none has been conducted in the Tanzanian context. The University of Western Ontario, the Lawson Health Research Institute, and Canadian Research and Development Centre for Probiotics are considered world class research institutions with a speciality in probiotics, however none of these facilities have research experience in Africa. Thus, this project was built around reasonable suppositions and hypotheses but there was no hard data on which to base the effectiveness of probiotics in this particular setting. Therefore, one of the most important functions of this case study is to illuminate further areas of study and provide university researchers with sign posts directing them towards promising avenues for exploration. In this instance the case study was above all

exploratory in nature. Most of these preliminary findings highlight the need for further study before definitive conclusions can be reached. Core strengths of the WHE project are its multi-disciplinary nature and the fact that faculty and the interns have represented a variety of different programme areas. The WHE steering committee is eager to use the data from this case study to select future interns, and the faculty will leverage this data to design further studies rooted in the social sciences, medicine, and public health.

According to clinical standards the evidence may not weigh heavily due to a lack of rigour in the study design; however this intentionally informal design has allowed for the researcher and participants to build rapport and a sense of trust. In order to overcome existing gaps in credibility, it was necessary to limit the scope of the study. Secondary studies could be administered using medical records as well as discussions with family practitioners to quantify reported health improvements.

Marginalized groups rarely have the resources to access health care services. This project specifically recruited individuals from the most marginalized segment of society—those who are the least likely to be able to afford attendance and consultation at a clinic. In the overwhelming majority of situations among the very poor, when the symptoms are not life threatening and are generally associated with a recognizable disease, individuals will self-diagnose and purchase medication directly from a pharmacy (in Tanzania, prescriptions are not necessary for pharmaceuticals). Within the context of Sub-Saharan Africa, the actions of the participants when they experience fever or ulcer (self-diagnosis and self-medication) are considered perfectly reasonable. Therefore, the research standard must be weighed against the cultural context.

The one concern raised by the community has been addressed by the project participants in a way that both alleviates the issue and creates an economic opportunity for the Tukwamuane group. The heightened awareness in the community about HIV/AIDS is both positive and negative. PLWA's, concerned about the stigma associated with their disease, articulated their discomfort about the lack of privacy at the community kitchen. To divert attention from the obvious nature of their visit, the Tukwamuane group have begun to sell other items. Now, the community kitchen offers a number of services including HIV counselling, sales of non-probiotic yoghurt, distribution of probiotic yoghurt to PLWA's, and sales of several home-made food items. In this manner, the Tukwamuane members are seen as sensitive to the needs of the PLWA's and are generating much-needed income for the group.

The concerns raised by the PLWA's are indicative of the necessity to pursue additional community-level HIV/AIDS public education, particularly with respect to social stigma and fear. Specifically, there is an opportunity for the community kitchen to enlarge its role as a site for health promotion, health education and increased community awareness regarding HIV/AIDS.

Further study is warranted to investigate the relationship between health improvements and the project participants' growing sense of empowerment, independence and control in a domain of their life. In particular, it is recommended that additional research investigate whether a temporal relationship exists between improved health and improved familial relationships. Under multi-causal circumstances such as this, it is difficult to determine whether the probiotic yoghurt or the new found sense of empowerment is the causative agent for improved health. In this case, multivariate research would be needed to identify the temporal sequence, and thus the causative agent.

7.1 Limits and Strengths of Study

This case study is a valuable contribution to the overall understanding of community projects, potential challenges and best practices within the Tanzanian context. As well, the findings provide project stakeholders with data on current achievements and highlights areas deserving of further study. However, several limitations in study design should be noted. The study's small sample size may be considered a hindrance to capturing the true nature of causal relationships, as well as uncovering new information and themes regarding the women's personal and life circumstances.

According to Lincoln and Guba (1985), following grounded theory, advocate sampling to the point of redundancy as purposive sampling aims to create rich in depth information. "The sampling is terminated when no new information is forthcoming from new sampled units, thus redundancy is the primary criterion" (Lincoln and Guba, 1985, p. 202). Although many responses were redundant within this small sample size, some dimensions of the research remain vague as there were no more available project participants who could be interviewed. Despite these concerns, the case study sample size was large enough to be able to determine the benefits of participating in the project, such as health improvements for the participants and their families, acquiring knowledge and the ability to transfer skills, and a sense of empowerment within the community. The case study was also able to identify specific areas needing improvement and further research.

Another limitation was the complexity of undertaking qualitative research in an environment where the participants were non-English speakers and the researcher did not have a strong command of Swahili. The necessity of using of a translator, cross-cultural variations, variability in word meanings, and the researcher's inability to identify and capture the subtleties of the participants' expressions have exerted an influence on identifying themes from the findings. Information which the researcher would deem vital for the purpose of developing themes may have appeared unimportant to the translator. Thus, the translator may have disregarded key information during the interview and/or transcription. This difference, the identification of vital information and themes, may be indicative of the influence of the different cultural backgrounds between the researcher and the translator. For instance, something which is a customary part of daily life in Tanzania may not have been considered by the translator as being essential for inclusion in the data when in fact it had significance to the research.

Additionally, there was a complexity in explaining words or concepts when no equivalent word existed in the target language, which consequently impacted the grammatical style, interpretation and quality of the transcripts when translated into English. This lack of equivalency would have implications in retaining meaning when systematically moving from source language to target language, and then to back translation. For example, it became evident that self-esteem is a word which does not exist in Swahili. The concept of self-esteem was therefore not grasped by the participants even after brief explanation, which led to an inability to generate themes surrounding this key concept. According to Twinns (1997), these obvious limitations "raise questions about the significance of the conceptual framework of the research design and sampling to the validity of the study" (p. 419).

The role of translation also raises concerns about the Dross rate in the interview. According to Filed and Morse (1985) dross is described as collected data which does not relate to the topic being discussed. This type of information acts as unusable 'fillers' in the interview, and when reading through translated transcripts it makes it quite difficult to interpret some of the concepts in English. Once again this demonstrates the researcher's difficulty in finding appropriate words and terms in the process of translation, which adds to the complexity of the situation due to a lack of concepts and expression.

8.0 FUTURE DIRECTIONS/RECOMMENDATIONS

8.1 An overwhelming percentage of Tanzanian women experience domestic violence at the hands of their male partners. It is therefore not surprising that a majority of the project participants reported being subjected to domestic violence prior to entering the Western Heads East project. The Tukwamuane group members were recruited from several Mabatini-area Community Action Groups with which Kivulini Women's Rights Organization (WRO) had established ties. Thus, the women had been exposed to KWRO's anti-violence and gender equity programming.

While only one respondent indicated that participating in the WHE project had precipitated further instances of domestic violence, steps should be instituted to reduce the possibility of this happening again in the future. Specifically, should the project be replicated in other communities, it would be critical to include an educational component designed to reach husbands, partners and other adult male household members. Training sessions should address project activities and how they may potentially affect household schedules. As well, training should include general information about the project and its goals, introduce the various stakeholders, and stress the vital role of the spouse in supporting the initiative and their wives' participation in it.

In a cultural setting where women occupy a subordinate position both with society and within their own households, participation in an outside endeavour such as the WHE project can arouse feelings of jealousy among spouses. As well, activities that allow married women to gain community standing or earn cash income are particularly threatening to male partners. Of the nine Tukwamuane members interviewed, six are currently married. Half of this group (3/6) reported that their spouse's reaction to their participation in the project was negative. All three women experienced emotional and verbal abuse as a result and, in one case, this escalated into physical violence. Hence, the need for education and awareness sessions is clear.

8.2 To date, distribution of the non-probiotic yoghurt has been limited. As mentioned earlier, this is due to a number of factors including the lack of packaging, advertising funds, marketing skill, and a lack of willingness by project participants to approach local business owners. Yet, opportunities to sell the product exist. For example, yoghurt is used by many local Indian restaurants. Establishing a market for the non-probiotic yoghurt is critical if the Tukwamuane group members wish to earn a livelihood through their participation in the project. Therefore, it is recommended that the institutional partners prioritize efforts to obtain packaging and train the women in marketing activities.

8.3 For a group such as Tukwamuane, this project represents a significant departure from prior life and work experience. There are few opportunities for Tanzanian women to make business decisions, establish a bank account and manage funds, and control their own assets. Therefore, women often lack the skills needed to administer a project and the contacts required to source supplies.

It would be helpful to develop a list of local businesses and key contacts for the project participants. During transition periods when no intern is present, or in the absence of a project coordinator, the Tukwamuane group members would be better able to assume administrative responsibilities. As well, in keeping with the overarching goal of fostering empowerment for the female participants, group members should be encouraged to actively seek out solutions to their problems without relying on WHE interns or paid staff.

8.4 Presently the Tukwamuane group members are participants but not equal partners in the project. Decisions affecting the direction of the WHE project are taken without involving Tukwamuane. Current theory underscores the wisdom of designing development projects that are participatory and in which local members are considered stakeholders. Thus, it is recommended that structural changes be implemented to allow the Tukwamuane group members to actively participate in decision making and to share fully in the risk taking process.

8.5 This case study revealed a number of major trends that require further research. First, research should be conducted to establish why local officials have encouraged the project organizers and participants but economic support has not been forthcoming, nor has a positive policy regime developed. Secondly, further study is needed to establish the temporal sequence, and thus the causal link, between empowerment and health improvement. Third, the economic and nutritional value of the yoghurt would need to be quantified in order to judge the degree to which the project is creating economic empowerment in the absence of direct payment to the Tukwamuane group members.

COMMUNITY READINESS ASSESSMENT: ASSESSING THE FEASIBILITY OF EXPANDING AND REPLICATING THE PROJECT TO OTHER COMMUNITIES IN THE MWANZA REGION

Introduction

In light of the promising initial data and the acceptance and support for the project within the Mabatini community, there is growing interest among the stakeholders to expand the reach of probiotics by replicating the project elsewhere in the Mwanza region.

A sustainability study of the existing project was conducted, the results of which are included elsewhere in this report. Analysis of the sustainability questionnaires revealed key strengths and areas of challenge; thus, should the decision to replicate be made, the stakeholders can leverage their past experience to maximize time and cost efficiency.

Development projects are always challenged to overcome physical, cultural, political and economic barriers in order to deliver benefits to communities in need. In the Mwanza region, there is significant variation between communities in terms of infrastructure and access to basic services. For example, some communities have no access at all to electricity, while others have electric service but experience frequent service interruptions due to national power shortages/outages. Distance to the National Institute for Medical Research (NIMR) laboratory can affect a community's ability to access the probiotic culture. Geography, housing density, open land, ground cover and water supply all bear on a community's ability to maintain cows or, alternatively, purchase milk at a reasonable cost. In comparison to Mabatini, many of the other communities in the Mwanza region face challenges that are more pronounced, diverse and multifaceted.

This community readiness assessment was initiated to identify potential sites for project implementation. It is the overarching goal of the stakeholders to deliver probiotics to the most vulnerable and marginalized communities. Thus, it was agreed to rank communities on the basis of need. However, physical, cultural, political and economic circumstances pose very real barriers to development, as mentioned above. Therefore, it was the goal of the researcher to measure both community need and barriers to development, and present the data in a way that will allow the stakeholders to weigh the two.

Methodology

Prior to gaining access to the communities, it was necessary to obtain approval from local government officials. The project was initially introduced to street leaders at a workshop through a short seminar presentation that encompassed the purpose of the WHE initiative, a description of probiotics, and the potential impacts of implementing such a development project within their community. There was an overwhelming interest among street leaders. Interested street leaders were requested to leave their contact information and were informed of potential future contact.

Community selection was difficult, as there does not exist a comprehensive listing of the characteristics of the districts and communities within the Mwanza region. Four street leaders were randomly chosen and contacted; appointments were made to meet in the community with the street leader, and the respective community action group representing that particular constituency. The four communities selected for in-depth assessment were:

- 1) Balewa, Isamilo
- 2) National, Isamilo
- 3) Mbugani, Isamilo
- 4) Nyakahoja

The in-depth assessment interviews were conducted in the respective communities using a semi-structured questionnaire adapted from the Tri-Ethnic Centre for Prevention Research. Upon completion of the assessment interview, a focus-group discussion followed which allowed the researcher to develop a comprehensive understanding of group dynamics, potential barriers to implementation, and community life.

Analysis

The current model is expandable/replicable, although each replication requires donor support during the establishment phase. The amount of seed money required varies based on the community and their particular needs. Resources available to, and needed by, each of the groups is presented on page 104 in chart form. Additional information on group advantages and challenges is included.

A visual tool depicting the comparative position of the groups in relation to need based on diarrhoeal disease, physical, cultural, political and economic challenges, and socio-economic status is presented following the analytical table.

Analysis

Group	Resources	Challenges	Advantages																																				
Group 1 Location: Balewa, Isamilo Name: Upendo, Amani, Faraja Size: 3 CAG x 10 = 30 members	<table border="0"> <tr> <td></td> <td>Yes</td> <td>No</td> </tr> <tr> <td>Building</td> <td></td> <td>x</td> </tr> <tr> <td>Electricity</td> <td>x</td> <td></td> </tr> <tr> <td>Running Water</td> <td>x</td> <td></td> </tr> <tr> <td>Cattle</td> <td></td> <td>x</td> </tr> <tr> <td>Refrigerator(s)</td> <td>x</td> <td></td> </tr> <tr> <td>Stoves/Hot Plate</td> <td></td> <td>x</td> </tr> <tr> <td>Kitchen Ware</td> <td>x</td> <td></td> </tr> <tr> <td>Packaging</td> <td></td> <td>x</td> </tr> <tr> <td>Close Proximity to NIMR</td> <td></td> <td>x</td> </tr> <tr> <td>Easy access to natural gas</td> <td></td> <td>x</td> </tr> <tr> <td>Marketing Infrastructure</td> <td></td> <td>x</td> </tr> </table>		Yes	No	Building		x	Electricity	x		Running Water	x		Cattle		x	Refrigerator(s)	x		Stoves/Hot Plate		x	Kitchen Ware	x		Packaging		x	Close Proximity to NIMR		x	Easy access to natural gas		x	Marketing Infrastructure		x	<ul style="list-style-type: none"> • Size of group • Electricity is only available Monday, Thursday, and weekends • Expect high level of external support • Milk delivery by traditional methods will be difficult due to location • Group dynamics-power structure evident 	<ul style="list-style-type: none"> • Have a functioning micro-credit program • Have a strong sense of commitment • Have a strong sense of the amount of effort that is needed to make project functional • Have mechanisms in place to ensure members follow operative protocol • Willing to provide yoghurt to marginalized families within the community at no cost • Displayed moderate amounts of enthusiasm regarding project
	Yes	No																																					
Building		x																																					
Electricity	x																																						
Running Water	x																																						
Cattle		x																																					
Refrigerator(s)	x																																						
Stoves/Hot Plate		x																																					
Kitchen Ware	x																																						
Packaging		x																																					
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Easy access to natural gas		x																																					
Marketing Infrastructure		x																																					
Group 2 Location: National, Isamilo Name: Kasi Mpya Size: 1 CAG x 12 = 12 members	<table border="0"> <tr> <td></td> <td>Yes</td> <td>No</td> </tr> <tr> <td>Building</td> <td></td> <td>x</td> </tr> <tr> <td>Electricity</td> <td></td> <td>x</td> </tr> <tr> <td>Running Water</td> <td></td> <td>x</td> </tr> <tr> <td>Cattle</td> <td></td> <td>x</td> </tr> <tr> <td>Refrigerator(s)</td> <td></td> <td>x</td> </tr> <tr> <td>Stoves/Hot Plate</td> <td></td> <td>x</td> </tr> <tr> <td>Kitchen Ware</td> <td></td> <td>x</td> </tr> <tr> <td>Packaging</td> <td></td> <td>x</td> </tr> <tr> <td>Close Proximity to NIMR</td> <td></td> <td>x</td> </tr> <tr> <td>Easy access to natural gas</td> <td></td> <td>x</td> </tr> <tr> <td>Marketing Infrastructure</td> <td></td> <td>x</td> </tr> </table>		Yes	No	Building		x	Electricity		x	Running Water		x	Cattle		x	Refrigerator(s)		x	Stoves/Hot Plate		x	Kitchen Ware		x	Packaging		x	Close Proximity to NIMR		x	Easy access to natural gas		x	Marketing Infrastructure		x	<ul style="list-style-type: none"> • No electricity, if conventional methods are used; they will have to rent a space • Milk delivery by traditional methods will be difficult due to location • Will require full start up support • Group dynamics-power structure evident 	<ul style="list-style-type: none"> • Have a functioning micro-credit program • Have a strong sense of commitment • Have a strong sense of the amount of effort that is needed to make project functional • Have mechanisms in place to ensure members follow operative protocol • Willing to provide yoghurt to marginalized families within the community at no cost • Displayed the highest levels of enthusiasm to participate in project
	Yes	No																																					
Building		x																																					
Electricity		x																																					
Running Water		x																																					
Cattle		x																																					
Refrigerator(s)		x																																					
Stoves/Hot Plate		x																																					
Kitchen Ware		x																																					
Packaging		x																																					
Close Proximity to NIMR		x																																					
Easy access to natural gas		x																																					
Marketing Infrastructure		x																																					

Group	Resources		Challenges	Advantages
<p>Group 3</p> <p>Location: Mbugani, Isamilo Name: Mama na Mtoto Size: 1 CAG x 30 = 30 members</p>		<p>Yes</p> <p>No</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p>	<ul style="list-style-type: none"> • Size of group • Displayed minimal levels of enthusiasm • Will require full start up support 	<ul style="list-style-type: none"> • Have a functioning micro-credit program • Have sense of commitment • Have a sense of the amount of effort that is needed to make project functional • Have mechanisms in place to ensure members follow operative protocol • Willing to provide yoghurt to marginalized families within the community at no cost • Have electricity everyday (except during periods of rationing) • Milk delivery will be easy
<p>Group 4</p> <p>Location: Nyakahoja Name: ----- Size: 1 CAG x 15 = 15 members</p>		<p>Yes</p> <p>No</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p> <p>x</p>	<ul style="list-style-type: none"> • Willingness to provide yoghurt to marginalized community members at no cost is minimal • Group dynamics-power structure evident 	<ul style="list-style-type: none"> • Size of group • Have a functioning micro-credit program • Have a sense of commitment • Have a sense of the amount of effort that is needed to make project functional • Have mechanisms in place to ensure members follow operative protocol • Expect minimal start up support • Have strong resource support by auxiliary members of the community • Have their own cattle

Considerations for Successful Replication

The current model is expandable/replicable, although each replication requires donor support during the establishment phase. The amount of seed money required varies based on the community and their particular needs.

- 1) The aim of this project is to empower local women in communities to undertake increasingly self-reliant initiatives.
- 2) The social structure of Tanzanian communities is based on cooperation, reciprocity and widespread participation. In this context, successful development projects adopt a people-centred, participatory model.
- 3) Ownership of the project by the local community helps to increase participation and also ensures sustainability.
- 4) Cost-sharing by local people develops a deep sense of responsibility and a feeling of ownership on the project. Most donor-funded development projects stop functioning once the donor agency withdraws their financial support. However, this project aims at empowering participants to become self-reliant through its own income sources.
- 5) Power devolution and risk sharing is necessary to build trust between partners in the developing and developed worlds.
- 6) Ongoing efforts to shift decision-making to local leaders and participants is desirable.
- 7) Grass-roots community groups, in particular women's groups, lack access to marketing infrastructure.
- 8) A permanent agreement between Western Heads East, the participant groups, and the owner of the probiotic organism is required.
- 9) Canadian faculty and interns assisting with expansion/replication need to be provided with adequate language and cultural awareness training prior to arrival in Tanzania.

Summary

Based on this brief analysis, three group categorizations become evident. Even though these groups are similar in that they are all comprised of poor women from the Mwanza region, there is a clear divide between the 'haves' and 'have nots'. During the focus group discussions it became apparent that the groups which had the most resources were the a) least enthusiastic; b) least willing to assist with yoghurt distribution to marginalized groups within the community; and c) expressed a greater expectancy and dependency on donor assistance.

The decision to expand and replicate the project then becomes an ethical dilemma for project stakeholders. The question becomes: Does WHE expand to a community which will require the least amount of financial support and *enforce* distribution to the neediest members of the community? Is it important to expand the reach of probiotics to the most marginalized community, even though it would necessitate providing financial and manpower for an extended period of time to implement the project?

These are pertinent ethical and moral decisions that must be made as Western Heads East prepares to extend into other areas within the Mwanza region. The University of Western Ontario has identified a researcher who will use this preliminary information to complete a more in-depth assessment.

PROJECT SUSTAINABILITY

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. Clinical studies have shown the ability of probiotic bacteria to kill HIV in vitro, colonize the intestine and vagina, help alleviate suffering from diarrhoea, and reduce the risk of bacterial vaginosis, a condition that predisposes women to HIV and other sexually transmitted diseases. Scientists at the Lawson Health Research Institute and the University of Western Ontario are leaders in probiotic research and technology. The Western Heads East project was conceived as a vehicle to:

“Transfer this technology, free of charge to an African community to enable local input into their application to foods...This illustrates a partnership between developed and developing countries, in which technology clinically tested in Canada is passed along to partners in HIV/AIDS ravaged communities, with a view to the local researchers assessing their impact on diarrhoea and HIV. It is hoped this type of collaboration can lead to a sustainable, community controlled, food-based probiotic production site. If successful, the model could be replicated at other sites.”

(Reid, et al., 2005, 486)

Launched in 2003, the Western Heads East (WHE) probiotic yoghurt project has since evolved from its development phase into a successful food-based initiative. As the project is now poised to enter a collaborative and multi-disciplinary research phase, it is timely to provide all stakeholders with a critical review of the project.

The purpose of this sustainability study is to assess the current state of the project vis à vis goals, results, challenges, communication and sustainability. This in-depth analysis of the survey responses will allow all stakeholders to draw out and explore important lessons learned during the first two years of the WHE project. Specifically, it provides a comprehensive picture of stakeholder perceptions, allowing all involved to identify and leverage successes and avoid unnecessary pitfalls in the future.

The project has three institutional partners: the University of Western Ontario (UWO) in Canada, represented by the Western Heads East steering committee, Kivulini Women’s Rights Organization (KWRO) and the National Institute of Medical Research (NIMR), both in Tanzania. The project participants in Mwanza, Tanzania, are known collectively as the Yoghurt Mamas. There are two project coordinators, one in each country. The institutions, participants and coordinators are all considered stakeholders in the project; the contributions of each stakeholder are vital to the project becoming sustainable.

Methodology

A survey instrument was developed and qualitative data was gathered from the stakeholders using open-ended questions (Appendix C). The members of the WHE steering committee and the Canadian project coordinator submitted written responses via e-mail. Individual interviews were conducted with KWRO and NIMR staff, and with the

Tanzanian project coordinator. A group interview was held with nine members of the Yoghurt Mamas.

Once all surveys were submitted, responses were coded and SPSS was used for data analysis. Cross-tab analysis was performed which permitted the data to be disaggregated by stakeholder groups, and the frequency of responses was compared between the groups.

Within this study the term *economic empowerment* refers to individuals having access to adequate funds to provide for their basic needs, and having control as well as decision-making power over their monetary assets. The variable *capacity building* is defined as the strengthening of an institution or group through knowledge transfers and skill building. The concept *sustainability* refers to the project reaching a state whereby it is financially independent, the participants have the skill, equipment, facilities and other resources necessary to carry out the project objectives, there is adequate demand for the product, and income generated from the project covers all costs.

Goals & Objectives

Respondents were asked to identify the initial goals of the project, and what needs the project fulfills. The Yoghurt Mamas identified personal/community goals and needs, while the other stakeholders listed institutional goals and needs.

There was significant disparity in perceived project goals, both between and within the stakeholder groups. Two respondents within the same institution indicated that their goal was to provide support for the other institutional partners, indicating they lack a sense of project ownership. Additionally, one respondent questioned whether all partners are contributing to, and benefiting from, the project. The lack of consistency with respect to goals is clearly impacting the project on many levels.

The most frequently cited goal was to conduct or support research (55%). Other goals cited were economic empowerment (36%), to improve nutritional status (36%), to improve health (36%), to address HIV/AIDS (27%), to support the efforts of the other institutional stakeholders (18%), project sustainability (18%), and project expansion (9%). Regarding what needs the project is fulfilling, increased awareness of probiotics and knowledge transfers (45%), improved health (36%) and capacity and skill building (36%) were the most common responses.

Fulfilling Expectations

The stakeholders were asked if the project has met their expectations. The majority (82%) of responses to this question were positive, however some of the respondents who answered *yes* went on to identify areas of concern. The negative responses were recorded from those working most closely with the project on a daily basis.

It is significant that the Yoghurt Mamas, the intended beneficiaries of the project, indicated that their expectations have not been met. Reasons cited were unfulfilled promises/credibility issues, lack of income stream, the prohibition on selling probiotic yoghurt and low production. Specifically, the reference to unfulfilled promises pertained to comments made at the initial meeting between project participants, community leaders

and a representative from the University of Western Ontario. The Yoghurt Mamas left that meeting expecting income from the project and to each receive a cow after six months participation in the project. Due to this, the project participants feel the university lacks credibility.

The laboratory staff expressed concern that inadequate facilities and a lack of supplies, equipment, and written policies and procedures impact their ability to meet project expectations. The laboratory staff also expressed frustration that compensation, promised by the first group of interns, has not materialized.

Challenges & Resolutions

Respondents were asked to identify key challenges encountered up to this point, how they were overcome, current challenges, and to share their thoughts regarding how these current challenges might be resolved.

Several respondents mentioned that the interns are poor at following up. Specifically, lab staff and supervisors at NIMR requested that interns contact UWO team members with technical questions regarding the yoghurt culturing. As well, NIMR staff asked interns to follow-up with UWO regarding promised compensation; in neither case was a response forthcoming. KWRO also reported lack of intern follow up on several issues, including revisions to the draft MOU, a request for clarification about project participants selling probiotic yoghurt, and payment for constructing the community kitchen. Respondents indicated that these incidents have damaged the university's credibility and, in some cases, they have also negatively impacted the credibility between Tanzanian institutional partners, project participants and local community members.

Of significance is the fact that many of the past challenges listed by the respondents are identical to the current challenges that they cited, indicating that concerns are often left unaddressed. This was reinforced when many of the survey respondents indicated that past challenges had not been resolved. Another important theme that emerged was that survey respondents do not feel adequately empowered to solve problems.

PAST CHALLENGES	CURRENT CHALLENGES
Funding	Funding
Consumes Time & Resources	Consumes Time & Resources
Communication	Communication
Lack of Packaging	Lack of Packaging
Food Safety & Quality Control	Food Safety & Quality Control
Liability Concerns	Liability Concerns
Lack of Intern Follow-Up	Lack of Intern Follow-Up
Poor Facilities	Poor Facilities
Lack of Supplies & Equipment	Lack of Supplies & Equipment
Roles & Responsibilities are Unclear	Roles & Responsibilities are Unclear
Unfulfilled Promises & Credibility Issues	Unfulfilled Promises & Credibility Issues

Difficulty finalizing MOU's	Difficulty finalizing MOU's
Government Acceptability	Government Acceptability
Lack of Electricity	Lack of Electricity
Production of Probiotic Yoghurt/Low Production	Production of Probiotic Yoghurt/Low Production
Lack of Cultural Sensitivity	Future Directions not Clear
Interns do not add value to other Stakeholders	Inability to meet time lines
	Patent Restriction on Probiotics
	Project Ownership Unclear
	Ownership of Community Kitchen Unclear
	Lack of Community Acceptability
	Large Scale Production

Communication

Each survey participant was asked to describe the level and type of communication they have with other stakeholders. A majority of those surveyed indicated that communication was an area of concern, with 55% describing communication as weak, lacking or non-existent. In contrast, only one respondent described the level of communication as good.

From the survey responses, an analysis of the information pathways shows several areas of weakness regarding project communication. Dissemination of project information within institutions is often patchy, indicating vertical linkages are missing or incomplete. Horizontal communication linkages between the institutional partners have never been properly established. Currently, Western Heads East interns act as the communication channel between the three institutional partners, the project co-ordinators and the Yoghurt Mamas. Among Tanzanian respondents there is a concern over the lack of direct communication linkages, and a lack of intern follow-up was noted.

A number of suggestions were offered by survey respondents on how communication may be improved. These included: a) a face to face meeting with all stakeholders present, b) ensuring that communication linkages are forged at an institutional level rather than a personal level, c) develop a comprehensive communication strategy, d) provide all stakeholders with a current organization chart and contact list. It is clear that regular and structured communication between the three institutional partners and the project participants is needed to foster common goals. This would also allow all stakeholders to develop a shared sense of ownership regarding project outcomes, strategize, and effectively resolve challenges as they arise.

Future Directions

Survey respondents were asked to provide their point of view on the future of the project, the degree of feasibility with respect to increasing production and expansion to other communities. All respondents indicated that it would be feasible to increase

production as well as to expand the project. Forty-five percent of the respondents described the future as *bright* or *successful*. Respondents indicated several reasons for this positive outlook: the community is supportive of the project and the product, and a belief the probiotic yoghurt will lead to improved health.

It was noted that concerns regarding project ownership should be resolved prior to expanding beyond the current location. Specifically, comments made at the initial meeting between project participants, local community leaders and a representative of the University of Western Ontario have resulted in tension between the parties regarding the division of generated income and how each party would benefit from the project.

Sustainability

Survey respondents were asked what steps are necessary for the project to achieve sustainability and whether they feel the project can be sustained without external input. A significant majority of the respondents, representing each stakeholder group, felt that the project is sustainable without external input. The Tanzanian stakeholders reported optimism regarding securing funding from their government and the international community once the health benefits of the probiotics are proven.

One respondent raised the issue of patent restrictions on the probiotic organism. Without a definitive agreement between the patent owner, the project partners and project participants, sustainability can never be assured. Currently, the project participants are restricted from selling probiotic yoghurt. As there is significant demand amongst HIV/AIDS patients and medical practitioners in Mwanza for the probiotic yoghurt the necessity of resolving this issue is pressing.

STEPS TO SUSTAINABILITY: COMMONLY CITED RESPONSES	
Ensure adequate supplies & equipment	36%
Improved facilities	27%
Run per business model	27%
Stakeholder commitment	27%
Capacity/Skill Building	27%
Secure Funding	27%
Food Safety & Quality Control	18%
Demand for Product	18%

For the project to be sustainable, respondents indicated that it will need to function as a business and adopt a model whereby all stakeholders' contributions are valued and efforts are directed toward achieving commonly held objectives. From responses to several questions it is clear that the majority of Tanzanian stakeholders expect the project to become an independent entity. There is recognition among all stakeholder groups that the project serves an important role within the Mwanza community.

The Western Heads East project holds great promise for Tanzania. Yoghurt improves the nutritional status of those who consume it, and it is hoped that probiotics will become an accepted intervention for people living with AIDS. For the Yoghurt Mamas the possibility of gaining economic empowerment through this project is a key motivator. All of the Tanzanian stakeholders are committed to putting forth the effort needed to ensure the success of this project.

Impending Issues

Respondents were asked to identify any impending issues that need to be addressed by the stakeholders. NIMR staff members felt that the key issues facing stakeholders are food safety and quality control, the need to conduct research in order to prove the health benefits of probiotics, and the need of all stakeholders to meet.

Members of the Western Heads East steering committee identified three issues, namely the necessity for increased capacity and skill building, the need for a local coordinator and microbiology technician to oversee the production of yoghurt at the site, and the need to confirm that all institutional partners are contributing to, and benefiting from, the project equally.

KWRO staff identified the need to clarify the roles and responsibilities of each party to the project, which can best be addressed with one Memorandum of Understanding which covers all stakeholders. Additionally, KWRO feels that a communication plan is needed.

Project participants surfaced the issue of cultural sensitivity, in particular the need for project communication and documents to be available in both English and Swahili. In addition, the Yoghurt Mamas requested informational materials on the benefits of both probiotic and non-probiotic yoghurt as they feel unable to accurately answer their clients' questions.

The project coordinators felt that key issues are the need for capacity and skill building, the question of project ownership, securing funding and the need to develop a communication strategy.

Conclusions

Survey responses indicate that the institutional partners, project participants and community leaders in Mwanza all feel that the Western Heads East probiotic yoghurt project holds great promise for Tanzania and its citizens. Comments reveal there is tangible enthusiasm for the project and for it to become sustainable, and indicate a high level of commitment among all groups to the future success of the project. In particular, respondents were unanimous in their belief that production can be increased and the

project expanded to other communities. It is clear that the project already serves an important role within the Mwanza community. The relationship between the WHE project and the external environment is excellent, and there is strong demand for the product.

Most of the concerns surfaced by the survey respondents relate 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. Frustration was expressed 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 were all cited as specific problems. Survey responses indicate there is confusion over roles and responsibilities, and stakeholders lack a common vision for the project. As a result, the institutional partners do not always work in concert. To ensure that “everyone is speaking the same language”, respondents suggested holding an all-stakeholder meeting and formulating a communication plan. Regular updates would allow all parties to remain informed, participate in decisions and deal with emerging issues.

SUMMARY AND CONCLUSIONS

This compilation of reports will form one of the main underpinnings for any future research. These preliminary results will be the key to ensuring the continued success of the project as major lessons are drawn out from the analysis and selected for comprehensive study. The initial results are extremely promising and will provide guideposts for future studies.

The Western Heads East project and the concept of using probiotics as an intervention for HIV/AIDS have been enthusiastically received by the Tanzanian medical and research communities, and have been embraced by HIV/AIDS patients and community leaders in Mwanza and Mabatini. The project is deemed culturally appropriate by the various constituents of Tanzanian civil society.

The gender analysis and results-based management planning and evaluative framework will provide the institutional stakeholders with a set of tools designed in accordance with development best practices.

The project has enjoyed great successes. At this point it is important to extract key lessons that will allow WHE to build upon these successes, and will help similar projects to become more effective in disseminating their benefits. Following this preliminary review, it will be important to conduct regular, comprehensive evaluations to ensure that outcomes continue to match participant and stakeholder goals. The evaluatory process will be most successful if spearheaded by our southern partners. Additionally, local community leaders and the members of Tukwamuane should be integrated into decision making and review processes. Inclusion of local leaders and government officials helps build rapport, trust, credibility, and provides development initiatives the opportunity to multiply assistance, whereby local support magnifies the effectiveness of international assistance.

When beneficiaries and funders are given equal authority and risk is equally shared, strong partnerships emerge. Equalizing the power dynamics between the North and the South, and minimizing power structures within development projects are key steps to realizing common goals. True partnerships are a creative learning process, where context and texture between stakeholders and participants create success.

Appendix A

Millennium Development Goal Indicators, Tanzania 2004-2005			
Goal	Indicator	Value	
1. Eradicate extreme poverty and hunger	Prevalence of underweight children under five years of age	Male: 22.1 Female: 21.5	Total: 21.8
2. Achieve universal primary education	Net enrolment ratio in primary education ¹	Male: 70.9 Female: 75.4	Total: 73.1
	Proportion of pupils starting grade 1 who reach grade 5 ¹	Male: 96.4 Female: 95.2	Total: 95.8
	Literacy rate of 15-24-year olds ²	Male: 74.7 Female: 64.3	
3. Promote gender equality and empower women	Ratio of girls to boys in primary and secondary education	Primary education: 0.97 Secondary education: 0.98 Tertiary education: 0.43	
	Ratio of literate women to men, 15-24 years old		0.86
	Share of women in wage employment in the non-agricultural sector ³		16.6
4. Reduce child mortality	Under-five mortality rate (per 1,000 live births)		112 per 1,000
	Infant mortality rate (per 1,000 live births)		68 per 1,000
	Proportion of 1-year-old children immunised against measles	Male: 70.0 Female: 68.5	Total: 70.2
5. Improve maternal health	Maternal Mortality Ratio (per 100,000 live births)		578 per 100,000
	Proportion of births attended by skilled health personnel ⁴		46.3
6. Combat HIV/AIDS, malaria, and other diseases	Percent of current contraceptive users who use condoms (any contraceptive method, currently married women 15-49)		7.8
	Condom use at last high-risk sex (population age 15-24) ⁵	Male: 45.5 Female: 33.8	
	Percentage of population age 15-24 years with comprehensive correct knowledge of HIV/AIDS ⁶	Male: 40.3 Female: 45.2	
	Contraceptive prevalence rate (any modern method, currently married women age 15-49)		20.0
	Ratio of school attendance of orphans to school attendance of non-orphans age 10-14 years		1.0
	Proportion of population in malaria-risk areas using effective malaria prevention and treatment measures ⁷	Prevention: ⁸ Treatment: ⁹ Prompt treatment: ⁹	16.0 58.2 51.0
7. Ensure environmental sustainability	Proportion of population using solid fuels ¹⁰	Urban: 93.5 Rural: 99.9	Total: 98.3
	Proportion of population with sustainable access to an improved water source ¹¹	Urban: 78.3 Rural: 36.8	Total: 46.6
	Proportion of population with access to improved sanitation ¹²	Urban: 97.5 Rural: 82.0	Total: 85.7

¹ Excludes children with parental status missing. TDHS data are based on reported attendance, not enrolment.

² Refers to respondents who attended secondary school or higher and women who can read a whole sentence

³ Wage employment includes respondents who received wages in cash or in cash and kind.

⁴ Among births in the past 5 years

⁵ High risk refers to sexual intercourse with a partner who neither was a spouse nor who lived with the respondent; time frame is 12 months preceding the survey.

⁶ A person is considered to have a comprehensive knowledge about AIDS when they say that use of condoms for every sexual intercourse and having just one uninfected and faithful partner can reduce the chance of getting the AIDS virus, that a healthy-looking person can have the AIDS virus, and when they reject the two most common local misconceptions. The most common misconceptions in Tanzania are that AIDS can be transmitted through mosquito bites and that a person can become infected with the AIDS virus by eating from the same plate as someone who is infected.

⁷ These figures represent Tanzania as a whole. The very small proportion of the Tanzanian population that lives in non-malaria risk areas is not excluded.

⁸ Malaria prevention is measured as the percentage of children ages 0-59 months who slept under an insecticide-treated bednet the night before the interview.

⁹ Malaria treatment is measured as the percentage of children ages 0-59 months who were ill with a fever in the two weeks preceding the interview who received an antimalarial drug. The treatment is considered prompt if the child received the antimalarial the same day as the onset of fever or the following day.

¹⁰ Charcoal, firewood, straw, dung, or crop waste

¹¹ Proportion whose main source of drinking water is a household connection (piped), public standpipe, borehole, protected dug well, or rainwater collection.

¹² Improved sanitation technologies are: flush toilet, pour flush toilet, traditional pit latrine, or ventilated improved pit latrine.

Appendix B

Box 1.2: What is Gender?

1. Gender is a social institution.

Gender is central to the way a society is organised. Like the family, religion, race, and other social institutions, gender affects the roles men and women play in a society.

Gender also establishes patterns of behaviour through interaction with other institutions, just as social class and the economy—also social institutions— influence each other. In most western societies, economic growth depends on people of different classes working in different jobs and accepting different rewards and benefits, gender functions in a similar manner to organise society. For many years, the U.S labour force operated under the assumption that most workers were men with wives and children at home to support. Salaries, hours, employer expectations, and the structure of businesses all reflected this assumption, and shaped the way that women were hired, fired, or compensated.

2. Gender Involves Differences in Power.

Like race and social class, gender orders social relationships in such a way that some individuals have greater power than do others. In every society, the roles women and men assume accord women fewer opportunities and privileges.

Gender affects both “*power to*” and “*power over*”. “*Power to*” refers to the ability to act and often requires access to social resources such as education, money, land, or time. Women usually have less “*power to*”—go to school, inherit land, or enter or refuse a marriage. Women are less likely to develop individual characteristics (such as higher levels of education) that would give them access to better-paying jobs or political office and enhance their power.

Individuals with “*power over*” are able to assert their wishes and goals even in the face of opposition from others. Women generally have less “*power over*” than men in all facets of society. They usually have less say than their husbands in family decisions and less authority

than men in the work-place. Because women hold far fewer positions in governing bodies, they have little impact on decision making or public policies.

Gender inequality may also be structured and perpetuated by the economy, the political system, and other social institutions. Civil law and religious customs in various countries, for example, may restrict a woman’s ability to own property, work in certain occupations, or serve as a religious leader.

3. Gender is a Cultural Construct.

Gender is organised differently in different societies. Accordingly, the expectations for women and men vary throughout the world. These differences are perhaps most clearly illustrated in inter-cultural comparisons of what is considered “*male*” and “*female*” work. In many areas of Latin America, for example, women are not involved in most aspects of agricultural work, especially plowing (in some areas, for women to touch a plow is considered bad luck). Farming is considered men’s work. But in sub-Saharan Africa, “*female*” farming systems predominate, and women are involved in most aspects of agricultural production. In some African countries, women are entrepreneurs and actively participate in the public markets. In South Asia, however, market roles are considered men’s domain, and women who participate in the public sphere out of economic necessity are not respected.

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Population Bulletin,
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